GUY MOORE HIGGINS, JR.

"If You Build It, WILL They Come?" A Study of the Effect of System Structure on the Institutionalization of Knowledge Management within Organizations

(Under the direction of JAY E. ARONSON)

The importance of knowledge in any venture has long been recognized. Long ago, Sir Francis Bacon (1597) wrote, *"knowledge is power."* More recently, however, management theorists and corporate leaders have become almost strident in their espousal of both the importance of knowledge and the need to carefully manage it in the business process. Lew Platt, chief executive of Hewlett-Packard, may have best expressed this when he said, "*If HP knew what HP knows, we would be three times as profitable*" (Stewart, 1997a).

To address the need to manage their "knowledge," many organizations have adopted a variety of technologies under the general aegis of "knowledge management systems." Some see these systems as simply a subset of information management and *"...suspect that nothing more substantial than 'terminological inflation' is taking place..."* (Davenport, 1999), while others see them as the natural evolution of the earlier information management systems, but an evolution that is reaching a higher plane and that is more or less clearly delineated from their information management systems forebears.

Orlikowski and Robey (1991) have proposed Giddens' (1979; 1982; 1984; 1993) Theory of Structuration as a framework for investigating the interaction between organizations and information technology. This dissertation studied the effect of knowledge management system structure on the institutionalization of the process of knowledge management in three global professional services companies. A number of critical success factors for the development and implementation of knowledge management systems were uncovered and support was found for using Giddens' (1979; 1982; 1984; 1993) Theory of Structuration as a surrogate for a measure of a successful knowledge management system. The

findings suggest that knowledge management systems do represent an evolution in information management and that significant future study is needed.

INDEX WORDS: Knowledge Management, Knowledge Management Systems, Structuration Theory, Institutionalization

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for

My Wife,

Deb,

Who worked harder to see this dissertation completed than even I did
and without whose help, love, and devotion I would never have been able to finish
thank you for supporting me through all of this
and I love you so very much.

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Chapter 1: Introduction

1.1 Statement of the Problem

The importance of knowledge in any venture has long been recognized. Long ago, Sir Francis Bacon (1597) wrote, *"knowledge is power."* Penrose (1959) specifically identified knowledge as a part of the human resources of an organization. However, unlike the other resources of the organization, she seems to have simply assumed the development and availability of this resource as a by-product of human experience; she does not appear to have foreseen the need for an organization to manage this particular resource, as it must with other resources. More recently, however, management theorists and corporate leaders have become almost strident in their espousal of both the importance of knowledge and the need to carefully manage it in the business process. Lew Platt, chief executive of Hewlett-Packard, may have best expressed this when he said, "*If HP knew what HP knows, we would be three times as profitable*" (Stewart, 1997a).

To address the need to manage their "knowledge," many organizations have adopted a variety of technologies under the general aegis of "knowledge management systems." The current stage of development of these systems is in many ways similar to the earlier stage of development of decision support systems that was addressed by Sprague with:

> *We seem to be on the verge of another "era" in the relentless advancement of computer based information systems in organizations. Designated by the term Decision Support Systems (DSS), these systems are receiving reactions ranging from "a major breakthrough" to "just another buzz word"* (Sprague, 1980).

If the subject of "Decision Support Systems" in the above quotation is replaced with the new subject of "Knowledge Management Systems," then an accu-

rate description of the current state of development in knowledge management systems is found. Continuing to look at the earlier literature on decision support systems for more parallels with today's knowledge management systems, Sprague wrote:

> *One view is that the natural evolutionary advancement of information technology and its use in the organizational context has led from EDP to MIS to the current DSS thrust. In this view, the DSS picks up where MIS leaves off. A contrary view portrays DSS as an important subset of what MIS has been and will continue to be. Still another view recognizes a type of system that has been developing for several years and "now we have a name for it." Meanwhile, the skeptics suspect that DSS is just another "buzz word' to justify the next round of visits from the vendors...* (Sprague, 1980).

These same types of concerns beset the adoption of a newer technology, knowledge management systems, today. Some see these systems as simply a "subset" of information management and *"...suspect that nothing more substantial than 'terminological inflation' is taking place..."* (Davenport, 1999), while others see them as the natural evolution of the earlier information management systems, but an evolution that is reaching a higher plane and that is more or less clearly delineated from their information management systems forebears.

For those that see knowledge management systems as a natural evolution of the earlier information systems, the question arises as to the appropriate strategy to adopt for the management of an organization's knowledge. One recent study found that consulting businesses employ:

> *...two very different knowledge management strategies. In some companies, the strategy centers on the computer. Knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the company. We call this the codification strategy. In other companies, knowledge is closely tied to the person who developed it and shared mainly through direct person-to-person contacts. The chief purpose of computers at such companies is to help people communicate knowledge, not to store it. We call this the personalization strategy.* (Hansen*, et al.*, 1999)

Clearly, this view accepts knowledge management as being different from earlier forms of information system management and extends the concept of knowledge management into two competing strategies. As can be seen, these competing strategies envision very different utilizations of the underlying information technology that is a part of an organization's knowledge management system.

In addition to the debate over whether knowledge management is differentiable from earlier forms of information system management, there is an alternative and contrary attitude; some of those who showed an early interest in knowledge management systems (*e.g.*, Tom Davenport) are now saying that knowledge management as a research topic is "dead" because many organizations have begun to adopt the idea.

If knowledge management is that next higher plane in information technology, then the adoption of knowledge management systems should ultimately result in the institutionalization of knowledge management in the organizations that adopt these systems. Has knowledge management already been institutionalized in the organizations that have adopted these new technologies? If so, then Davenport may be correct and, as a research topic, knowledge management is dead; but no one has shown this to be the case. Once any system, IT or other, is adopted and becomes diffused through an organization, it becomes institutionalized (*e.g.*, DSS, EIS), yet still there are many issues which need the additional clarification brought by research. Following this article Sprague's seminal DSS article (1980) there was a flowering of DSS research. Additionally, if there are, as Hansen *et al*. (1999) argue, competing strategies for the management of an organization's knowledge and if these strategies are not understood, then it is unlikely for the institutionalization of knowledge management to have yet occurred in those adopting organizations.

If institutionalization has occurred, or to be in the process of occurring, there must be structural factors in the various knowledge management systems

adopted, and in the organizations that adopted them, that determine the effectiveness, and therefore the level of institutionalization within the organization, of the knowledge management system adopted. This, I believe, remains a very valid area of research and yet, according to Alavi and Leidner (1999b) "...*the existing body of work on KMS consists primarily of general and conceptual principles of KMS and case descriptions of such systems in a handful of bellwether organizations*."

1.2 Adoption of Innovation

The proponents of knowledge management systems consider these systems to be an innovative use of technology that will lead to a competitive advantage for the organizations that adopt the concept. If the adoption of a knowledge management system results in the development of a competitive advantage for an organization, why would any organization fail to adopt this system/technology? This question was as appropriate in the discussion of decision support systems approximately twenty years ago as it is to the discussion of knowledge management systems today. Further, the question is equally appropriate to a discussion of any new system or technology that is promoted as an innovation.

1.3 Knowledge Management and Organizational Change

The role of information technology (IT) as a catalyst of organizational change has been the subject of study for many years. Leavitt and Whisler (1958), the first to use the IT label, predicted that IT would result in dramatic organizational changes. Since that article, many other studies have addressed organizational change due to IT (Attewell and Rule, 1984; Blau*, et al.*, 1976; Carroll and Perin, 1994; Fry, 1982; Schein, 1994). However, among the many studies in this area, Orlikowski and Robey (1991) have proposed Giddens' theory of structuration as a framework for investigating the interaction between organizations and IT. They argue persuasively that structuration theory holds great potential for

exploring the structural and cultural changes that must occur as an organization institutionalizes a new system or technology (Orlikowski, 1992; Orlikowski and Robey, 1991). The more significant the impact on the organization of the movement from trial to institutionalization of the new system or technology, the more visible and far-reaching the evidence of structural changes will be.

Knowledge management systems are, in one sense, simply one of the latest off-springs of IT that may result in dramatic organizational changes as predicted by Leavitt and Whisler (1958), although possibly not in the specific types of changes that they predicted. However, in the larger sense, knowledge management systems are an excellent choice as a focal technology in a study of institutionalization. Discussion about "learning organizations" has become quite popular in both the academic and popular[1] management presses (Fiol and Lyles, 1985), yet the organizational learning literature does not clearly address "how" an organization "learns." I contend that the development of a successful knowledge management system is one of the crucial factors in becoming a learning organization. Thus, the organizational changes (institutionalization) associated with the adoption of such a knowledge management system should provide clear evidence of an organization's continuing evolution as a learning organization.

1.4 Knowledge Management and Knowledge Management Systems

While knowledge management has become one of the current buzz words in information systems research and the concept of the learning organization is also quite popular in management research, these are not new ideas. Any organization, whether a modern business organization or the pyramid builders in ancient Egypt, must either learn from its mistakes or it is doomed to repeat

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[1] A search on "Learning Organizations" at the AMAZON.COM website on 18 May 2000 found 77 entries; approximately six months earlier there were only 65 entries.

them. In fact, the pyramids of ancient Egypt show clear evidence of the builders learning from earlier "mistakes" and eventually developing their "ideal" form. Additionally, the coming together of a group of individuals into an organization should be expected to produce an output greater than the possible sum of the individual efforts – otherwise there would be no reason to form the organization. This greater output is caused by the pooling of the individual resources and, as already discussed, one of these individual resources is their knowledge. When an organization regularly learns and improves its performance from its past experiences, it can be said to be a learning organization. Organizations have traditionally capitalized on their experiential learning by developing standard operating procedures, *etc.*, and instituting training programs to disseminate this knowledge throughout the organization, while relying on mentoring and on-the-job training to further develop knowledge throughout the organization. This codification and communication for the purpose of improving organizational performance is the management of knowledge. Thus, the two competing strategies discussed by Hansen *et al.* (1999) are nothing new and have existed in tandem for thousands of years.

The current popularity of knowledge management in information systems is coming from two trends: (1) the increasing size and globalization of modern organizations which makes traditional one-on-one or small group communication more difficult, and (2) the development of new technologies, both hardware and software, that can, in part, overcome the difficulties imposed by increasing distance and contracting time schedules.

1.5 Potential Critical Success Factors

Based on my literature review, knowledge management systems are a type of technology that has seen little empirical research. Nor have I found any prior research into the critical success factors (CSFs) leading to a successful adoption of a knowledge management system; however, there has been a signifi-

cant body of research concerning CSFs for earlier IS innovations, such as executive information systems (EIS), and for other modern IS innovations, such as data warehouses. This earlier research involving other types of systems provides a beginning point in ascertaining the CSFs appropriate for knowledge management systems.

1.6 Purpose of the Study

Early management theorists came to understand the formal organization as a structure of conscious, rational design whose purpose was to reconcile the opposing forces of specialization and coordination through such commonplace bureaucratic devices as record-keeping, rules and policies, and the standardization of personnel policies. These techniques were intended to achieve uniformity of organizational practices (Weber, 1930; Bernard, 1938; Simon, 1945). This desire to achieve a uniformity of organizational practices can be seen as an early form of knowledge management. A part of the movement to develop modern knowledge management systems is simply a continuation of this desire to achieve uniformity, but in the modern global organization this desire for uniformity has been upgraded to a desire to consistently apply the "best practice" and to avoid "reinventing the wheel." In fact, an organization is a synergistic structure, one that shares the knowledge of its many individuals in order to achieve competitive advantage (Bernard, 1938; Simon, 1945). Therefore, all organizations practice some form of knowledge management.

The recent interest in learning organizations has spawned many different views of knowledge management systems. Are they an evolutionary advance or are they just another buzz word? Is one management strategy more appropriate than another? Are they already dead as a topic of research or are they a promising field for that research? Although there is a great deal of practitioner literature addressing the topic of knowledge management systems, I have not found a significant body of academic literature in the area, although that is beginning to

change. Specifically, I have not found any serious research attempting to measure the success of knowledge management systems; nor does it appear that anyone claims to know how to measure their success. In the absence of a well-defined metric for a dependent variable, I want to begin to examine whether the level of institutionalization of knowledge management may be taken as a surrogate for the organization's perception of the competitive advantage conferred. Thus, the purpose of this study is to investigate the effect of the structure of various knowledge management systems (defined in both technical and social terms) on the level of institutionalization within the organization using that particular structure with respect to knowledge management

1.7 Questions of the Study

The focus of this study is on the institutionalization of knowledge management within an organization, that is, the changes in organizational structure and policies which occur as a result of the development and use of knowledge management systems. Following the lead of Orlikowski and Robey (1991), the level of institutionalization of this type of system is proposed as a surrogate for the organization's perception of its success. Additionally, by studying the use of these systems in a number of organizations, as exemplars of the alternative views of knowledge management systems, the effect of the various system structures on institutionalization can be identified. Thus, the principal questions to be addressed in this study are:

1. Does the implementation of a knowledge management system necessarily result in significant changes to the organizational structure of that firm?
2. Is the implementation of an organization's knowledge management system differentiated by Hansen *et al.'s* (1999) strategies of codification and personalization or can these strategies be pursued in tandem?

3. Are these structural changes supported by corresponding changes in the human resource and other policies of the firm?
4. How do these various structures and policies contribute to the effectiveness of the knowledge management systems and, through these systems, to the overall effectiveness of the organizations employing them?
5. How do the various organizations measure the success of their knowledge management systems?

These are very broad questions and, for reasons to be presented in detail later in this dissertation, I have decided that the best way to approach them is through a series of interview-based case studies. This format will allow the respondents from each of the case studies to tell their own stories in speaking to these questions. I do not expect to get definitive answers to these questions. In fact their stories may raise other questions, but the goal of this dissertation research is to develop a set of testable hypotheses around these questions which can be taken forward to the next phase of my research.

1.8 Conceptual Frame for a Knowledge Management System

How does an organization husband its knowledge resources? I propose that the information processing of the human cognitive system, as modeled by the Adaptive Character of Thought - Revised (ACT-R) model (Anderson, 1996), is an appropriate metaphor for the processes that must be utilized by knowledge management systems within learning organizations when that organization has adopted Hansen *et al.'s* (1999) codification strategy.

1.9 Significance of the Study

It is well established that knowledge is a valuable resource; in fact, if Drucker (1993) is correct, it is the "...*only meaningful resource*." Organizations may be conceptualized as institutions for integrating knowledge (Grant, 1996); this definition seems particularly apt for a "learning organization." Thus, when

knowledge is viewed as an organizational resource, individually held knowledge, arguably the by-product of the combined experience of all of the organization's employees, is somehow transformed into organizational knowledge. This transformation that allows the transferability of the organizational knowledge is essential if it is to be considered as an organizational resource. However, Badaracco (1991) terms as "migratory knowledge" that "organizational knowledge" that is only "on loan" to the organization. Migratory knowledge is a greatly underutilized resource and is not easily transformed or transferred particularly efficiently. The knowledge of individual employees only becomes organizational knowledge when it is transformed by the organization. Knowledge management systems may provide the method for this transformation process; therefore, it is important to develop a framework for understanding and developing knowledge management systems.

1.9.1 Significance to the Researcher

Just as Sprague found that the world of information systems seemed "…*to be on the verge of another 'era' in the relentless advancement of computer based information systems in organizations…*" (Sprague, 1980) due to the development of decision support systems, the extreme interest in the practitioner press (*e.g.*, see the footnote on page 5) concerning the current state of development of knowledge management systems seems to indicate that another new era is dawning in organizational information systems.

This study is significant to the researcher, and to the academic community at large, because it continues the examination of this relatively new phenomenon. This is an area that has seen only little empirical investigation, so this study extends our knowledge about the topic itself, about the topic's impact on organizations, and about the relationship between knowledge management systems and the larger concept of learning organizations.

1.9.2 Significance to the Practitioner

Knowledge management is one of the current "buzz words" of the information systems field. Similarly, the importance of being a "learning organization" is part of the "buzz" in the fields of strategy and general management. Is there a connection between being a learning organization and maintaining a knowledge management system? How does an effective knowledge management system contribute to the overall effectiveness of the organization? Must organizations choose between competing strategies in their quest to manage their knowledge? How does one measure the effectiveness of a knowledge management system?

In ever-increasing numbers, businesses are turning to investments in information systems to provide the means of achieving and sustaining competitive advantage (Haapaniemi, 1996; Mata*, et al.*, 1995). The non-profit American Productivity and Quality Center, which describes itself as the "international benchmarking clearinghouse" and offers a wide range of information on what companies are doing to improve performance, recently reported that more than fifty percent (50%) of best-practice organizations in a European study explicitly include knowledge management as a part of their strategic goals (Anonymous, 1999).

One common method employed by businesses searching for technological solutions is to embrace new technologies rapidly. Knowledge management systems are among the latest new technologies, and practitioners are beginning to invest substantial resources into the development and implementation of knowledge management systems (Alavi and Leidner, 1999a; Alavi and Leidner, 1999b). Davenport and Prusak (1998) reported that Buckman Laboratories, a specialty chemicals firm, estimated that it spent two and a half percent (2.5%) of its revenues on knowledge management. Additionally, they reported that Ernst & Young spent six percent (6%) of its revenues, and McKinsey & Company spent ten percent of its revenues. Interestingly, while these are significant investments

in knowledge management, a somewhat earlier study by the American Productivity and Quality Center (1996) reported that approximately eighty percent (80%) of companies do not calculate the Return on Investment (ROI) of their knowledge management activities.

This research study continues the effort to provide the practitioner a framework for understanding and developing knowledge management systems. The development of such a framework would provide greater focus to these investments and the hope for greater return on these investments.

1.10 Research Methodology

The major objective of this study is to explore the effect of various system structures and the policies that support them on the institutionalization of the process of knowledge management within organizations. Based on my literature review, the area of knowledge management and knowledge management systems warrants more definitive research. This study is seen as the beginning of a body of research concerning knowledge management systems. To this end, a multi-phase research design is planned. Within this research design, a different research method is required at each successive stage. An overview of the proposed stages and their appropriate research methods is provided in Figure 1.1, below:

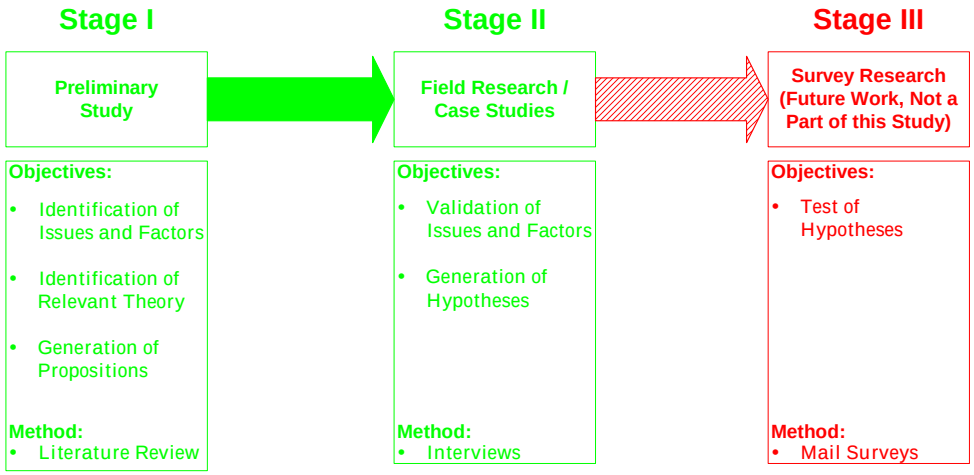

Figure 1.1: Organization of the Proposed Program of Research

In Stage I, the academic and practitioner literature was reviewed in order to provide a foundation for understanding the current state of development and implementation of knowledge management systems. In addition, a review of the theories of adoption of innovation and structuration was made to determine their relevancy to the study of knowledge management systems.

Based on the findings from the literature review, a series of research questions and propositions were developed; however, there was not enough information to transform those propositions into hypotheses. Propositions may be transformed into hypotheses either inductively or deductively. The inductive approach moves from specific observations to the generalized explanations, while the deductive approach begins with general theoretical expectations and moves to specific hypotheses. Thus, inductive methods move from concrete observations to general theoretical explanations, and deductive methods begin with general explanations and move to observations. The two methods, though, may be used iteratively to supplement each other (Wallace, 1971). It is this iterative relationship that describes the program of research that I have embarked upon. The outcomes of this portion of the first stage of the research are presented in Chapter 2.

In the final portion of the first stage, a survey of the methods literature was made in order to determine the most appropriate research method for this proposed study. Following the selection of the field research/case study method as the appropriate method, a detailed review of this particular method was made. A full discussion of the methodology applied in my research is presented in Chapter 3.

This dissertation describes in detail how I conducted and analyzed the interviews that comprise the case studies that made up the second stage of my agenda.

The major objective of Stage II was to examine, in a real world context, the operations of three knowledge management systems. This was accomplished by conducting interview-based case studies. The findings of these case studies are presented in Chapters 4, 5, and 6. Based on these findings, the research propositions developed during the first stage of this research have been developed into testable hypotheses. These hypotheses are presented in Chapter 8.

While it is not a part of this dissertation study, these hypotheses will later be operationalized and empirically tested in Stage III of my program of research using a survey method. As can be seen, this proposed future stage of this program of research follows the iterative relationship suggested by Wallace.

1.11 Overview of the Dissertation Document

This dissertation is presented in eight chapters. In Chapter 2, the relevant literature is reviewed in order to provide the theoretical and conceptual basis for my research. Then, Chapter 3 details the research design and the methods employed in the study. The next three chapters (4, 5, and 6) present the factual findings of the individual case studies. Chapter 7 presents the understandings that I have developed from this research to date via a cross-case analysis. Finally, Chapter 8 presents the conclusions of the study including the hypotheses that I have developed from the results and findings presented in Chapter 7.

Chapter 2: Literature Review

The first stage of this study was a review of the relevant literature; however, the topic of knowledge management systems is relatively new and little academic research was discovered. There is, however, a growing body of practitioner literature concerning the topic. The results of the literature review are shown in the following:

- a set of *definitions* of the major terms used in the study;
- a detailed discussion of the *theoretical framework* of the study;
- a detailed discussion of the *conceptual framework* of the study;
- a *model* that combines the *theoretical* and *conceptual frameworks* of the study; and,
- a detailed statement of the study's *objectives*.

2.1 Definition of Terms Used in the Study

2.1.1 What is Knowledge?

For millennia, philosophers have pondered the meaning of knowledge and, yet, the debate continues. It is not the purpose of this research to enter that debate, but if knowledge is to be managed, there must be a definition of that knowledge. According to Spender (1996), most management theorists have adopted a "…*positivist theory of knowledge that takes little account of the millennia of debate about the problematic nature of human knowledge.*" This view holds that all knowledge is the "…*result of a systematic (scientific) analysis of our sensory experience of a knowable external reality.*" Thus, knowledge is generated from human experience and as a result of the analysis of that experience. While this definition may gloss over some of the stickier issues concerning the true na-

ture of knowledge, it begins to provide a foundation for an understanding of what knowledge is from the perspective of this study.

However, Spender's definition of knowledge does not address what I consider to be a critical component of any definition of knowledge, that there is a relationship between knowledge and action. Alavi and Leidner (1999b) have proposed the following definition of knowledge based on the earlier work of Nonaka (1994) and Huber (1991):

> *Knowledge is a justified personal belief that increases an individual's capacity to take effective action.*

This definition clearly positions knowledge as an individual asset ("*personal belief*") and clearly states its relationship to action ("*capacity to take effective action*"). Additionally, the definition demonstrates the value of knowledge in that it leads to "*effective*" action, and it also indicates that knowledge can be transferred if the individual receiving the knowledge feels that he/she can be "*justified*" in their "*belief*" that the knowledge transferred from another individual is of value or is useful to the receiver. I will adopt this definition for my research.

2.1.1.1 Data, Information, and Knowledge

Knowledge is very distinct from "data" and "information" in the information technology context. Whereas data are a collection of facts, measurements, and statistics, information is organized or processed data that has been transformed into content relevant to the situation (McFadden*, et al.*, 1999;. Knowledge, referring back to the Alavi and Leidner (1999b) definition given earlier, is information that the individual holding that information believes increases his or her capacity to take effective action. The implication, then, is that knowledge has strong experiential and/or reflective elements that distinguish it from information in a given context. Having knowledge implies that it can be exercised to solve a problem, whereas having information does not carry the same connota-

tion. A “capacity to act effectively” due to one’s knowledge is an integral part of being knowledgeable in a given area. For example, two consultants on the same engagement with the same information available to them may not have the same ability to use the information to the same degree of success with the problem at hand. Hence there is a difference in their individual capacities to add value to the engagement. The differences in capacity may be due to different experiences, different training, different perspectives, *etc*.

2.1.1.2 Tacit and Explicit Knowledge

While knowledge has a reflective element, this does not mean that all of an individual’s knowledge is nicely ordered and easily expressed. Polanyi (1958) first conceptualized the difference between an individual’s tacit and explicit knowledge. “*Tacit knowledge*” is usually in the domain of subjective, cognitive, and experiential learning, and is highly personal and difficult to formalize. “*Explicit knowledge*” deals with more objective, rational, and technical knowledge (data, policies, procedures, software, documents, *etc*.), and is easier to formalize (Nonaka and Takeuchi, 1995).

Tacit knowledge is the cumulative store of the experiences, mental maps, insights, acumen, expertise, know-how, secrets, skills set, understanding, and learning that an individual possesses. Tacit knowledge, also referred to as “*embedded knowledge*” (Madhaven and Grover, 1998), is usually localized, either within the brain of an individual or embedded in the group interactions within a department or a branch office. Tacit knowledge typically involves expertise or high skill levels.

Tacit knowledge is diffused, unstructured, without tangible form, and therefore, difficult to codify. Polanyi (1966) suggests that it is difficult to put tacit knowledge into words. For example, an explanation of how to ride a bicycle would be difficult to document explicitly, and thus is tacit. Successful transfer or sharing of tacit knowledge usually takes place through associations, internships,

apprenticeships, conversations, other means of social and interpersonal interactions, or even through simulations (*e.g.*, see Robin, 2000). Tacit knowledge has been called "*sticky knowledge*" because it is relatively difficult to pull it away from its source (Alavi, 2000).

Explicit knowledge is formerly tacit knowledge that has been articulated – it is knowledge that has been codified and that can then be distributed to others without requiring interpersonal interaction. Thus, explicit knowledge is distanced from the individual who articulated it. Explicit knowledge has also been called "*leaky knowledge*" because of the ease with which it can leave an individual, document, or the organization, since it can be readily and accurately documented (Alavi, 2000).

Leonard and Sensiper (1998) suggest that most knowledge falls between the extremes of tacit and explicit. Some elements (explicit) are objective/rational and others (tacit) are subjective/experiential and created in the "here and now." However, they say that being tacit does not mean that such knowledge cannot be codified.

2.1.2 What is Organizational Knowledge?

While data, information, and knowledge may also all be viewed as assets of an organization, knowledge provides a higher level of meaning about data and information. It conveys "meaning," and hence tends to be much more valuable, yet more ephemeral. Penrose (1959) specifically identified knowledge as a part of the human resources of an organization. Thus, as an organizational resource, individually held knowledge, or actually the combined knowledge of all of the organization's employees, somehow becomes organizational knowledge. This is not a new concept; organizations have always had operating procedures. As an example,

> *…the McDonald's restaurant's operating manual captures almost every aspect of the restaurant management including cooking, nutrition, hygiene, marketing, food production, and accounting. By*

> *capturing, codifying, and disseminating this knowledge, the company reduces the level of required know-how for its managers while improving the effectiveness and efficiency of its operations* (Peters, 1992).

However, the distinction is that McDonald's has captured and codified the "knowledge" previously held by some of its more experienced employees, and then has disseminated that knowledge to other members of the organization. These other members of the organization have then accepted this knowledge and used it to improve the effectiveness and efficiency of McDonald's operations.

Unfortunately, much of what is considered "organizational knowledge" is only "on loan" to the organization as long as the individual that holds it remains an employee; it has not been captured and codified. This knowledge is what Badaracco (1991) refers to as *"migratory knowledge."* The knowledge of individual employees only truly becomes organizational knowledge when it is captured, codified, and made available for dissemination by the organization. I contend that the organization that makes a concerted effort to shepherd the knowledge of its employees should be considered a learning organization.

2.1.3 What is a Learning Organization?

Organizational learning is the development of new knowledge and insights within an organization that have the potential to influence an organization's behavior. Organizational learning occurs when the members of an organization share their associations, cognitive systems, and memories with other members (Croasdell*, et al.*, 1997). The term "learning organization" refers to an organization's capability of learning from its past experience (DiBella, 1995). Before a company can improve, it must first learn. To build a learning organization, it must tackle three critical issues:

- Meaning: Determining a vision of what the learning organization is to be;
- Management: Determining how the firm is to work; and,

- Measurement: Assessing the rate and level of learning.

A learning organization is also one that performs five main activities well:

- Systematic Problem Solving;
- Creative Experimentation;
- Learning from Past Experience;
- Learning from the Best Practices of Others; and,
- Transferring Knowledge Quickly and Efficiently Throughout the Organization (Garvin, 1993).

As can be seen, the path to becoming a learning organization involves both innovative use of technology and the ability to make the process changes necessary to support the organization's vision of what it is to be. Primarily, however, the path to becoming a learning organization involves convincing the employees of the necessity of that goal.

2.1.3.1 Organizational Memory

While technology may not be the only component for becoming a learning organization, a learning organization must have an organizational memory; a means to save, represent, and share its organizational knowledge and many organizations have adopted formal organizational information systems to fulfill this need. However, organizations also "remember" the past in their policies and procedures. Individuals ideally tap into this memory for both explicit and tacit knowledge when faced with issues or problems to be solved. Human intelligence draws from the organizational memory and adds value by creating new knowledge.

Historically, formal organizational information systems have focused on capturing, storing, managing, and reporting explicit knowledge. However, many organizations are now beginning to recognize the need to integrate both explicit and tacit knowledge in their formal information systems. In fact, Nonaka and Takeuchi (1995) claim that intangibles like insights, intuitions, hunches, gut

feelings, values, images, metaphors, and analogies are the often-overlooked assets of organizations. Harvesting this intangible asset can be critical to a firm's bottom line and its ability to meet its goals.

2.1.3.2 Organizational Culture

The ability of an organization to learn, develop memory, and share knowledge is arguably most dependent on its culture. Culture is a pattern of shared basic assumptions (Schein, 1992; 1994; 1999). Over time organizations learn both what works and what does not work, and they adapt themselves to this knowledge. As the lessons become second nature, they become part of the organizational culture. New employees learn their new organization's culture from their mentors along with the know-how needed for their specific jobs.

Business strategists, both practitioners and academics, are continually striving to find ways in which organizations can achieve sustainable competitive advantage, and the concept of the learning organization has been one of the more popular solutions to this challenge (Argyris, 1992; Moingeon and Edmondson, 1996; Senge, 1990). Williams (2001) has proposed a process model that focuses on the social rather than technical aspects of information processing and so addresses the role that organizational culture plays in organizational learning.

The impact of corporate culture on an organization is difficult to measure. However, strong culture generally produces strong, measurable bottom-line results: net income, return on invested capital, and yearly increases in stock price (Hibbard, 1998).

2.1.3.3 Learning Organization Synopsis

While the idea of organizational learning is not new (March and Simon, 1958), it has apparently been difficult to develop a clear definition of it or of a learning organization (Garvin, 1993). Many theorists, extending Bernard's (1938) view of the organization as a cooperative system designed to expand capacity beyond the limitations of its individual members, see the organization as an *"in-*

formation-processing machine" extending the bounded rationality of its human decision makers (March and Simon, 1958; Nonaka and Takeuchi, 1995; Simon, 1945). Thus, there is a tradition, going back to Bernard, of an almost biological model for the information/knowledge-processing component of organizations. This model provides for the various social and technical components necessary to become a learning organization.

More recently there has been an increasing recognition that "knowledge," as opposed to "data" or even "information," is the most critical of an organization's resources. In fact, many agree with Drucker (1993) in defining today's environment as the *"knowledge society."* In this knowledge society, Drucker argues that knowledge is not just another resource of production, but that it is the only meaningful resource. Extending Drucker's thesis, it has been proposed that an organization's knowledge, how an organization uses its knowledge, and how quickly it can acquire additional knowledge is the only means of sustainable advantage in this knowledge society (Prusak, 1996). Knowledge and its management can be seen as a core competency, and this leads to increased interest in more carefully shepherding this precious resource. Thus, the learning organization is the organization that recognizes its knowledge, and the management of that knowledge, as a core competence, and makes a concerted effort to shepherd this resource.

2.1.4 What is Knowledge Management?

Alavi and Leidner (1999b) found that "...*effective knowledge management systems involve far more than just technology, encompassing broad cultural and organizational issues*." This is true because knowledge management is a process; it is not simply a technology to be adopted. While one cannot deny the importance of the technology involved in knowledge management systems, considering knowledge management simply as a technology sees it as only an objective, external force that impacts the organization, and this view ignores the subjective

impact of human choice and social action on that system. Clearly, this subjective impact has a longer history in organizational knowledge management than does the technological view (see page 15). As stated earlier, organizations can be viewed as cooperative systems designed to expand capacity beyond the limitations of their individual members. Thus, the organization can be seen as an *"information processing machine"* extending the bounded rationality of its human decision makers (March and Simon, 1958; Nonaka and Takeuchi, 1995; Simon, 1945). This view of the organization clearly involves knowledge management, and it is a very social action oriented view of the organization. The figure below graphically demonstrates the relationship of technology to the structure of the organization and its people.

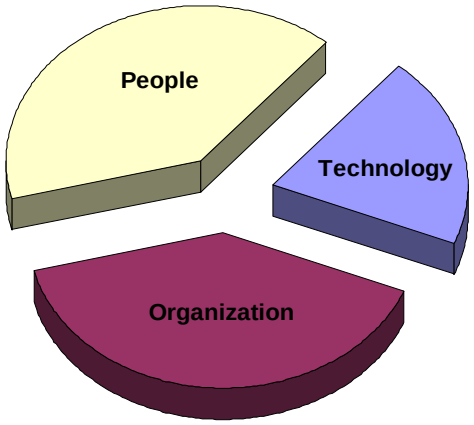

Figure 2.1: Technology is Only a Piece of Knowledge Management

From this view, every organization has adopted the process of knowledge management to some degree; the question is not whether knowledge management, the process, is institutionalized in an organization, but the degree to which the process is institutionalized in any organization. For this study, knowledge management is seen as a set of behaviors – some written, some, spoken, some inferred – but it is one of many processes that are a part of the broader socio-technical system (Bostrom and Heinen, 1977) that encompasses the computer-based knowledge management system.

2.1.4.1 The Need For and Benefits of Knowledge Management

For centuries, the mentor-apprentice relationship has been a slow but reliable means of transferring tacit knowledge from individual to individual due to its experiential nature. When people leave an organization, they take their knowledge with them in what Badaracco (1991) refers to as *"migratory knowledge."* One critical goal of knowledge management is to retain this valuable resource that can otherwise so easily and quickly leave an organization.

Unlike other assets, knowledge has the following characteristics (Gray, 1999):

- Extraordinary Leverage and Increasing Returns: Knowledge is not subject to diminishing returns. When it is used, it is not consumed. Its consumers can add to it, thus increasing its value.
- Fragmentation, Leakage, and the Need to Refresh: As knowledge grows, it branches and fragments. Knowledge is dynamic; it is information in action. Thus, an organization must continually refresh its knowledge base to maintain it as a source of competitive advantage
- Uncertain Value: It is difficult to estimate the impact of an investment in knowledge. There are too many intangible aspects.
- Uncertain Value Sharing: Similarly, it is difficult to estimate the value of sharing the knowledge, or even who will benefit most.

Over the last few decades, the industrialized economy has been in the process of shifting from one based on natural resources to one based on intellectual assets (Alavi, 2000; Hansen*, et al.*, 1999; Von Krogh*, et al.*, 2000). The knowledge-based economy is a reality. Rapid changes in the business environment cannot be handled in traditional ways. Firms are becoming global in scope, and in some areas personnel turnover is extremely high, fueling the need for better tools for collaboration, communication, and knowledge sharing. Firms need to

develop strategies to sustain competitive advantage by leveraging their intellectual assets for optimum performance.

2.1.4.2 The Goals and Objectives of Knowledge Management

Knowledge management involves a strategic commitment to improving the organization's effectiveness, as well as improving its opportunity enhancement. Its goal is not cost control (Davis, 1998). The goal of knowledge management as a process is to improve the organization's ability to execute its core processes more efficiently.

2.1.4.3 The Knowledge Management Process

Firms generate, transfer, and apply required knowledge, since markets are incapable of doing so. The cognitive capabilities of employees are the prime method of learning and memory. An organization performs three major steps:

- Knowledge Generation;
- Knowledge Codification; and,
- Knowledge Utilization.

Alavi (2000) describes organizations as "*knowledge systems*."

Knowledge management formalizes organizational learning and memory into a nonconsumable resource, typically through a knowledge repository. It is implemented through information, collaborative, and communication technologies. In a study at Xerox Corp., Barth (2000) found that the top ten domains in which knowledge concepts are leveraged in organizations through knowledge initiatives are:

- Sharing knowledge and best practices;
- Instilling responsibility for sharing knowledge;
- Capturing and reusing best practices;
- Embedding knowledge in products, services, and processes;
- Producing knowledge as a product;
- Driving knowledge generation for innovation;

- Mapping networks of experts;
- Building and mining customer knowledge bases;
- Understanding and measuring the value of knowledge; and,
- Leveraging intellectual assets.

Primarily, knowledge management is a process of eliciting, transforming, and diffusing knowledge throughout an enterprise so that it can be shared and thus reused. Stated simply, knowledge management is making shared information useful (Busko and Raynor, 1998).

2.1.5 What is a Knowledge Management System?

In the problem statement (see page 1), I discussed the debate that ranges around perceptions of knowledge management systems; and I stated my belief in the value of knowledge management systems. But what is a knowledge management system? Is it a technology? Must it be computer-based? As stated earlier, many organizations have adopted a variety of technologies under the general aegis of "knowledge management systems." The current stage of development of these systems is in many ways similar to the earlier stage of development of decision support systems that was addressed by Sprague in 1980. The same types of concerns that beset the adoption of decision support systems twenty years ago now beset a newer technology, knowledge management systems, with vendors hyping their every product as a "knowledge management system." To further aggravate the problem, my review of the practitioner literature indicates that the term "knowledge management system" generally refers to a computer-based system, but there appears to be little agreement as to the functions of that system. Depending on the article being read, a knowledge management system can address decision support projects, business process reengineering projects, quality improvement projects, *etc.* (King, 2000).

Davenport *et al*. (1998) describe four broad objectives of knowledge management systems in practice:

- Create knowledge repositories;
- Improve knowledge access;
- Enhance the knowledge environment; and,
- Manage knowledge as an asset.

These objectives appear to be directed at the implementation of the codification strategy advanced by Hansen *et al.* (1999); although, the objectives might be stretched to also include provision for their personalization strategy.

2.1.5.1 The Knowledge Management Cycle

In order to achieve these objectives, a functioning knowledge management system follows a cycle of six steps (see Figure 2.2 on the following page). The reason for this cycle is that knowledge is dynamically refined over time. The knowledge in a good knowledge management system is never finished because, over time, the environment changes, and the knowledge must be updated to reflect the changes. The cycle works as follows:

- Create: Knowledge is created as people experience new problems, determine new ways of doing things, or develop know-how. Sometimes external knowledge is brought in.
- Capture: New knowledge must be identified as valuable and be represented in a reasonable way. Capture may refer to the identification of a document (explicit knowledge) to be brought into the system if the organization is pursuing a codification strategy or it may refer to the identification of expertise held by certain members of the organization (tacit knowledge) if the organization is pursuing a personalization strategy.
- Organize: New knowledge must be placed in context so that it is actionable. This contextualization is where process knowledge is linked with the explicit facts. The contextualized knowledge must then be stored in a reasonable format in a knowledge repository.

- Access: Knowledge must be made available in a useful format to anyone in the organization who needs it, anywhere and anytime.
- Use: Employees of the organization must be encouraged to use the knowledge maintained in the knowledge repository.
- Track: Like a library, the knowledge must be kept current. It must be reviewed to verify that it is still relevant and accurate.

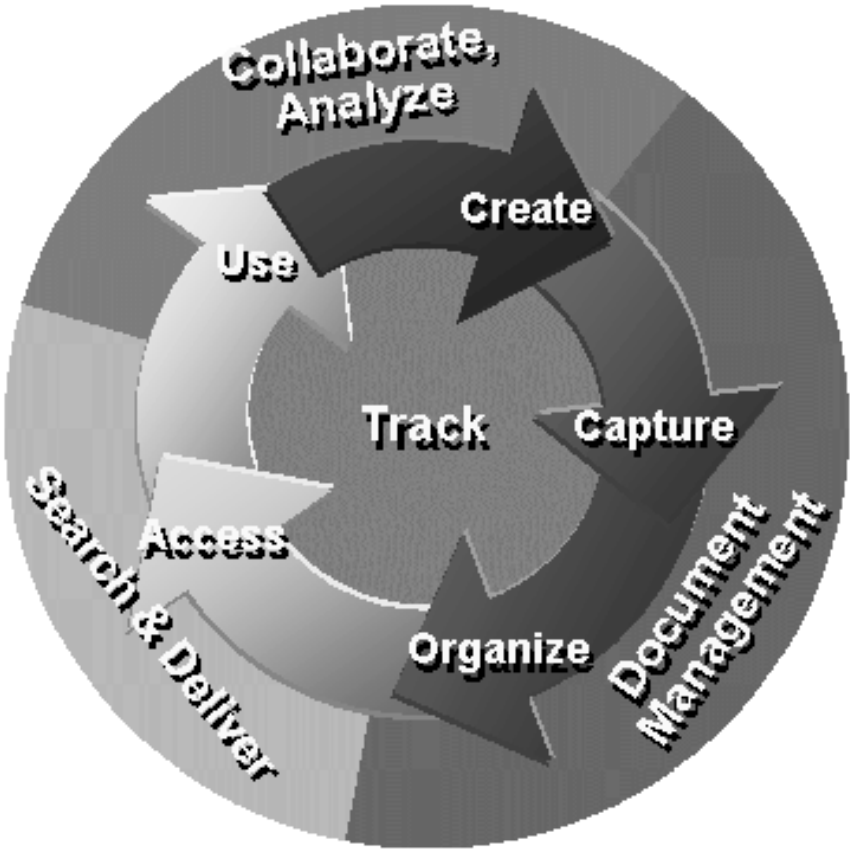

Figure 2.2: Services of a Knowledge Management System
Source: Microsoft
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As shown in the figure above, the six phases of the knowledge management cycle can be categorized by the functions that a knowledge management system would provide:

- Collaborate and Analyze;
- Document Management; and,

- Search and Deliver.

These functional groups provide yet another way of envisioning the functions of a knowledge management system.

2.1.5.2 Using the System

Encouraging employees to use a knowledge management system, both for contributing knowledge and for seeking knowledge, can be difficult. The reasons people do not like to share knowledge are as follows (Vaas, 1999).

- Willing to share, but not enough time to do so;
- No skill in knowledge management techniques;
- Don't understand knowledge management and benefits;
- Lack of appropriate technology;
- No commitment from senior managers;
- No funding for knowledge management; and
- Culture does not encourage knowledge sharing.

As can be seen, only one of these obstacles to using a knowledge management system involves the system's technology, the majority of the obstacles stem from process or procedural issues. As indicated earlier, technology is only a piece of knowledge management. Generally when a technology project fails, it is because the technology does not match the organization's culture. This is especially true for knowledge management systems, because they rely so heavily on individuals contributing their knowledge. Most knowledge management systems that fail in practice do so because of organizational culture issues (*e.g.*, see Drucker, 2001).

Osterloh and Frey (2000) argue that different kinds of motivation are crucial in encouraging the sharing of explicit and tacit knowledge. An employee can be "*extrinsically*" motivated if they are able to satisfy their needs indirectly, especially through monetary compensation. "*Intrinsic*" motivation occurs if the activity is undertaken for one's immediate satisfaction. Intrinsic motivation is directed to a self-defined goal or obligations of a personal or social identity. In this

sense, the ideal incentive is the work content itself, which must be fulfilling to the individual. Intrinsic motivation is typically required for tasks that require creativity. Alternatively, extrinsically motivated individuals tend to produce stereotyped repetition of what already works (*e.g.*, see Amabile, 1996, 1998). Thus, they argue that the sharing of tacit knowledge, which is difficult to observe or measure, is most strongly motivated intrinsically, while the sharing of explicit knowledge, which can be observed and measured, is most strongly motivated extrinsically. However, the question remains that if tacit knowledge is made explicit specifically for the purpose of contributing that knowledge to a knowledge management system, what is the most appropriate form of motivation?

Hansen and Oetinger (2001) suggest that in order for organizations to properly leverage their knowledge resources what is needed is a change in the way that managers behave, a change in the way that they spend their time. They call their new approach "*T-shaped management*." The T-shaped manager would break from the traditional corporate vertical hierarchy to share knowledge more freely across the organization (the horizontal part of the "T") without losing focus on individual unit performance (the vertical part). They argue that a number of companies are already implementing this type of managerial approach. Their approach would address many of the cultural obstacles to knowledge sharing; however, it is easier to write about changing individual and organizational cultures than to do it.

2.1.5.3 Knowledge Management System Synopsis

When I refer to a knowledge management system, I am referring to a computer-based system used to assist in the identification, capture, systematization, and dissemination of knowledge from and to members of an organization. Such a system could address either the codification or personalization strategies of knowledge management as identified by Hansen *et al.* (1999), or it might ad-

dress both. Therefore, the system could provide document management capabilities for the knowledge that has been captured, organized, and stored, search and delivery capabilities to allow access to the stored knowledge, and collaboration and analysis capabilities for the users of the stored knowledge who, in their use of the knowledge, would create new knowledge for the organization, or it could provide capabilities for the identification and dissemination of expertise information (expertise mapping) within the organization in order to enhance communication between the possessor of the knowledge and the individual(s) needing that knowledge. The iterative processes that comprise a knowledge management system are shown in Figure 2.2 on page 28.

In order for the capabilities of such a system to be fully implemented, the support of the entire organization is required. A knowledge management system would not be operated as a centralized, back-office function with little effort required of the line functions that it supported (Hansen and von Oetinger, 2001). On the contrary, line personnel would be intimately involved in the identification and capture of the knowledge resources, the organization (review) of those resources, and the search for and use of those resources. Therefore, there must be a system to motivate those employees (Osterloh and Frey, 2000) in order to ultimately develop the more knowledge management astute employee (Hansen and von Oetinger, 2001). Only when both the technical and the process obstacles to use of a knowledge management system are addressed can that system become truly successful.

2.2 Theoretical Framework of the Study

2.2.1 Adoption of Innovation

Organizations, and society as a whole, are confronted with claimed “innovations” every day, yet only a few of these “innovations” are ever widely adopted. What is an innovation? Why are some “innovations” adopted and others not? According to Rogers (1962), an innovation is any idea that is perceived as new by its

possessors/promoters. The innovative ideas that at least begin their process of adoption are then diffused through a social system through a complex process of group decision-making. Taken to its fullest extent, this diffusion results in the institutionalization of the innovation within the organization adopting it. Thus, to answer the question of "why," one must study this group decision-making process.

Danhof (1949) was one of the early researchers to study the adoption of innovation; he focused on industrial firms and described four adopter categories:

- **Innovators:** the first firms to adopt a new idea;
- **Initiators:** the firms who adopted the idea soon after the innovators;
- **Fabians:** the firms who adopted the idea only after its utility was widely acknowledged in a particular industry; and,
- **Drones:** the last firms to adopt new ideas.

Since Danhof's typology of adopter categories was published, many researchers have attempted to expand this work

Rogers (1962) addressed the process of adoption among individuals, although his work should be equally applicable to organizations. Rogers posed a five-stage adoption process:

- **Awareness:** the individual, or organization, is exposed to the innovation, but lacks complete information about it;
- **Interest:** the individual, or organization, becomes interested in the innovation and begins to seek additional information concerning it;

- **Evaluation:** the individual, or organization, decides whether or not to try the innovation by mentally applying the innovation to the present or anticipated situation;
- **Trial:** the innovation is utilized on a small scale to determine its utility; and,
- **Adoption:** the individual, or organization, decides to fully adopt, or use, the innovation.

There is an additional stage in this adoption process, that of institutionalization. Both individuals and organizations may choose to formally "adopt" innovations without the adoption of those innovations resulting in significant structural and cultural changes within the individuals or organizations. Fichman and Kemerer (1999) describe this as the "assimilation gap." However, if the innovation does provide the significant competitive advantage that was originally promised, then the organization will institutionalize the new process and institute both structural and cultural changes within itself in order to maximize the benefit of the newly adopted process.

In the area of individual adoption, researchers have been increasingly re lying on theories of innovation diffusion (Alexander, 1989; Brancheau and Wetherbe, 1990; Johnson and Rice, 1987; Moore, 1987). While these same theories of innovation diffusion also apply at the organizational level, a stronger theoretical basis for extending this research to the organizational level is needed. Orlikowski and Robey (Orlikowski, 1992; Orlikowski and Robey, 1991) have proposed the use of Giddens' (1979; 1982; 1984; 1993) theory of structuration in this role.

2.2.2 Structuration Theory

Many researchers in the past have adopted philosophical stances that either limited them to viewing technology as an objective, external force that would have an impact on things such as organizational structure, or as a more subjective view of strategic choice and social action determining technology's im-

pact on these same issues (Orlikowski, 1992). In Giddens' (1979; 1982; 1984; 1993) theory of structuration, social reality is the aggregate of subjective human actors and of objective institutional properties. Giddens (1979; 1982; 1984; 1993) calls this the "*duality of structure*" and defines it with the idea that the structures (institutional properties) of social systems (or organizations) are both the construction of human action and the constructors of future human action. Roberts and Scapens (1985) wrote:

> *Through being drawn on by people, structures shape and pattern (i.e., structure) interaction. However, only through interaction are structures themselves reproduced. This is the "duality of structure;" it is in this way that structures can be seen to be both the medium and the outcome of interaction.*

Thus, explanations of social phenomena (*e.g.*, organizational adoption of technological innovation) must consider both human actions and the impact of existing institutional properties, because both of these will help explain the changes to future institutional properties that will occur along with future human actions. It is Giddens' theory of structuration that defines the focus of this research.

For Giddens, structure is not concrete; rather it is an abstract property of the social system or organization being examined. Structure cannot exist separately from the human actors within that social system who define and interpret its existence. Thus, rather than having a structure, organizations may be seen as exhibiting, at a specific point in time, certain structural properties that are the product, or current interpretation, of the human actors that inhabit the organization. However, these structural properties, the product of earlier human action, then define and shape current human action, which begins the process of recreating the structural properties anew. As Giddens (1982) wrote "*...man actively shapes the world he lives in at the same time as it shapes him*."

2.2.2.1 Modalities of Structuration

Giddens (1979; 1982; 1984; 1993) defines all human interaction in terms of structures of communication of meaning ("*Signification*"), power ("*Domination*"), and moral frameworks ("*Legitimation*"). The manner in which these structures are drawn upon in human interaction is called a "*modality*." When actors interact, or draw upon these structures, they use or experience a particular modal form. In their interaction, the actors intentionally shape the nature of their specific action and coincidentally, and possibly unintentionally, reconstitute given social structures. Giddens identifies three modalities that link action and institutional structure:

- Interpretive Schemes (Structure of Signification);
- Facilities (Structure of Domination); and,
- Norms (Structure of Legitimation) (Haugaard, 1992).

"Interpretive schemes" are communal properties of the human actors (Bryant and Jary, 1991). These schemes are the commonly held bodies of knowledge that allow communication and understanding between individuals. This includes the words which have special meaning within an organization and provide a short cut for tying in to the common experience that binds the organization. All organizations have these words or jargon and as a member of the organization an individual learns them. As an example, I am a retired Naval Officer; when I speak with others from any branch of the military services, there are words that refer to certain common experiences that are clearly understood by those who have served in the military. This is true because elements of military life, while common among the different services, are different from civilian life. This common understanding is even greater when I speak with someone who has served in the Navy, because our common experience is greater. Finally, because I was an officer in a specific staff corps, the Supply Corps, the commonality of experience and understanding is even greater. The same is true for academe; there

is a commonality of experience and a jargon across the different disciplines. However, the commonality of experience and understanding as disciplines or communities are more closely defined. In the consulting world I have heard consultants mention “AndersenSpeak” or “PwCSpeak,” referring to their corporate jargon that, while it may be confusing or obtuse to those outside of the organization, provides a quick path to understanding among members of these organizations.

Except in introductory training, this common, or background, knowledge is normally taken for granted and is rarely articulated, but it is the knowledge that the actors use to interpret meaning, behavior, *etc.* This can lead to some difficulties and misunderstandings when the supposedly “common” knowledge is, in fact, not commonly held. Moreover, this taken-for-granted knowledge is never fully accepted and, in certain circumstances, some element of it may have to be defended by one or more of the actors involved. Thus, this knowledge is not an absolute; rather it is continually being reproduced as a part of the interactions between the human actors (Giddens, 1993). Again, using my military background as an example, I have been out of the military for approximately ten years. During this time the military that I knew has restructured itself based on the ongoing experiences of current military members, so that experiences that were common when I served are no longer common and what was taken-for-granted knowledge in my day, may no longer be taken for granted – the interpretive schemes have evolved.

“Facilities,” or both the material and non-material resources of the organization, are properties of the institutions rather than of the actors (Bryant and Jary, 1991). These facilities are the institutional means through which *“…intentions are realized, goals are accomplished, and power is exercised…”* (Orlikowski and Robey, 1991). Thus, it is the application of these facilities by the actors that allow them (the actors) to achieve specific outcomes (Thompson, 1989).

These facilities may be money or people or even time. The provision of these facilities, whatever they are, tends to make some action more possible, while the withholding of facilities reduces the likelihood of the action from which they were withheld.

The provision or withholding of resources is, according to Giddens, an exercise of power, but there are certainly limitations on any exercise of power. There is the old saying that "you can lead a horse to water, but you can't make him drink." The provision of resources by an organization faces a similar problem. If an organization decides to provide resources to a project, we can assume that it is to the detriment of other projects – as there are almost always more demands for resources than resources available. Therefore, an organization would not decide to provide resources, or withhold resources, lightly. Clearly then, these resources would not normally be provided unless the "organization" believed that there was an advantage in doing so, yet the provision of resources does not necessarily mean that they will be utilized by their intended recipients. The advantage seen by the organization must also be seen by the intended recipients of the resources, or they must be convinced of that advantage. In some cases, in the absence of convincing people, the organization may mandate their use; as an example, first the federal government mandated the provision of seatbelts in cars and when people refused to wear them, the government mandated the wearing of those set-belts. This is clearly an exercise of power, but it is not always possible to mandate behavior, and it is probably more difficult to do so with resources provided to knowledge workers (such as the knowledge management systems that are the topic of this study) than it is to clerical or production workers.

The goal of the organization in providing facilities is not domination, but rather persuasion. In naming the structure "domination" I believe that some of Giddens' world view is showing, but in modern society "domination" is quite dif-

ficult to enforce. Again calling on my military experience, an officer in the military (such as I was) has an unusual degree of authority to enforce his or her will. Possibly the power to punish was enough in the type of warfare of centuries past. One could order an attack in which the soldiers "might" die, but their option was "certainly" to die if they did not attack. The military of today is no longer like that. Many of today's military personnel are also knowledge workers and in order to obtain their best efforts, military leaders must motivate and persuade their subordinates rather than attempt to dominate them. I am not attempting to revise Giddens in this position; I am simply attempting to clarify some of the limitations that are involved in an organization's exercise of power.

"Norms" are properties of both the institutions and the actors, although institutional and actor norms do not have to be congruent. Institutional norms are the rules of the institutions that are used in the evaluation of the conduct of the actors (Bryant and Jary, 1991). These include the formal rules of the organization; as an example, a doctoral candidate must have at least five approved members of the University of Georgia faculty serving on his/her dissertation committee. If the committee does not meet this rule, a dissertation cannot be approved. Actor norms are the rules of the actors that are used in the evaluation of the conduct of either the institution or of other actors. As an example, doctoral candidates may discuss among themselves which members of their faculty they may wish to have on their committee. From the University's perspective, any member of the Graduate School faculty is acceptable, but students will have other evaluative criteria. Norms, both institutional and actor, provide the commonly held sense of what is proper or appropriate and what is not. As with the interpretive schemes, these norms are not an absolute; rather they are continually being reproduced as a part of the interactions between the human actors (Giddens, 1993).

Thus, norms can be the property of either the organization or of individuals within the organization. Organizational norms are another exercise of power on the part of the organization. They form the evaluative criteria that the organization applies in its consideration for pay raises, promotion, and even dismissal. Organizational norms are frequently formal, but they are not always formal. In fact, there may be formal statements from an organization which have the appearance of an organizational norm, but as they are never, or almost never, actually applied, they are not organizational norms. Correspondingly, there may be informal organizational norms that can be demonstrated from an organization's actions but are not formally stated as one of its norms. As an example, a number of years ago, a national restaurant chain was repeatedly sued for discriminatory conduct towards minority patrons. Certainly, this type of discrimination would not have been formalized as a policy of the chain, but because similar conduct occurred in many different restaurants within the chain, there was at least the appearance of this type of conduct being an organizational norm.

Actor norms are almost always informal in nature. A number of individuals within the organizations with similar individual opinions (interpretative schemes) coalesce into a group with a group, or actor, norm for evaluation. Just as the organization uses its norms to evaluate behavior, *etc*., so do groups of individuals within an organization. Additionally, these informal groups do not have to represent all, or even the majority, of the individuals within an organization – they simply must be a group large enough to provide an element of authority to their evaluations. As an example the University may not have a formal dress code for its faculty, and this appears to give considerable latitude to professors, *etc*. in their choice of dress; however, if a line is crossed, then some group (other faculty, staff, or even students) will make known their displeasure and the offending individual will be encouraged/forced to modify his/her apparel choices.

Norms appear to provide the sense of balance in organizational behavior. The organization through both the modality of facilities and the modality of norms does have considerable powers of persuasion, if not domination. Individuals within the organization may disagree with some of the organization's, or other individuals within the organization, actions, but acting as individuals they have little authority to counter the offending actions. However, acting as a group they may gain sufficient authority to be heard. One might say that the rise of labor unions is due to the formalizing of group norms found in previously ignored and abused workers.

2.2.2.2 Structures and Interactions

The modalities of structuration provide lines of mediation between *"structure"* and *"interaction."* Just as there are three modalities, there are also three structures and three interactions. The structures are:

- Signification;
- Domination; and,
- Legitimation.

Their related interactions are, respectively:

- Meaning;
- Power; and,
- Sanction (Haugaard, 1992).

Structures are the principles that make social order possible, but for Giddens these principles only exist in the moment of action. Therefore, how are these principles carried from one moment of action to another? Giddens attributes a cognitive awareness to his actors; their actions (interactions) are neither the "effect" of the structure nor do they (the human actors) act as cultural automatons.

In considering this cognitive awareness, Giddens replaces the traditional Freudian division of individual into "id," "ego," and "super-ego" with "discursive

consciousness," "practical consciousness," and the "unconscious." *"Discursive consciousness means being able to put things into words"* (Giddens, 1984). *"Practical consciousness consists of all the things which actors know tacitly about how to 'go on' in the contexts of social life without being able to give them discursive expression"* (Giddens, 1984). The unconscious is the source of the various drives and motives that have to be controlled in order to maintain the security system of the adult personality (Giddens, 1984). While these three forms of consciousness are analytically separate, there is both a continuous flow between and a bar between discursive and practical consciousness. The bar is necessary to maintain an individual's security system so that the discursive and practical consciousnesses are the key to the control of the motives and drives coming from the unconscious.

Thus, human action occurs within an awareness (discursive and practical consciousness) of these social principles, but may not be guided by them if control lapses. Action, for Giddens, is a conscious decision on the part of the actor that has the unintentional effect of either reproducing existing structure or modifying that structure. Thus, even though structures only exist in the moment of action, as rules and resources they can also order action by existing in potential form as knowledge of rules and resources.

Thus, if the "interaction" is the "communication" of meaning, all of the actors involved draw on their "interpretive schemes" to understand the meaning being communicated. At the "structure" level, this interaction involves "semantic rules" and results in the structure of "signification," while, if the "interaction" involves the exercise of "power," the actors apply the "facilities" at their disposal to attempt to secure their desired outcomes. At the "structure" level, this interaction comprises the structure of "domination." Finally, if the "interaction" is the application of "sanctions," the actors draw on their "norms" in determining whether a particular interaction was either appropriate or inappropriate and what their appropriate response or sanction should be. At the "structure" level,

this interaction involves “moral rules” in the structure of “legitimation” (Haugaard, 1992).

The arrows in Figure 2.3: The Interaction of Human Actors and Structure as Mediated by the Three Modalities of Structuration, on the following page, demonstrate the three levels of structure, modality, and interaction and:

> *…the recursive nature of structuration, with the active I (interpretative schemes), R (resources), N (norms) being balanced by I’ (interpretative schemes), R’ (resources), N’ (norms), respectively. The figure represents Giddens’ idea that the constitution of social structure through human action and the mediation of human action by social structure occur simultaneously…* (Orlikowski and Robey, 1991).

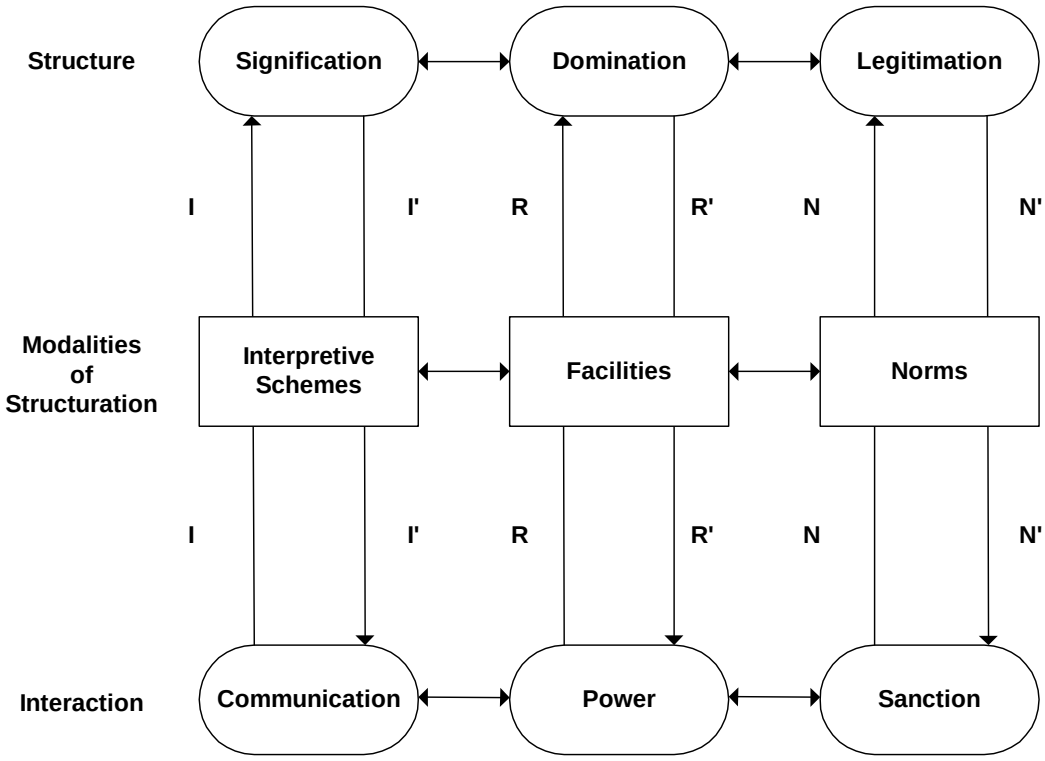

Figure 2.3: The Interaction of Human Actors and Structure as Mediated by the Three Modalities of Structuration
(Adapted from Giddens, 1984)

While the model in the figure above may imply that these three structural dimensions are separate (and it is sometimes possible to distinguish them in a

specific social setting), it is important to note that they do not, and cannot, exist independently.

2.2.2.3 The Applicability of Structuration Theory to this Research

As will be discussed more fully in the following chapter in the section "The Researcher's Role" beginning on page 92, I am a post-positivist in my research philosophy and as a post-positivist I maintain a certain degree of an objectivist perspective. However, Giddens is clearly a constructionist in his philosophical outlook, so the question of the appropriateness of my using this particular framework must be addressed. Is there an insurmountable philosophical conflict between my perspective and Giddens'?

I am drawn to Giddens because, as Orlikowski (1992) suggested, his work provides a bridge between the objectivist view of technology as an external force affecting organizations and the subjectivist view of the importance of individual strategic choice and social action in determining technology's impact on these same issues. To my mind, while there is an element of objectivist "truth" in all things, how we do things in many ways determines who and what we are and technology's impact on how we do things cannot be ignored, but we are not controlled in our use of available technology. The continual re-creation of structure postulated in structuration does not make it impossible to accurately describe that structure at a given point in time. Additionally, at that point, the description is not only the "truth" as seen by the researcher, but should be seeable by others. This "evident" truth, one that combines both objective and subjective perspectives, is made possible by structuration theory. Thus, I contend that it is possible for a post-positivist researcher to utilize a constructionist theory in the analysis of organizations.

Actually, it is not the difference in our philosophical perspectives that has caused me a degree of concern in my determination to rely on Giddens' Theory of Structuration. It has been my fear that Giddens never really intended that

structuration theory be developed into the testable set of hypotheses that I hoped to develop from this research. On the theoretical level I find structuration theory to be resonate in its explanations of organizational activity; however, on the more practical side, relying on a more positivistic tradition, I find it difficult to adequately operationalize the richness of structuration theory. This current research has been my initial attempt to bridge that gap.

However, I did find some evidence to support the potential of using institutionalization *a la* Giddens' Theory of Structuration as a surrogate for a successful knowledge management system. Although she did not utilize structuration theory in her work, Zuboff (1988) detailed her study of both the history of work and of how "...*to grasp how everyday life had been altered by the profound material change in the means and methods of production*." As I read this book, I was struck by how structuration theory would have provided insights into many of the phenomena she described, and that what Giddens' calls institutionalization is, in fact, the alteration of the everyday life of the individuals brought on, in my case, by the implementation of a knowledge management system. While Zuboff studied the implementations of earlier and simpler information management systems and the effect of those implementations on clerical and production workers, I believed that I would find many similarities in the impact of the implementation of more advanced information systems on knowledge workers.

2.2.2.4 Organizational Structures

As my research focuses on changes in organizational structure and policies that occur as a result of the development and use of knowledge management systems, it is well to consider the area of organizational structure. The word "organization" derives from the Greek "organon," which means a tool or an instrument. This derivation points to a central fact in the reason for the existence of organizations – organizations are rarely intended to be an end in themselves, but rather are intended to be an instrument to achieve other ends. These ends may

change, be they the building of a pyramid, the establishment of a standing army or navy, or the establishment of a university, but the centrality of an end, a purpose, and the organization's existence as a means of achieving this purpose remains constant (Morgan, 1997).

However, the modern organization began to take shape as a consequence of the Industrial Revolution, first in Europe and then in North America. The Industrial Revolution brought a proliferation of machines that two centuries later led Zuboff (1988) to attempt "...*to grasp how everyday life had been altered by the profound material change in the means and methods of production*." In altering everyday life, the presence of these machines altered the very fabric of organizations. Organizations became more mechanistic in their attempts to keep their machines running at peak efficiency. Factory owners quickly realized that in order to achieve this peak efficiency, changes were needed in the structure of their organizations; and this led to the division of labor that was praised by Adam Smith (1776) in his book *The Wealth of Nations*. In fact, according to Sayles (1976), organizations face two problems: (1) how to specialize, which leads to creating this division of labor, and (2) how to integrate the specialized parts to create a whole product or service. Over the last two hundred years, specialization has certainly been mastered. However, the integration problem, how to coordinate these various specialized functions has proven more difficult. Management philosophies have swung been centralization and decentralization several times over the past decades (Sayles, 1976). A third problem faced by organizations due to their increased bureaucratization is the effect that specialization has on the discretion of their workers. In their efforts to increase machine/worker efficiency, many procedures have been introduced that stifle worker discretion (Morgan, 1997).

2.2.2.4.1 Matrix Structures

A matrix organizational structure allows for the coexistence of aspects of both centralized and decentralized management. The heads of the various product or project groups can run their own groups as a decentralized unit, almost an independent unit, within their larger organization, but they can also draw upon centralized resources from that larger organization when these resources are needed. The larger organization benefits from greater access to high levels of technical proficiency and economies of scale in providing these resources due to its larger size (Sayles, 1976).

The matrix organizational form seems ideal for a consultancy, and this form has been adopted by a number of consultancies. Consultancies both by the nature of their "product," in-depth knowledge in a wide variety of managerial and technical areas, and the nature of their "work," engagements with a wide variety of clients involving different mixes of their product, appear to lend themselves to a matrix form that provides the right mix of both centralized and decentralized management. However, the matrix form does not necessarily address the third organizational problem discussed above, that of stifling worker discretion.

2.2.2.4.2 Communities of Practice

The earlier bureaucratic procedures of the Scientific Management School (Taylor, 1911) MAY have been appropriate for the unskilled or low skilled workers of almost a century ago, but the last thing that an organization of knowledge workers would want to do is stifle their workers' discretion and creativity. Wenger (1998) identified the "community of practice" as an organizational form that would facilitate learning and worker creativity within the organization. His understanding of the social theory of learning that leads to communities of practice is shown in Figure 2.4 on the following page:

Figure 2.4: Components of a Social Theory of Learning

These components include the following:

- *Meaning: A way of talking about our (changing) ability – individually and collectively – to experience our life and the world as meaningful;*
- *Practice: A way of talking about the shared historical and social resources, frameworks, and perspectives that can sustain mutual engagement in action;*
- *Community: A way of talking about the social configurations in which our enterprises are defined as worth pursuing and our participation is recognizable as competence; and,*
- *Identity: A way of talking about how learning changes who we are and creates personal histories of becoming in the context of our communities* (Wenger, 1998).

Like the matrix organizational form, the idea of communities of practice seems ideal for a consultancy and is a form that has been adopted by a number of consultancies. Consultancies by the nature of their "product," in-depth know-

ledge in a wide variety of managerial and technical areas, have a great need to enhance the learning of their "communities."

2.2.2.5 Structures as Sensitizing Concepts

My research is an investigation of the institutionalization of knowledge management within organizations that is, the changes in organizational structure and policies that occur as a result of the development and use of knowledge management systems. This section of the chapter lays down the theoretical foundation for how I attempted to recognize the institutionalization of knowledge management as I analyzed my interview data. It must be remembered that the prize, and the challenge, of qualitative research is the ability to recognize emerging themes. Through an analysis of related literature I was able to discern several anticipated, or *a priori,* themes related to the development and implementation of an information system that served as initial theoretical sensitizing concepts that were useful in examining the data. However, I also accepted that other themes would emerge and modify my understanding of the anticipated themes as the analysis of the interviews progressed. Thus, structuration theory developed at least some of the *a priori* themes that I expected to find during my analysis of the interviews. Based on my literature review, the following were the preliminary, or *a priori*, themes in my research model:

- the Structure of Signification;
- the Structure of Domination; and,
- the Structure of Legitimation.

It is through these three structures, as developed by Giddens, that I expected that I could identify the institutionalization of knowledge management within an organization. For Giddens, these structures are the principles that make social order possible, but these principles only exist in the moment of action.

In Chapter 1 in the section entitled "Research Methodology" beginning on page 12, I discussed my process of developing a series of research questions (see

the section entitled “Questions of the Study” beginning on page 8) and propositions (to be presented at the end of this chapter) from my literature review and my intention to transform those propositions into testable hypotheses. I have used the deductive process during my literature review to develop a set of *a priori* propositions from the general theoretical expectations derived from earlier studies of both knowledge management systems and other types of information systems. Many qualitative researchers, approaching their work from a more interpretivist philosophical tradition, are content to further refine their descriptions of a phenomenon and their propositions drawn from that phenomenon as a result of their analysis of their observations. This type of analysis is inductive in that it moves from specific observations to the more generalized explanations seen in their final descriptions and propositions. However, I approached my research from a post-positivist perspective and so I wanted to lay the groundwork of a more generalizable study which would follow this current research. Therefore, I envisioned my *a priori* propositions as precursors to some of the themes that MIGHT have emerged, were anticipated to emerge, from my analysis of the interview transcripts. Thus, my goal for this current study was to take the limited understanding gained from my literature review combined with the richer understanding gained from my analysis of my interview transcripts and to deduce from this a set of testable hypotheses that would lay the groundwork for a follow-on, and more generalizable, quantitative study.

Therefore, I expected that those themes which emerge, and by their emergence tend to provide evidence of the interactions of structuration theory at work in the three organizations studied, could be eventually transformed into the dependent variables of my testable hypotheses. Finally, this research should not be seen as an attempt to test the proposed, or *a priori*, propositions; these propositions were only developed to assist me as the researcher in developing a sense of order in my growing understanding of my chosen topic and to inform the readers

of this dissertation of my understanding as it grew. Clearly, this sense of order had to be allowed to change as my understanding grew, and the change in the sense of order can be seen in the emergence of new themes, the refinement of proposed themes, or the discarding of proposed themes which were found to be lacking in evidence of their existence. Moreover, the chosen method of research, interview-based case studies, does not allow the testing of these propositions in any generalizable sense; that testing will come later after the appropriate propositions have been transformed into hypotheses and the research method has developed into a quantitative one.

2.2.3 Critical Success Factors

The presence of critical success factors (CSFs) has been found to lead to the successful adoption of earlier IS innovations, such as executive information systems (EIS), and of more current IS innovations, such as data warehousing. I believe that this earlier research involving other types of systems provides a beginning point in ascertaining the CSFs appropriate for knowledge management systems. Researchers have suggested the following critical success factors for EIS development and adoption:

- **Committed Champion** - A committed champion is a member of the organization's senior management who, with an appreciation of the potential of a knowledge management system, is willing to expend the political capital in order to move the project through trial to adoption by securing the necessary facilities while also acting to address organizational resistance (Barrow, 1990; Rockart and DeLong, 1988; Watson*, et al.*, 1991).
- **Appropriate Resources** - Appropriate resources include all of the facilities (personnel, material and non-material resources, *etc.)* necessary for the successful development of the knowledge manage-

ment system (Barrow, 1990; Rainer and Watson, 1995; Rockart and DeLong, 1988; Watson*, et al.*, 1991).

- **Management of Data** - The knowledge management system must be able to provide the facilities *(e.g.,* knowledge to assist in problem-solving) in an efficient and effective manner (Barrow, 1990; Leidner and Elam, 1994; Rainer and Watson, 1995; Watson*, et al.*, 1991; Watson*, et al.*, 1995).
- **Clear Link to Business Objectives** - The knowledge management system must be clearly capable of solving a business problem such that it is worthy of the concomitant changes in the organization's structure and policies that it will cause (Rainer and Watson, 1995; Rockart and DeLong, 1988).
- **Management of Organizational Resistance** - The implementation of a knowledge management system will challenge some of the interpretive schemes within the organization and will cause some level of organizational resistance or sanction. The management of this resistance is crucial (Barrow, 1990; Rockart and DeLong, 1988; Watson*, et al.*, 1995).

Critical success factor analysis has been applied to the study of implementation of more recent technologies such as data warehousing (Haley, 1998) and has in large part supported the importance of the critical success factors originally identified in EIS research, but this more recent research has also realized that each technology may have critical success factors that are specific to that technology (Little and Gibson, 1999). In the case of data warehousing, data quality was identified as an additional critical success factor in the implementation of a data warehouse (Malmborg, 1998).

The effect of system structure on the institutionalization of knowledge management within an organization may be impacted by the presence or ab-

sence (and the strength of their presence) of those critical success factors that are crucial to the implementation of a knowledge management system. Therefore, it is important to identify which critical success factors are crucial to the implementation of a knowledge management system. I had anticipated that the following critical success factors would be important:

- Committed Champion;
- Appropriate Resources;
- Management of Data;
- Clear Link to Business Objectives;
- Management of Organizational Resistance; and,
- Information Quality.

However, it must also be noted that prior to beginning the analysis I understood that there might well be other critical success factors that were also crucial to the implementation of a knowledge management system that had not been identified in the earlier research into the implementation and adoption of other types of information systems. Therefore, in my research I was open to the finding of additional critical success factors that were specific to a knowledge management system and also to the possibility that I might find that some of the anticipated critical success factors (listed above) were not, in fact, critical to the implementation of a knowledge management system.

2.2.3.1 Critical Success Factors as Additional Sensitizing Concepts from the Literature

Just as structuration theory laid the foundation for the dependent variables to come out of this body of research, critical success factor research establishes the foundation for some of the independent variables expected from it. The impact of each critical success factor can be associated with one or more of Giddens' structures and will typically act at the modality level. For the anticipated critical success factors, I propose that the associations are as follows:

- **Committed Champion** - A committed champion exercises power on behalf of the implementation of the knowledge management system. This exercise of power can take many forms, so it impacts the "interaction" of "power."
- **Appropriate Resources** - One of the ways in which a champion exercises power on behalf of the implementation of the knowledge management system is the provision of appropriate resources. The implementation of a knowledge management system is a massive undertaking and requires the committal of significant resources, both in human and material terms. While the provision of appropriate resources can be seen as impacting the "interaction" of "power," it is more clearly seen as impacting the "modality" of "facilities."
- **Management of Data** - The management of data (*i.e.*, the tools available within the knowledge management system) is a specialized form of resource, so it is seen as impacting the "modality" of "facilities."
- **Clear Link to Business Objectives** - In order for any system to be institutionalized it must have a clear linkage to the business objectives. This linkage must be within the minds of the employees of the organization (their interpretive schemes). Interpretive schemes are not a property of the organization or subject to its control, but rather are a property of the individuals concerned. The best the organization can do is to attempt to influence its employees. Thus, this attempt to influence (to modify the interpretive schemes of its employees) is seen as impacting the "interaction" of "communication."

- **Management of Organizational Resistance** - Even in the face of an obvious need, there is frequently a resistance to the change of the status quo with its attendant uncertainty. An organization can attempt to manage this resistance in two ways: persuasion and/or sanction, the carrot and/or the stick. Like the linkage to business objectives, persuading employees not to resist the change involves changing their interpretive schemes and so is seen as impacting the "interaction" of "communication." However, in the face of strong resistance, persuasion may not be sufficient (the persuasion may need to be reinforced) and there may be a need to adopt rules to mandate and/or reward adoption of the system; this is seen as impacting the "interaction" of "sanction."
- **Knowledge Quality** - In addition to having the appropriate tools within the knowledge management system to access and utilize its resources, the information/knowledge held by the system must be of sufficient quality and timeliness to inspire trust in its use by the employees of the organization. This, again, is a specialized form of resource, so it is seen as impacting the "modality" of "facilities."

Figure 2.4: The Interaction Points of the Anticipated Critical Success Factors with the Modalities of Structuration, on the following page, shows how these anticipated critical success factors of a knowledge management system act upon the interaction of human actors and structure as mediated by the three modalities of structuration (see the figure on page 42). As can be seen, most of the critical success factors are seen to act at the interaction level of the model. This should be expected, as it is in the moment of action that structure both exists and is reproduced/modified. Thus, any activity at the interaction level will be felt throughout that modality and, because the modalities do not exist as separate structural dimensions, throughout the entire system. I have chosen to show

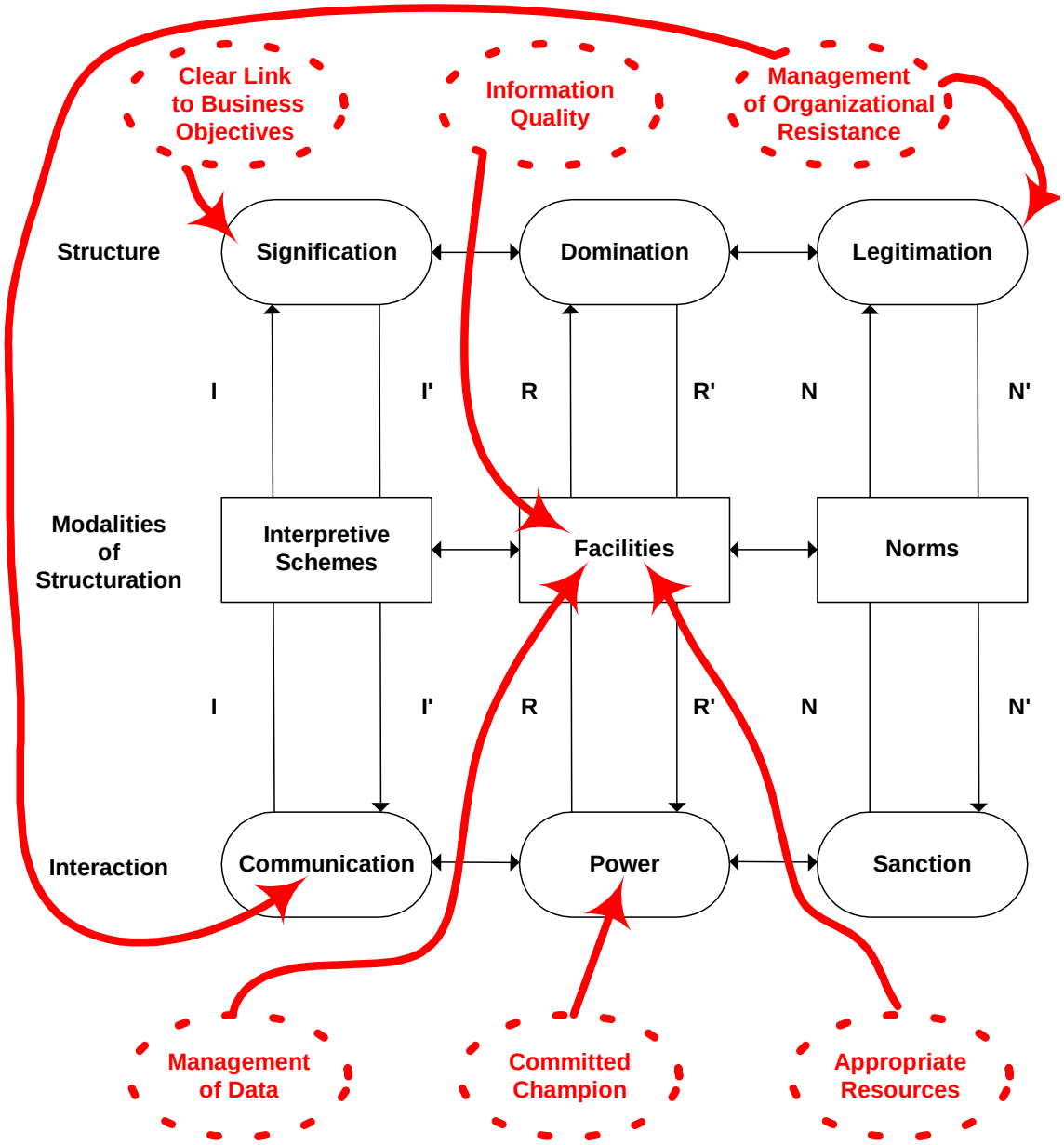

Figure 2.5: The Interaction Points of the Anticipated Critical Success Factors with the Modalities of Structuration

three of the critical success factors ("appropriate resources," "management of data," and "information quality") as acting at the modality level. All of these critical success factors are tightly related to each other and to the actual structure of the knowledge management system. The provision of all of the re-

sources/facilities is an exercise of power, but I have chosen to show them at the facility level to distinguish them from the exercise of power by the champion.

The three critical success factors that are operating at the modality level ("appropriate resources," "management of data," and "knowledge quality") can also be said to operate at the system level, and they begin to define the actual system structure within the structure of domination; however, more definition is needed. Two of the remaining critical success factors ("clear link to business objectives" and "management of organizational resistance") operate at the organizational level within the structures of signification and legitimation. They can be seen to move from the view of knowledge management as a purely technological solution to the view that knowledge management is a socio-technical process.

2.2.4 Adoption of Innovation Leads to Structuration and Institutionalization

The works of Danhof (1949), Rogers (1962), and Gibson and Nolan (1974) provide an overview of the adoption of innovation process. Organizations, or individuals, are exposed to new ideas and follow a general process of determining whether to even consider an idea as applicable to their needs. Through a combination of their state of risk aversion, availability of slack resources, evaluation of the potential of the new idea, *etc*., different organizations will decide to try the new idea at varying rates of speed. Once an idea actually enters the trial stage, it progresses through a lifecycle as the organization's members experiment with it and discover ways of utilizing it. Assuming the idea has merit, it ultimately becomes formally adopted by the organization.

Structuration theory indicates that when an organization decides to enter the trial stage with an innovation, the actions of the employees involved in that trial may begin to enact changes on the organization's structure, and that these institutional changes will begin to shape future actions of the employees. During the trial stage, these changes (institutional or human) may be almost unnotice-

able; however, the formal adoption of the innovation causes more of the organization's members to become involved with it. Thus, formal adoption should result in significant changes in the structure of the organization and, through those structural changes, in the future actions of the employees.

In terms of the trial and adoption of a knowledge management system, an organization has made a commitment to evaluate a knowledge management technology or technologies. This type of commitment typically involves a "champion" who has urged the trial of the technology. It is the champion that has personally moved through the phases of "awareness," "interest," and "evaluation," because in championing the project, the champion is expending some of his/her political capital (use of a "facility" in a structure of "domination"). During the trial period, the employees involved (they are "innovators" if they buy in to the goals of the project) are attempting to determine whether and how a knowledge management system would provide benefit to the organization. While the trial might start relatively modestly, if the early results are promising, more emphasis (*e.g.*, more "resources") will be applied to the trial, as more employees (both "innovators" and "initiators") become involved with the trial. Within the organization, the exercise of "power" by the champion and the other proponents of the system may force the senior management to take note of the trial and possibly to attempt to apply a more "formal" set of controls to it; these controls are a form of structure. If the results of the trial are positive, and if enough "power" is exercised in behalf of the project, then the organization will "formally adopt" the project. This "adoption" should result in changes in the structure of the organization. These changes might be:

- institution of the position of "Chief Knowledge Officer" at the strategic level of the organization;
- incorporation of knowledge management as a strategic objective of the organization; and,

- adoption of organizational and departmental policies to foster the use of the knowledge management system.

Clearly, the institution of a new position at the strategic level of the organization's management is an exercise of "power" within the structure of "domination." Similarly, the incorporation of knowledge management as a strategic objective of the organization is at least an effort to change the "norms" of the organization and to legitimize knowledge management. This is described as an "effort" to change organization "norms" because organizations have been known to simply pay "lip service" to some of their stated objectives. The adoption of a new strategic objective is a change in the "norms" of that organization, but my interest is in whether that new objective is institutionalized. Additionally, the adoption of organizational and departmental policies to foster the use of the knowledge management system not only changes the "norms" of the organization and works to legitimize knowledge management, it is also an effort through the communication of the policy changes to modify the "interpretive schemes" of the employees concerned. Of course, the employees themselves do any modification in their "interpretive schemes;" this is not automatically accomplished through a change in organizational policy, as the employees can resist. Finally, the incorporation of a knowledge management system into the essential workings of the organization would also tend to alter the "interpretive schemes" used by the members of that organization if they saw things such as a clear link to business objectives and good knowledge quality,

2.2.5 Conclusion

Based on information systems theory, I propose that the following will be the theoretical concepts in my research model:

- the Structure of Signification;
- the Structure of Domination; and,
- the Structure of Legitimation.

Additionally, I expect that the following factors can be identified from critical success factor research; these are:

- Committed Champion;
- Appropriate Resources;
- Management of Data;
- Clear Link to Business Objectives;
- Management of Organizational Resistance; and,
- Information Quality.

2.3 Conceptual Framework of the Study

2.3.1 The Need to Shepherd Organizational Knowledge

How does an organization shepherd its knowledge resources? Again, the recognition of the need to manage organizational knowledge is not new. Most organizations already have a basic form of knowledge base in their standard operating procedures (SOPs), company policies, transaction records, *etc*. However, most of the data/information/knowledge held in these forms truly does "belong" to the organization - it is simply the compiled history, policies, and transaction data of the organization. But, as already discussed, "organizational knowledge" cannot be confined to only this transactional data maintained in existing information systems; it is also the process, or human or migratory, knowledge that must be made the organization's own.

Unfortunately, unless it is actively managed by the organization, much of this process knowledge never moves beyond those individuals who actually experienced its creation. Additionally, each employee experiences many opportunities for gathering new information and, through these experiences, for creating new knowledge. It would seem that the volume of this new information and knowledge is likely to be beyond the practical capacity of an organization to manage. Thus, a large portion of this potential organizational knowledge is continually being lost as the employees concerned either simply forget their experi-

ence or actually leave the organization. Rather than being migratory knowledge, it is simply transitory knowledge, as it does not require the departure of an employee for his/her newly created knowledge to be lost to their organization.

Nonaka proposed the knowledge-creating company, or one involved in "knowledge management," as an example of organizational learning (Nonaka and Takeuchi, 1995). Nonaka's emphasis is on the organization's need to foster knowledge creation, certainly an important husbanding function. However, as previously discussed, employees are already creating more individual knowledge than the organization can manage. While much of this knowledge may not be of a quality that the organization would want to claim as its own, organizations are surely losing a great deal of potential knowledge that would be beneficial to the organization. Thus, this research concentrates on the management of knowledge after its creation, not the creation process of that knowledge.

Lipshitz, Popper, and Oz (1996) have proposed a modification of the Nonaka definition with organizational learning being the *"...process through which organization members develop shared values and knowledge based on past experience of themselves and others."* This definition not only emphasizes that the creation of knowledge is a human process, but that this knowledge becomes organizational as it is shared with others. Further supporting this view, Simon (1945) suggested that *"...all learning takes place inside individual human heads; an organization learns only in two ways: (a) by the learning of its members, or (b) by ingesting new members who have knowledge the organization previously did not have."* Levitt and March (1988) suggested that learning by individuals becomes organizational when its products materialize at the organization level. Thus, I contend that the development of a successful knowledge management system, the processes by which organizations identify, capture, systematize, and disseminate knowledge from and to members of the organization, is the crucial factor in being a learning organization.

It is important to note that these processes are present in systems that support either the "codification" or the "personalization" strategy as presented by Hansen *et al.* (1999). Under the codification strategy, documents that are the artifacts of process knowledge are identified, captured, systematized, and made available for dissemination through the organization's databases; clearly, the knowledge in these documents has to some extent become organizational. However, it must be recognized that these documents are artifacts of the process knowledge held by an individual or individuals; the documents are not the knowledge itself. A fuller understanding of the process knowledge that led to the particular artifact might be gained through communication with the individual(s) who generated the artifact. Facilitating this type of communication represents a move to a personalization strategy. Under the personalization strategy, it is the expertise of the individuals within the organization that is identified, captured, systematized, and made available for dissemination through communication with that individual. In the personalization strategy, an individual's knowledge is not captured; but when that individual shares that knowledge with others in the organization, then the knowledge becomes organizational. Clearly, though, these two strategies can be complementary. While the personalization strategy is capable of conveying a richer understanding, it requires the cooperation (time) of the holder of the knowledge and an infrastructure that facilitates communication across time and distance, whereas the codification strategy, although not as rich, is possibly simpler to implement and does not continually pull holders of knowledge away from their current engagements.

2.3.2 The Human Memory System as a Metaphor for a Knowledge Management System

2.3.2.1 The Human Neurological/Cognitive System

Human cognition may be defined as the collection of mental processes and activities used in perceiving, remembering, thinking, and understanding. This

cognitive system has both a set of biological/neurological components (the brain/nervous system) and a production-system architecture (the ACT-R model). The basic biological/neurological components of the human cognitive system are:

- Sensory Registers,
- Executive Control Processes,
- Short-Term/Working Memory, and
- Long-Term Memory.

The "sensory registers" are the points of initial contact with the environment where the interception of external stimuli occurs. The sensory registers include sight, hearing, touch, smell, and taste. Processing of incoming information from each of these registers begins immediately upon this interception, and we "select" information from among this input for further processing. Information that is not selected for this further processing is retained for a very short period, but eventually is permanently lost in a process known as decay (Kolb and Whishaw, 1995).

Collectively, the "executive control processes" comprise the set of components that reflects the allocation of resources to all aspects of the processing system. This allocation is necessary because our ability to perform mental work is limited by the degree of utilization of these cognitive resources. An example of a cognitive resource is "attention," the mental energy used to perceive, think, and understand (Bruning*, et al.*, 1995). Attention can be further subdivided into "focal attention" and "cognitive attention." Focal, or selective, attention is used to select information from the environment for additional processing. It is this focal attention resource that is involved in the "selection" of information from among this input for further processing from the sensory registers. This selection is not a conscious process; a human is continuously receiving information from each of the senses. Debate is on-going as to whether all incoming information is processed (full processing) or there is an early limitation on the processing of incom-

ing information (attenuated processing) (Bruning, *et al.*, 1995; Kolb and Whishaw, 1995).

Cognitive attention is the internal processing that connects newly selected information with the existing knowledge base. This occurs in short-term memory and is what we normally identify as thinking. “Short-term or working memory” is what we know as consciousness; this is where conscious, meaningful cognitive activity takes place. Working memory has both limited capacity and limited storage time; a specific “memory” that has been selected for further processing can still be permanently lost if either the capacity (interference) or storage time (decay) of working memory is exceeded before the information is transferred to long-term memory. The decay of information in short-term memory can be delayed through recycling the information in a process known as rehearsal/maintenance. This processing of these informational inputs within working memory again requires the expenditure of cognitive resources. These cognitive resources are also limited, leading to the potential for exceeding either the capacity or storage time constraints of working memory. It is processing within working memory that determines what is stored in the final system component (Bruning, *et al.*, 1995; Kolb and Whishaw, 1995).

“Long-term memory” theoretically has both unlimited capacity and permanence; however, access to the elements of long-term memory requires both time and effort (additional cognitive resources, although these are expended within working memory). Forgetting information that has been stored in long-term memory is not believed to be a permanent loss of that memory, but rather a failure at the reconstruction or retrieval of that information when it is needed. The reconstruction or retrieval of information from long-term memory is, in part, a product of its representation (Bruning, *et al.*, 1995; Kolb and Whishaw, 1995).

The biological and neurological components of the human memory system are shown in the model as Figure 2.5: The Human Memory System, on the fol-

lowing page. The model clearly demonstrates that there are several levels of processing prior to adding information to long-term memory. These processing levels allow for the identification of information that is considered worthy of further processing (selective attention), the capture and systemization of this information (cognitive attention, rehearsal/maintenance elaboration), and its dissemination (retrieval/reconstruction). The model also shows how information may be lost along these processing stages. Long-term memory consists of both declarative knowledge (facts) and procedural knowledge (how to use those facts).

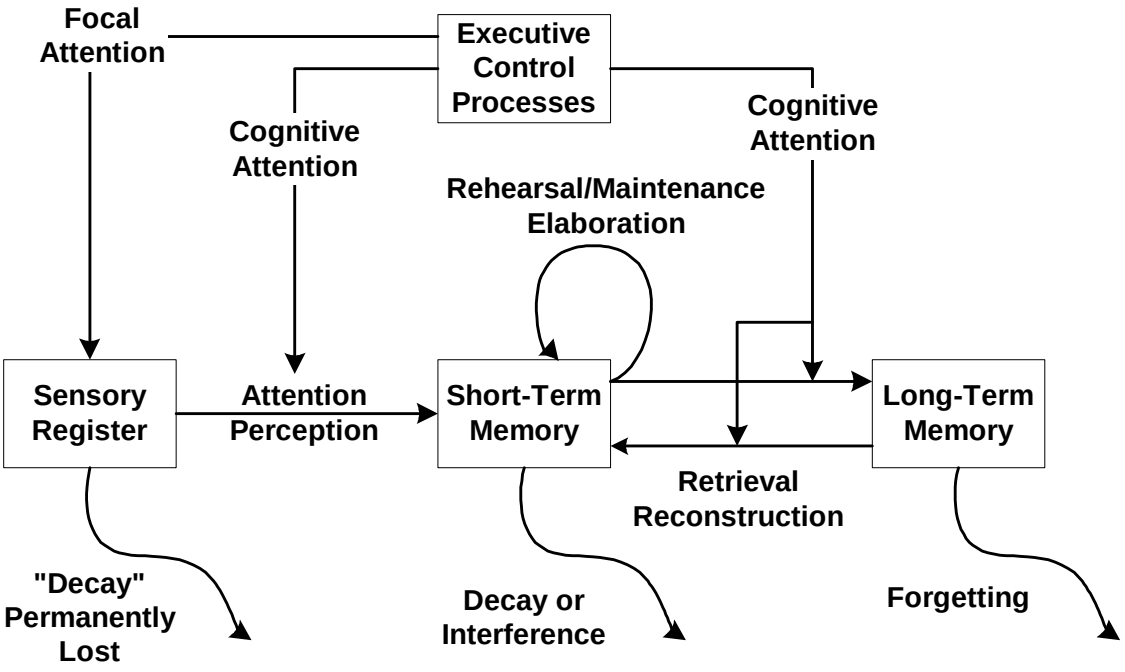

Figure 2.6: The Human Memory System

The ACT-R model represents declarative knowledge in schema-like structures or “chunks” that encode the category and contents of information. Procedural knowledge is represented by productions. Production rules specify the conditions and actions of productions, that is the conditions under which the action will take place and the outcome of the production, which can include creating new declarative knowledge. In the ACT-R model, declarative and procedural knowledge are intimately related. Production rules specify how chunks are

transformed and apply only when a rule's conditions are satisfied by the knowledge available in declarative memory. Thus, declarative knowledge provides the context in which cognitive processes, as represented by production rules, take place (Anderson, 1983).

The concept of "Spreading Activation" is a key feature of the ACT-R model. Spreading activation is seen as determining the level of activity in long-term memory. This activation must begin somewhere, and the points where activation begins are called "focus units." Once focus units are stimulated, activation spreads through associated elements. Any element's activation is a function of prior experience, the extent to which that element has been useful in the past, and the odds that it will be useful in the current context (Anderson, 1983).

2.3.2.2 The Human Memory System as a Metaphor for a Knowledge Management System

2.3.2.2.1 Control and Resource Allocation

The memory system model shown in Figure 2.5: The Human Memory System, on page 64, may be said to begin with the executive control processes. Human cognitive resources are limited, and the efficient operation of the cognitive system requires effective allocation of these resources. Similarly, management of any organizational purpose requires allocation of the organization's resources. If a company is to be considered a learning organization, then a purposeful knowledge management system must become an integral part of that company's operations. Such a system would clearly require executive sponsorship, allocation of significant resources, and a plan for its development, deployment, and maintenance; yet a recent survey of 143 organizations by the *Journal of Knowledge Management* showed that only seven percent of the respondents reported that their organizations had clear, explicit knowledge management goals, while an additional thirty-nine percent reported implicit goals.

2.3.2.2.2 Infrastructure

Many organizations will believe that the IT infrastructure they have developed at such cost over past decades provides the structure of their knowledge management system; however, this is only partially correct. As has already been discussed, an effective knowledge management system is a socio-technical system, and that IT infrastructure is just a small piece, albeit an extraordinarily expensive piece, of the overall knowledge management system of a global organization. The existing IT infrastructure can certainly act in the fashion of the human nervous system for the transmission of information, but the heart of a knowledge management system is the processing of the multitude of potential information/knowledge inputs for the identification, capture, and systematization of the knowledge that is to become part of the organization's strategic resources; and this is a human activity.

2.3.2.2.3 What Strategy to Implement: Codification or Personalization?

An effective knowledge management system will first define what type of knowledge is to be managed. In order to define the knowledge to be managed, a company must first select the appropriate knowledge management strategy. Hansen *et al.* (1999) present two strategies, codification and personalization, and argue that an organization must choose between the two strategies. They state:

> *…companies that use knowledge effectively pursue one strategy predominantly and use the second strategy to support the first. We think of this as an 80-20 split: 80% of their knowledge sharing follows one strategy, 20% the other. Executives who try to excel at both strategies risk failing at both. Management consulting firms have run into serious trouble when they failed to stick with one approach.*

While this statement makes intuitive sense – by specializing on one strategy predominantly one would expect that the organization's probability of successfully implementing that strategy would increase – it is not the way that the human system works.

The human system has five different sensory modalities, instead of just two, and each would seem to involve a different strategy of process the input. Apparently, however, the human system is able to maintain some type of balance in processing the stimuli across these modalities. Certainly, at any given time, priority may be given to one modality over the others, as the occasion requires. For example, if I am involved in a conversation, I will probably be a better conversationalist if I devote a significant portion of my attention to listening to what the other person is saying rather than watching something happening in the background. I may be capable of "balancing" all of my senses in a fashion, but to do something really well, in this case converse, I may need to focus for a time. Interestingly in humans it is said that when one is deprived of one or more of their senses (*e.g.*, they are blind or deaf, *etc.*), the other senses may become more acute to in part make up for the missing input. The ability of the human system to both balance and focus as required is what makes humans successful in interaction with their environment; other animals have much more acute senses, but only humans have been able to find the right mix that has allowed them to master their environment.

Hansen *et al.'s* (1999) two strategies look at "knowledge" in two very different ways, almost as if there were different sensory modalities inputting stimuli for consideration. Under the codification strategy, knowledge is the artifact that can be captured and stored, while under the personalization strategy, knowledge is closely tied to the person that holds it (through experience, learning, or whatever means) and the system facilities identification of and communication with these people. Unlike the human system which can both balance sensory input and can focus it as needed, Hansen *et al.* argue that the company must focus its development efforts on only one of these and may have some small effort in the other. As stated earlier, this seems to ring intuitively true; but, it also has the feel of trying to ride a bicycle with only one wheel. An organization

would seem to need to be alert to all aspects of its environment and able to use all of the tools at its disposal. My study examined this issue and those findings will be reported later.

2.3.2.2.4 Identification and Capture

However, even when a specific strategy has been selected, further definition of the knowledge sources and types to be scrutinized must be made. An active effort to identify and capture all potential inputs would surely overload both the processing and storage capacity of any system under either strategy. Overloads in the processing capability would cause some of the inputs to be lost through "decay," while overloads in the storage capacity would cause some of the inputs to be lost through "interference." Defining what knowledge is to be managed is clearly a strategic decision and requires the attention of the organization's senior management. This is a resource allocation problem similar to those addressed by the executive control processes in the human system. Once the product of the knowledge management system has been defined, the necessary structure to produce this product can be designed.

The employees function as an organization's sensory registers. The first information processing challenge in the human system is that of sorting through the multitude of sensory inputs to identify and select those that warrant further processing. An organization faces a similar problem; each of its employees can be considered as an analogue for an individual sensory modality, and each employee will potentially produce information/knowledge to be processed. Fortunately, while there is not an obvious order for the processing of input from the human senses, in an organization there is a degree of logical order. Clearly, the probability of significant knowledge input is higher from the organization's managers and knowledge workers than from those employees lower in the corporate hierarchy. Thus, because there are simply insufficient resources to attempt to identify and capture everything, any potential knowledge input from these other em-

ployees would probably be lost through decay as would any potential knowledge input from the organization's managers and knowledge workers that they failed to submit for consideration – this is what Badaracco (1991) calls migratory knowledge.

The larger issue, however, is how to sort through all of the potential input from the designated employees in order to identify the important inputs. Only the individual employee/work group that has had the experience is capable of the initial selection of their new knowledge for input into the system. While there have been technological advances in support of this initial selection/identification, human input is still required. Moreover, this selection process is quite difficult and the organization will need to provide the resources (either training for the individuals or specifically trained individuals) to assist in the selection process. Any potential input not selected at this initial level would be eventually lost through decay. Thus, an effective knowledge management system must provide both adequate incentives to encourage this reflection and input by the individual employees/work groups concerned and the resources to make this reflection effective.

2.3.2.2.5 Systemization

Once the individual employee/work group proposes input to the knowledge management system, it must be processed to determine whether, and if so how, it should be incorporated into the organizational knowledge base. As in the human system, this might well be done in several stages. The early part of this processing could be done by the existing middle management structure of the organization; however, the ultimate decision must rest with reviewers capable of seeing the broad strategic picture. This broad strategic view may be accomplished within a functional area or it may depend on a cross-functional review. The management of the organization's knowledge resources would in large measure determine the organization's future direction and success.

2.3.2.2.6 Dissemination

While the identification, capture, and systemization of knowledge are all essential parts of any knowledge management system, it is the dissemination of the knowledge that is crucial. With apologies to Sir Francis Bacon (1597), knowledge in and of itself is NOT power for the organization; only when knowledge is shared and utilized throughout the organization does the organization gain power. Organizations have been developing and refining methods of sharing/disseminating their knowledge since their inception. Standard operating procedures, company policies, *etc*., are all ways to share/disseminate knowledge; however, while these methods may be effective in disseminating templates of procedures to be followed, not all knowledge can be exactly templated. How does an employee faced with a problem identify the elements in the organization's knowledge base that represent similar, but still somewhat different, previous problem situations?

2.3.2.2.6.1 CATALOGUING

Many companies have adopted a library approach to their knowledge bases. The contents of the knowledge base (either documents or expertise) are catalogued, and indices are developed to assist in finding a specific element of the knowledge base. However, like using a dictionary to find the spelling of an unknown word, an indexing system may not be helpful to all users. Finding the needed knowledge can be like looking for a needle in a haystack. A better system of knowledge dissemination is needed. It is here the production-system architecture of the ACT-R model and its use of the concept of spreading activation should prove valuable.

As discussed earlier, in the human cognitive system, nodes of declarative knowledge are linked by procedural knowledge. The strength of these linkages is based on either the depth of the processing that occurred when the nodes were stored in long-term memory or the number of times that the specific linkage

since has been called upon ("fired"). The stronger the linkage between the nodes, the greater the association between the nodes. Any of these nodes can become a focal unit (the beginning point of a "spread" to associated nodes) simply by the declarative knowledge in that node being fired. The associated nodes can be wildly dissimilar; for instance, the word "bridge" is associated with a structure spanning a river or road, a card game, a component of a computer network, and many other meanings. Each of these meanings is appropriate in a particular context, and it is through the context that we assign meaning to the word. However, the evidence suggests that we consider all possible meanings before settling on the one appropriate meaning. This is essentially a browsing function with appropriate filters to quickly cull inappropriate information.

A similar function might be adopted for an organization's knowledge base. Organizations develop their own jargon, their own corporate-speak. This corporate-speak becomes a part of the "interpretive schemes" of each of the organization's members. Therefore, the incorporation of the organization's own corporate-speak as focal nodes in the cataloguing system would simplify the search function for elements associated with the node. Just as the ACT-R model and spreading activation allow for the identification of the appropriate portions of the human knowledge base with a minimum of cognitive resource expenditure, a corporate knowledge base should and could be similarly user friendly. This is clearly an area where IT holds great promise.

2.3.2.2.6.2 System Maintenance and Review

Just as in the human system, resources are expended in the application of cognitive attention to the movement of input from the sensory registers to short-term memory for processing and from short-term memory into long-term memory for final storage; an organization must provide similar dedicated resources for these tasks. Thus, the metaphor indicates that there should be a dedicated knowledge management organization, and that the degree of resources available

to that organization will in some part determine the amount of potential organizational knowledge capital that is lost through failure to be processed or mistakes in processing (akin to the human losses through decay and interference).

The human system also expends cognitive resources in the rehearsal/ maintenance function that is the processing of inputs in short-memory. Again, the need of in-place organizational resources to provide a similar function that mimics the human system is indicated. Additionally, rehearsal/maintenance would seem similar to the need of the organization to provide for personnel to continually review and keep current its organizational knowledge capital.

2.3.2.2.7 Synopsis of the Metaphor Discussion

While not wishing to extend the human metaphor too far, clearly each of an organization's employees can be viewed as a sensory register for that organization's learning process. As in the human cognitive system, the stimuli acting on these sensory registers result in a volume of potential informational input well beyond the capacity of the organization to capture, identify, and systematize. Thus, a learning organization, like humans, must have procedures in place for an initial selection of which inputs will even be considered as pertinent knowledge.

While the organization's IT infrastructure may be seen to represent the human nervous system in its transmission of these inputs, the actual selection of inputs for consideration for further processing must involve human decision-making. Similarly, the further processing of this information (analogous to the human working memory processes) is a human activity. However, the long-term storage of those identified and systematized best practices and the dissemination of these memories will clearly involve the IT infrastructure. This infrastructure would be most efficient if it could simulate the spreading activation process of the ACT-R model.

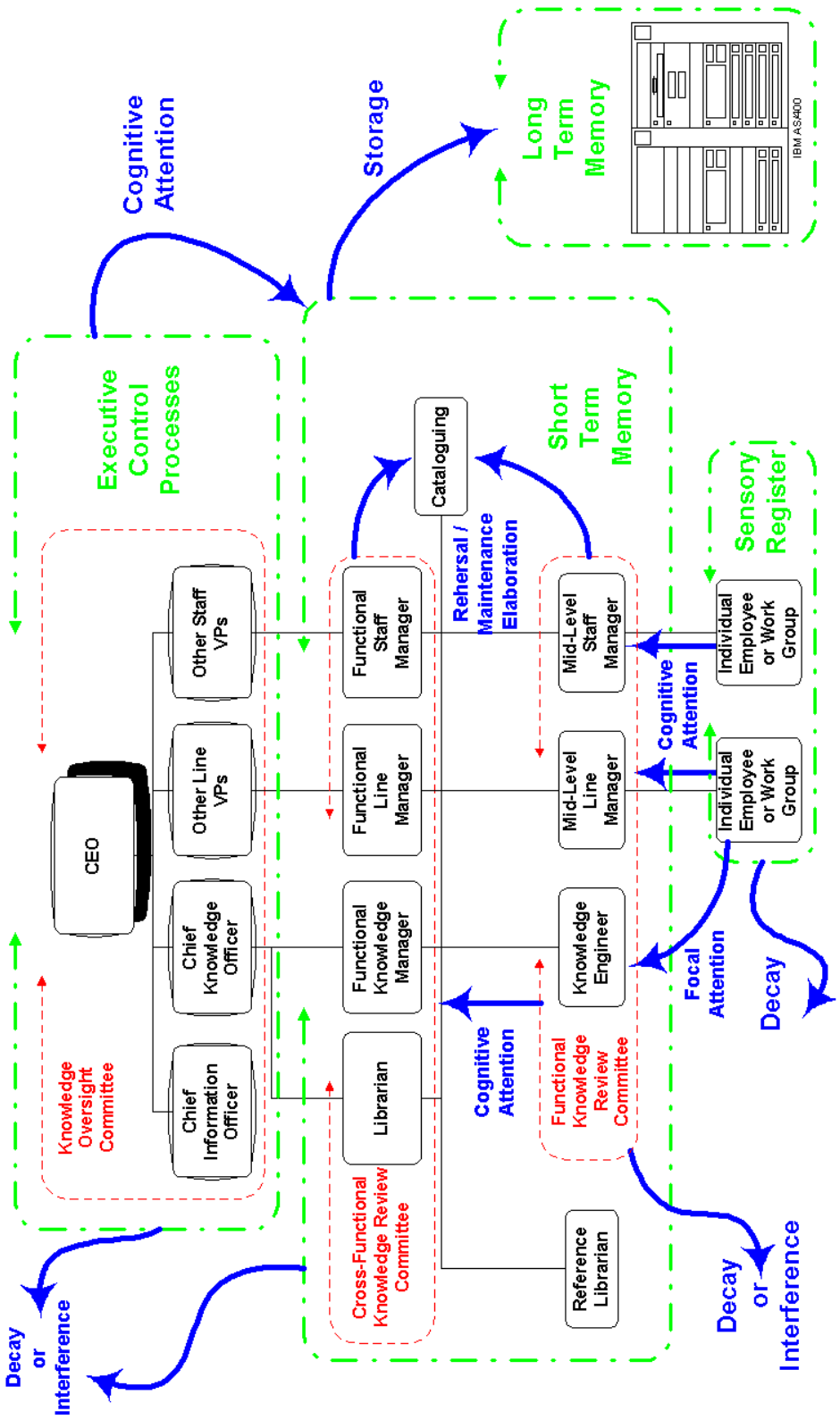

Figure 2.7: The Human Memory System as a Metaphor for a Company's Knowledge Management Organizational Structure

Figure 2.6: The Human Memory System as a Metaphor for a Company's Knowledge Management Organizational Structure, on the previous page, provides a graphic depiction of the metaphor described in this section. The model is organized along the four major components of the human system:

- The employees of the organization as its "Sensory Registers;"
- The lower and mid-level components of the formal knowledge management organization as the organization's "Short-Term Memory;"
- The organization's data repositories as its "Long-Term Memory;" and,
- The organization's executive leadership, functioning as a final "Knowledge Oversight Committee," as the organization's "Executive Control Processes."

Both the expenditure of cognitive resources and the potential of loss of organizational knowledge capital is clearly shown in the model.

2.3.3 Conclusion

While any organization, if it is to survive, must "learn" from the experiences of its employees, a "Learning Organization" formalizes the process of identifying, capturing, systematizing, and disseminating this knowledge. In this way, it attempts to ensure that a higher proportion of this valuable resource is retained and shared within the organization. The decision to become a learning organization, and I contend that it must be a conscious decision by senior management, must involve a significant allocation of corporate resources. While in most organizations the IT infrastructure is already in place, the staffing and procedures for the capture, identification, and systemization of knowledge that are necessary to a successful knowledge management system must still be developed.

Just as the second section of this chapter ("Theoretical Framework of the Study" beginning on page 15) began to develop some of the anticipated dependent

variables and some of the independent variables for this research, this section has laid a conceptual foundation for how I intend to analyze the system structures from the data that I collected. As with the preceding section, this section extends the sensitizing concepts that I anticipate in the upcoming analysis of my data. Again, it must be remembered that other themes will emerge and modify my understanding of these concepts as the research progresses. However, based on my conceptualization and my literature review, the following sensitizing concepts are proposed for my preliminary research model:

- the identification and capture of "knowledge" at the sensory register (individual employee/workgroup level);
- the application of resources to this identification and capture of "knowledge;" the existence of a rehearsal/maintenance or elaboration loop in the organization's short-term memory (its functional and cross-functional review levels);
- a long-term memory function that allows for the storage and retrieval of that "knowledge" that is selected for storage in short-term memory; and,
- the existence of a knowledge oversight committee that provides the executive control processes of the system.

2.4 Research Model for the Study

Theory provides a foundation for research. A research project with a clear and solidly developed theoretical framework benefits from better insights into the study's objectives, its overall design, and, ultimately, its findings. Two theories, an established stream of research, and a metaphor that I propose were discussed in this chapter of the dissertation:

(1) Rogers' Adoption of Innovation Theory;

(2) Giddens' Structuration Theory;

(3) Critical Success Factor Analysis; and,

(4) The Human Memory System Metaphor that I have proposed.

The combination of all of these "theories" forms the theoretical and conceptual framework of my study.

As discussed earlier, knowledge management systems are a new technology that has been presented by its proponents as an innovative technique that will lead to a competitive advantage for the organizations that adopt it. Many organizations have opted to attempt to adopt this new technique. The use of Rogers' Adoption of Innovation Theory provides an initial framework for studying an organization's attempt at adoption of knowledge management system technology. However, as this theory delineates, not every innovation that is either considered for adoption or that even begins the "trial" process ends up being adopted by the organization that began the process. What are the reasons that some innovations are adopted and others are not?

But what is meant by "adoption"? While I feel that Rogers provides an insufficient definition of adoption, I propose that the degree of institutionalization of the technology undergoing consideration of adoption is an indication of the degree of the adoption of that technology. Further, I postulate that this institutionalization can be richly considered through the lens of Giddens' Structuration Theory. The use of Structuration Theory does not address in a quantifiable means whether the technology being adopted does in fact provide the competitive advantage that its proponents anticipated, but I further postulate that the degree to which an organization institutionalizes a new technology correlates highly with that organization's perception of the level of competitive advantage conferred by the technology. Therefore, I expect that the degree of institutionalization of a new technology, such as a knowledge management system, can function as a surrogate indicator for competitive advantage until more objective measures are identified and ways to measure them found. Among the most dramatic changes of this Information Age is the rapidity with which new and inno-

vative technologies are institutionalized by their adopters, and how quickly this adoption spreads. If the use of a knowledge management system does truly confer competitive advantage on an adopting organization, or is at least perceived to do so by the organization, then evidence of the institutionalization of this technology should be clear.

The earlier work with critical success factors in such areas as executive information systems (EIS) and its current applications in data warehousing may provide clues as to why some innovative technologies are ultimately adopted while others of equal promise end up "falling by the way-side." Clearly, the critical success factor frameworks developed for the EIS and data warehousing fields are only a beginning point, as one would expect that each new technology (such as knowledge management systems) would have critical success factors that are unique to that technology, and that some of the critical success factors of an earlier technology might not be as critical for the new technology. However, this earlier research has indicated that certain factors can ultimately be identified as being critical to the adoption of a new and innovative technology.

Finally, the use of the human memory system as a metaphor for an organizational knowledge management system provides an organizing structure to the major components of such a system and speaks to organizational issues that must be addressed in such a system. While technology is clearly a component of a formal, computer-aided knowledge management system, the use of this metaphor begins to organize the social side components of this socio-technical system.

Thus, while the knowledge management system itself is modeled like the human system with its sensory registers, short-term memory, long-term memory, and executive control processes, the organization is modeled as Giddens three structures. If the existence of a formal, computer-aided knowledge management system does convey some competitive advantage, then over time one would expect structural changes in the organization that implemented the sys-

tem – this "changed" organization is shown as the model of the organization prime. Based on the preceding discussion I propose the research model shown on the following page for my study:

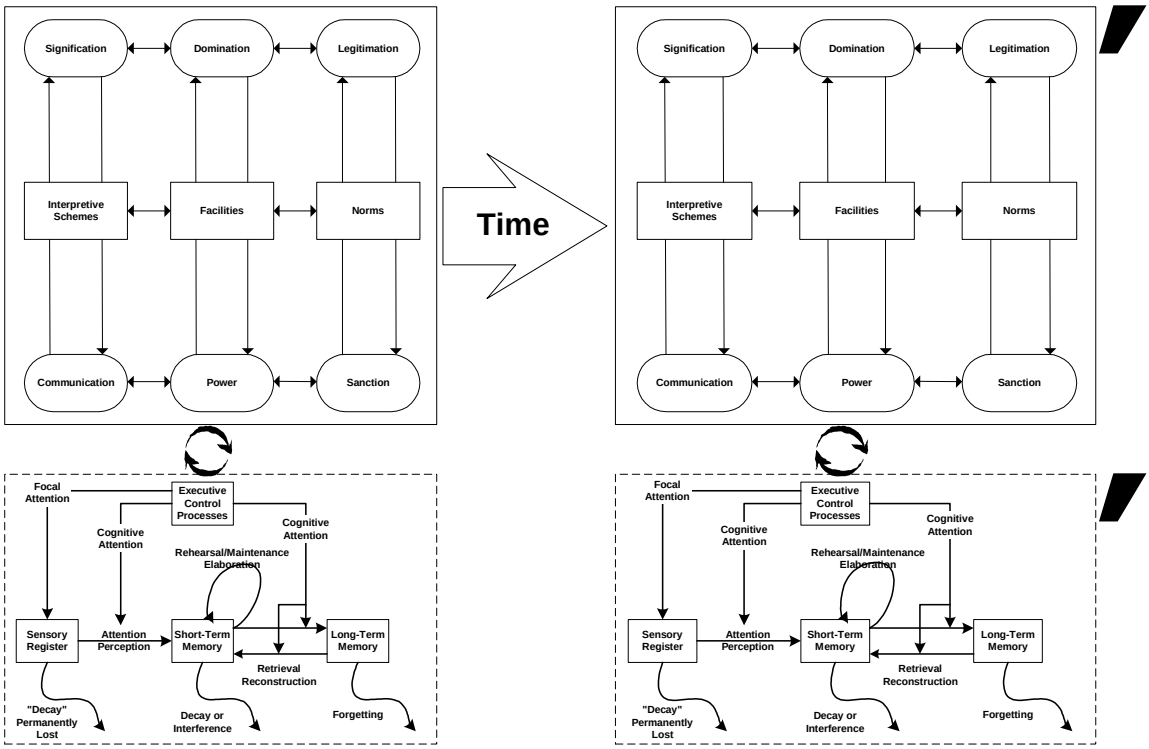

Figure 2.8: Preliminary Research Model

2.5 Study Objectives

The most common purposes of research are: (1) exploration, (2) description, and (3) explanation (Babbie, 1998); Marshall (1995) adds another purpose, (4) prediction. *Exploratory* research is frequently used when the topic is relatively new and the researcher knows little about it. Exploratory studies typically have at least one of the following three purposes: (1) to expand the searcher's understanding of the topic, (2) to determine whether more extensive study is warranted, or (3) to develop methods to be used in a subsequent study. *Descriptive* research is based on the careful description of situations and events. From these descriptions, the researcher can then attempt to examine "why" the observed situations exist. *Explanatory* research is generally undertaken when the

objective is to explain "why" certain relationships exist (Babbie, 1998). *Predictive* research occurs when the researcher attempts to predict the outcome of a phenomenon or to forecast the events and behaviors resulting from the phenomenon (Marshall, 1995).

The topic of knowledge management is relatively new; only a little empirical research into the application and use of these systems in organizations has thus far been published. Therefore, this topic was quite appropriate for either *exploratory* or *descriptive* research. The focus of this research was an *exploration of* the development and use of knowledge management systems within selected organizations and a *description of* the structure and policies governing the development and use of these systems within organizations. The principal objectives of this research were:

1. To describe the structure and policies governing the development and use of computer-aided knowledge management systems within the organizations selected for analysis;
2. To describe how these structures and policies contribute to the institutionalization of knowledge management within the overall organization; and,
3. To refine a series of research propositions and then to develop hypotheses that can be empirically tested at a later stage in the body of research that this study is intended to begin.

To this end, my literature review has led me to the following set of preliminary propositions that were examined and refined during this study:

1. There must be a "committed champion" who is willing and able to support the KMS.
2. There must be "appropriate resources" available to the infrastructure of the KMS.

3. The knowledge stored within the KMS must show a “clear link to the business objectives” of the organization.
4. The KMS must be managed in such a way as to overcome “organizational resistance.”
5a. The technical infrastructure of the KMS must provide appropriate “management of data.”
5b. The technical infrastructure of the KMS must provide for knowledge of sufficient “information quality.”
6a. Efforts to capture knowledge must be timely.
6b. Provision should be made to assist in the process of making tacit knowledge explicit.
7. A system for focusing limited resources on the most probable productive sources is required.
8a. Provision should be made for a dedicated organization for knowledge management.
8b. Provision should be made for a series of reviews of the input, interpreting it in terms of the previously accumulated knowledge.
8c. Provision should be made for comprehensive cataloguing and retrieval.

Chapter 3: Methods

This chapter details the research design of my study; it includes:

- a description of the *research method* followed;
- a definition of the *study population* and how it was sampled;
- a definition of my *role* as the *researcher;*
- a description of the *data collection method* used;
- a description of the *study protocol;*
- a description of the *data analysis methods* used; and,
- a description of the *limitations* of the methods used.

Each of these elements was consistent with the objectives of the study. My study employed a multi-unit, cross-sectional case study research design using multiple measures within an "embedded" case design. In this chapter, the details of the research design and its design elements are discussed.

3.1 Research Method

This is a qualitative study. Qualitative methods are used to identify whether an element is present or absent, while quantitative methods would involve the measurement of the degree to which an element is present (Kirk and Miller, 1986). Given the exploratory and descriptive nature of this research, one of the qualitative methods was clearly more appropriate. Once the objectives of this study are met, the next stage of the proposed body of research will involve the use of quantitative methods to take the hypotheses developed from this study, operationalize them, and then test those hypotheses.

The case study method was determined to be most appropriate for this research project. The case study method is an intensive, holistic description and analysis of a single unit or a bounded system (Merriam, 1998). Thus, the case

study method, which emphasizes the context of the research, is generally considered to be appropriate for studying areas and topics for which the variables of interest have not been clearly identified (Benbasat*, et al.*, 1987).

This research employed a multi-unit case study research design using multiple measures within an "embedded" case design *(e.g.,* multiple levels of analysis within each case) (Yin, 1984). Case research is the most common qualitative method used in information systems research (Orlikowski and Baroudi, 1991). The choice of case study research is warranted when:

- the research *objective* is exploratory, descriptive, or explanatory rather than predictive in nature;
- the *focus* is on contemporary rather than historical events (Yin, 1984);
- the research cannot be done experimentally for practical or ethical reasons (Marshall, 1995); or,
- when the complexities of the organizational context are needed for an accurate understanding of the phenomenon under investigation (Orlikowski, 1993).

Case study research also tends to be appropriate when:

- the phenomenon of interest is examined in its *natural setting*;
- the focus is on *contemporary* events;
- the research phenomenon is *not supported by a strong theoretical base*; and,
- experimental controls or *manipulation are not involved* (Benbasat*, et al.*, 1987).

Case study research, like other field studies, examines phenomena in their natural context. The distinction between case studies and other field studies lies in the fact that a case studies researcher "*...may have less a priori knowledge of what the variables of interest will be and how they will be measured...*"

(Benbasat*, et al.*, 1987). However, others view this distinction as far more subtle, since advance knowledge of variables and constructs is possible in both methods (Benbasat*, et al.*, 1987).

3.2 Population and Sample

Selection of an appropriate population helps to control for extraneous variations, as well as to define the limits for generalizing the findings of the study. Furthermore, the selection of cases from the population is particularly important when the goal of the research is theory-generation (Eisenhardt, 1989). The population for this was all organizations currently using or in the process of implementing a computer-aided knowledge management system. The sample frame for the study was all large, multi-national consulting/professional services organizations who were either currently using or in the process of implementing a computer-aided knowledge management system. These organizations were selected as the sample frame because of my assumption that they would tend to be more "cutting edge" in their development and implementation of knowledge management systems. My position in this stemmed from two suppositions. First, it is clear in the consulting/professional services organizations that "knowledge" is their stock-in-trade; therefore, managing their knowledge capital would seem to have an even higher priority for this type of organization than others. Secondly, these organizations have a clearer opportunity to spin-off some of their knowledge management expertise as a product to be offered to their clients; whereas, while the same opportunity would also exist for other types of organizations, their existing relationships would not necessarily support such a new venture. I understood that these organizations were acknowledged leaders in the development of knowledge management systems.

3.2.1 Unit of Analysis

For this study, the unit of analysis is the organization, and specifically large, multi-national consulting/professional services organizations, drawn from

the sample frame, that are either currently operating or are in the process of developing a formal, computer-aided, knowledge management system.

3.2.2 Unit of Observation

One cannot observe an organization directly; therefore, one observes surrogates, called units of observation. Units of observation are those things that we examine in order to create summary descriptions of all such units and to explain differences among them. Units of analysis may also be individuals, groups, organizations, or social artifacts (Babbie, 1998). For this study, the units of observation were either employees within the organization who were involved in some fashion with the organization's knowledge management system or the documentation of the organization that pertains to that knowledge management system. The employees observed were sub-divided into three categories:

- Knowledge Management Professionals – those employees who are directly involved in the development or maintenance of the organization's knowledge management system;
- Users – those employees who utilize, or should utilize, the organization's knowledge management system in the furtherance of their employment objectives; and,
- Senior Personnel – those employees who, because of their position in the organization, can provide insight into the organizational effectiveness of the knowledge management system. These employees include representatives from both the knowledge management professional and user communities.

3.2.3 Number of Cases

Case study research is characterized by the use of a small number of cases in which a few entities (persons or groups within an organization) are examined in great detail (Benbasat*, et al.*, 1987). However, it is difficult to determine the

number of cases needed in advance. Eisenhardt addresses the issue of the number of cases to be selected with:

> *Two issues are important in reaching closure: when to stop adding cases, and when to stop iterating between theory and data. In the first, ideally, researchers should stop adding cases when theoretical saturation is reached [Theoretical saturation is simply the point at which incremental learning is minimal because the researchers are observing phenomena seen before (Glaser and Strauss, 1967)]. This idea is quite similar to ending the revision of a manuscript when the incremental improvement in its quality is minimal. In practice, theoretical saturation often combines with pragmatic considerations such as time and money to dictate when case collection ends. It is not uncommon for researchers to plan the number of cases in advance...Finally, while there is no ideal number of cases, a number between 4 and 10 cases usually works well. With fewer than 4 cases, it is often difficult to generate theory with much complexity, and its empirical grounding is likely to be unconvincing, unless the case has several mini-cases within it...With more than 10 cases, it quickly becomes difficult to cope with the complexity and volume of the data.* (Eisenhardt, 1989)

Thus, there is a balancing act between reducing the number of cases in order to obtain a rich understanding of what is happening within the case and increasing the number of cases in order to form a solid foundation for any theory generated from the analysis of the cases studied. Eisenhardt addresses the difficulty of determining the number of cases to be studied in advance. I determined that three cases would be investigated for this study. I selected this number with a view to providing the opportunity of finding adequate variation between the individual cases, while allowing the possibility of adequate description in the case write-ups to allow the reader to understand the findings. I viewed my decision to investigate three cases as a minimum number to be studied. Had it appeared to me that the three cases selected did not provide the adequate foundation for my analysis that I desired, I would have expanded the number of cases. However, as I was finishing the interviews and initial analysis of the second case, I realized that, with some notable exceptions, many of the same themes were appearing. It was clear in the third case that most of the emergent concepts

were becoming theoretically saturated. Strauss and Corbin (1990) define theoretical saturation as:

> *...(1) no new or relevant data seem to emerge regarding a category; (2) the category development is dense, insofar as all of the paradigm elements are accounted for, along with variation and process; (3) the relationships are well established and validated.*

As I believed that I had reached the point of theoretical saturation, I did not believe that any more cases were required to complete this phase of my body of research.

3.2.4 Selection of Cases

The guidelines for the selection of the specific cases to be studied are much less stringent that the guidelines for sample selection in quantitative research. The sample frame was still fairly broad (*i.e.*, consulting/professional service organizations that were either already operating or were in the process of developing a formal, computer-aided, knowledge management system), and I intended to limit it even further to just management consulting organizations meeting the other criteria already established. However, that proved difficult in that many of the large, multi-national management consulting organizations are actually divisions of even larger professional service organizations. Making it even more difficult to enlist the cooperation of these companies was the fact that a recent regulatory rule was seen to encourage the spin-off of the management consulting divisions as separate companies so as to avoid the appearance of any conflict of interest. One management consultancy that originally agreed to be a participant in my study withdrew after being spun-off and sold by the professional service organization of which it had been a part. Another participant was involved in arbitration as to its subsidiary relationship with the larger professional services organization, while another participant was under rumors of its sale while I was conducting my interviews. Finally, when the third participant agreed to participate in the study, their management consulting group was still

a part of the organization; however, the interviews with this participant were delayed until after their Global Knowledge Management Office had rolled-out a new version of their knowledge management software. During this time, the company spun-off their management consulting organization; however, the agreement to participate had come from the larger professional services organization, not the spin-off. As the spin-off occurred just before my initial interviews, I was not aware of the spin-off until it was mentioned in one of the interviews. After discussing the situation with my committee chair, I decided to include this participant as one of my three cases.

Each of the three corporate participants wished to have their cooperation publicly identified as a condition of their participation. As each of these participants are quite well-known, I believe that their open identification adds to the strength of my findings. The three cases are Accenture (formerly Andersen Consulting), KPMG International, and the Management Consulting Services (MCS) division of PricewaterhouseCoopers (PwC). Both Accenture and the MCS division of PwC are management consultancies, while KPMG International is a professional services organization. Each of these large, multi-national organizations had developed and implemented a formal, computer-aided, knowledge management system and were considered to be excellent participants for my study. As a reminder, in the interest of their confidentiality, all of the individual respondents are identified by pseudonyms throughout this document.

3.3 Data Collection Method

Four fundamental methods are available to the qualitative researcher for gathering data: (1) participation in the setting, (2) direct observation, (3) in-depth interviewing, and (4) document review (Marshall, 1995). This research employed both semi-structured interviews and document reviews. The planned internal data collection strategy is presented in Table 3.1, on the following page.

Table 3.1: Internal Data Collection Sources

Type of Data	Location of Data
Interviews	• The sponsor/champion of the knowledge management system, • The project manager of the knowledge management system, • Personnel involved in the cataloguing of new knowledge being added to the corporate knowledge base, • Personnel involved in the final review of proposals for inclusion in the corporate knowledge base, • Personnel involved in any intermediate reviews of proposals for inclusion in the corporate knowledge base, • Personnel who have submitted proposals to the corporate knowledge base, • Personnel, who from their position could have submitted proposals to the corporate knowledge base, but have not, • Personnel who have utilized the corporate knowledge base, and • Personnel, who from their position could have utilized the corporate knowledge base, but have not.
Documents	• Organizational mission statement; • Departmental strategic plan; • Departmental mission statement; • Departmental strategic plan; • Organizational charts; • Position descriptions; • Technology spending in the KMS area; • Technical documents as regards operation of the KMS; and, • Human resource policies as regards the KMS.

In practice, the planned data collection strategy proved difficult to attain. The three corporate participants were quite willing to make individuals available for interviews and the individuals interviewed basically met the categories requested; however, it proved difficult to obtain access to many of the written documents.

3.3.1 Interviews

It has been said that we live in an "interview society" (Silverman, 1993). In support of this, it is estimated that ninety percent (90%) of all social science research utilizes interview data (Briggs, 1986); in fact, interviewing seems to be an almost universal means of systematic inquiry (Hyman*, et al.*, 1975). There are

many different types of interviews; Moser (1987) distinguished them along a functional continuum from practical interviews whose purpose is to educate or evaluate, to interviews with more abstract or academic goals. The Maccobys (1954) classified interviews by their degree of standardization - whether the interview used a structured format or a more flexible format.

Another way in which interviews may be differentiated is the degree of interviewer involvement. Many researchers believe that the interviewer is a potential source of bias in arriving at what the respondent "knows" (Gorden, 1987); from this perspective, the less interviewer involvement, the more accurate the interview. However, an interview is a social interaction between the interviewer and the respondent. Treating the interview as a social encounter recognizes the possibility that the knowledge gathered in an interview is created from the action taken to obtain it (Cicourel, 1964; Cicourel, 1974; Garfinkel, 1967). From this perspective, the respondent's

> *...fund of knowledge is diverse, multifaceted, and emerging resource" and "access to it is actively selective and constructive. In this view, the respondent both construes and calls on what is considered relevant in relation to the matters under consideration in the interview, assembling the information so that it makes sense as a response, that it coalesces into a circumstantially sensible and relevant story...* (Holstein and Gubrium, 1995).

The "active interview" format is one in which the interviewer's participation in this process is recognized as integral to the construction of knowledge (Holstein and Gubrium, 1995).

This research employed semi-structured interviews with a series of both open-ended and close-ended questions using an active format. Participants were asked a series of open-ended questions about their experiences related to their involvement in, use of, or failure to use their organization's knowledge management system. The basic script for the anticipated questions is shown in Appendix "A" on page 358. Probes followed the open-ended questions on specific points of

Table 3.2: Data Collected for the Study

Corporate Participants	Interviews	Documents
Accenture	21 Interviews with 20 Individuals • 13 KM Professionals (Including the Partner in Charge of the KM organization) • 8 Users (Including an Associate Partner)	• Corporate Mission Statement • KM Organization Mission Statement • KX 4.0 – Using the Andersen Consulting Knowledge Xchange • Knowledge Management Assessment Report • A Vision for Andersen Consulting's Knowledge Xchange System
KPMG International	21 Interviews with 19 Individuals • 10 KM Professionals (Including the Global CKO and a National CKO) • 9 Users (Including a Partner)	• Corporate Mission Statement • KM Organization Mission Statement
PricewaterhouseCoopers	14 Interviews with 16 Individuals • 7 KM Professionals (Including the Partner in Charge of the KM organization, 2 of the 3 Theater Leads, and the KM Global Technology Lead) • 7 Users	None
Total Interviews across the 3 Case Studies	56 Interviews with 55 Individuals • 30 KM Professionals (Including the Partners in Charge of KM in each of the organizations studied) • 24 Users • 989 Pages of Transcript	

their responses. These interviews were projected to last approximately sixty (60) to ninety (90) minutes; however, they actually ranged from approximately fifteen

(15) minutes to one all day presentation. Interviews were tape recorded and transcribed for further analysis.

A total of fifty-six (56) interviews were conducted for this study. A distribution of these interviews along with the documents analyzed for each case is shown in the table on the previous page.

All of the interview participants were volunteers, but their participation was requested by the organization within my parameters as to types of employee; I did not have any role in selecting specific individuals to participate in these interviews. The Accenture case study includes interviews with thirteen (13) knowledge management professionals, including the partner that heads the knowledge management organization, and eight (8) users of the system, ranging from an entry level analyst through an associate partner. The KPMG case study includes interviews with ten (10) knowledge management professionals, including the Global CKO and a National CKO, and nine (9) users, ranging from entry level accountants through a partner of the firm. The PricewaterhouseCoopers case study includes interviews with seven (7) knowledge management professionals, including the partner that heads the knowledge management organization, along with two of the theater leads for knowledge management and the global technology leader for knowledge management. The PwC case study also included interviews with seven (7) users of their system. These interviews resulted in 989 pages of transcript.

3.3.2 Document Reviews

While the participant companies were quite willing to make their employees available for interview, they were less forthcoming with internal documents. Only Accenture provided me with documents that made a significant impact on my analysis. They provided two planning documents for their knowledge management system ("Knowledge Management Assessment Report" and "A Vision for Andersen Consulting's Knowledge Xchange System") and a training manual

for their system. Each of these documents assisted in my understanding of the Accenture system.

3.3.3 Time Period of Interviews

A cross-sectional approach in data collection was applied to this research in that both interview data and documentary data was collected; however, this was primarily an interview-based series of case studies. The data collection was conducted between March, 2000, and May, 2001.

3.3.4 Procedures

Selected organization participants were initially contacted via informal means (*e.g.*, telephone or e-mail) generally based on contacts developed at lower levels in the organization. If the informal contact proved positive, then a formal request for participation was mailed to the organizationally designated point of contact in each participant organization. This package included: (1) an explanation of the research, (2) documentation of informed consent, (3) description of the requested interview participant characteristics, and (4) the questions to be asked during the actual interview. Based on this information, the participant organizations selected the actual interview participants in line with the criteria provided. Following transcription, participants were provided the opportunity to review their interview transcripts to ensure accuracy. Additionally, the findings of fact were provided to the organizational point of contact for review at the conclusion of the research. In this, the final research product, individual identifying information (*i.e.*, participant names) has been replaced with fictitious identifiers.

3.4 The Researcher's Role

An understanding of the researcher's subjectivities and the role that they may play in the study is crucial to the ultimate understanding of the product of that study. From a research philosophy perspective, I am unabashedly a post-positivist. By this I mean that I believe that there is an objective truth and that the purpose of any scholarly research is to come closer to defining that truth. As

a post-positivist, as opposed to a positivist, I accept that each researcher is an imperfect lens and that ultimately the view of "truth" that his research produces is clouded by the imperfections of his own human perceptions. Additionally, unlike the positivist, I recognize that it is not possible for any researcher to approach his research without some prior agenda formed by his experience. However, it is the duty of any ethical researcher to follow the data wherever it may lead rather than only consider the data that supports one's preconceptions.

On a personal level, I am a middle-aged, white male and I have spent the bulk of my working life either as a Naval Officer (I am retired from the U.S. Navy) or in various professional and managerial positions in small public or private organizations. I have not worked for either a management consulting organization or a large professional services organization nor have I worked with computer-aided knowledge management systems. However, I have many years of involvement with the use of computer-based information systems in many different capacities and am a strong believer in their value when well designed. Additionally, I have a personal perception of organizations as being vehicles for the leveraging of the individual strengths of their members; mine is almost a Bernardian (1938) perspective on organizations. Therefore, I expected to find that properly structured knowledge management systems would be institutionalized, although I believed myself capable of recognizing the fallacy of this belief, if the data led to that conclusion

As to the role that I expected to play in this study, the bulk of the data collection was through interviews. I expected to, and did, play an active role as an interviewer, probing when necessary to receive a rich account of the participant's experiences with the knowledge management system in his/her organization.

3.5 Data Analysis

While the collection and transcription of my interview data resulted in just under a thousand pages of interview transcripts. These transcripts were

analyzed to uncover thematic patterns (similarities and dissimilarities) relating to the identification, capture, review, cataloguing, storage, and dissemination of knowledge and the effect of the system structure for accomplishing these on the institutionalization of knowledge management within the organization. Searches for thematic patterns began on a within-case basis and then proceeded to cross-case comparisons. The thematic search process began with several close readings of the text to confirm (or deny) the appropriateness of the anticipated categories and to develop any additional categories or themes shared by one or more statements. Through my reading and rereading of the interview transcripts combined with the "understanding" I had gained in my literature review prior to beginning the data collection phase of this study, I came to believe that I had an understanding of the major themes found in my transcripts and was ready to begin reducing this data to manageable units.

This data reduction was accomplished through coding the various transcripts. According to Coffey and Atkinson (1996) coding can accomplish many purposes, among these is data reduction or simplification. In my approach to coding my data, coding actually served two purposes. It did aid in data reduction by focusing my attention on those parts of the transcripts that I believed to be important. But it also allowed me to refine and clarify my more general understanding of the major themes that I had found prior to my beginning the coding process. Miles and Huberman (1994) define codes as:

> *…tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Codes usually are attached to 'chunks' or varying size – words, phrases, sentences or whole paragraphs, connected or unconnected to a specific setting. They can take the form of a straightforward category label or a more complex one (e.g. metaphor).*

My codes were certainly this, but as Coffey and Atkinson (1996) point out, codes can be more than just links to related data fragments (facilitating data reduction), they can aid in the more important work of "…*establishing and thinking*

about such linkages…" (Coffey and Atkinson, 1996)(assisting in refining and clarifying my understanding).

This identification of thematic patterns through coding was accomplished with the aid of a qualitative analysis software package, NUD*IST NVivo. In my use of NVivo I adopted what Coffey and Atkinson (1996) call a "*code-and-retrieve procedure*." In doing do enacted the three operations that Coffey and Atkinson credit to Seidel and Kelle (1995):

- *…Noticing relevant phenomena,*
- *Collecting examples of those phenomena, and*
- *Analyzing those phenomena in order to find commonalities, differences, patterns, and structures* (Coffey and Atkinson, 1996).

Thus, my coding was more than a simple mechanical process, it was another step in the process of understanding the data.

While I used NVivo to code my data, this was just a computer-aided implementation of a more traditional and manual method of doing the same type of qualitative analysis. Just as codes provide a linkage between related data fragments, the same type of linkage could be accomplished by something like cutting out copies of the passages of interest from the interview transcripts and filing them into various categories for the themes identified. In a study such as mine, which collected approximately one thousand pages of transcript data, the use of a computer-aided process greatly facilitated my work. Because of its major impact on the analysis of the collected data, I believe that it is appropriate that I provide a detailed description of how I utilized NVivo in the analysis of my data.

NVivo is a database that stores links to the selected passages under each of the themes or codes identified. In NVivo these themes are called "nodes." A node can be considered as a database entity with the individual links to the selected passages as the instances of each entity.

Themes, or nodes, can be identified in two ways: (1) they are either indicated by the literature review prior to the beginning of analysis, or (2) they represent those unanticipated themes that emerge from the transcript during analysis. NVivo can accommodate both forms of identification. In NVivo, nodes can be organized as either freestanding (*i.e.*, unrelated to other nodes in the database) or into "trees." A "tree" is a hierarchical structure showing the relationships between the nodes contained in the tree. Nodes previously considered to be freestanding can be easily grafted to a tree when their relationship is understood, and nodes within a tree can be pruned when that need becomes apparent.

Based on my literature review, I had identified a number of anticipated themes/nodes for both what I expected would ultimately be developed into the independent variables of the hypotheses developed in this study (from previous critical success factor analysis of other types of information systems implementations) and the dependent variables of those hypotheses (from structuration theory). The themes (nodes) that I determined *a priori* were important components of my analysis of my data but, of course, were modified in the course of the analysis. These *a priori* themes/nodes are shown below:

Critical Success Factor Themes/Nodes

- Committed Champion
- Appropriate Resources
- Clear Link to Objectives
- Management of Organizational Resistance
- Management of Data
- Knowledge Quality
- Identification and Capture of Knowledge at the Sensory Register
- Functional and Cross-Functional Review Levels
- Long-Term Storage
- Executive Oversight Committee

Structuration Themes/Nodes

- Structure of Signification
- Structure of Domination
- Structure of Legitimation

Of course, these *a priori* themes/nodes are just one of the beginning points for the data analysis. It was fully anticipated that additional themes/nodes would emerge and that my understanding of these predefined themes/nodes would change as my understanding of the data grew. However, the use of NVivo simplified the mechanics of coding the data. The actual coding of the document followed the procedures many of the precepts of "Constant Comparative Analysis."

3.5.1 Coding with NVivo under Constant Comparative Analysis

Constant comparative coding allows the themes within the data to emerge, and NVivo assists in the mechanics of coding. Coding would occur in a three part sequential process:

- **Open Coding:** This is *"...the process of breaking down, examining, comparing, conceptualizing, and categorizing data*" (Strauss and Corbin, 1990).
- **Axial Coding:** This is "...*a set of procedures whereby data are put back together in new ways after open coding, by connections between categories*" (Strauss and Corbin, 1990).
- **Selective Coding:** This is "...*the process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement*" (Strauss and Corbin, 1990).

Thus under the constant comparative methodology, coding follows this sequence:

Transcript ⇨ Open Coding ⇨ Axial Coding ⇨ Selective Coding

3.5.1.1 Open Coding

I originally thought that the *a priori* themes that had emerged from my literature would form the starting point in my open coding of the transcripts; however, many of these themes were more in the nature of categories that represented the end of the open coding rather than its beginning. A better example of my process of opening coding would be my process of taking a segment of the

transcript text, assigning it a descriptive name, and assigning it as a free node in NVivo[2]. This selection and assignment broke the text down into fragments that I believed to be interesting or important. Then I compared each of these fragments with other fragments (nodes), both free and tree nodes, and in many cases found relationships that either combined several different free nodes into one larger single (free) node or I developed several different nodes, again both free and tree nodes, into a more complex tree node. These larger free nodes and the tree nodes are the result of developing categories under the constant comparative methodology.

3.5.1.2 Axial Coding

While open coding fractures the body of one's transcripts, axial coding begins to restore those fragments into a new and more organized whole. The process of categorizing the different nodes in NVivo continued in this phase of the analysis, but my perception of these categories was becoming "larger." My data, which had seemed so large and unmanageable during my first attempts at opening coding, was beginning to make sense to me. As an example, I had several text passages coded as "Globalization" because the word kept appearing and because I knew that one of the reasons that these companies had begun to develop their knowledge management systems was that they were expanding globally; however, during the axial coding phase I began to realize that there were many dimensions to the theme of globalization. These other dimensions had in some cases been coded under a different name, but were now combined as one node in NVivo. One of the functions of NVivo that makes it so valuable to a qualitative

[2] As a free node it is not a part of a larger category, although there may be other passages in the transcripts that are a part of this same free node.

researcher is the ease with which one can combine previously separate nodes into one category, or node, as the relationships become clear.

3.5.1.3 Selective Coding

Selective coding is generally seen as selecting one central category and relating all of the other categories to this one central theme. I did not do this. Instead I found several categories or themes that seemed to run through the data as unifying concepts. These unifying concepts will be discussed in Chapter 8, Section 8.2: Key Findings of the Research beginning on page 295 of this dissertation. In failing to identify "one" core theme, I believe that I departed from the pure definition of selective coding. However, I also believe that I remained true to my data and have provided a more accurate reflection of the stories that my respondents were trying to tell.

During this study my version of the selective coding phase was intimately tied into the writing-up phase. I previously described my use of NVivo as a "*code and retrieve*" procedure; while this is correct, it does not describe the details of the retrieval. In combining the writing-up and selective coding phases, I was attempting to weave the major themes that had emerged from my data into a coherent story. As I was trying to tell a part of that story, I would realize that an element was either missing or needed to be expanded. This would take me back into the coded data. I was drawn to categories that I had not previously realized were related. I was amazed at how well I knew the data and how previously unseen relationships would arise as I was writing-up. In some cases I had to recode certain previously coded categories as I developed a better understanding of the story that the data was trying to tell. The combination of writing-up and selective coding completed the process of recombining the fragments of my data into a coherent whole which is now represented by this dissertation; although, some might describe this as the completion of the axial coding phase and not selective coding at all.

One functionality of NVivo which proved useful during both this and the earlier axial coding phase was its ability to manage "sets." In NVivo a set is simply a grouping of either documents or nodes for purposes of working with them together. As an example, all interviews from a particular company formed a set and I could look at categories across that set. Two of the other sets were all knowledge management professionals and all users. Again, I could look at categories across these sets. These sets were certainly used to establish parameters for my searches, but they allowed the story to emerge from the data more easily.

3.5.1.4 Coding Synopsis

The process of coding the number of documents involved in this study required was large. I spent many months coding and recoding these documents. The final set of codes, both free nodes and tree nodes, is shown in Appendix "B" on page 367 of this report. I finished with fifty-one (51) nodes (27 free nodes and 24 tree nodes); these nodes coded 1,977 passages[3] of the transcripts' text. Did I code the documents correctly? Is there more to their story to tell? I believe that I have identified the heart of the story that my respondents were trying to tell, but I know that there is still a tremendous amount of rich detail that is not done justice to in this account of their story.

As with any database, it is the retrieval capabilities of NVivo that make it truly useful to a qualitative researcher. The use of nodes and sets allows the researcher to precisely craft the search to the question to be answered, and NVivo not only can return the individual passages that meet the parameters of the search, but can also expand the response to show the context in which those passages were situated.

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[3] A passage might be a phrase or a number of paragraphs.

Finally, it must be understood that my use of NVivo is simply as a tool of the researcher – it does NOT define the analysis process. It simply takes one of the traditional qualitative analysis methods (*i.e.*, "coding" using the "code-and-retrieve procedure" through the manual "cut-and-paste" method) and enhances it with computer technology. The steps in the use of NVivo are shown in Figure 3.1 below:

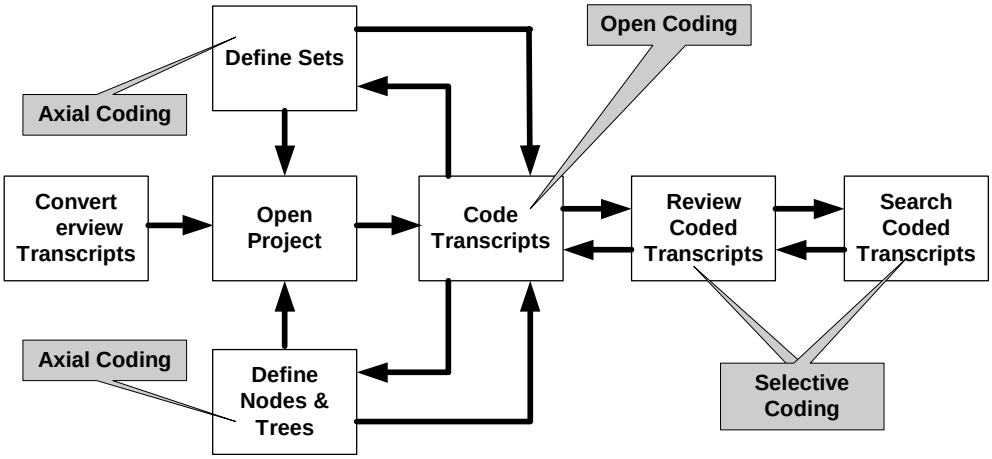

Figure 3.1: Steps in NVivo

3.6 The Study Protocol

The study followed the steps prescribed in the protocol for constant comparative analysis. Specifically, this includes the overlapping steps of data collection, coding, memoing (theorized write-ups of ideas about codes and their relationships as they strike the analyst while coding), and sorting (the processes of comparing and refining earlier classifications and relationships). In the qualitative research paradigm, the researcher functions as the instrument (Marshall, 1995; Miles and Huberman, 1994). Qualitative research, therefore, must take into account several considerations analogous to those of operationalized quantitative instruments. Thus, the study protocol may be viewed as similar to the explanations of procedures in quantitative research. Along this line, provisions for reliability, validity, and generalizability must also be considered within the study protocol. Concern for reliability, validity, and generalizability is necessary in any

study, but these issues are particularly difficult to address in qualitative studies because the researcher is the instrument and the mathematical methods for considering reliability and validity in quantitative studies do not apply in qualitative studies.

3.6.1 Reliability

Reliability "...*refers to the likelihood that a given measurement procedure will yield the same description of a given phenomenon if that measurement is repeated*" (Babbie, 1998). Thus, the basic idea of reliability can be said to be "consistency." A measurement is reliable if the measurements that it returns are consistent (Huck and Cormer, 1996). Reliability can also be seen as the "...*degree to which the observed variable measures the 'true' value and is 'error free'; thus, it is the opposite of measurement error. If the same measure is asked repeatedly, for example, more reliable measures will show greater consistency than less reliable measures*" (Hair Jr.*, et al.*, 1998). To this end, reliability is improved by reducing the errors and biases that impact the ability to conduct the same study again (Blanton*, et al.*, 1992). Three types of reliability problems have been noted in qualitative research: (1) quixotic, (2) diachronic, and (3) synchronic reliability (Kirk and Miller, 1986).

Quixotic reliability refers to *"...the circumstances in which a single method of observation continually yields an unvarying measurement"* (Kirk and Miller, 1986). This form of reliability could potentially mask variations of interest to the researcher. Kirk and Miller (1986) provide the following insightful example:

> *Americans reliably respond to the question, 'How are you?' with the knee-jerk 'Fine'. The reliability of this answer does not make it useful data about how Americans are.*

Similarly, managers have been noted to give less than reliable accounts in what Carlson terms "administrative pathologies." Administrative pathologies describe how the manager's actions often differ from what they themselves view

as efficient behavior (Carlson, 1951). Outside activities, which can account for a significant amount of the manager's time, are sometimes viewed as temporary burdens, and not explicitly planned for as part of their work (Stewart, 1997b). As a result, these activities may not be consciously considered by the executive and thus remain undisclosed by the interview process.

This research relies almost entirely on interviews with knowledge workers within the studied organizations; therefore, it is certainly open to quixotic reliability problems especially of the administrative pathology type. However, my questions were very open-ended and allowed, in large measure, the respondents to speak to what they wished to address. Additionally, the respondents were assured of confidentiality. I believe that the variety of experiences expressed, many of which were certainly not what the company in question would have wanted to hear, reduces the risk of quixotic reliability in this study.

Diachronic reliability refers to "*...the stability of an observation over time and is usually demonstrated by taking the same or similar measurements at different times*" (Kirk and Miller, 1986). In cases where the phenomenon under observation is dynamic, the relevance of diachronic reliability is considerably diminished. This study addressed a dynamic phenomenon; in fact, the goal of the study was to determine if changes were occurring over time. I do not believe that diachronic reliability presents much concern to this study.

Synchronic reliability refers to *"...the similarity of observations within the same time period"* (Kirk and Miller, 1986) and can be evaluated by comparison of data gathered from alternative forms or sources. The observations made by the respondents, while admittedly a very small portion of the employee base of the companies studied and not randomly selected, frequently addressed similar issues and I believe that they provide a solid degree of reliability.

Diachronic reliability (the stability of observations over time) and synchronic reliability (the similarity of observations within the same time period

from different methods) can be identified during analysis. The risk of problems with quixotic reliability (respondents giving the "party line" answer) is more difficult to identify, but it is absolutely necessary to identify. Many researchers tend to focus on reliability rather than validity, *"Reliability is a necessary, but not a sufficient condition for validity. That is, a measure cannot be valid, if it is not reliable, but being reliable it is not necessarily valid for the purpose its author or a user has in mind"* (Pedhazur and Schmelkin, 1991). Rozeboom (1966) labeled reliability as *"the poor man's validity coefficient"* or *"instant validity."*

However, "*In qualitative research, issues of instrument validity and reliability ride largely on the skills of the researcher. Essentially a person more or less fallibly - is observing, interviewing, and recording, while modifying the observation, interviewing, and recording devices from one field trip to the next. Thus, you need to ask, about yourself and your colleagues, "How valid and reliable is this person likely to be as an information gathering instrument?*

Markers of a good qualitative researcher-as-instrument are:

- *Some familiarity with the phenomenon and the setting under study*
- *Strong conceptual interests*
- *A multidisciplinary approach, as opposed to a narrow grounding or focus in a single discipline*
- *Good 'investigative skills, including doggedness, the ability to draw people out, and the ability to ward off premature closure'* " (Miles and Huberman, 1994).

There is no statistical test to measure the reliability of a qualitative report; however, good qualitative work provides sufficient detail in order to convince the reader that the author's conclusion makes sense. Therefore, if triangulation ("...*support*[s] *a finding by showing that independent measures of it agree with it or, at least, do not contradict it...*" (Miles and Huberman, 1994)) is utilized, then the reader's confidence in the reliability of the report should be increased.

In most cases in qualitative research, triangulation would be from other interviews, and these other interviews would he expected to support or, at least, not contradict the findings of the other interviews. Of course, there will be differences in the various interviews (each is made up of either different participants, different times, and/or different interviews), so there must be acceptance of some variation in the reports. If, however, there were contradiction of evidence as to an important construct, then more interviews (possibly follow-up interviews with the original participants for confirmation of the accuracy of their reports) would be required.

In this study, ensuring acceptable reliability was accomplished by developing a case study protocol (Yin, 1984) that documents as much as possible the sources of data, the interviews conducted, and the procedures for the data analysis. The use of a written protocol reduces the variation between data collections. Finally, the semi-structured interview format is meant to be a way of avoiding "party lines" that might result in quixotic reliability problems.

3.6.2 Validity

Validity refers to "...*the extent to which an empirical measure adequately reflects the real meaning of the concept under investigation*" (Babbie, 1998). Thus, you are considering how well your findings address the concept or construct which they are meant to measure. According to Bagozzi (1980), construct validity *is "...the degree to which a concept (term, variable, construct) achieves theoretical and empirical meaning within the overall structure of one's theory. Six components of construct validity are proposed:*

1. *Theoretical Meaningfulness of Concepts*
2. *Observational Meaningfulness of Concepts*
3. *Internal Consistency of Operationalizations*
4. *Convergent Validity*
5. *Discriminant Validity*

6. Nomological Validity"

While Bagozzi's writings tend to reflect an emphasis on quantitative research, the components he identifies are equally applicable to qualitative work, particularly when that work is done from a positivist or post-positivist perspective. Three forms of validity have been noted in qualitative research: (1) apparent, (2) instrumental, and (3) theoretical validity (Kirk and Miller, 1986).

Apparent (content) validity is based on the assumption that the measuring instrument is so closely linked to the phenomenon under observation that it is "obviously" providing valid data. Apparent validity is, in itself, insufficient to ensure validity (Kirk and Miller, 1986). However, the presence of apparent validity is integral to most research; how can one conceive of a construct and then develop measures of it in the absence of a domain of content? The very definition of a construct implies a domain of content (Pedhazur and Schmelkin, 1991). "*Methods classed in the content-related category thus should be concerned with the psychological construct underlying the test as well as with the character of test content. There is often no sharp distinction between test content and test construct*" (American Psychological Association, 1985). Thus, apparent validity in qualitative analysis is strongly related to the first three of Bagozzi's components (theoretical meaningfulness of concepts, observational meaningfulness of concepts, and internal consistency of operationalizations).

Instrumental (or criterion) validity occurs when observations match those generated by an alternative procedure that is itself accepted as valid (Kirk and Miller, 1986). This, of course, is Bagozzi's convergent validity component. Convergent validity is "...*the degree to which two or more attempts to measure the same concept through maximally different methods are in agreement (Campbell and Fiske, 1959)*" (Bagozzi, 1980).

Theoretical (or construct) validity exists if the theoretical paradigms rightly correspond to observations (Kirk and Miller, 1986). This is Bagozzi's no-

mological validity component. The structure of any theory can be represented through concepts, propositions, rules, and definitions. Within such a theoretical structure, any of its theoretical terms is related to the other terms through the propositions. Nomological validity is the degree to which predictions (non-observational propositions) developed from theory are confirmed. Achieving nomological validity requires that the constructs observed have been considered within the overall context of your theoretical framework (Bagozzi, 1980).

The three forms of validity noted by Kirk and Miller do directly address the sixth of Bagozzi's components, discriminant validity. Discriminant validity is "*…the degree to which a concept differs from other concepts (Campbell and Fiske, 1959)*" (Bagozzi, 1980). I believe that consideration for discriminant validity must also be given.

In this study, validity concerns are addressed using two techniques recommended by Yin (1984): (1) multiple sources of evidence, and (2) reviews by key informants. Multiple sources of evidence are intended as a means of triangulation, reducing the error contribution of any one source. Reviews by informants, sometimes known as "member checks," also ensure that researcher interpretation and informant intentions are in synch.

3.6.3 Generalizability

A final concern with the selection of a particular research method is generalizability. The issue of generalizability is concerned with how well the findings concluded from a study apply to the broader population from which the sample is drawn (Babbie, 1998). The personal nature of the observation, the comprehensiveness of the understanding, and limited sampling of the total population tend to limit the generalizability of field research (Babbie, 1998).

The primary approach used to increase the generalizability of the proposed study is that suggested by Miles and Huberman (1994), cross case analy-

sis. In this way, findings demonstrated in one case can be confirmed against cases with similar attributes (literal replication) (Yin, 1984).

3.7 Delimitations and Limitations of the Study

As stated at the beginning of this chapter (see Section 3.1: Research Method, beginning on page 81), no research method provides the perfect mix of precision of measurement, realism of context, and generalizability of findings that is the goal of any researcher. Therefore, all research involves the exercise of a strategic choice on the part of the researcher as to the method to be employed. The case study/interview study method was selected as the research method for this study. That selection established some of the limitations of the study. These inherent limitations may be best illustrated through the Runkel and McGrath's (1972) circuplex illustrating the dilemma of alternate research strategies. Runkel and McGrath propose three conflicting desiderata: generalization, precision, and existential realism. "...*the very choices and operations by which one can seek to maximize any one of these will reduce the other two; and the choices that would 'optimize' on any two will minimize on the third..."* (Runkel and McGrath, 1972). Bonoma (1985) considers this as the *"...tensions and tradeoffs* of *knowledge accrual."* In the case of my study of the institutionalization of knowledge management in major consulting organizations using the case study method, I have chosen to maximize the context of the system character (its "existential realism") and, thereby, I minimize the study's generalizability.

It is not just the selection of the case study method that limits the generalizability of this research. In selecting consulting organizations as the focus of the research, I again limited the study's generalizability. The stock-in-trade of a consulting organization is its' knowledge, and a consulting organization has the potential of taking its' lessons learned in developing a knowledge management system to market as a regular part of their service offerings; therefore, one might expect that a consulting organization might be somewhat different in its institu-

tionalization experience. Thus, other types of organizations may respond differently in their attempt to institutionalize knowledge management. Even in consulting organizations there are clear indications that national culture plays a role in the institutionalization of knowledge, and this research was narrowly focused on consulting in English-speaking, western cultures. Clearly, this study must be seen as the beginning of a program of study rather than a comprehensive result.

Another limitation is also inherent in the selection of the corporate participants. The original study plan called for the corporate participants to be management consulting organizations. When the study was originally planned, it was quite common for management consultants to be a division of a larger audit, tax, and consulting firm; in fact, Accenture (then Andersen Consulting) was a subsidiary of Andersen Worldwide, which included the Arthur Andersen & Company audit and tax firm. The Management Consulting Services of PricewaterhouseCoopers is still a division of that larger organization which includes tax and audit services also, although the management consulting division is expected to be separated from the larger firm in the foreseeable future. Therefore, in enlisting the participation of KPMG's Global Knowledge Management Office I anticipated that I was following the prescribed pattern. However, by the time my interviews began, the management consultants of KPMG had been spun-off into a separate company and were no longer a part of the Global Knowledge Management Office's client. In deciding to continue the participation of KPMG I began looking at a system designed for a somewhat different type of knowledge worker – an accountant rather than an IT/management consultant. The differences in these two types of knowledge worker/consultants may introduce unanticipated and misunderstood variation into the findings of this study.

Beyond the limitations imposed by the selection of the corporate participants in the study, there are also limitations imposed by the selection of the in-

dividual participants. Had this been a quantitative study, it would have been imperative that the individual participants had been randomly selected. This was not the case; the individual participants were selected by the participating organizations. While this certainly introduces the potential for bias, particularly in the users of the systems, the range in their responses appears to minimize the possibility of problems with both quixotic reliability and administrative pathology. Still, it must be recognized that the method of selection of the individual participants in the study imposes some limitation on the reliability of its findings.

3.8 Summary

Multiple cases, each with multiple interviews, provided a way of increasing reliability and validity in this study. I believe that the rich description of each of the cases provided by the extensive interviews and the triangulation of the cases does increase the trustworthiness of the descriptions.

While these descriptions do support some of my existing propositions, other themes did arise. The end goal is to understand the themes found in the descriptions and to produce hypotheses related to the observed knowledge management system structures and the institutionalization of knowledge management within these organizations. Those hypotheses will then form the basis of the next stage in this body of research, a survey to test the generalizability of the findings from this stage.

Chapter 4: Accenture

Accenture is the world's largest independent provider of management and technology consulting services and solutions, with approximately 65,000 people in forty-eight (48) countries delivering a wide range of specialized capabilities and solutions to clients across all industries. Accenture operates globally with one common brand and business model designed to enable the company to serve its clients on a consistent basis around the world. The company generated revenues of $9.75 billion for the fiscal year ended August 31, 2000. As previously discussed, Accenture is openly identified, as are the other two corporate participants in this study. However, all individual participants are identified by pseudonyms. A list of the pseudonyms and a brief description of the job responsibilities of that individual is found in the appendices of this study. The pseudonyms and their position descriptions for the Accenture participants are found in Appendix "C" on page 371 of this report.

4.1 History of the Company

Prior to an arbitrator's decision that they should be separated, Accenture (then known as Andersen Consulting), along with Arthur Andersen & Company, were the two principal subsidiaries of Andersen Worldwide. Prior to the arbitration, Andersen Worldwide was the second-largest accounting and business services firm in the world. The creation of the two separate business units in 1989 was the result of tensions that had arisen because, while the consulting division was generating approximately forty percent (40%) of the company's total revenues and was growing much more rapidly than the auditing and tax division, consultants were paid less than auditors and there were conflicts over the auditors' control of consulting operations. In the face of disgruntled consulting partners resigning, the leadership of the company agreed to a restructuring in which

Arthur Andersen was divided into two entities, an auditing and tax firm known as Arthur Andersen & Company and a consulting firm dubbed Andersen Consulting. Each of these firms then became separate financial entities under the Swiss-based Arthur Andersen Societe Cooperative (Andersen Worldwide), the ruling body of the company's worldwide organization, which would coordinate the activities of the entire firm's operations.

While the restructuring helped to smooth over some of the harsh feelings among the consulting and auditing partners, the 1990s saw a continuation of the sky-rocketing growth of consulting revenues and the emergence of Andersen Consulting as the largest management consulting firm in the world. Between 1988 and 1992, Andersen Worldwide's revenues grew from just under $3 billion to almost $5.6 billion. This increase of almost fifty percent (50%) was brought on almost entirely by the consulting firm whose revenue during the period grew by eighty-nine percent (89%), while the accounting firm only grew by thirty-eight percent (38%) (Grant, 1998).

The 1989 restructuring included a profit sharing agreement that provided for the more profitable firm to make payments to its less successful sibling. Under the terms of the profit sharing agreement, Andersen Consulting had to make payments to Arthur Andersen in all but one of the years since 1989. While this caused a great deal of bitterness among the consulting partners, the decision in 1997 by Arthur Andersen to expand into management and technology consulting caused the argument to re-explode. In December, 1997, Andersen Consulting requested arbitration, charging Arthur Andersen with breaching the terms of the restructuring agreement and Andersen Worldwide with failing to ensure the cooperation of the two firms. On 7 August 2000, Dr. Gamba with the Paris-based International Chamber of Commerce (ICC) ruled that "*Claimants (Andersen Consulting) acted in good faith, with a proper basis and in accordance with the Member Firm Interfirm Agreements in filing their Request for Arbitration pro-*

ceeding." It also ruled that Andersen Worldwide had breached its obligations to Andersen Consulting by failing to coordinate the practices of the two firms and found that: "*On account of AWSC's fundamental non-performance, the Member Firm Interfirm Agreements are terminated. Consequently claimants are released from all their obligations.*" However, the consulting firm did not win damages from Arthur Andersen and was required to relinquish the name, Andersen Consulting, by the end of the year (Stanley, 2000). Emerging from the arbitration as Accenture, it is the world's largest independent management and technology consultancy (Clark, 2000).

4.2 Corporate Organization

Not only is Accenture the largest independent management and technology consulting firm in the world, in order to meet its many commitments to its clients, it is a truly complex organization. According to Russ, a Director of the Global Knowledge Management Office, "*Engagements*[4] *are typically national and global. They're large, they're complex; they can last for several years... typically focused on some amount of mission critical activities...*". In order to meet its global client demands in a rapidly changing environment, Accenture has developed a matrix organization based around its communities of practice for its line, or client-facing, personnel.

What is a community of practice? In the general sense, a community of practice is a group of people bound together by shared professional interests and expertise. The ties binding such a group may be either formal or informal. While the term "community of practice" is one of the current buzz words in management circles, this is quite an old concept; the medieval craft guilds were formal communities of practice. Within the Accenture organization a "community of practice" is a formal grouping by expertise and shared knowledge, but the groups

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[4] "Engagement" is the term used for client projects.

can be just about anything that fosters the company's business goals. They are used to encourage organic growth, but a community also dies when the subject matter around which it grew becomes less interesting.

Accenture, then, is a matrix of many different groups of expertise, or communities of practice, that can be mixed-and-matched to form an engagement team with the necessary expertise to meet a client's particular needs. The company's current communities of practice consist of its competencies, its market units, and its lines of business. The company is based around four (4) competencies, the types of business services the firm provides:

- Strategy;
- People (organizational performance);
- Process; and,
- Technology.

The company goes to market within five (5) market units, the types of clients the firm serves:

- Communications and High Tech;
- Financial Services and Marketing;
- Products;
- Resources; and,
- Government.

It does so within four (4) lines of business, the types of technology services the firm provides:

- Customer Relationship Management;
- Supply Chain Management;
- Strategic Information Technology Enablement; and,
- Financial and Performance Management.

Each community of practice represents a way that Accenture views an area of its corporate expertise, and develops and strengthens that expertise within its em-

ployees. Additionally, each community forms a component of the firm's matrix organization and has considerable autonomy in the management of its affairs, including its involvement with knowledge management. Finally, there are sub-categories within each of these communities (*e.g.*, within the Financial Services and Marketing market unit there are sub-categories for commercial banking, investment banking, insurance, health services, *etc.*) and, again, each of these sub-categories has a degree of autonomy and is recognized as an individual, but related, community of practice. Unlike a more traditional, hierarchical organization, little is directed by executive fiat and the leadership, all partners in Accenture, of each community of practice must be convinced of the benefit of any organizational system, such as knowledge management, before giving the community's full formal endorsement to the proposed system.

A line consultant can have only one competency and only one market unit, but is encouraged to develop expertise in multiple lines of business. Thus, a line consultant, in developing expertise in several different areas, will receive direction and advice from a number of different communities of practice. A simple view (showing only one line of business community) of the relationship between an individual consultant and the various communities of practice to which that consultant would belong is shown in Figure 4.1, below:

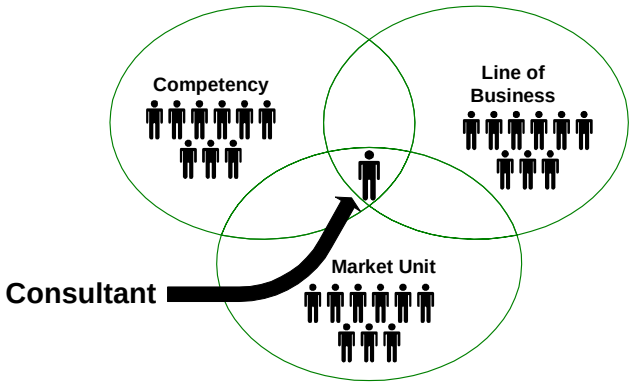

Figure 4.1: The Relationship between a Consultant and the Various Community of Communities to which the Consultant Belongs

The use of a Venn diagram in the figure on the previous page to show the relationship between consultants and their communities is also quite representative of the corporate matrix of Accenture. One might visualize this matrix as many overlapping communities of practice. While the knowledge and expertise within a specific community is, in many ways, managed as if they are autonomous units, it is the combination (the overlapping) of these many areas of expertise that gives Accenture the ability to serve the breadth of its clients needs. Of course, the corporate organization chart (see Figure 4.2, below) is not a mass of overlapping Venn diagrams (it even appears quite hierarchical), but such a vision can help explain the role of communities of practice in this organization.

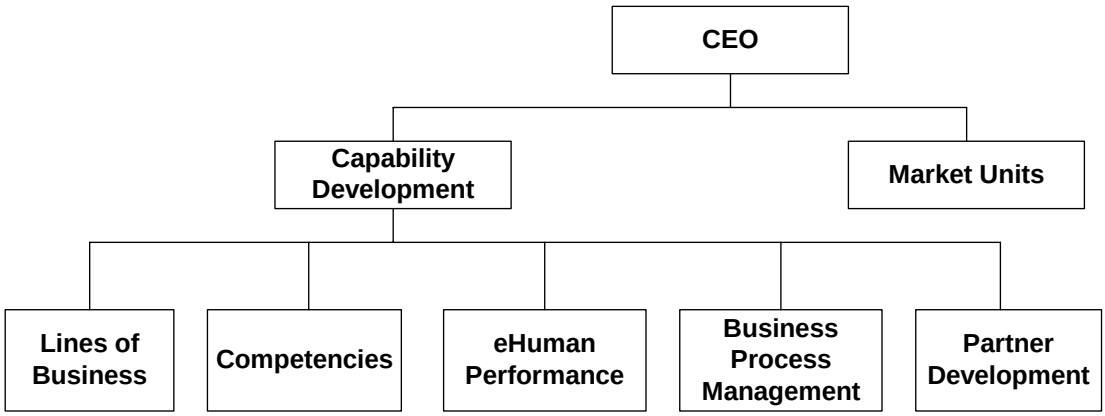

Figure 4.2: Accenture's Organization Chart

As Figure 4.1 demonstrates, the individual consultant is expected to continually be developing and strengthening his or her expertise in each of the communities to which he or she belongs. The individual consultant could be viewed almost as an independent contractor to the Accenture organization in that by developing more and deeper expertise in the various communities, the consultant makes him or herself more desirable for recruitment onto an engagement team. Consultants bid to be placed on specific engagement teams, and the leadership of that team "hires" specific consultants based on their individual ex-

pertise and how it matches the needs of the engagement. Jim, an Associate Partner who makes these types of "hiring" decisions, said:

> *…there are LotusNotes databases that are maintained very actively and proactively by our human resources functions within our global operating units… you know all the different go-to-market groups, and… they have weekly calls about… what do you need, who do you have, who's available… so that if I know that John Doe is coming available and my project needs someone with John Doe's skills next Thursday, I can go straight out to a database and pull down that resume in real time and check out John Doe.*

Thus, an individual's expertise increases their marketability for engagements, and involvement in different engagements is possibly the best way of increasing one's expertise. Therefore, personal knowledge management is important to each Accenture employee, just as corporate knowledge management is to the firm.

In addition to the company's line organization, there is also the business practices, or staff, organization. These business practices include:

- Finance;
- Human Resources;
- Quality;
- Legal;
- Marketing and Communications; and,
- Knowledge Management.

Thus, while Accenture has developed a matrix, rather than a hierarchical, organization, it does encompass the traditional line/staff organization. The line organization within Accenture consists of those client-facing communities of practice. These are the components of the organization that deliver management and technology consulting services and solutions to the company's clients. The staff components or the organization provide those back-office services necessary to support the line components in their client-facing role. As will be discussed later in detail, a majority of the personnel within the knowledge management

organization are "deployed" to the various line communities to provide a closer level of support to those communities.

4.3 Accenture and Knowledge Management

4.3.1 A History of Knowledge Management at Accenture

I stressed in the opening chapters of this document that knowledge management is not a new phenomenon. Knowledge management has been a part of Accenture since its inception, and a study of the history of Accenture's knowledge management activities shows that the firm has been almost continually moving towards the goal of efficiently and effectively developing and deploying its knowledge capital. Again according to Russ, a Director of the Global Knowledge Management Office and a twenty-three (23) year veteran of the company:

> *…there has always been at Accenture a culture of sharing… a willingness to share what you know through the written word as well as face-to-face contact. We've had, we've always had meetings, workshops, you know those sorts of face-to-face gatherings that had as one of their main objectives the sharing of what was going on in a particular industry, in a particular office, in a particular client, you know whatever it might be, and as time has gone on, and you can get together face-to-face with all your executives when you have 10,000 people, when you have 65,000 people, it's a big problem. It's expensive, you're taking people away from the business for extended periods of time with travel and everything else, and so that culture of sharing needed to change a little bit from the face-to-face to something more electronic, something more at the point of need, and that's what… begets the Knowledge Xchange, being able to share the best thinking and the best ideas and the learnings of Accenture, no matter the time, no matter the place.*

In this one statement, much of what I discovered concerning knowledge management, not only at Accenture but at the other two organizations also, is addressed. This includes:

- Knowledge sharing within an organization exists, in some degree, with or without a formal, computer-aided, knowledge management system, and the degree to which knowledge sharing exists within

an organization is not solely dependent on the existence of a formal knowledge management system;

- There are many ways to share knowledge and not all of them, in fact most of them, do NOT require the assistance of a formal, computer-aided knowledge management system;
- The preferred way that most individuals share knowledge involves face-to-face communication between the holders of the knowledge and those who wish to gain that knowledge;
- Growth in the organization's size and its global operations necessitated developing a formal, computer-aided knowledge management system as a surrogate for the more traditional, face-to-face means of sharing knowledge;
- However, any means of sharing knowledge is expensive and reduces the amount of time that line consultants can devote to their client-facing, revenue generating, roles; and,
- The goal of the company and, therefore, the goal for knowledge management is to bring the "…*best thinking and the best ideas and the learnings of Andersen Consulting* (Accenture)*, no matter the time, no matter the place…"* to the benefit of their clients.

4.3.1.1 Knowledge Sharing

Organizations exist because they are cooperative systems that leverage the abilities of their individual members. But within this cooperation, a culture of knowledge sharing is not always found. There are many organizations in which the culture might be said to be "MY knowledge is MY power, and I will only share when it is to my advantage to do so." However, in not one of my interviews with the people of Accenture did I find disagreement with the idea that there is a culture of sharing within the company. As Jane, one of the mid-level users, said "…*knowledge sharing is not only generally valued and encouraged,*

but it's expected, so you don't consider something that you've created just yours." Thus, in attempting to develop its knowledge management system, Accenture has greatly benefited from an organizational culture that was in place well before the new system was implemented.

4.3.1.2 Methods of Sharing Knowledge

While there are many ways to share knowledge (from reading a document to engaging in face-to-face communication), all of the consultants interviewed preferred some form of personal communication, particularly with people with whom they were previously acquainted. Russ spoke of a willingness to share knowledge and then of meetings, workshops, and various face-to-face venues in which Accenture employees could not only share knowledge but could form relationships to aid in future sharing. The meetings and workshops that Russ referred to provide the opportunities for expanding one's informal network of acquaintances. As an example, Jim, the Associate Partner, said:

> *…one of the strong cultural aspects of Andersen is your people network… I was part of a group that we called the "Power Team" in our change competency. It started in 1995, and we needed to very rapidly on a global basis capture our knowledge capital and share it in the whole area of SAP, SAP change management, specifically. So about eight people were handpicked to become part of this group, and we were active practitioners at the time. Now that group has formed for me a human knowledge network, because I know they've been there, done that, and they would help me at a moment's notice, and vice versa. And I have others like that in different areas of knowledge that I've connected with personally over my career, and these are the people who I would particularly feel comfortable and willing to go to if I ever saw a name reference in the Knowledge Exchange, even if it was a friend of a friend, I would be more inclined to go to them.*

While it is certainly more straight forward for an organization to adopt a codification strategy for its knowledge management solution, for many, if not most, people, it is easier to gain the rich detail of knowledge transfer through personal communication rather than reading a document. Additionally, for many

people, knowledge sharing is a personal activity; you are giving of something that is yours. Correspondingly, for many people it is easier to ask a friend to take the time to give their knowledge than to ask a stranger. This person-to-person form of knowledge sharing, a personalization strategy, has been the primary method by which we transfer knowledge throughout human existence. It would seem that any formal, computer-aided knowledge management system would need to consider how it might enhance and facilitate a personalization strategy in addition to the codification strategy which might seem simpler to implement.

Accenture has a deep culture of knowledge sharing; the goal in sharing knowledge is to make common the utilization of best practices throughout the firm. Accenture now provides its clients with a common business model, but that was not always the case.

4.3.1.3 Growth, Globalization, and the Common Business Model

At Accenture the primary need to develop a knowledge management system came not from an unwillingness of its employees to share knowledge, but from the difficulties imposed on that existing culture of sharing by the company's rapid growth and globalization. Russ, the twenty-three (23) year veteran of the company, when speaking of the early days of the company before the implementation of the knowledge management system said, "*Back then all of our work was done at clients. There was a strong local orientation, office orientation, the Atlanta office rules … the London office, the whatever it was.*" Obviously, the firm had not, at that time, developed its truly global orientation, but consultants were still expected to share their knowledge.

Even in the mid 1960s it was expected that when consultants finished their work in the field, they would write up their experiences and store them in the then repository – the filing cabinet – as a resource for everyone in the office. The goal of these subject files was leverage of the knowledge, even if that leverage might be restricted to a particular office most of the time.

These “subject files” became a way of life for the firm with a very structured format for the write-ups to aid in retrieval and further use. However, by the late 70s or early 80s, the use of subject files had evolved into a more formalized system of “industry binders,” a set of three-ring binders for each industry. The industry binder concept involved a team of people, experts in their particular industry, working for the partner who was the head of that industry program to consolidate and develop the company’s knowledge capital for every industry in which Accenture was active. These binders could then be “borrowed” by a consultant like a book from a library. Industry binders were made common across all of the then Andersen Consulting offices. Thus, the industry binder concept was a move towards globalizing a common business model for each industry, although there could be significant differences between industries.

In the early 80s, Accenture produced the first official methodology, “Method 1,” which was a set of tools for developing systems in various environments from custom development on mainframes, installing packaged software and client-server environments. Method 1 was followed by a design tool called “Design 1”, and an installation tool called “Install 1”. Each of these sets of tools represented an attempt to consolidate and develop Accenture’s knowledge capital in a particular area and to make uniform or consistent these approaches, which represented the company’s “best practice” in each instance, to their engagements across their workforce. Ultimately, clients wanted to buy these methodologies and their tools and Accenture eventually sold the tools even without their consulting services, demonstrating that an originally back-office function can become a profit center in its own right.

From the subject files to industry binders, Accenture has been developing its organizational knowledge capital, its knowledge base, in a semi-formal to formal way for approximately forty (40) years and approximately twenty (20) years ago started using computers to make this knowledge capital more accessi-

ble. The increasingly formal approach to developing and disseminating its organizational knowledge capital was a method of addressing the firm's rapid growth by globally deploying an increasingly common business model in order to harness the firm's best practices; however, in all this time the firm had never formally acknowledged that its knowledge, and the knowledge of its employees, was at the core of its being.

4.3.1.4 Knowledge as the Firm's Core Competency

In 1991, Accenture conducted an internal strategy project called "Horizon 2000." From that strategy project came new mission and vision statements for the organization. Horizon 2000 saw Accenture's mission to be to help its clients change to be more successful, with the corresponding company vision to be a global firm committed to quality by having the best people with know-ledge capital partnered with the best clients to deliver value. This was the first time that the words "knowledge capital" or "knowledge" were made explicit in the things that Accenture did. Clearly, this was a company that was moving in the direction of an enhanced emphasis on managing its knowledge, a formal recognition that knowledge was the core competency of the firm.

The development and deployment of a global knowledge management system with its attendant technical infrastructure is an almost ruinously expensive endeavor. According to Russ, the Director of the Global Knowledge Management Office, Accenture, "…*invest*[s] *about $500,000,000 a year in knowledge management activities, depending on what you count, it could be a billion, but I'll make the statement that it's about $500 million in pure knowledge management…*".Yet, Russ also said that one of the things that the former CEO of the then Andersen Consulting, Mr. Shaheen[5], was famous for saying was, "…*I never asked for a*

[5] Mr. Shaheen is the real name, not a pseudonym. Mr. Shaheen was not a participant in my study.

business case for this. I did it because we had to do it to keep us, to be competitive. This was a strategic imperative that we had to do…".

No business case for an endeavor whose annual operating costs, not its initial capital costs, range from $500 million to $1 billion, and from a firm whose record revenues in the year 2000 were $9.75 billion! Only the recognition that knowledge was the core competency of the organization could justify this type of commitment. Again, according to Russ, Mr. Shaheen also said:

> *"Knowledge capital is the most valuable asset. It drives our organization. It's what we sell and what we must continue to protect and perfect. Our people should diligently find new ways to share and reuse information and deploy it around the world…"*

which Russ then described as, "…*a pretty powerful statement from your CEO…*". It was a powerful statement of the centrality of knowledge and it must have been a strongly held belief because Mr. Shaheen not only risked backing the Knowledge Xchange without a "*business case,*" he then was successful in selling the idea to his partnership.

Again speaking of the Horizon 2000 study, Russ, said that it also resulted in:

> *…a very significant division in our methodology and a very significant division in the way we went to market and delivered client services. Another outcome of it was the development of the Knowledge Xchange, which was… Lotus Notes groupware which at the time was the only game in town really for a company the size of Andersen, even the size of Andersen back then, and making, and giving Lotus Notes ID's and PC's, laptops, and remote access to that Knowledge Xchange to the executives in our company…*

It can be argued that, as a result of the Horizon 2000 strategy project, Accenture began restructuring itself as a learning organization with an increased focus on the management and leverage of its knowledge capital. The development of the Knowledge Xchange brought the enabling global infrastructure that was previously missing, but possibly the more important step was the formal

recognition of the centrality of the company's knowledge capital to its corporate goals.

4.3.1.5 A Global Infrastructure

Beginning in 1992 and running through 1995, Accenture was in what they now describe as their "*Build It and They Will Come*" period. This was a technology-led strategy that focused on the development of a global Lotus Notes-based communications infrastructure which became known as the Knowledge Xchange (KX). In March, 1993, the Chief Information Officer (CIO) organization published a vision for the KX system:

> *To be a virtual place where AC personnel can build and share knowledge internally and with external groups, forming global electronic communities of practice that transcend the barriers of geographical and organizational boundaries.* (KM2000 Initiative, 1997).

As the goal of developing a global enabling infrastructure was attained, Accenture's knowledge management shifted into what is now seen as its second phase (1994 through 1997), "*Knowledge is a By-Product.*" The goal of this phase was to enhance knowledge sharing by encouraging contributions to the document libraries (knowledge bases) within the KX and to encourage the development of the electronic communities of practice called for in the 1993 KX vision statement. The philosophy of this stage was that knowledge is a by-product or derivative of the work that Accenture does for its clients and that employees of the company should do a better job of sharing their experiences. The key word, therefore, was "contributions"; thus, this was a full-fledged codification strategy implementation. Accenture was essentially consolidating, building, and preserving organizational memory in a similar fashion to their earlier industry binder system, but using information technology to facilitate and enhance those functions. To that end, document libraries were created and electronic communities of practice began to form. However, their initial success in soliciting contributions sowed the

seeds of a new set of problems, as the company became aware of the need to continually manage the content of these document libraries.

4.3.1.6 Future Direction: Balancing Codification and Personalization

These problems led to the CIO organization launching what was known as the "Emerald City" project in January, 1996. This project envisioned the Knowledge Xchange of the future as consisting of three distinct, but inter-related, capabilities, depicted graphically in Figure 4.3, below:

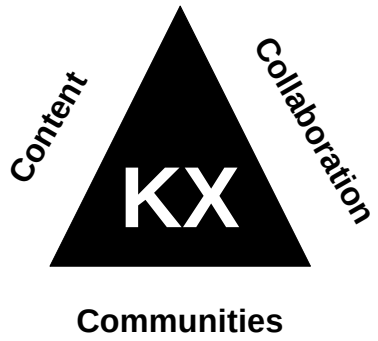

Figure 4.3: A 1996 Vision for Accenture's Knowledge Xchange System of the Future
Source: "A Vision for Andersen Consulting's Knowledge Xchange System" Reproduced with Permission

"**Content:** *The KX system of the future will provide full life-cycle support for managing textual, graphical, and other multimedia content. Specifically, the system will enable the capture, storage, dissemination, retrieval, refinement and eventual retirement of content. Further it will also provide seamless access to content that is external to Andersen Consulting* (Accenture) *such as client content, and content from Internet and other popular sources*.

Collaboration: *The KX system of the future will provide people, process and technology support for both asynchronous and real-time collaboration among Accenture personnel on a global basis. In the long run, the KX system will also enable us to collaborate with non-AC personnel through popular network infrastructures. The collaboration technolo-*

gies will range from email and workflow to video-conferencing and work sharing.

Communities: *Andersen Consulting* (Accenture) *management will provide active support and leadership to encourage the formation and sustenance of communities through the KX system. Besides being a locus for the creation and sharing of knowledge, communities will sustain a global Andersen Consulting* (Accenture) *culture by enabling AC personnel to form mutually beneficial relationships among each other irrespective of location*." (Emerald City Project Team, 1996).

With these three concepts, "Content", "Collaboration", and "Communities", Accenture committed itself to developing a formal, computer-aided knowledge management system which addressed both of Hansen *et al.'s* (1999) knowledge management strategies, codification and personalization. The codification strategy is clearly indicated in the "content" capability called for by the study, while the desired "collaboration" and "communities" capabilities are directly focused on developing an electronic personalization capability. While Accenture's early knowledge management efforts (*e.g.*, the subject files and the industry binders) were focused almost entirely on the codification strategy, the Emerald City project clearly called for the development of a corresponding personalization capability in the company's system. Therefore, at the end of this "yellow brick road" was the vision of a powerful, computer-aided system that could return the now globally deployed Accenture employees to the "intimacy" of virtual "face-to-face" communication in their knowledge sharing needs.

This vision was described in terms of six (6) major components. The relationship between these components is depicted graphically in Figure 4.4 on the following page. In the figure, "Access" provides the basis for utilizing the system and is to be enhanced such that access from "best" client sites would be comparable to access from the firm's own offices. Once the user gains access to the sys-

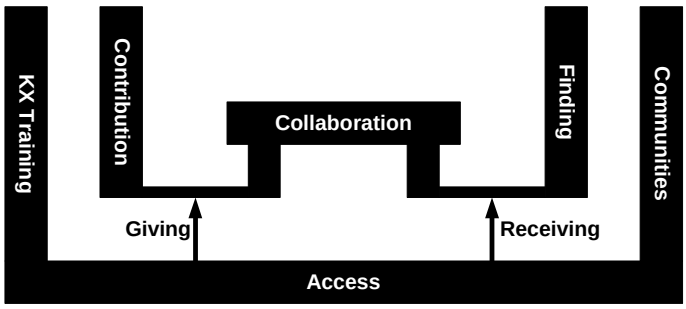

Figure 4.4: Six Components of the KX Vision
Source: "A Vision for Accenture's Knowledge Xchange System"
Reproduced with Permission

tem, the user can either "Give" or "Receive" knowledge. The target of giving may be either a knowledge repository ("Contribution") or a person ("Collaboration"). Contributions would become a part of the engagement Quality Assurance process (see "The Quality Assurance Process" on page 148) and would occur through an ongoing and facilitated knowledge-mining process, while the firm's collaboration technologies would be enhanced from the current low-interactivity tools such as e-mail to high-interactivity tools such as video conferencing. Similarly, the source of the receiving might be a repository ("Finding") or an expert ("Collaboration"). Around these, the user's ability to find either knowledge or an expert would be enhanced by new types of browsing and agent capabilities that would be more user-friendly. Finally, "Training" and "Communities" would be the two cornerstones for the effective utilization of the system and, therefore, are shown as the two end pillars. Training would be expanded based on a 3-step training strategy: Step 1 would emphasize tool training and Step 2 would emphasize the collaborative execution of the firm's business processes, while Step 3 would involve engagement-specific content training. This content training would become a part of the engagement Quality Assurance process and would be a new responsibility of the knowledge management organization. Finally, the project envisioned that in the Knowledge Xchange of the future, communities would be more than just a navigational aid. New mechanisms (*e.g.*, community membership reg-

istries, community DJs, *etc*.) would enhance the ability of communities to build an identity and a critical mass of members (Emerald City Project Team, 1996).

The efforts to implement the vision of the Emerald City project led to the next, and current, phase (1996 to 2000) of Accenture's knowledge management odyssey which is thought of as knowledge outfitting or "*Knowledge is Actively Managed*." As discussed by Russ, the Director of the Global Knowledge Management Office, this phase is distinguished by a:

> *…move toward a more Web-like technology, move away from dated Notes… into a more browser-based capability… And there was a move and an effort to aggregate things. Forget about… these 10,000 documents. Let's start building some… home pages that if you want to know about a particular subject, here's all the links to the great stuff about that subject. It might be in this library, it might be in that library… it's a Lotus Notes document, today, it might be an HTML page or an XML page or some other thing tomorrow…*

So less than a decade after building a global infrastructure around Lotus Notes, which had been "…*the only game in town really for a company the size of Andersen, even the size of Andersen back then*…" when that infrastructure was first constructed, Accenture's vision is now to a more Web-based infrastructure with a simplified organizational scheme to reduce the difficulty in a consultant's accessing the company's knowledge capital. Clearly, the company is restructuring itself in response to the opportunities and problems identified as a result of the earlier restructuring.

As a follow-on to the Emerald City project, Accenture's Practice, Process, and Quality (PP&Q) organization issued a "Knowledge Management Assessment Report" in 1997 for the KM2000 Steering Committee. This report first addressed "What is knowledge management?" with the following definitions and strategy:

> ***Knowledge Management:*** *is the application of people, process, and technology to effectively share, expand, and continuously improve upon knowledge capital.*

Knowledge Capital: *is the collection of methods, tools, training, facts, ideas, observations, and experiences that is of value to* Andersen Consulting *(Accenture) to conduct its business* (KM2000 Initiative, 1997).

Thus, the report found that knowledge management should follow the strategy as shown in Figure 4.5, below:

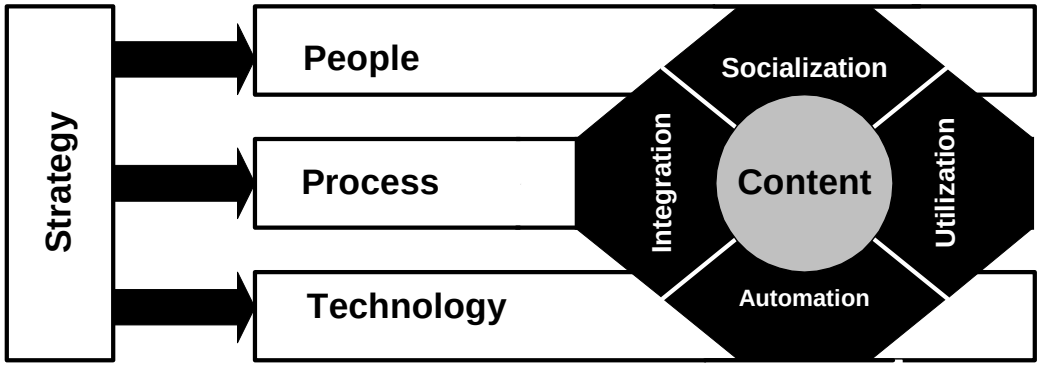

Figure 4.5: Accenture's Knowledge Management Strategy
Source: "Knowledge Management Assessment Report"
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The KM2000 Initiative called for many improvements in the direction of knowledge management at Accenture. The sum of the specific recommendations found in the report clearly calls for a socio-technical system in which technology is used to facilitate and enhance human communication, not to replace it. Further, the goal of the report is to implement both the codification and personalization strategies on a global scale. However, the emphasis appears to be on the personalization strategy as if there is an understanding that a codification strategy does not fully incorporate the elements of the knowledge sharing culture developed in an earlier and smaller time in the company's existence. Not all have yet been adopted, but many have. The goal of this knowledge management journey is described as "*Our best knowledge guides our activities*." Again from Russ:

> *Now as we're moving into the 21st century... what we want to move from the content management... into more integrated performance support activities, where the tools that people use on the engagement*

> *are knowledge tools. In the past, our methods… our methodology has been managed by a different group of people than managed our knowledge capital… and that's also different from our education, and so while there is a proclivity and an interest in cooperating, there's no requirement to do so, or there hasn't been… so we've realized this… and said 'We've got to make a change.' We need to bring these things together and make them one thing. Knowledge management… needs to include all the knowledge capital that is created and collected, the methods, the training, and all of the tools that are going to be used in the engagement… If they want to do training, they've got to go into some context… If they want to go to the Knowledge Xchange, now they've got to change go to LotusNotes or some other thing, and if they want to use another tool on the engagement, they've got to go to a browser and use the BI designer tool set. It makes things difficult for people, and there's no reason why that needs to be that difficult.*

Clearly, Accenture is continuing on its journey of structuring itself around knowledge as its core component. There seems to be an increasing recognition that knowledge management is not a back-office function, but is at the heart of its client-facing functions. With each step along this journey Accenture moves closer to the revised mission statement suggested by the KM2000 Initiative:

> *To enable Business Integration Teams to apply our collective knowledge and experience, and that of the outside world, to deliver dramatically improved value to clients* (KM2000 Initiative, 1997).

4.3.2 The Knowledge Management Organizational Structure

In discussing the firm's organization, emphasis was given to its matrix form and the autonomy that is held by each of its communities. In discussing its history of knowledge management, it became clear that these communities of practice also hold a key position in the firm's knowledge management strategy.

According to "KX 4.0–Using the Andersen Consulting Knowledge Xchange", the employee training manual for the Knowledge Xchange, at Accenture the CIO organization was responsible for:

> *…maintaining the infrastructure and standards of the databases which compose the Knowledge Xchange system. The CIO Organization is NOT responsible for the content or knowledge capital contained in the Knowledge Xchange system. Knowledge management*

> *is the responsibility of each industry or Community of Practice…Ultimately, the responsibility falls upon each individual to share his or her knowledge capital with the rest of the firm* (CIO Technology Services, 1999).

Thus, it is the communities of practice that control and are responsible for the content in Accenture's knowledge repositories.

Yet it seems clear that the KM2000 Initiative found that at least some of the various communities of practice were not placing enough emphasis on their responsibility for maintaining the knowledge repositories (*e.g.*, "*More needs to be done to actively and systematically debrief…", "More needs to be invested…", "…more subject matter experts are needed…",* and *"Often, the care and feeding of the KX system has been an add-on to existing structures…*" (KM2000 Initiative, 1997)). Additionally, the autonomy of the communities apparently has hindered the adoption of firm-wide integrated procedures ("*Communities seldom look to integrate their knowledge with that of other communities…"* and *"Different Industry and Competency groups hold different opinions as to what knowledge integration entails…*" (KM2000 Initiative, 1997)). This division of responsibility for knowledge management, with its attendant difficulties, had to be recognized.

As is indicated in the section on the history of Accenture's knowledge management efforts, organizational support for knowledge management was originally in the CIO organization. This was a logical placement for knowledge management when it was driven by a technology-led strategy. However, this placement led to the division of responsibility discussed above; one of the recommendations of the KM2000 Initiative report was:

> ***Broader responsibilities for the CIO organization:*** *To meet Andersen Consulting's* (Accenture's) *future needs, the CIO organization must have formal responsibility, accountability, and authority for not only the KX system infrastructure, but also the execution, learning, and systems management architectures of a global technology infrastructure* (KM2000 Initiative, 1997).

While the need for this centralization of responsibility, accountability, and authority was legitimate, its location in the CIO organization was not. There was another organization within Accenture, "Practice, Innovation, and Enablement" (PI&E), which was responsible for the company's methods, tools, and Accenture Education, but not for knowledge management. However, in September, 1999, knowledge management was moved to the PI&E organization, and for the first time the firm had all of the aspects of knowledge management under one organizational umbrella. In February, 2000, additional organizational changes occurred. One of the main changes in this restructuring was that the PI&E organi-

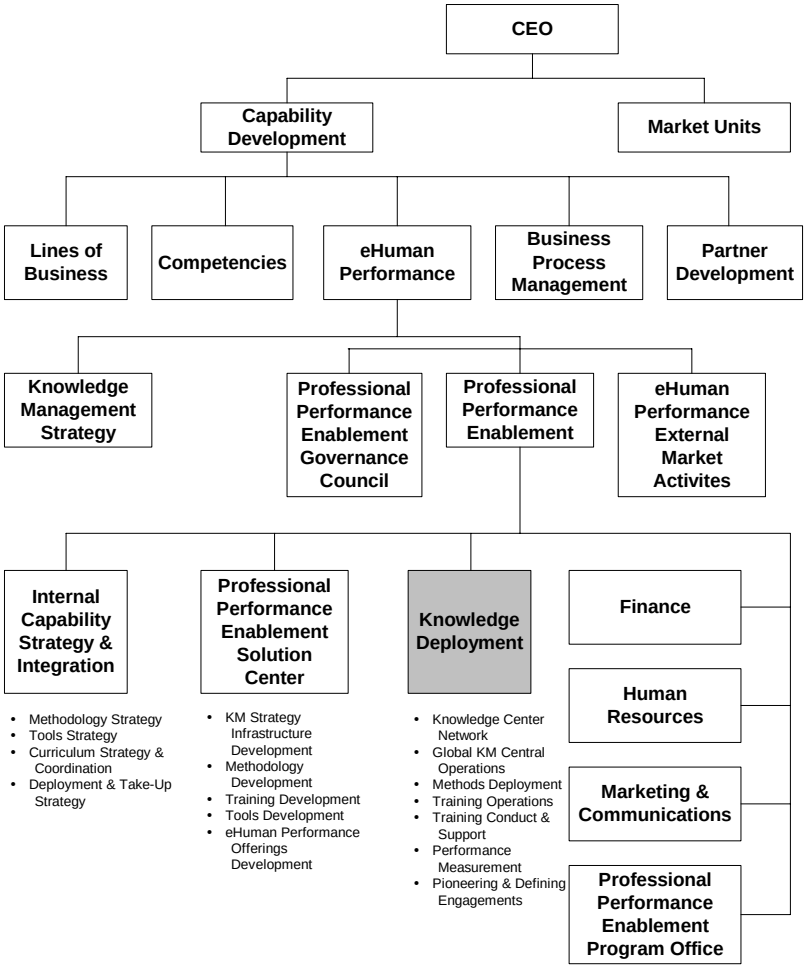

Figure 4.6: A Knowledge Management View of the Accenture Organization
Source: "University of Georgia" presentation
Reproduced with permission

zation now reported to the much larger organization that now includes all of the lines of businesses, competencies, *etc.* The organizational restructurings from late 1999 through early 2000 have worked to consolidate and integrate all of the company's knowledge management capabilities under one umbrella. These organizational realignments have now placed responsibility for knowledge management in the super-organization as shown in Figure 4.6 on the previous page.

In Figure 4.6, the block entitled "Knowledge Deployment" is the hub of the global knowledge management organization; however, not all of the firm's knowledge management professionals are formally a part of this organization. The knowledge management organization is shown in Figure 4.7 below.

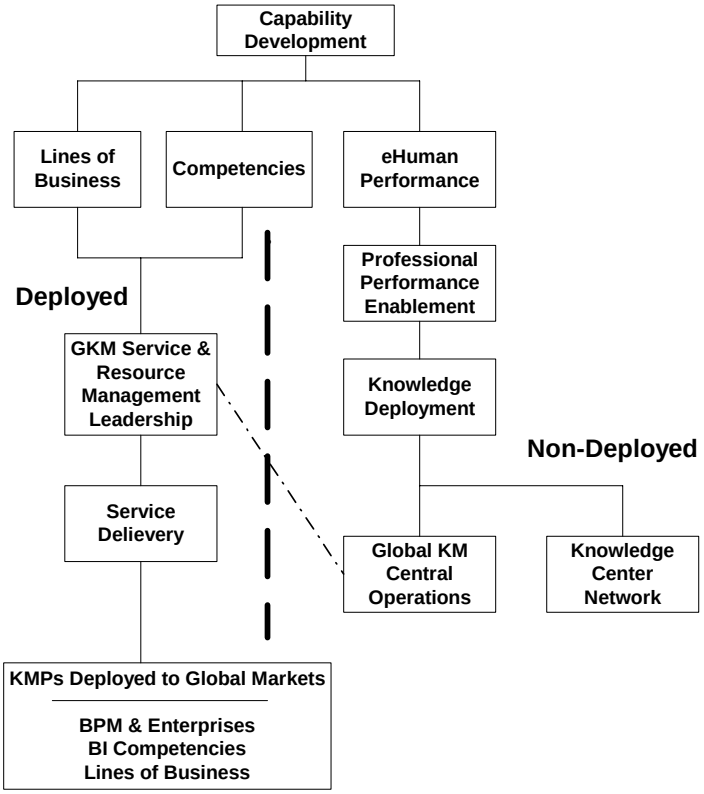

Figure 4.7: Accenture's Global Knowledge Management Organization
Source: "University of Georgia" presentation
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As can be seen, this organization includes both deployed people and non-deployed people. Non-deployed means that those individuals are not focused

typically on a competency, market unit, or line of business; they serve all of the communities of practice. Deployed means that the individual's head count and cost is paid by the community of practice to which they're deployed. In knowledge management this means that those individuals are entirely focused on their particular community of practice. Thus, the partner who is designated as the "Knowledge Management Partner" in a specific community of practice directs the day-to-day work of the knowledge management personnel who are deployed to that community of practice. The bulk of the knowledge management personnel are deployed. Of the 480 personnel involved with knowledge management, about 300 of them are deployed to the various communities of practice. The other 180 are non-deployed, and of those, 150 of them are in the Knowledge Center Network. The Global Central Operations Office, which contains the remaining 30 non-deployed personnel, provides liaison and support to the deployed knowledge management personnel.

4.3.3 Knowledge Management Technical Infrastructure

As discussed in the history section, the knowledge management infrastructure is based on Lotus Notes groupware, and that infrastructure has grown along with Accenture. Today, there are approximately 65,000 LotusNotes IDs in Accenture, all within a single domain. There are about 450 servers which are separated by function. Some servers are dedicated to mail and other servers are dedicated to database replication. There is extensive use of Notes for internet mail transport and knowledge sharing. The infrastructure also allows for connectivity to vendors and other third parties.

There are about 12,000 different applications on the Knowledge Xchange or, in other words, 12,000 unique LotusNotes databases. In addition to being a groupware system, LotusNotes is also a development environment, and it's very easy to implement a database; unfortunately some of these databases are suspected to be abandoned.

Of these 12,000 databases, there are approximately 100 databases that are globally relevant and globally actively maintained. Another approximately 1,000 of the databases have a more local focus, but are still very active, which is to say that they are still very important to some aspect of the business but are not important to everyone at Accenture and, in fact, some of them may not even be open to everyone at Accenture.

The bulk of the remaining active databases are workgroup databases. They are focused on a particular engagement, on a particular project, or on things such as the annual evaluation process. Thus, they are active for a period of time, and then they become inactive.

Additionally, there are approximately 3,600 mail-in databases. A mail-in database supports the ability to put links on a Notes mail message or in a database that, for example, says “Press here” and something will happen; you will receive something or you will be added to a mailing list. Much of Accenture’s administrative management occurs through these mail-in databases. They provide the processing of the firm’s time reports, its personnel evaluations, its invoices, *etc*. In fact, these are only the obvious administrative examples of these mail-in databases. From a knowledge management perspective, there are profile applications utilizing these mail-in databases that an individual can set up that will be discussed later.

The applications on the Knowledge Xchange serve many other administrative functions. There is a daily news feed, a newsletter application, which actually is a profile function. The “drop box” is the central repository for all knowledge management contributions. There is an application called “Octel Lookup”; Octel is Accenture’s voice mail system, and this application lists everyone’s Octel number, and the individual does not have to be connected to the network to use it. Finally, the Knowledge Xchange provides access to a number of external information databases (*e.g*., the Gartner Group, IDC, Forester, *etc*.).

Figure 4.8, below, illustrates Accenture's global server topology. The mail routes peer to peer across servers, while the database servers use a hub and spoke replication topology. As an example of this topology, Helsinki would replicate to Oslo, Oslo would then replicate to Frankfurt which is the EMEAI hub, *etc*. The high and medium priority databases replicate every twenty-four (24) hours across the entire network; the lower priority ones replicate every seventy-two (72) hours. So if a new element is added to a low priority database, it might be three or four days before that element shows up across the networks. Additions to or requests from the high priority databases will be seen globally in twenty-four (24) hours.

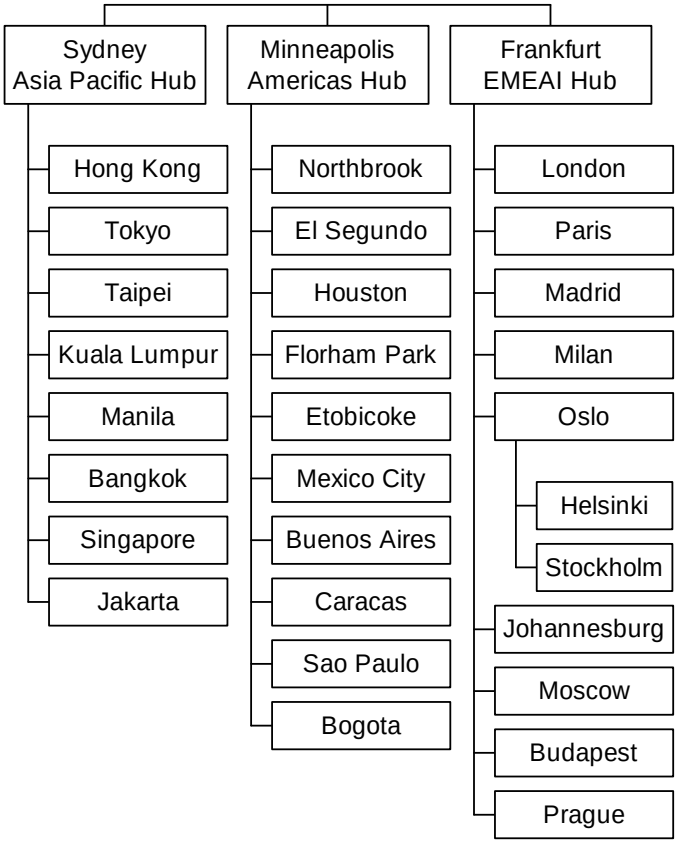

Figure 4.8: Accenture Server Topology
Source: "University of Georgia" presentation
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The decision to base the infrastructure on Lotus Notes was made almost ten (10) years ago; however, the KM2000 Initiative report recommended:

- An integrated technical architecture; and,
- Integration with the World Wide Web

While Accenture's knowledge management system is still based on Lotus Notes, there is a project that may ultimately lead to an evolution in the current infrastructure as called for in the KM2000 Initiative report – the "Global Markets Portal Project". According to Betty, a Senior Manager working on this project:

> *My understanding was that a lot of the senior executives in the firm have a less than positive attitude towards our Lotus Notes, the Knowledge Xchange, in terms of it's perceived as being too big, too clunky, too slow, and the data not current enough, so this was one avenue to kind of both leverage some new technology that's available and... also a way to kind of break some of our reliance on just all Lotus Notes-based stuff.*

It would appear that this project is intended to answer many of the complaints about the current system, but it is not a complete break from Lotus Notes. Rather it utilizes the "Plumtree Corporate Portal" (from Plumtree Software of San Francisco, California) to provide a Web-based front-end to all of the organization's content, almost any part of which can continue to reside in Notes-based databases. Thus, the portal project is not, with some few exceptions, a new data repository. However, some data is going to be created and stored solely for the Global Markets Portal and the business development framework and processes, and data associated with that, which is currently stored in a number of Lotus Notes databases on the Knowledge Xchange, is going to be converted into some new databases specifically associated with the portal.

Will this portal technology, or some variant of it, replace the near complete reliance on the Lotus Notes-based Knowledge Xchange? According to Betty:

> *I have never heard the Global Markets Portal referenced as a replacement for Lotus Notes... but I do think that if you look at the bigger picture of where Accenture is going... and I think if we really start realizing that vision of where we want to get to, you know both functionally and technically with portals in the firm, that the Knowledge Xchange could kind of morph into something completely*

> *different than what it is today, both from a technical platform perspective, as well as just how it's used or what it looks like.*

Whether it is the Global Markets Portal or some other initiative, it seems clear that Accenture will eventually address the concerns raised in the KM2000 Initiative report and that this will result in a different enabling infrastructure than the current Notes-based configuration. This new configuration certainly will be both more Web-like and more user-friendly in its operation.

4.3.4 Synopsis

Over the past forty or more years, Accenture (formerly Andersen Consulting) has been on a journey down the "the yellow brick road" (if we extend the imagery of the Emerald City project). At the end of that journey, in the "Emerald City" of knowledge management, is the hope of a powerful "wizard," a computer-aided knowledge management system that will return Accenture employees to the intimacy of a personalized approach to knowledge management (an approach that was spectacularly successful in the company's early days), but with the reach of a global system and will allow the firm to offer, as Russ said, the "…*best thinking and the best ideas and the learnings of Andersen Consulting* (Accenture)*, no matter the time, no matter the place…"* to the benefit of their clients.

Along this journey, Accenture has addressed the need to identify and capture its experiential learnings (first with subject files through to today's Notes databases); the need to systematize those learnings (first with industry binders through to today's managed vocabularies and computerized search agents); and, the need to be able to globally disseminate its knowledge capital (first with industry binders through to today's Lotus Notes-based Knowledge Xchange). Also along this journey, Accenture has tried a strictly human implementation (the subject files and the industry binders) and an essentially technical solution (the early days of the Knowledge Xchange before the need for a significant organization to manage the firm's knowledge resources was recognized). Today Accenture

has adopted a socio-technical approach with a sophisticated global technical infrastructure and a highly skilled and extensive human support organization (approximately one knowledge management professional for every 135 Accenture employees). Although the "Emerald City" has not yet been reached, they have charted their path and are working hard to reach their goal of efficient and effective utilization of the company's knowledge resources.

4.4 The Knowledge Xchange

The KX Front Page is the entry point for the Knowledge Xchange. Figure 4.9, below, shows the KX Front Page main screen. On this screen are the tools needed for searching for information across the databases, communication pieces about the firm, and tips on how to utilize the Knowledge Xchange effectively.

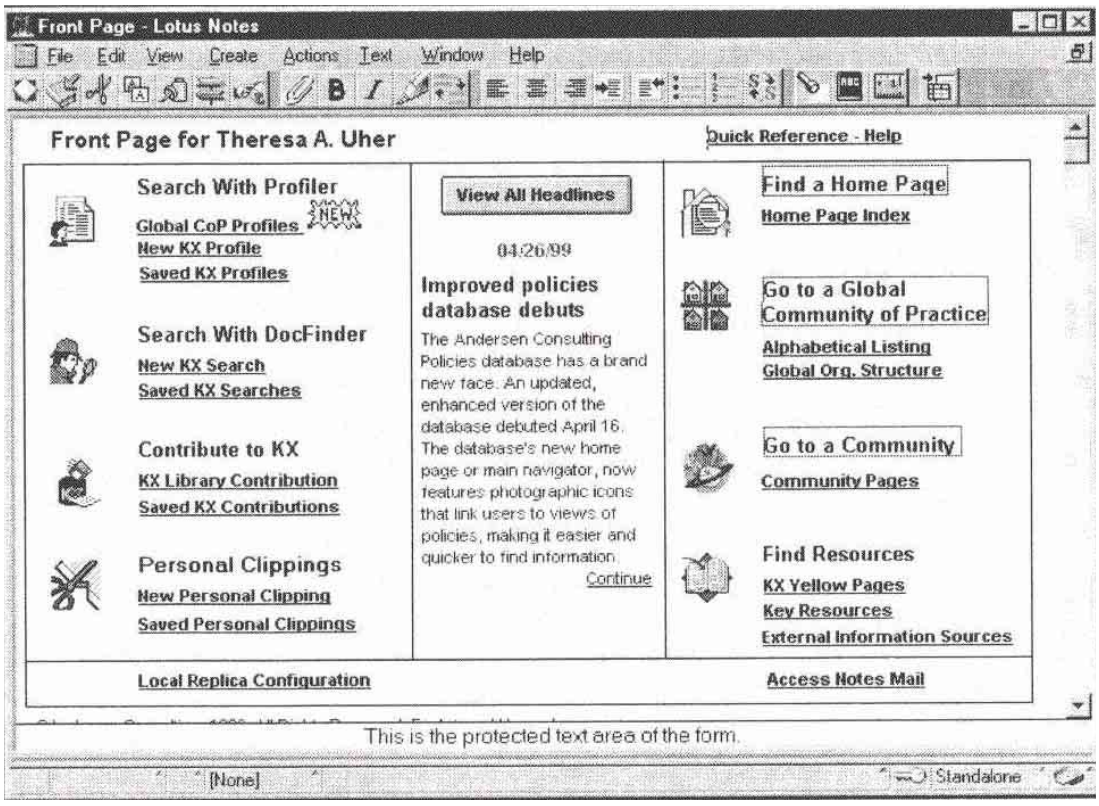

Figure 4.9: The Main Screen of KX Front Page
Source: "KX 4.0 – Using the Andersen Consulting Knowledge Xchange®"
Reproduced with permission

From the KX Front Page a user has the ability to:

- Create and save “KX Profiler” searches;
- Create and save “KX DocFinder” searches;
- Contribute to the KX;
- Create and save “Personal Clippings”;
- View all “Headlines”;
- Find a “Home Page”;
- Go to a Global Community of Practice;
- Go to a Community; and,
- Find various Resources.

4.4.1 Searching for Information in the Knowledge Xchange

The Knowledge Xchange can have information either “pushed” or “pulled” from it. KX Profiler is the proactive searching tool that “pushes” information to the user on a recurring basis, while KX Doc-Filer is its companion one-time search tool that allows the user to “pull” information from the Knowledge Xchange as needed. The KX Doc-Finder/Profiler search screen, which is shown in Figure 4.10 on the following page, is the point at which the user defines both his/her recurring or one-time information needs.

4.4.1.1 KX Profiler

The Profiler utility keeps the user up-to-date on the latest postings in specific areas. With Profiler the user can search up to thirty (30) selected databases at one time for specific items of interest without being dialed into the server for extended periods of time. From the KX Doc-Finder/Profiler search screen, the user:

- Identifies the search request in “Request Title”;
- Defines the “Search Criteria”:

- in “All of these words” the words or phrases that are included in this field MUST appear in the document for the DocFinder to retrieve it; this is an AND search condition;
- in “One or more of these words” (not shown in Figure 4.10) the words or phrases that are included in this field CAN appear in the document for the DocFinder to retrieve it; this is an OR search condition; and,
- from the “Alphabetical Listing of All Searchable DocFinder/ Profiler Databases” (not shown in Figure 4.10) the user selects the desired databases for the search.

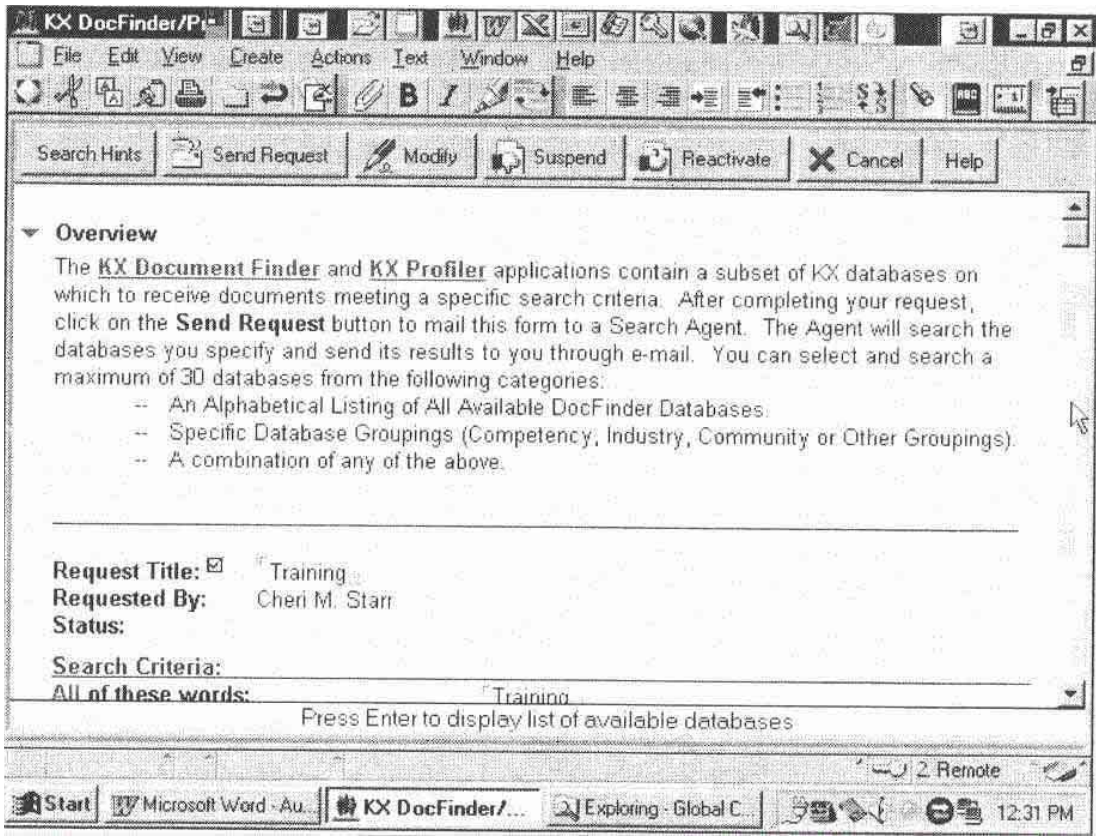

Figure 4.10: The KX DocFinder/Profiler Search Form
Source: “KX 4.0 – Using the Andersen Consulting Knowledge Xchange®”
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Once a search request is created in Profiler, that request is mailed to a “server agent” that performs the search across the multiple databases specified

for all new (since the last time the same search was run) and/or modified Knowledge Xchange documents that meet the user's search criteria. Results of a profiled search request are mailed to the user weekly as a series of "doc-links" along with a very brief description of what each document contains and how big the document is. A doc-link provides a linkage for the user to the document in the knowledge repositories that matched his/her search criteria, so if the user chooses and is connected to the network, then clicking on the doc-link will take the user to the document.

4.4.1.1.1 Community of Practice Profiles

Profiler is used for individual search definitions, but it also has another method of use. Community of Practice (CoP) Profiles are profiles created by the Knowledge Managers of the various competency-based communities. Members of these communities have the opportunity to subscribe to these CoP Profiles and have the results mailed to them on a weekly basis.

4.4.1.2 KX DocFinder

Just as Profiler "pushes" information to a user, DocFinder can be used by the user to "pull" information from the Knowledge Xchange. DocFinder functions like Profiler except that the request is handled on a one-time basis. The KX DocFinder/Profiler search screen (seen in Figure 4.10 on the previous page) is also the point at which the user defines his/her one-time information need.

After the search criteria are defined, the user sends the request to the search agent and can leave the Knowledge Xchange. Approximately twenty-four (24) hours later (this is a mail-in database, thus the replication time of the servers is in play), the results of the search(es) are mailed to the requestor as "doc-links" along with a very brief description of what that document is and how big it is, just like the results of a Profiler search are presented.

4.4.1.3 Limitations

While the KX DocFinder/Profiler search form seems to make the searching of the firm's knowledge repositories a simple task, there are three apparent limitations to the system:

1. The user must be connected to the system to either initiate a search (either Profiler or DocFinder) or to access the doc-links that are the results of a search. As has already been addressed, the majority of employees are deployed to client sites on a long-term basis and may have only limited access to the firm's network.
2. The user must select the databases that they wish to have searched (up to 30 databases per search request). While there are only 125 of the databases actually available to users for search through the Knowledge Xchange (and these are the most commonly used databases in the system), users may find selecting from even this reduced set of databases confusing. How can a user of the Knowledge Xchange be confident that they have selected the appropriate databases for their knowledge search?
3. The user must provide the appropriate key words in their search criteria to obtain the appropriate search results. How can a user of the Knowledge Xchange be confident that they have selected the appropriate key words for their knowledge search?

Each of these limitations was identified in the KM2000 Initiative report and priorities expressed to address them. However, the limitation that the firm has apparently gone the farthest in remedying is the requirement for the user to provide the appropriate key words for the search. The KM2000 Initiative report established the priority of:

> "***Uniform vocabulary and index:*** *Our content needs to be organized such that users can find best content in databases other than those they are familiar with. Therefore, we need a uniform indexing*

> *scheme that uses a 'managed vocabulary' to systematically classify all of our best content."* (KM2000 Initiative, 1997).

4.4.1.4 Managed Vocabulary

In an effort to establish a "managed vocabulary," Accenture has a group working on developing and improving its enterprise-wide content architecture and managed vocabulary. Content architecture defines the logical construct or design of the knowledge management system. For example, what are the classes of knowledge that are important to the firm for its professionals to do their work? A managed vocabulary is a structured, controlled vocabulary that identifies the subject areas of the content. Similar to a thesaurus, it is the vocabulary that is important to Accenture, and it is the system that the knowledge managers need for indexing content and users need for searching content. It includes such things as identifying the synonyms and the acronyms and what those mean so that the system can build those relationships into the back-end, and users, when they want to search or browse or tag contents, don't have to think of every possible variation. The goal of this project is to have consistency across the repositories within the firm and to simplify access to those repositories.

While this project is still in the design phase, its intent is clearly to develop a managed vocabulary that will simplify the process of identifying the appropriate key words and ensure that the keywords are part of "Andersen Speak".

4.4.2 Making Contributions to the Knowledge Xchange

The KM2000 Initiative report established the priority of:

> *"**Ownership:** AC personnel at 'all' levels must take ownership of the knowledge management strategy at a community level, community leaders and members must perceive value in the knowledge sharing performed by their community."* (KM2000 Initiative, 1997).

Contributing to the Knowledge Xchange is crucial to knowledge sharing. Knowledge can be contributed by users:

- Asking and answering questions;

- Posting knowledge that the user has acquired and that will be beneficial to others; and,
- Posting documents that will aid the user's peers.

To contribute to a database, the user simply opens the database, chooses the appropriate form from the Create menu, and fills in the form's fields (an example of such a form is shown in Figure 4.11 below:

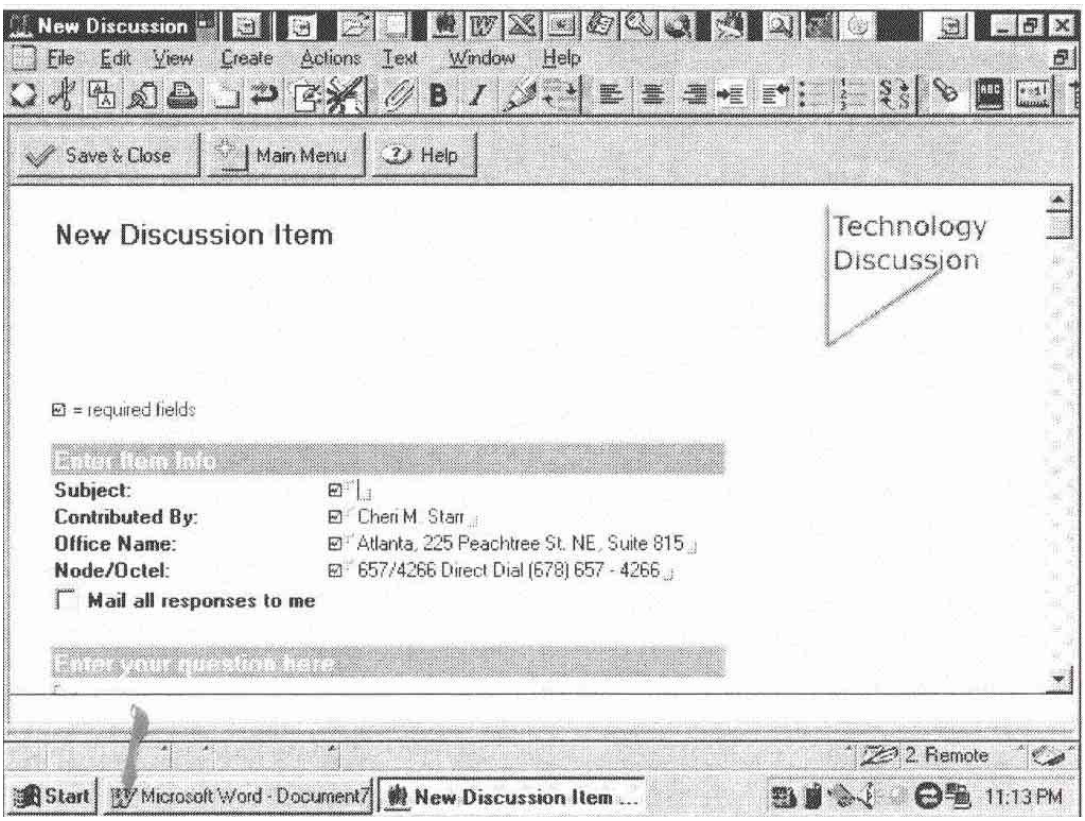

Figure 4.11: New Discussion Item Form
Source: "KX 4.0 – Using the Andersen Consulting Knowledge Xchange®"
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4.4.2.1 Asking and Answering Questions

A user can ask and/or answer questions through contributing to a discussion group. This contribution form is shown in Figure 4.11 above.

4.4.2.2 Posting Knowledge or Documents

The KX Library Contribution form provides users with a central place to contribute to the Knowledge Xchange. All contributions made with this form are

mailed to a centralized repository, the "Drop Box", that is monitored by the Knowledge Managers. While making a contribution the contributor suggests the appropriate repositor(y/ies) for the document. The Knowledge Managers then determine if the contributor's suggestion is/are the correct place(s) for the contributed items, and if it should also be placed in any other repositories. This form is available from either the KX Front Page or the mail databases.

It is everyone's responsibility to make contributions to the Knowledge Xchange; however, as a practical matter probably most of the postings are made by a designated member of each engagement team – the Knowledge Champion.

4.4.2.3 The Knowledge Champion

It is the norm, although apparently not a requirement, for each engagement team to designate a "Knowledge Champion." This individual assumes the responsibility for coordinating the capture of knowledge on the project, sanitizing[6] it, and submitting it for inclusion in the firm's knowledge base. While this is a formal role on the engagement team, it is not a full-time role; it is simply an additional responsibility that someone volunteers to assume.

Jeff, a Manager who has frequently acted as an engagement Knowledge Champion, explained the role as:

> *...primarily we're responsible for...probably two biggest things would be educating our engagement teams with how to use the Andersen knowledge management system, called the Knowledge Xchange... how to research and find out where they can get what they need when they need it, sort of bringing the knowledge capital of the firm to my specific engagement or project team is one. The second is, the other direction of taking what we're doing on the project, figuring out the best way to catalogue it or capture it, and then send that back to folks in Andersen who determine the most appropriate place to put that on our Knowledge Xchange.*

---

[6] Documents are "sanitized" by removing all references to the client from the document. This is a contractual arrangement that may be required for any document from a particular engagement to be added to the Knowledge Xchange.

The Knowledge Manager role is a collateral duty as the same manager explained:

> *I'm there to deliver client solutions.* [But, the duties of the Knowledge Champion are] *not something I do as an afterthought, but it is a… voluntary thing. I choose to do it because I enjoy it, and it's something I have to remind my bosses that I need to try to take care of, and sometimes it's a challenge because there's so many other things going on. I have to… convince my leadership there on the project team that we have to continue to implement these checkpoints along the way or at least as a worse case when the project is wrapped up and before people go on to doing other things, we need to capture what we can from them, and they recognize the importance but they have new jobs they need to staff and clients to keep happy, so it's not a perfect world, because it's not like it's actually my job and that's what my description is. I have to deliver stuff for the client, and, oh, by the way, on lunches or early or after hours I have to do these other things. I mean I get paid for that, so that's not really voluntary, but it's still something I have to get the other folks to come to the table to do with me.*

Thus, in somewhat formalizing the role of Knowledge Manager on an engagement, Accenture attempts to insure that the learnings of each engagement are contributed to the Knowledge Xchange. However, it is always a matter of balancing the client responsibilities of the Knowledge Champion with their knowledge management responsibilities; again from Jeff, it is "…*definitely challenging to do that, because in this environment, especially where I am now, right, I mean on Monday I could find out that I'm moving to the next client, and it would be really challenging.*"

4.4.2.4 The Quality Assurance Process

Two of the recommendations made in the Emerald City Project for the future direction of the Knowledge Xchange concerned the Quality Assurance Process. The recommendations were:

1. Contributions would become a part of the engagement Quality Assurance process and would occur through an ongoing and facilitated knowledge-mining process.

2. Content training would become a part of the engagement Quality Assurance process and would be a new responsibility of the knowledge management organization.

The Quality Assurance process consists of scheduled, periodic points of review as a part of the engagement work plan. According to John, a former Consultant with Accenture:

> *… there's a formal QA process, quality assurance process, where a partner would come and look at what you're doing and with the purpose of making sure that the project was on track, not just that the stuff was getting done but that the stuff that was being produced or to be produced was of the quality that the firm would be proud.*

While these reviews are a part of the engagement work plan, according to Jeff, the Manager who has frequently acted as an engagement Knowledge Champion, these reviews have not been used in the past for knowledge management related review. However, the recommendations of the Emerald City project to expand the scope of this "*formal QA process*" meeting to facilitate the knowledge-mining process and to enhance the training of the engagement team in the use of the firm's knowledge resources seems quite reasonable.

4.4.3 Other Knowledge Xchange Features

4.4.3.1 Personal Clippings

The "Personal Clippings" feature of the KX Front Page acts as a personal electronic filing cabinet or as a personal knowledge management system. Knowledge Xchange documents and links to databases can be saved in Personal Clippings and categorized according to the user's individual preference. The user can save a path to a specific document on a drive, a specific document in the Knowledge Xchange system, or a path to a specific view in another database.

4.4.3.2 Headlines

"Headlines" is the firm's newsletter. The information here is "pushed" to allow users to keep up-to-date on all global Accenture news.

4.4.3.3 Home Pages

"Home Pages" are created to centralize both information and links to information that would be of interest to the users of the specific home page. Home pages may be created by any special interest group who share common interests in particular issues for knowledge sharing purposes. Home pages vary greatly in style, substance, and purpose; they have been created for market offerings, communities, topic areas, and projects. The "Home Page Index" is a central list of all home pages.

4.4.3.4 Global Communities of Practice

The various Communities of Practice create their own community home pages which contain relevant information for their community. Community pages may contain specifics on a current topic for a given community or links to databases that have more details on a given topic. The community pages provide the user a means to keep informed about current events in their communities.

Each community page has three or four sections:

- **Newsletter:** An electronic newsletter for the selected group updated every two to four weeks;
- **Home Page Gateway:** A static organizer for frequently accessed information;
- **Key Resources:** A list of databases that the community recommends adding to the member's workspace (see Figure 4.12 on the following page); and,
- **Optional:** Section specific to the community.

4.4.3.5 Communities

Communities, not the formal communities of practice, typically contain 100 to 160 people, with members from a single competency and a single location including people at all experience levels from multiple Global Market Units. The "Community" is designed to enhance each individual's sense of belonging, build

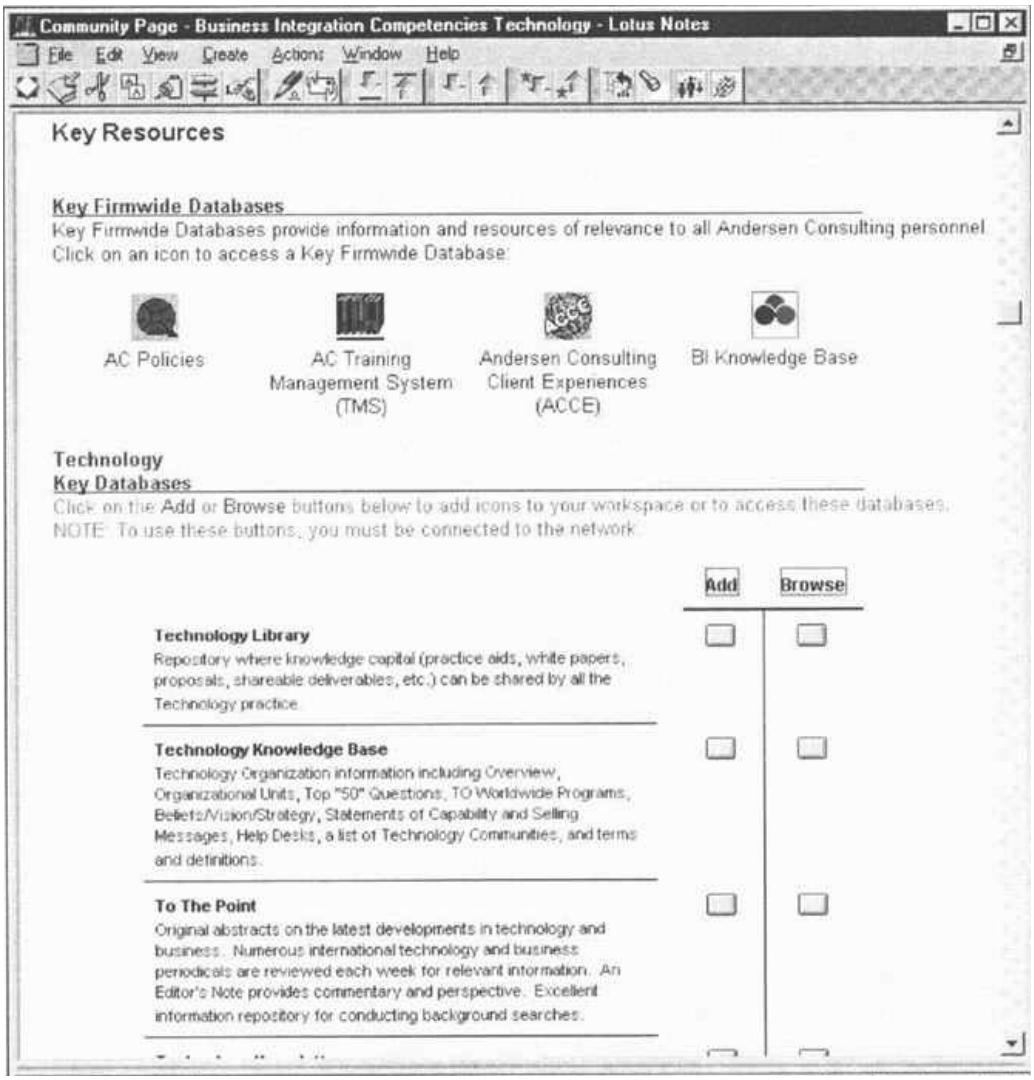

Figure 4.12: Key Resources View from a Global Community of Practice Page
Source: "KX 4.0 – Using the Andersen Consulting Knowledge Xchange®"
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interpersonal relationships, increase communication, and foster the development of skills and capabilities. "Community Home Pages" (see Figure 4.13 on the following page) provides a central location for communities that have created a home page to post community news and information, community member lists, community meeting minutes, *etc*.

4.4.3.6 Resources

Finally, from the KX Front Page, the user has a link to:

- KX Yellow Pages: A database directory containing information about all of the databases available through the Knowledge Xchange system;
- Key Resources: Another link directly to a specific Global Community of Practice's key resources page;
- External Information Sources: A link to the KX Yellow Pages view listing "open access" and "subscription only" Notes databases;
- Local Replica Configuration: Configures the local replica copy of the KX Front Page database to the appropriate server to properly replicate; and,
- Access Notes Mail: Server mail, local mail (where applicable), and archive mail.

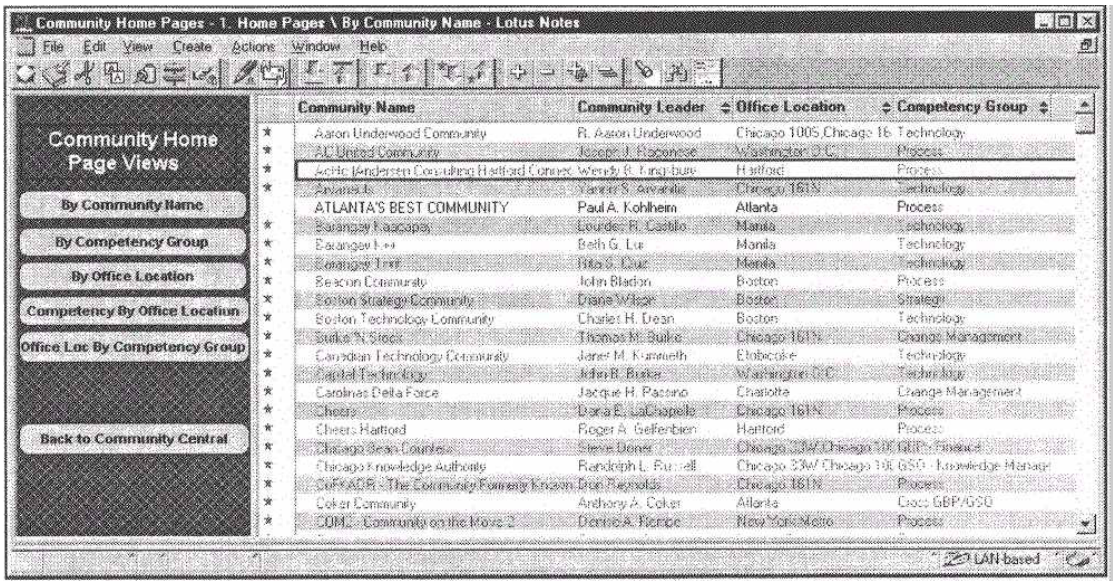

Figure 4.13: Community Home Page Views
Source: "KX 4.0 – Using the Andersen Consulting Knowledge Xchange®"
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4.4.4 Synopsis

KX Front Page provides entry for members of Accenture into the Knowledge Xchange, the firm's knowledge management system. From its entry screen the user can:

- Search for Information on the Knowledge Xchange:
  - Obtain the results of a recurring individual knowledge search ("Profiler");
  - Obtain the results of a Profile defined by their Community of Practice's Knowledge Manager ("Global CoP Profile");
  - Obtain the results of a one-time individual knowledge search ("DocFinder");
- Make Contributions to the Knowledge Xchange:
- Utilize a variety of Other Features in the Knowledge Xchange:
  - Maintain their personal knowledge management system ("Personal Clippings");
  - Obtain up-to-date global news about the company ("Headlines");
  - Obtain news and information about the groups in which they have a special interest ("Community" and "Home Page");
  - Obtain up-to-date news and information about their various communities of practice ("Global Community of Practice" and "Community"); and,
  - Read and send mail ("Access Notes Mail").

This is an impressive list of capabilities; they would seem to give the employees of Accenture easy access to the wealth of knowledge stored in the firm's knowledge repositories. But, as has already been discussed, Lotus Notes is not a particularly user-friendly environment; therefore, the true usability of all of these

features depends on the individual user's knowledge of how to manipulate them. The degree to which the Knowledge Xchange has been accepted (or institutionalized) will be addressed in the final section of this chapter (see "Institutionalization" beginning on page 155). However, for employees that have difficulty finding what they need in the Knowledge Xchange or need things that are not available on the Knowledge Xchange, the company also provides human help.

4.5 The Knowledge Center Network

The Knowledge Center Network is described by Tom, a Research Manager in the Network, as Accenture's "*...largest secondary research organization. We provide secondary research services to the practice.*" In the section on the knowledge management organization, it was mentioned that there are approximately 150 people assigned to the Knowledge Center Network. These people are assigned to a number of different call centers supporting each of the communities of practice. Supporting a specific community of practice, the researchers in the call centers can go beyond the basic role, again as Tom said:

> *...a lot of secondary research organizations in my experience...tends to be more almost data dumps... In other words... your customer calls and says 'I need this information', and you're kind of the gopher, you go out and get it, and what we've done with the Knowledge Center Network is we've kind of taken it to the next step and we've said 'Well, yeah we can go and get you this information', but the body of people we have can pretty much do that in their sleep. It's pretty simple stuff, so we've taken the step and said... we're going to add a little value here, and we do that in a couple ways. One is just by coming up with these new products and services and newsletters and actually do proactive research that we can kind of push to them and kind of tease them a little bit with the information that's out there and our capabilities.*

As a result, the Knowledge Center Network attempts to be more than a simple help desk; it attempts to be more proactive in "pushing" new information out to potential users. Finally, the Knowledge Center Network has access to a number of external information sources that, due to cost reasons, are not made openly accessible to all Accenture employees. These resources combined with

highly skilled research personnel CAN, in essence, add another member to an engagement team if the team makes use of the services of the Knowledge Center Network.

4.6 Institutionalization

The goal of this study was to determine if there was evidence of the institutionalization of the process of knowledge management as a result of the implementation of a formal, computer-aided knowledge management system in a company. In the opening chapters of this document I said that evidence of institutionalization of the process of knowledge management is found when there is evidence that users of the formal knowledge management system have altered their day-to-day work life to incorporate the use of that system. This would mean that the use of that system has become routine for them.

I interviewed ten (10) users at Accenture. Obviously, a sample of ten cannot be considered representative of an organization with 65,000 employees. As stated in the Methods chapter, the user respondents were selected by Accenture according to my specifications. As can be seen this group of user respondents represents a range of job levels, years of experience, and types of expertise. While the possibility remains that there is still some bias in the selection of these user respondents[7], I believe that the range of user respondents provides an excellent foundation of my study of institutionalization in this case. My user respondents were (pseudonyms have been changed to ensure confidentiality):

- Shirley, a Consultant in the Process competency who has been with Accenture for approximately three years.

[7] The user respondents were selected by knowledge management personnel and I assume that they may have been known to them prior to my request for respondents. In being known to the knowledge management professionals, these users may be more favorably disposed towards the knowledge management system than other employees of Accenture.

- John, a former Experienced Consultant was in the Financial Services market unit with the Customer Relationship Management line of business. John was with Accenture for approximately three (3) years before he left.
- Bill, a Manager in the Process competency within the Finance and Performance Management line of business, but crosses over between market units. Bill has been with Accenture for approximately four and a half years. Bill has been involved in the implementation of a knowledge management system at a client site with Accenture.
- Jane, a Manager in the People competency for the Financial Services market unit with the Human Performance line of business. Jane has been with Accenture for approximately four and a half years.
- Jason, a Manager in the Resources market unit. Jason has been with Accenture for approximately five and a half years.
- Gerry, a Manager in the People competency in the Communications and High Technology market unit. Gerry has been with Accenture for approximately seven years.
- Ellen, a Manager in the Technology competency in the Communications and High Technology market unit. Ellen has been with Accenture for approximately eight and a half years.
- Jeff, a Manager in the Technology competency in the Government market unit. Jeff has been with Accenture for approximately eight and a half years. Jeff has served as a “Knowledge Champion” in the past, so, in a sense, could almost be considered part of the knowledge management professionals team.

- Charlie, a Senior Manager in the Process competency for the Communications and High Technology market unit with the Customer Relationship Management line of business. Charlie has been with Accenture for approximately four years.
- Jim, an Associate Partner in the People competency for the Communications and High Technology market unit. Jim has been with Accenture for approximately eleven years and was with other consultancies for approximately fourteen years before coming to Accenture.

From these users I found solid evidence that the process of knowledge management is becoming institutionalized at Accenture; people are routinely using the knowledge management system in parts of their everyday work life. However, I also found significant evidence that there are still elements of the current knowledge management system that hamper users' reliance on the system and limit the parts of their work life where they find its use beneficial. Limitations in the system were found in the following areas:

- Infrastructure Problems:
  - The system is difficult to access from client sites;
  - The system does not provide for easy retrieval of its content; and,
  - The system does not adequately address a personalization strategy.
- Data Management Problems:
  - The content of the system is not perceived as being current; and,
  - The content of the system is not linked to business needs.
- Organizational Problems:

- Personnel are not afforded adequate time in order to make contributions to the system;
- Personnel involved in the review of content are not perceived by users as being THE experts in that area of the content and there is insufficient emphasis placed on this function;
- Personnel are not trained in the use of the system and Accenture's knowledge resources; and,
- There is little provision for a personal knowledge management system.

4.6.1 Routine Use of the Knowledge Management System

All of the more experienced consultants that I interviewed were quite familiar with the Knowledge Xchange and most were quite positive about its benefits, if also aware of its shortcomings. In discussing knowledge management, John, a former Accenture employee with approximately three years experience with the firm, said:

> *I would say the overall system is, goes beyond the technology, you know, it's a matrix of relationships that you have on the team, off the team, and everyone you've ever known within Andersen… I think that the way it worked is, you know we typically tried to figure out what it is that we knew, the team knew collectively and didn't know collectively, and where we could find those answers and almost always one of the best places to look was on Andersen's Knowledge Xchange, so an analyst typically or a consultant, depending on what the particular research was about, would do some searches on the Knowledge Xchange, similar to, I don't know, almost like a Yahoo search in some ways.*

John's comment provides an interesting perspective on "knowledge". John and his team members are clearly treating their knowledge just as they would any other resource. First they evaluated their current inventory of the knowledge resource ("…*we typically tried to figure out what it is that we knew, the team knew collectively*…") and it was viewed as a collective, not individual, resource. Next they identified what elements of the needed resources were lacking

("...*we typically tried to figure out what...* [we] *didn't know collectively*..."), and then where those needed elements could be found ("...*we typically tried to figure out... where we could find those answers*..."). The view of knowledge as a manageable resource is a key corollary to the firm's recognition that its knowledge is its core competence. Additionally, if knowledge is a manageable resource, then it should be possible to implement a knowledge management system just as management systems have been developed for other types of resources (cash management, inventory management, budget management, *etc*.). Finally John says, "...*and almost always one of the best places to look was on Andersen's Knowledge Xchange*...", and that someone would search the Knowledge Xchange for the needed knowledge which would then be added to the engagement team's collective resource and also to the individual expertise of the members of the engagement team that used that knowledge. As John was speaking about the typical way an engagement team, in his experience, addressed a project, this is a clear example of routinizing the use of the firm's knowledge management system.

But there are several other examples; one of the most interesting examples was from Jane, a Manager with approximately four and a half years of experience. Jane asked me, "*When you say knowledge management system, are you taking into account our formal and informal structures, or, and are you talking about just our Knowledge Xchange or more past that?"* I contend that when the "system" becomes something larger than just the formal computer-aided system provided by the organization, then there is evidence of its institutionalization. Formal systems may be forced on employees, but informal systems are typically formed in the ways that employees develop on their own to accomplish their missions. Jane was not the only employee to address the existence of both formal and informal systems of knowledge management within the firm; four of the other respondents (or half of the total respondents) made reference to the two types of systems.

Finally there was Charlie, a Senior Manager with approximately four years experience. Charlie described himself as a sporadic user of the knowledge management system, not a "power user." When I asked him to expand on that, he said:

> *I guess the simplest form, the definition I would have for power user is someone that uses it through their daily pattern, their daily routine. They go to certain information sources within our Knowledge Xchange and they sort of, woven into their daily pattern…*

Even if Charlie does not see himself as a power user of the Knowledge Xchange, he is clearly aware of such users and he has probably given some thought to whether he is using the system to the best advantage for himself. Of my respondents, only Jim, the Associate Partner, seemed to have felt that he had achieved Charlie's definition of a power user. It may then be no coincidence that Jim has also achieved the highest rank of any of the respondents.

4.6.1.1 Synopsis

With the exception of the most junior respondent, it seems fair to say that all of the respondents were familiar with and regular (to varying extents) users of the knowledge management system. Gerry, a Manager with approximately seven years experience, said, "…*from day one Andersen has been an extremely strong promoter of knowledge management."* While the firm, Accenture, may be a promoter of something, that does not mean that the promoted item will be institutionalized. In Giddens' terminology, the firm's promotion is an exercise of its power. But institutionalization occurs when the individuals within the firm modify their interpretive schemes in order to accept and routinize the item. It appears that for the majority of the respondents, knowledge management has been accepted, if not quite fully routinized. The reasons given for not fully routinizing the use of the knowledge management system are discussed in the next section.

4.6.2 Limitations to the Routine Use of the Knowledge Xchange?

As stated earlier, the limitations that users mentioned for not more fully utilizing the Knowledge Xchange fall in three major categories: infrastructure problems, data management problems, and organizational problems. Each of these problem areas will now be explored in more detail.

4.6.2.1 Infrastructure Problems

In the past decade, Accenture has developed a global technical infrastructure to support its knowledge management needs. This infrastructure was developed around Lotus Notes as it was the only application at the time that was capable of addressing the firm's needs. However, as was discussed in detail earlier in this chapter, several internal reviews have suggested that Notes is not as user-friendly as would be desired and that a more Web-based system would be preferable.

4.6.2.1.1 Access from Client Sites

One of the most common complaints was that the system is difficult to access from client sites. Users spoke of the disparity in access that they face at various client sites; at some sites they will have a broad-pipe full network connection, while at others they may have to disconnect a phone or a fax machine to use the phone line for a dial-up connection. Jane, a Manager with approximately four and a half years experience, said:

> *The other bad thing I would say is just because of the nature of our work… being on client site, trying to access this enormous wealth of information and these enormous documents from a remote dial up connections, I know a lot of people will abandon using Knowledge Xchange because it takes too long.*

Gerry, a Manager with approximately seven years experience, knowing that we were going to be talking later about the Knowledge Xchange, told me that she:

> *…did open up yesterday a Lotus Notes with the feedback from a technology survey that was done a little while ago… some of the big-*

> *gest complaints or suggestions for improvement for the technology... were replication time and access, just speed of accessing our Lotus-Notes knowledge databases...*

Access can clearly be a problem, since virtually every user mentioned it; however, as Gerry points out, gaining access is one problem and the speed of data transfer is a related problem. The Knowledge Xchange is Notes-based and it is assumed that users will replicate their most commonly used databases to their own computers. But replication of a database via a dial-up connection is a very slow process. Discussing the problem of replication from client sites, Karen, the partner responsible for the knowledge management organization, said:

> *That may be true, because you can take an entire database and replicate it onto your local drive and that, it absolutely makes more sense to do that in the office; however, but then on an ongoing basis through dial-up, then it just picks up any new entries, so really the only time you really need to go to the office is for that first replication. And to me that's not that big of a deal...*

However, Jane responded to the use of replicated databases with, "*I have occasionally done that, but I find that because my, the field I work in is fairly broad that in order to download everything I think might be valuable, it's not possible*."

This is not an unknown problem for the knowledge management organization. The Emerald City project report in 1996 called for the provision of access from "best" client sites that would be comparable to access from the firm's own offices. However, this call for infrastructure improvement has not yet been accomplished.

4.6.2.1.2 Content Retrieval

In discussing the limitations of the KX DocFinder and KX Profiler, I indicated that some users might find their requirements difficult (see "Limitations" beginning on page 144). Ellen, a Manager with approximately eight and a half years of experience, confirmed this when she said, "*I think, I would say probably*

my two biggest things would be, first, easier ways to search and filter so that it's easier for me to go to the right database, go to the right document type of thing."

Users do seem to have difficulty in shaping a search request in the Knowledge Xchange. If the problem is, as Jason said, "*a fairly straightforward"* one, then there should be no problem in shaping the search request, but as Ellen added:

> *...sometimes very detailed questions... and feel like it would probably take me so long to sift through and find the document that answers my question. I find it very helpful for high level and general direction, but for the very specific detailed questions I think there's that question of time to find it versus value in what I think I would find ...sometimes I feel is kind of a needle in a haystack type thing.*

While Jane said:

> *...I think we've made recent strides in terms of organizing this particular network. What I mean by that is giving greater structure to the way it's housed, operating off of home pages, so that you can go to a particular, like, say, organization design home page, and then from there you can follow the links to different parts of organization design... So I think our organization, while it still could probably be a little bit better, it's getting there. With the volume of information we have, it used to be almost unwieldy. I think a lot of people started giving up on the Knowledge Xchange, because we've got so much out there with little organization. In terms of bad points, it's still big. It still can be a bit unwieldy at times. We're getting there; we're getting a lot closer than we were, but still there is, you have to hunt and peck, you really have to go out and look for things. The search functions are not that sophisticated, so it works more like a library, in terms of entering a couple of keywords and then you see what pops up, as opposed to a real search engine, the way I would think like the Internet works or like, say, an "Ask Jeeves" or something like that.*

Jane's response is perhaps more insightful; possibly it is not just the search and filter functions that are at fault, but the very size of the databases, the amount of content, also contribute to the problem of retrieving the desired data. Ellen also said that when she ran a search in the Knowledge Xchange, she wanted it to return "*...the two best ones or the two most current or the two most complete are out there, and don't give me fifty*."

Users say that they want the one or two best documents, but I believe that there is an element of "satisficing" (Simon, 1945) rather than optimizing at work here. The users are pressed for time and they want an answer quickly, but that answer should be a good one. As Russ, a senior knowledge management official, said in discussing how a consultant searches the Knowledge Xchange, "*It's very results oriented… there are very few people in Andersen Consulting* (Accenture) *who want a hundred documents to sort through, much less a thousand or ten thousand*."

Again, this is not an unknown problem for Accenture's knowledge management organization. The Emerald City project report in 1996 called for the search mechanisms to be enhanced by new types of browsing and agent capabilities that would be more user-friendly. However, another possibility might be to reorganize the content of the knowledge repositories in such a way as to identify those documents that were considered the best of their type and so not return quite as many documents in response to a search request.

4.6.2.1.3 Provision for a Formal Personalization Strategy

Virtually all of the respondents expressed a preference for their informal system of calling friends, friends of friends, and even cold calling, in order to be able to discuss a complicated problem. This, of course, is related to the personalization strategy and is an area of their knowledge management system that Accenture recognizes needs to be improved.

The need for the implementation of a personalization strategy becomes more evident as the problem faced becomes more complex. Jason, a Manager with approximately five and half years experience, said:

> *It depends on the type of the problem. If it is, if it's a problem that requires a tool set or a fairly straightforward approach or a proven approach to it, then I will typically go through formal channels, because I can easily quantify what I need, what it needs to look like, and I can pick some ready sources to work from. If it is something*

that requires more synthesis or I can't quite define exactly what I'm looking for, then I'll tap my informal network.

Tapping into their informal network is something that all of the respondents said that they did. However, this method is neither efficient nor does it necessarily call on Accenture's best resources for the problem at hand. It is not efficient in that many of the respondents admitted to using a "shotgun" approach with their informal network – Can any of you help me with this? And, of course, no informal network would have access to all of the members of the firm. But, it would seem that the knowledge management system should have a method of identifying needed expertise and, again, provision of this type of application has been called for in the Emerald City project report.

4.6.2.1.4 Infrastructure Problems Synopsis

The infrastructure issues noted in my interviews involved problems with access from client sites, difficulties with retrieving the desired content from the firm's knowledge repositories, and the lack of a formal personalization implementation. None of the issues had failed to escape the notice of Accenture's knowledge management strategy teams, and there are plans either under consideration or in effect to address these problems.

4.6.2.2 Data Management Problems

Early in the life of the Knowledge Xchange Accenture recognized that it was not enough to simply capture content and store it in repositories for eventual dissemination. That content needed to be managed, and much of the knowledge management efforts over the past several years have been aimed at managing that content better, in other words, Accenture needed better housekeeping insofar as its knowledge repositories were concerned. However, users still find a number of data management problems that they say limit their reliance on the firm's knowledge management system.

4.6.2.2.1 Knowledge Must be Current

Speaking of this need for a better housekeeping effort, Russ, a senior knowledge management official, said:

> *…there was a growing realization that if you're going to have… a set of knowledge management repositories… somebody has got to keep those things fresh, and if you're going to go to a client and talk about industry best practices, you better have industry best practices. Not two years old, sometimes not even six months old stuff…*

But, along these lines, Ellen said:

> *…I guess housekeeping from the standpoint of, if there's a document out there from 1997 and there's a document out there from last year, I don't really want to have to look through both of them to realize that that's way old. That's not relevant anymore.*

While Jane said:

> *…I think they're doing a better job of cleaning it up, but it seems like there is some old material still laying around out there that I wonder if it's been really searched for content relevance.*

Clearly, a knowledge management system needs a continual review of the contents of its knowledge base to ensure that the content is still current. Accenture has adopted "review by" dates to address this problem; however, who is to decide if Ellen's 1997 document is "*way old*". Clearly, Ellen thinks that it is, but surely in some cases it would not be. Certainly there is a need for current documents, but there is also a need for the best representatives of a type – whatever their age. This is a problem, but the problem may be one of perception rather than reality and this may be related to perceptions of the content review process. Whatever its cause, it appears that this problem still exists in the minds of many users.

4.6.2.2.2 Content Must be Perceived as being Linked to Business Needs

The primary reason not to use the Knowledge Xchange appears to derive from the initial strategy used in building the Knowledge Xchange. The Know-

ledge Xchange is still primarily a content management system – an example of the codification strategy. The documents held in the knowledge repositories are the artifacts of the process knowledge that created them, and there appears to be a strong belief among the respondents that these artifacts are only really useful in the early stages of an engagement when general knowledge can still be helpful.

Bill, a Manager with approximately four and half years experience, said, "*I didn't tend to do as much research on the middle or toward the end of a project. I tended to do it if we were starting up or doing a proposal or something along those lines*." While Jason, a Manager with approximately five and half years experience, said:

> *It depends on the type of the problem. If it is, if it's a problem that requires a tool set or a fairly straightforward approach or a proven approach to it, then I will typically go through formal channels, because I can easily quantify what I need, what it needs to look like, and I can pick some ready sources to work from. If it is something that requires more synthesis or I can't quite define exactly what I'm looking for, then I'll tap my informal network.*

Certainly in Jason's comment is a call for more emphasis on a personalization strategy which could extend his personal informal network; however, could not there also be more content related to the later stages of an engagement's life cycle? It would seem that in these more difficult problems that Jason speaks of there is even more need for the collective wisdom of the firm. It appears that the current content of the system is not adequately addressing an entire phase of the business need, the later stages of the engagement. In order to address these needs, possibly the firm needs to enhance its ability to harvest the tacit or process knowledge that the current codification strategy appears not to be fully addressing.

4.6.2.2.3 Data Management Problems Synopsis

When discussing limitations imposed by infrastructure problems, I found that consultants want the responses to their searches to be very tightly focused. Ellen said that when she ran a search in the Knowledge Xchange, she wanted it to return "*…the two best ones or the two most current or the two most complete are out there, and don't give me fifty*." But what makes a document the "*best*," or the "*most current*," or the "*most complete*"? In this section we have addressed two issues: the need for current content and the need for content linked to all phases of the business need. These seem to be more difficult problem areas to solve in that they are linked to the perceptions of the users; however, they must be solved if use of the system is to be fully routinized. The solution would seem to be in the review process for content, and more particularly in the users' perception of that review process.

4.6.2.3 Organizational Problems

Over the past decade Accenture has put extraordinary effort into developing and deploying their knowledge management system, the Knowledge Xchange. In doing this, they have been ground-breakers as there were few, if any, similar systems against which they could benchmark. As extraordinary as their efforts have been, the users that I interviewed have identified some other areas that need attention.

4.6.2.3.1 Adequate Time for Contributions

In the discussion of the procedures for making contributions to the system, I found that, while all employees are encouraged to make contributions, the system really depends on its "Knowledge Champions" to make the bulk of the contributions, and these Knowledge Champions are volunteers who take on this responsibility in addition to their other job on the engagement. One thing that became clear in all of my interviews is that consultants are very busy people; they are very simply confronted daily with more things that need to be done than

there is time to do them. In such a situation, when making a contribution is an "extra" thing to do, one must expect that this will frequently slip through the cracks.

When asked about this, John, the former Accenture employee, replied, "*...did Andersen capture all that I learned in my three years? Not even close.*" This is the reason for the need for "timely" capture – remember these organizations have between a twenty and twenty-five percent (20% to 25%) turnover annually. But he followed that with "*Did they capture the project-specific deliverables? Sure*.". So it is not that Accenture did not make an effort to capture this employee's knowledge; they did, but what was it that they were missing? John said:

> *I think in terms of my specific projects, they lost... process knowledge, so they had the output of the projects, but not the process of getting to the output, which is often more valuable than the ultimate output.*

If this former employee is correct, and a number of the other users answered along a similar vein, there is an identification and capture process at work, but it is not necessarily identifying the most valuable elements for capture.

Identification and capture, or submission, begins the knowledge management process. Martha, the knowledge management professional that works with engagement teams, sees her job as:

> *Okay, so that's sort of the first step of the knowledge process. The other side is, obviously each of our groups that are out at these client sites are doing really interesting stuff. Now some of it's going to be similar to work we've done other places... But you know a lot of people are doing very cutting edge things, so what we want to make sure is that we're always adding to this base of information, so when I'm working with these teams, not only is my goal to make sure we're getting information to them, my goal is also to make sure we're getting the best information from them...*

In order to provide the "best information," people need adequate time, and possibly professional assistance, to consider what they learned at the various points in the engagement and to write up those learnings. Yet many of the respondents spoke about a lack of time for this type of activity. Again, the Emerald City project report spoke to the need for enhanced knowledge-mining procedures to be added to the Quality Assurance process. As the Quality Assurance process is a formal series of reviews that occur at different points in the engagement life cycle, the addition of enhanced knowledge-mining, with adequate time and professional assistance, would certainly address this problem.

4.6.2.3.2 The Review Process

Accenture recognizes that review of the contents of their knowledge repositories is important. This review is accomplished by the combined efforts of the knowledge management professionals and designated Subject Matter Experts (SMEs).

Theresa, a knowledge management professional, described her review process as follows:

> *…the element of review I do, more than reading and saying "You know, this is great", it's more based on you know what, this is sanctioned by so-and-so, who is THE guru, and here's some comments he made on it and saying "This is the best, this is required reading". This is a direct quote: "This is required reading for every e-commerce practitioner". You know, this is the best example of a, what was it, of a, I think it was a, our organizational strategy offering, and so I had those quotes, and to me that's the best vetting that I could possibly have for a document, and so I try to capture that…*

When a user in a particular community sees a document vetted by someone of their own community, someone who they recognize as an expert, then that document will be much more readily accepted as an example of quality. Unfortunately, as Gerry said:

> *I know we have a real problem here with the image of some of our staff functions. When you relegate knowledge management to staff functions, and now you're trying to do some of the things we're try-*

> *ing to do with ramping it up and making it much more easy, making it Web-based, those sorts of things, you can't do that with the B-team. So I think we've got a ways to go in terms of valuing the people that do that job and valuing the expertise it might take to do that job well.*

The use of SMEs, as opposed to knowledge management professionals, lends credibility to the contents of the knowledge base. As Jane said:

> *The next good point is that we now have again, again this is, I think, a fairly recent development, we have started monitoring for quality. In other words, you can't just throw something out there. There is a person who is an owner or a monitor of each of the libraries or databases, and they monitor the quality of documents that are going out there or it actually has to go through them in order to get posted onto the Knowledge Xchange. That's great, because it's not like the Internet where you just have no idea of the source or quality or value perhaps of what you're looking at. It has been deemed by some sort of expert or knowledgeable person in our area as being contribution.*

Unfortunately, when speaking about the review process as an SME, Jim, an Associate Partner who has been involved in the knowledge base review process said:

> *My job was to, I was one of a probably hundreds of people around the world who, during a ninety-day period, went through all of our knowledge capital in our Knowledge Xchange, and we did this virtually, and we tagged, identified, and decided what to keep, what to update, what to pitch, or what to archive I should say... and the good news is that I was able to do it while I had a couple of long flights to Europe and I was able to just go through an incredible amount of stuff on my time.*

Jim is clearly the type of individual that should be an SME; as an Associate Partner he has both the seniority and visibility to lend credence to his opinions on the content of the knowledge base, and this was probably a very effective review of that knowledge base. But the review was on his own time and squeezed in between the on-going requirements of his engagements. It simply must affect the quality of these periodic reviews; the SMEs must be given the time to do these reviews or users will continue to be concerned that the knowledge base

does not really reflect the best that the firm has to offer. Karen, the partner in charge of the knowledge management organization, felt that she had been selected for her position because:

> *...we finally decided that the right way to get some of these systems in was to treat it like a consulting job and give it our top players, not give it people that were sitting on the bench for a while, not always move people in and out of it when a client came calling...*

The same criterion needs to be assigned to the use of SMEs in the review process. This simply requires that review becomes a regular, and recognized, part of the jobs of the SMEs – it must be recognized by the firm as having at least equal value to time spent on engagements and it must have at least equal value in the consideration for a partnership offer; otherwise, the "best and the brightest" will be reluctant to take on the responsibility.

4.6.2.3.3 User Training

Charlie, a Senior Manager with approximately four years experience, described his training in the Knowledge Xchange as:

> *It was real brief. It said okay, this is out there, here's the yellow page you go to, and you can find pretty much anything from there. We did not spend any time I would say using it in any great detail and becoming familiar with it. It was more of a heads up, here's how, here's what it is and here's how you use it.*

Yet Jane said, "*There's a lot of functionality that I personally don't know how to use, that I know I'm not achieving the maximum benefit out of it...*". Few of the users that I spoke with believed that they had gotten good training in the Knowledge Xchange or really used all of its capabilities; from a company that spends half a billion dollars annually on knowledge management, there seems to be an element of "penny wise, pound foolish" in not ensuring that users understand how to utilize the Knowledge Xchange.

4.6.2.3.4 Need for a Personal Knowledge Management System

Accenture has devoted significant resources to developing its organizational knowledge management system. The rationale for doing so is obvious; the corporate vision statement for Accenture is, "*To be one global firm committed to quality by having the best people with knowledge capital, partnering with the best clients to deliver value.*". Clearly, Accenture formally recognizes the importance of their organizational knowledge in providing value to their clients; however, Accenture also says, "...*having the best people with knowledge capital...*". I contend that it is not enough that the firm captures vast amounts of individual knowledge, stores it, and makes it available for dissemination; it must also facilitate their employees turning that organizational knowledge back into individual knowledge in order that they may use it for the benefit of clients. The missing piece of this system is the tool set to assist in that final piece of knowledge transformation.

Accenture has made a small provision for personal knowledge management system. The "Personal Clippings" feature of the Knowledge Xchange allows users to store documents and doc-links; however, more is needed. Some of the users have recognized the need to take personal responsibility for their own knowledge management. As Jim said:

> *I can keep Lotus Notes in my database, in my personal folders, that have all the doc-links that I want so that when I have a need to get insights and expertise on topic A, I can just call up that table of contents, if you will, and launch and retrieve what I need. So in fact, just recently I went through, my assistant was amazed, I went through a personal cleanup process in my LotusNotes and an indexing process so that my database is personally fresh, so it's going to really help me do a better job myself of leveraging myself.*

In fact, virtually every user interviewed had a similar story to tell, such as Gerry, "...*I kind of keep, and I know a lot of people that do this, a set of best practices like on my own hard drive...*". I propose that a stronger tool set would en-

hance the ability of the individuals to build their own knowledge management system.

4.6.2.3.5 Organizational Problems Synopsis

Knowledge management has come a long way at Accenture, but in many ways it is still perceived as a back-office function, to be tolerated so long as it does not interfere too much with the client-facing, revenue-producing, line functions. Yet the purpose of knowledge management is to make these line functions more efficient and effective, and to do this some of the old ways of doing things are simply going to have to change. Consultants, line personnel, are involved in almost every facet of knowledge management and for them to meet their responsibilities in the knowledge management arena, adequate time must be provided. These are not "extra" functions; these are functions that are vital to the care and maintenance of the firm's core competence.

4.6.2.4 Limitations Synopsis

Accenture's own knowledge management strategy reviews have already identified many of problems discussed above. Many of the infrastructure problems appear to be related to the reliance on Lotus Notes and the need for an expanded personalization strategy component in the system. It is not that Accenture employees do not employ this personalization strategy, it is that they just do so through their informal networks. Unfortunately, the use of informal networks restricts the number of "experts" that might be called on and does not have the same potential for appropriate connections as a properly designed and implemented formal system would have. The data management problems appear to be related to one of the organizational problems, the need for a more effective review process; but it is the organizational problems that will probably be most difficult to address. The recognition that time spent by line personnel on their knowledge management responsibilities, rather than producing revenue, is

equally important to the firm and will require a difficult readjustment in the thinking of many.

4.7 Summary

Accenture's corporate mission statement is:

To help our clients change to be more successful.

This is supported by their corporate vision statement:

> *To be one global firm committed to quality by having the best people with knowledge capital, partnering with the best clients to deliver value.*

George Shaheen, the former CEO of the firm, described "knowledge capital" as:

> *Knowledge capital is our most valuable asset and it drives our organization. It's what we sell, and what we must continue to perfect and protect. Our people should diligently find new ways to share and reuse information and deploy it around the world.*

Accenture's culture of knowledge sharing was consistently commented on by the respondents in this case study. One suggested that the basis of this culture might be the firm's training facilities in St. Charles, Illinois; certainly these facilities are world renowned. It is clear from the quotations above that the senior leadership recognizes the importance of the firm's knowledge capital and, as the early parts of this chapter detail, it is equally clear that the firm has committed very significant resources to the continuing need to "*perfect and protect*" that resource as Mr. Shaheen addressed.

Accenture has been developing its formal, computer-aided knowledge management capabilities for almost a decade, and its overall knowledge management process for many years more than that. Its Knowledge Xchange provides access to an extensive range of knowledge repositories, but the Knowledge Xchange is based on an aging system that in some ways limits the power of the knowledge management system. However, there are projects underway (*e.g.*, the

Global Markets Portal, *etc*.) that may hold the solutions for many of these problems.

Is knowledge management institutionalized at Accenture? No, not yet. But the company is clearly moving in that direction.

Chapter 5: KPMG International

KPMG International, which is headquartered in the Netherlands, is the world's third largest accounting firm. The firm provides accounting, tax and legal, financial advisory, and assurance services from more than 820 locations in more that 159 countries. Since its formation in 1986, KPMG International, which is frequently described as a "confederation of national practices," has been focused on unifying its historically loose federation of member firms in order to develop a consistent global image and to offer a cohesive array of products and services to its clients around the world. As previously discussed, KPMG is openly identified, as are the other two corporate participants in this study. However, all individual participants are identified by pseudonyms. A list of the pseudonyms and a brief description of the job responsibilities for each individual is found in the appendices of this study. The pseudonyms and the position descriptions for the KPMG participants are found in Appendix "D" on page 372 of this report.

5.1 History of the Company

The history of KPMG began in 1897, just after the first American accounting firm had been established. Two immigrants from Scotland founded the Marwick, Mitchell & Company in New York City. In 1911, Marwick, Mitchell & Company merged with a British accounting firm and the new transatlantic company was called Peat, Marwick, Mitchell & Company; this configuration remained in place for the next three-quarters of the century.

The U.S. branch of the firm grew to become one of the "Big Eight" major accounting firms in the country and, in fact, by the 1970s it was the largest public accounting firm in the nation. In 1978, the firm formed Peat Marwick International to oversee its activities outside of the United States. Peat Marwick International was set up as a multinational umbrella partnership of different firms

around the world. The goal was to prepare the firm for further globalization in the world economy and financial markets by combining various established local accounting firms into a single image.

In 1986, Peat Marwick agreed to merge with Klynveld Main Goerdeler (KMG), a Dutch accounting firm. KMG had been formed in the early 1980s through the merger of a German company (Deutsche Treuhand-Gesellschaft), a Dutch company (Klynveld Kraayenhoff & Co.), an American company (Main Hurdman & Cranstoun), and several other European and Canadian accounting firms. The resulting international accounting federation, KMG, was based in the Netherlands; the U.S. arm was known as KMG Main Hurdman.

In 1986, Peat Marwick was the second largest public accounting firm in the U.S., while KMG Main Hurdman was the ninth largest. The merger of Peat Marwick and KMG created the largest accounting firm in the world in terms of size and revenue. Prior to the merger Peat Marwick was the dominant of the two firms in the U.S., while KMG was the dominant firm in Europe. The merger of the two organizations, now known as Klynveld Peat Marwick Goerdeler, or KPMG, enhanced the new firm's ability to attract as audit clients large U.S. companies with multinational operations. With their combined power, KPMG hoped to hold a leadership position across the world.

However, the merger of two large firms with different operating cultures and management styles proved more difficult than expected. Member firms in Australia and New Zealand chose not to join the new company and began investigating other merger options with competing firms after their vote against merger into KPMG.

In March, 1999, KPMG restructured its operations again to create global operating regions. Colin M. Sharman, Chairman, KPMG International, said:

> *KPMG's 19 member firms throughout Latin America, Mexico, and the Caribbean have unanimously agreed to combine operations with the United States firm, KPMG LLP. KPMG's national practice in*

> *Australia and New Zealand is also combining with the United States, to form the new regional KPMG "Americas" body... In the first step towards regionalization in Europe, KPMG will combine its national practices in the United Kingdom, Germany, France, and the Netherlands, and operate there as the "EMA" (Europe, Middle East, and Africa) regional practice* (KPMG, 1999).

Other KPMG practices were expected to join and the firm planned to form an "Asia-Pacific" group at a later date.

Discussing this reorganization, Stephen G. Butler, Chairman and CEO of KPMG LLP, who led the new regional KPMG "Americas" body, said:

> *This is how we're going to remove national barriers to serving global clients and realize KPMG's unique vision for the future. It is a vision focused on a globally managed product line organization that serves multinational clients wherever they operate. This structure aligns us with how our global clients operate, but also allows us to recognize individual country cultural issues and national client bases. In sum, it will enable KPMG to further refine its global capabilities* (KPMG, 1999).

While globalization has clearly been an important strategic goal for KPMG International, the firm was consistently referred to as a "federation of national practices" by the participants in my interviews; in fact, the "*Big Seven firms within KPMG here, the G-7 as we refer to them*" (the G-7 consists of the U.S., the U.K., the Netherlands, Germany, Australia, Canada, and France) hold the predominance of power in KPMG International. As will become even clearer throughout this chapter, globalization, and its attendant ability to develop a consistent global image and to offer a cohesive array of products and services around the world, has been a major strategic goal for KPMG International for many years, but it remains just that – an unattained goal.

Along with the firm's continued growth, there were also problems. In 1997, the Canadian practice almost left KPMG International and merged with Ernst & Young (Grant, 1998), and in 1999 it also considered merging with Arthur Andersen. While neither deal came to fruition and the Canadian practice re-

mained within KPMG International, the repercussions of the breakaway movement left the company divided. Also in 1999, PricewaterhouseCoopers acquired the Belgian consulting practice. In 2000, the entire consulting practice was spun-off as KPMG Consulting.

5.2 Corporate Organization

To understand the organization of KPMG, it is important to remember that traditionally it has been a "federation of national practices." While the merged firm, KPMG International, is only fifteen (15) years old, on the United States side the firm's progenitors have been in business for over one hundred (100) years and when the U.S. firm increased its global presence approximately thirty (30) years ago in establishing Peat Marwick International, its global operation was set up as a multinational umbrella of different partnerships around the world. Additionally, the other large national practices that made up the merged firm each had their own strong traditions of independence. Therefore, when officials of KPMG International say that globalization is an organizational goal, that goal (as with any other announced goal) may not necessarily be supported by the individual partners of the various national practices.

In any partnership, the leadership must lead more by persuasion than by mandate, as the partners being led are also the owners of the firm; however, in many ways the executive leadership of KPMG International has an even more difficult problem. Partners in KPMG hold their partnerships in their national firms, not in the international organization; and each of those national firms has an executive leadership of its own responsible to its partners. The executive leadership of KPMG International must first persuade the national practice leaderships and then persuade a majority of the partners in each of those national practices.

According to Dave, the Global Chief Knowledge Officer, "...*it's actually quite a difficult organization to understand*...". The foundation of KPMG is its

national practices. While there has been some regionalization of the national practices, there are still over one hundred different partnerships that make up the member firms of KPMG International. Each partnership has its own management structure built around its service functions (typically Assurance, FAS, Tax and Legal, and still in some parts of the world, Consulting). Additionally, each of these partnerships has somewhat different partnership agreements, but each partner is an owner of that national firm and has some degree of independence. Each of the national practices pays a portion of their revenues to the international organization, which in turn provides a number of services; among these is knowledge management.

KPMG International has an "International Board" made up of the chairmen of the seven largest practices (the U.S., the U.K., the Netherlands, Germany, Australia, Canada, and France) and others. The International Board is headed by the chairman of the U.S. practice and under the International Chairman is the International CEO. Beneath the International Board is the "International Executive Team" which is chaired by the International CEO. The International Executive Team is made up of the heads of the global business functions (Assurance, FAS, and Tax and Legal) and the heads of the global infrastructure services (Knowledge Management, Technology, Marketing, Risk Management, Human Resources, etc.). The International Executive Team attempts to coordinate these functions so that KPMG presents itself as a global company. Again according to Dave, the Global CKO:

> *It's integral to the achievement of the globalization vision, and the areas like knowledge management, technology, and human resources are likely the ones that will be, are on the forefront... of that... globalization initiative, and that can also...* [play out] *within the business areas, say, assurance, that our globalization objective will be achieved through how we would implement a number of the technology or knowledge management initiatives, so within the business itself and how the business is done, these are critical activities, critical to the, our strategy.*

For example, each of the global business functions (Assurance, FAS, and Tax and Legal) has an international advisory center to act as a global center for product development and support for the specific practice, and then there are frequently smaller service centers for each of the business functions in each of the national practices.

5.3 KPMG and Knowledge Management

5.3.1 A History of Knowledge Management at KPMG

The idea of developing a knowledge management system for KPMG is not new; however, in the past the initiatives to develop such a system seem to have developed at the national practice level rather than at the global level. This is not unusual; for all of the interest in globalizing the firm seen in the previous sections of this chapter, each national practice still maintains its own profit & loss statement, and the individual partners' earnings are based on the success of their national practice, not on the firm's global performance. Thus, these early efforts at developing and implementing knowledge management systems were directed at leveraging a national firm's knowledge capital, not other objectives.

In 1989, a formal proposal and system prototype for an initiative known as "Shadow Partner" was presented to the United States partnership, KPMG Peat Marwick. Shadow Partner was to be a system to facilitate knowledge sharing among the U.S. firm's professionals; it would provide global electronic connectivity, e-mail, and access to shared repositories. However, the proposed cost ($100 million for full implementation) was beyond what the partnership was willing to accept and the Shadow Partner initiative was not implemented.

In 1991, the knowledge management system concept reemerged in the U.S. as a new proposal, "Knowledge Manager" or "K-Man." The basic premise of K-Man was to enhance, leverage, and distribute KPMG's knowledge capital. The system was intended to address both of Hansen *et al.'s* (1999) strategies for managing knowledge: "codification" and "personalization." In the K-Man system,

codification was called the “Library” and personalization was called the “Conference.” A Library was a knowledge repository containing information about the firm, its clients, *etc*. This information included experiences, “lessons learned,” and other items submitted as documents by members of the firm and then reviewed for quality by content experts. Each document was described with abstracts and key words to assist in the retrieval of the appropriate document. The Conference facilitated ongoing discussion and exchange of ideas. Conferences were organized by topics that were of interest to different groups within the firm, similar to chat rooms on the Internet today. The K-Man system was first introduced in 1991 in a component of the U.S. firm’s consulting group; it was extended to the audit and tax functions in 1994 and made available globally in 1995 (Alavi, 1997).

In 1995, KPMG LLP, the U.S. national practice, decided to shift its knowledge management infrastructure to an intranet and to move K-Man to that new platform. The K-Man system was originally built around an application called “First Class,” a Canadian messaging product, but in 1996 it was migrated to Microsoft Exchange (Cole-Gomolski, 1997) in order to support its move to an intranet. This new Web-based system, known as “Knowledge Web” or “K-Web,” was introduced in 1997. However, while the K-Man/K-Web system worked, problems developed. Ultimately, the U.S. based K-Man/K-Web system was replaced by the next step in KPMG’s knowledge management journey, “KWorld.” According to Bill, a change management specialist in the Global Knowledge Management Office, “*The U.S.’s* [knowledge management system, or K-Man/K-Web] *had sort of been floundering a bit anyway so I’m not sure that was a huge stretch* [to replace it]*…*”.

The United States practice was not the only national practice in KPMG International to attempt to develop its own knowledge management system. The practices in Australia, Belgium, Canada, France, Germany, Hong Kong, the

Netherlands, Singapore, Taiwan, and the United Kingdom all developed their own knowledge management systems. For example, the system in the United Kingdom, known as "UK-Now" (pronounced "U Know"), still exists and is said to be actively utilized.

The result of these individual efforts was that things were getting a little too Balkanized for a "global" firm. The complexity extended into all of the firm's information technology. Throughout KPMG there were thirteen (13) different messaging systems, six (6) different knowledge management systems, and multiple human resources, finance and payroll systems on more than six different operating systems. On 9 June 1999, KPMG International announced "KWorld," an online messaging, collaboration, and knowledge sharing tool, which is the firm's current knowledge management system (Grzanka, 1999). KWorld was, among other things, intended to bring order to the firm's technological chaos.

KWorld was announced with considerable fanfare. Michael Turillo, then the firm's Global Chief Knowledge Officer at KPMG's Boston-based "Global Knowledge Exchange," a new unit of the company established to oversee KWorld technology development and its worldwide rollout, said, "*Now we have one messaging system, one knowledge management system, and we are moving rapidly to address the other business processing systems...*" (Grzanka, 1999). In addition to its global internal use, the plans for KWorld called for a go-to-market strategy, with KPMG helping its customers implement KWorld as a corporate-wide communications and knowledge management platform. At the time of the announcement it was being piloted not only at KPMG, but also at five Fortune 100 clients with global operations (Grzanka, 1999).

The roll-out of KWorld was planned to be accomplished in phases and, in fact, was still underway at the time of my interviews (late 2000 through early 2001). At the time of the initial announcement of the system, it was only deployed in the four largest national practices – the United States, the United

Kingdom, the Netherlands, and Germany. Soon after, KWorld was deployed in Canada, Australia, Sweden, Switzerland and other larger practices. The first fifteen (15) countries in which KWorld was deployed are known as "Wave One" and they "*had access to everybody; all the firewalls were down*," according to Paul, a knowledge management official involved in the roll-out. Paul also said:

> *The next twelve countries* [Wave Two] *have had only access to the Alpharetta*[8] *documents, in other words, those that were stored not locally. This restriction of access was because security issues arose…* [the] *Global CIO, simply was not comfortable and the first so many countries were not comfortable giving access now to so many other countries to their local service… By lowering the security standards* [for the Wave Two countries] *but not giving them access to the seven big countries' documents, they could bring more countries in quickly in a Wave Two category… but, so several countries, four to my knowledge, have upgraded from Wave Two to Wave One, so the pathway is there. So they get in early but they don't get to everything, but if they want to go through the extra, you know walk the extra mile, they can move up to the Wave One status.*

While no country has refused to deploy KWorld, in addition to the security requirements discussed above, there are a number of other stringent requirements that has led some of the smaller national practices to delay their deployment of KWorld. These requirements involve selection of a national CKO, security, infrastructure, content services, help desk functions, training and communications, and other issues – all of which must be in-place before the Global CKO will approve the deployment of KWorld within a country. For some of the smaller practices meeting these requirements is quite difficult and expensive. In fact, Paul, the Manager of Global Deployment, said:

> *…whether or not one hundred practices, all of them will be able to connect to the worldwide WAN, which is the expensive connection and the fast connection, is under debate, because there may not be funding for every small country to connect to the system.*

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[8] Operation of the servers for the global KWorld network was outsourced to Compaq, Inc. Compaq's data center is in Alpharetta, Georgia.

5.3.2 The Knowledge Management Organizational Structure

The Global CKO leads the international knowledge management organization. The Global CKO has an advisory body known as the "Global Knowledge Management Steering Committee," which is made up of the CKOs of the seven largest practices (the U.S., the U.K., the Netherlands, Germany, Australia, Canada, and France), the Global Knowledge Managers of the three business functions (Assurance, FAS, and Tax & Legal), two representatives from the Office of the Global CKO, and representatives from Human Resources, Marketing, Technology, and Global Markets. The Global CKO chairs this steering committee. The steering committee attempts to coordinate knowledge management efforts globally.

According to the Global CKO, the National CKOs and Global Knowledge Managers of the business functions provide:

> *...integration or reinforcement of the objectives or alignment of the objectives, but if our business objective is to share knowledge globally... actually the knowledge is currently resident in individual countries or practice areas. What we have to do is... get those groups, those various factions, working together to actually try to achieve the overall vision... you can't actually legislate a number of these activities. You actually have to... organize it, you have to align the objectives and the timetable and... get those activities relevant to the business, because in the knowledge management area we require the cooperation of the business to actually enable the business to share the knowledge, so there is the potential of these factions working against each other, but... in any of these kinds of things where you're trying to either regionalize it or you're trying to nationalize it or you're trying to globalize it, you actually have to have all the players who have influence into the circumstances working on the solution and being either convinced in their gut that that's the right thing to do or convinced because the boss tells them that that's what they're supposed to do, in order to actually achieve what we want to do, and that's bring this stuff together.*

Beneath the international level, each National CKO and each Global Knowledge Manager of the business functions has a staff of full-time knowledge

management professionals who, according to Cheryl, the manager of one of the national knowledge management staffs:

> *…do a variety of things. Some of that is operational for the applications; some of that is change management, communications, working with different groups, adoption. The other, I guess, key role I have is working with the* [national] *businesses to help them in their knowledge management activities. It's quite varied and it also involves, clearly, global evolvement.*

Paul, the Manager of Global Deployment, described the responsibilities of the knowledge management professionals on the staff of the Global Knowledge Managers of the business functions as:

> *…the role of those individuals is to increase or to stimulate participation in this initiative, in knowledge sharing, across KPMG within their functions, so that these people produce materials, hold conferences, actually conduct country visits, all around as fellow assurance specialists, as fellow tax and legal specialists, convincing their colleagues of the merit of this system, so they are, so to speak, a support system for the CKO.*

Finally, there are other knowledge management professionals who are not formally part of the knowledge management organization. These people are a part of the business functions themselves and so report through that hierarchy, although they work closely with the knowledge management organization. Again according to Paul, these people may be:

> *…the Knowledge Manager, or a Function Knowledge Manager… their job is to line up… our "Knowledge Leads." In other words, who are the leaders in the different knowledge areas of your practice? Those people get named* [by their] *specialty… Every country submits to us a list of their Knowledge Leaders…Well, they're treated as SMEs. Those are the people that, it's the CKO's role or it's the Knowledge Manager who's been set aside, if the practice is big enough they can afford a fulltime person to do this, and… part of their job is to speak with these leaders in each of the knowledge areas…*

5.3.2.1 Global Network Operating Center, Solution Centers, and Help Desks

As might be expected with the matrix organization of KPMG, the help desk function is also in layers. There is a global help desk known as the "Global Network Operating Center," or GNOC. GNOC is located in Amsterdam (the headquarters of KPMG International) and manages the organization's global problem ticketing system. For example, if a country newly on KWorld cannot access one of its services (*e.g.*, Lexis/Nexis or Gartner), they would file a problem ticket. GNOC functions as a distributor of problems; so that if it sounds like a networking problem, they would forward the problem ticket to the technical networking staff; or if it sounded like a service provider (*e.g.*, Lexis/Nexis or Gartner) had not been informed that the member firm was now to have access to the service, the problem ticket would be forwarded to the person in charge of contracting for those services. GNOC distributes problem tickets to the division, area, person, *etc*. that can provide the solution; it generally does not provide the solution itself.

There are two levels of direct user support: the Help Desk and Solution Centers. When a user looks in KWorld's "Help" section, there are separate lists of Solution Centers and Help Desks. In small practices the Solution Center is the name of the national CKO, but in many cases it is the Knowledge Manager for that function.

5.3.3 Knowledge Management Technical Infrastructure

KWorld is built around a dynamic Web site using active server pages (ASP) to deliver the content requested by the user. Its technical infrastructure is comprised of an integrated suite of plain-vanilla Microsoft products, including Windows NT Server, SQL Server Version 7.0, Site Server, and Exchange. It also uses Windows 2000 and Office, with MS Outlook as the mail package. Additionally, the environment includes interfaces to Lotus Notes and Oracle databases.

The network infrastructure is outsourced to Compaq Computer Corp., with applications running on servers at Compaq's data center in Alpharetta, Georgia with a mirror site in the United Kingdom.

According to James, a senior knowledge management official, these Web pages are delivered by:

> *...three different platforms. We have teams working on our internal platform, which is our intranet, our external platform, the Internet, and our client collaboration platform, the extranet, so we have three very different communication platforms and content management platforms, but in reality they're all delivering the same thing. They're providing advice to somebody somewhere or connecting people somewhere together. What we're focusing, in this group on at least now is bringing those three avenues of Internet, extranet and intranet together through like processes. Effectively, content is authored somewhere in our business, ideas come somewhere from within our business, people have thoughts somewhere in our business, so externally, yeah, we want to filter those and put them in the environment of most use, and if that happens to be all three environments simultaneously, or any one environment, that's a decision that needs to be made by the business, where they believe that's going to be of value. We put it into your preferred environment, try and provide notice that things that are relevant are going to be in that environment, either for a client to consume or a partner to consume or a new starter to consume...*

So, the KWorld infrastructure with both network and Internet components is intended to be able to deliver content to users wherever they may be located when they need that content.

In attempting to explain the infrastructure, Sandy, the system architect said:

> *First, the work of the system at the highest level of abstraction breaks down a lot like the work that goes on in a library... the ability of the system to handle the kinds of requests around that card category is, makes that particular workload trivial... It winds up not making the infrastructure that we've brought to bear on this problem breathe hard...*
>
> *The other part of the workload, which is people that are actually taking stuff out, we'll ignore the contribution process because, although from a business perspective it's half the essence of the game,*

> *from an engineering perspective, it's not a big enough workload to make much of an impact on the kinds of things that we're chatting about at this level, but the process of folks finding what they're looking for and saying, 'gimme', that's a very significant workload from the standpoint of the infrastructure, which breaks down into two broad categories. One's the servers and all that little programming stuff that's going on up there, and the other is all that long bunch of collection of wires that we've got to hang this all together. It's significant from the standpoint of the network because it seems that knowledge and brevity are not synonymous. So we have an assortment of treasures of knowledge in our collection which range from the size of elephants down to things that are really quite small… at that point, why the cocktail napkin arithmetic takes over. How many bits have you got and how many bits can you take a second? So if you were a user of KWorld I wouldn't be so concerned about anything other than how fast your modem was. It's not about the back-end infrastructure at all; it winds up being how big is the straw you're sipping with?*

So the use of active server pages combined with back-end infrastructure reduces the access problem for users deployed to client sites to the speed of their modem.

5.4 KWorld

KWorld is KPMG's online messaging, collaboration, and knowledge sharing tool, but it is important to realize that KPMG intended the system to be more than just that. In fact, KWorld was originally intended to serve three (3) roles:

1. To be the catalyst for globalizing what still remained a "federation of national practices;"
2. To spin-off a go-to-market product; and,
3. To be the global firm's online messaging, collaboration, and knowledge sharing tool;

5.4.1 KWorld's Globalizing Role

When KWorld was first launched, the then Chief Knowledge Officer Mike Turillo said, "*This is the most significant initiative that KPMG has embarked on in its 100-year history*…" (Cone, 1999); while KPMG International's Chief Executive Paul Reilly called KWorld "…*the No. 1 priority of the global firm*." (Cone, 1999). KPMG International's top leadership had charged Turillo with using new

and emerging technologies to tie together KPMG's four largest national units — the U.S., the U.K., the Netherlands, and Germany — which accounted for 44,000 of the company's then 90,000 employees in more than 140 countries.

According to Turillo, "*The business owners at the Board level said, 'We want to do this and we want it to be a competitive advantage for us. What'll it cost?'* " (Cone, 1999). As already stated, KWorld was to serve a number of strategic purposes for KPMG International, none more important than its role as a catalyst for increased globalization. "*No firm can be truly global unless its people are interconnected and the accumulated best-practices and horror stories are accessible to everyone…*", says Marianne Hedin, research manager at International Data Corp. "*Since you don't have a choice about being global, this is a must-do*." (Cone, 1999)

While there were technical problems involved in installing the global infrastructure, those problems have largely been solved. However, the goal of actually globalizing the firm has proven much more difficult. As James, a senior knowledge management official, said:

> *What they're* [the national practices] *finding it difficult to do still is to commit to the fact that we're creating a truly global system, and that's, that's understandable. We don't really have much of a global presence yet. We have created some artificial places for the global organization to play, but they're not necessarily well-defined or well-recognized enough for the business to be seeking to be global yet…so what we do now is really look at trying to modify the country's processes around content generation, content management, and so on to make them more effective in what they've been doing. What we've found is that many of the countries have excellent processes locally supporting national systems or regional systems.*

5.4.2 KWorld as a Go-To-Market Product

When I first began my interviews with KPMG, John, a Senior Analyst in the Global Knowledge Management Office, said that the firm's knowledge management organization:

> *...is restructuring to reflect the change in strategic priorities... I don't know if ABCD told you, but there's a technology spin off in the works...I mean that much is public knowledge; the details of it aren't being announced, but KPMG has said, yes, there is a technology that was produced within this group that is going to be spun off as a separate company.*

In fact, according to Bill, the Manager of Change Management in the Global Knowledge Management Office, during the time of my initial interviews there were in essence two knowledge management organizations in KPMG, "...*although the official word was it's one, we're one group and they're just a project...*". There was the Office of the Chief Knowledge Officer that was responsible for the internal use of KWorld, and then there was the "Special Project Group" which was headed by Mike Turillo (the former Global Chief Knowledge Officer) that was developing what was to be known as "Cering." Again according to Bill:

> *...Mike and a team of people were funded for a period of time to try to take what had been created internally for KPMG to the marketplace in the form of a software product...maybe twenty, twenty-five people were on it fulltime, and there was an expectation that if they got the approval from the KPMG International Board that, and that would happen when they presented the deal and the deal was made up of investment money from partners and various venture capital groups... the KPMG Board would vote and say yea or nay on yes, you can go, you can take this intellectual capital you've developed with you and we'll keep a stake in the company and then X number of people from the internal group would essentially be moved over to the spin-off because KPMG was to become a client of the spin-off...So Mike went off to do that and to basically create a revenue-generating opportunity from this group. Rod came in at that time to, and these are words he has used, to sort of "operationalize" the group and make it a group that's tighter with the business, less of a sales organization, if you will.*

5.4.3 KWorld as an Online Messaging, Collaboration, and Knowledge Sharing Tool

The maintenance and continuing development of KWorld as KPMG's online messaging, collaboration, and knowledge sharing was occurring in the Office of the Chief Knowledge Officer. As Bill mentioned above, the new CKO

"*...came in at that time to... sort of 'operationalize' the group and make it a group that's tighter with the business, less of a sales organization...*". Again, I see a consultancy that has designed a knowledge management system that is intended to address both of Hansen *et al.'s* (1999) strategies for managing knowledge.

In fact, KWorld is clearly a continuation of the approach to knowledge management seen in K-Man/K-Web. It also uses the library metaphor for its content management or codification strategy, and its collaboration space is the heir of the "Conference" in K-Man/K-Web. In fact, Mitch, the Manager of User Support, said:

> *Knowledge management has always been driven by the United States... and there is a certain view that says that this is an "Americanization" of the firm. In fact, the joke out there is that we're K-Borg, if you resist us, you're going to be absorbed... Some people say globalization is a euphemism for "Americanization".*

So the goals of globalization and go-to-market are not separated from the development and maintenance of the firm's internal knowledge management system. As has already been discussed, KWorld is built around a dynamic Web site using active server pages to deliver the content requested by the user. The content to be delivered is determined by KPMG's taxonomy – the "triplet."

5.4.3.1 Taxonomy – the "Triplet"

KPMG's taxonomy divides the firm's content into three frameworks:

- Geography – the physical location (*e.g.*, a country – Germany);
- Services – the business function (*e.g.*, Assurance, FAS, Tax and Legal OR one of each of their sub-categories); and,
- Industry Segments – the type of industry (*e.g.*, Uranium Mining).

This would allow for accessing and managing content in context rather than a more traditional content-based strategy such as a Web page. Therefore, if the user works in Germany and is in the banking practice, then there should be

a place that is clearly German banking, and in that place everyone who is in German banking can go and work together.

Thus, KPMG's taxonomy forms a cube (see Figure 5.1 below) of cells with the potential of document storage. In the illustration this appears to be manageable; however, the illustration is not drawn to show all of the cells. Actually, there are approximately 125 different services in the taxonomy (each of the major service areas, Assurance, FAS, Tax & Legal, have sub-categories) and there are twenty-three (23) industries, and then there are approximately 140 countries. In the cube there is one layer for each country that has 125 times 23 cells. Thus, there needs to be a balance because if the matrix (services and industries) is too deep then people cannot categorize the information, and if it is not deep enough, the "buckets" are too big and the needed information cannot be found. Continuing this matrix calculation yields a data cube (or "matrix") of 399,280 cells (or "buckets").

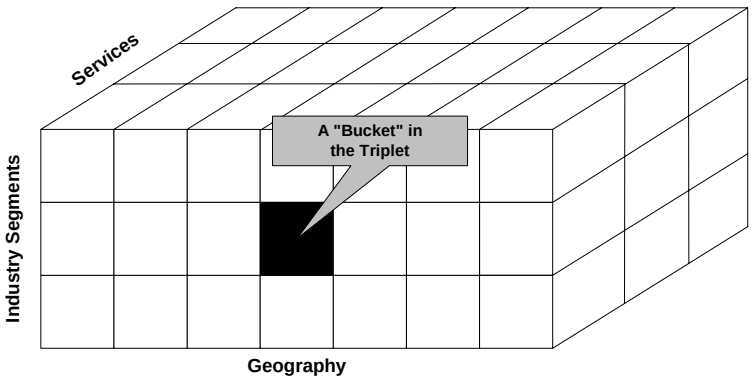

Figure 5.1: KPMG's "Triplet" Taxonomy

However, not all practices sell all services or work in all industries; so when the taxonomy was introduced as a navigation and classification schema for the content coming into KWorld, although it made perfect sense conceptually, problems quickly arose. Both services and industries were added as people started saying, "I don't fit in anywhere, I need a space" or "I do not actually fit in that specific bucket." As was seen, potentially there are millions of contexts; but

from KPMG's business perspective, how many of those millions of contexts were needed? The KPMG International Board accepted that the triplet as a navigation and classification schema creates a lot of dead ends (one can navigate to any of the triplets, but very few of them are actually going to have content) because it allows an overall view of the international organization.

While the taxonomy certainly does generate empty cells in the data cube, Peter, one of the National CKOs, said that in his opinion there are two major strengths to the triplet taxonomy; these are:

> *One is that it is, it defines your strategy, so in KPMG we have as our taxonomy the triplet… we have industries, we have geographies, and we have functions or services, so our strategy is that at KPMG we will provide these services to clients in these industries in these geographies. So our strategy is clearly defined by the taxonomy, and so those two have to match… my second point on the taxonomy is I think a taxonomy is a contract between the owner of the information and the maintainer of the information… There's an implied contract, called the taxonomy, between these people, and the users say, we will use that information that you put in there if you put it in the way we've agreed to use it, which is these industries, these countries, and these services, and the people who own the content said, yes, we will make best efforts to put it into the relevant triplets…*

As will be seen later, once the user selects a triplet in KWorld a number of options become available, among which are "Custom Views."

5.4.3.1.1 Custom Views

A Custom View is a new feature in KWorld; it debuted in Version 2.0 which was introduced in September, 2000. While KWorld is built around a dynamic Web site using active server pages to deliver the content requested by the user, now the content requested by the user may be a specific Custom View. A Custom View is a static HTML page, but one that contains all the commonly used or required links to support its specific community. It does not reflect the full content within the database applicable to the community; it only reflects the commonly used items for that particular community.

Thus, Custom Views are intended to make it easier for the user to find the content they need. According to the Global CKO:

> *The bulk of our people… their function is… all they're interested in. If that's where they basically do most of their work… Custom Views will allow them to get to a certain portion, and the trick is to have them know that if they want to go more broadly they can… there's a whole bunch of other stuff there…*

5.4.3.2 KWorld as a Portal to Legacy Systems

As has been discussed, several of the national practices had significant knowledge management systems prior to the advent of KWorld. From the standpoint of some of the global knowledge management staff, the preferred solution to these "legacy systems" would have been to port their content into the KWorld single global repository and recategorize it using the triplet system. However, there was considerable resistance to this from those national practices that had a significant investment in their own system. Bill, the change management specialist, said that their response to this was, "…*look, we've optimized already in our world, and you've got to play with us*."

Moreover, as Sandy, the System Architect, said, from a globalization perspective there was little reason to push for porting this local content in any case:

> *…because the practice intranets do not really feed into globalization… the Managing Partner for Assurance is probably not able to be held hostage by gems of wisdom in UK-Now… KWorld is supported to a large degree by the functions and by the fact that at the strategic level the company has said quite clearly, we're going to be global… that's where our future lies. With respect to the practice intranets, a significant portion of their content is used primarily locally, and it's an interesting question whether or not gathering all of those bits of workload… and putting them on the worldwide network is a step forward or a step backwards…*

So, as there was no strong need to fight the battle of porting the content and since it placed little additional load on the infrastructure, the decision was made to utilize KWorld as a portal into these practice intranets.

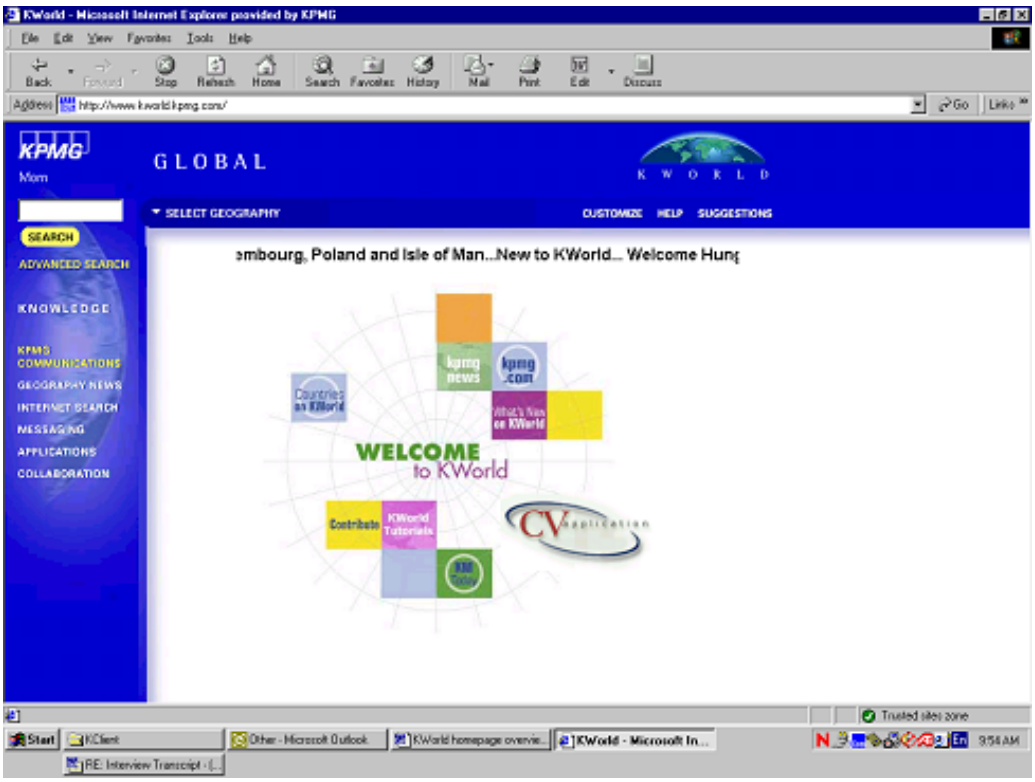

Figure 5.2: KWorld Global Entry Screen
Source: KPMG, Reproduced with Permission

5.4.4 Navigating KWorld

KWorld is the default browser screen on all KPMG computers; when the user goes to Internet Explorer the entry screen loads (see Figure 5.2 above). As can be seen, this is the global screen. If the user selects any of the navigation options from the left side frame, the return will be from the global perspective. From the upper frame the user can:

- Conduct a “Search” by keyword in the dialog box, or the user can:
  - Select the “Advanced Search” option which allows the user to filter their search by:
    - Selecting a specific triplet; and/or,
    - Selecting the desired content type from metadata.
  - “Advanced Search” allows the user to save their searches if it is to be a recurrent search;

  - "Advanced Search" returns 100 hits which can be filtered and sorted;
  - However, "Advanced Search" only searches (by default) the KWorld single global repository, not the national practice intranet systems. There is a facility for a "Linked Search" where the user selects from a list of other KPMG systems, but not all systems are available. This feature is under revision and will shortly be able to access all repositories.
- "Select Geography" (at the top left of the screen) which shifts the perspective of the screen from global to the country selected. This changes the returns that would be given by the navigation options in the left side frame;
- "Customize" does very little currently; however, shortly the user will be able to define the triplet desired as their default screen;
- Go to "Help" (at the top right of the screen) which, as discussed earlier, provides a list of Solution Centers and the Help Desks. It also provides tutorials and a Microsoft-like on-screen help index; and,
- "Suggestions" are sent to the global knowledge management center.

The user may also select one of the navigational options from the left side frame (again, these are from a global perspective unless the user has selected another geography):

- KPMG Communications" is the internal communications forum, or "InfoTrack" (see Figure 5.3, on the following page), for KPMG;
- "Geography News" provides access to external information sources (*e.g.*, newspapers – each country selects which will be available);
- "Internet Search" provides access to several of the standard Internet search engines (however, the specific engines are selected by the different national practices);

- "Messaging" takes the user to e-mail using Microsoft Outlook;
- "Applications" provides a list of standard tools such as work flow tools and administrative tools; and,
- "Collaboration" takes the user to Net Meeting and provides access to white boards, chat rooms, *etc*.

Figure 5.3: KPMG Communications Screen – InfoTrack
Source: KPMG, Reproduced with Permission

Typically, a user would select their desired triplet and would be shown the Custom View for that selection (see Figure 5.4 at the top of the following page). Again, this is a custom view; it is a set of links to information that the Knowledge Manager for Assurance in Canada believes will be helpful to that segment of the practice. Notice that the individual who develops the custom view can include whatever they might feel would be helpful, so that on this particular page the user has access to practice news, search engines, manuals, administrative policies, internal and external links, *etc*.

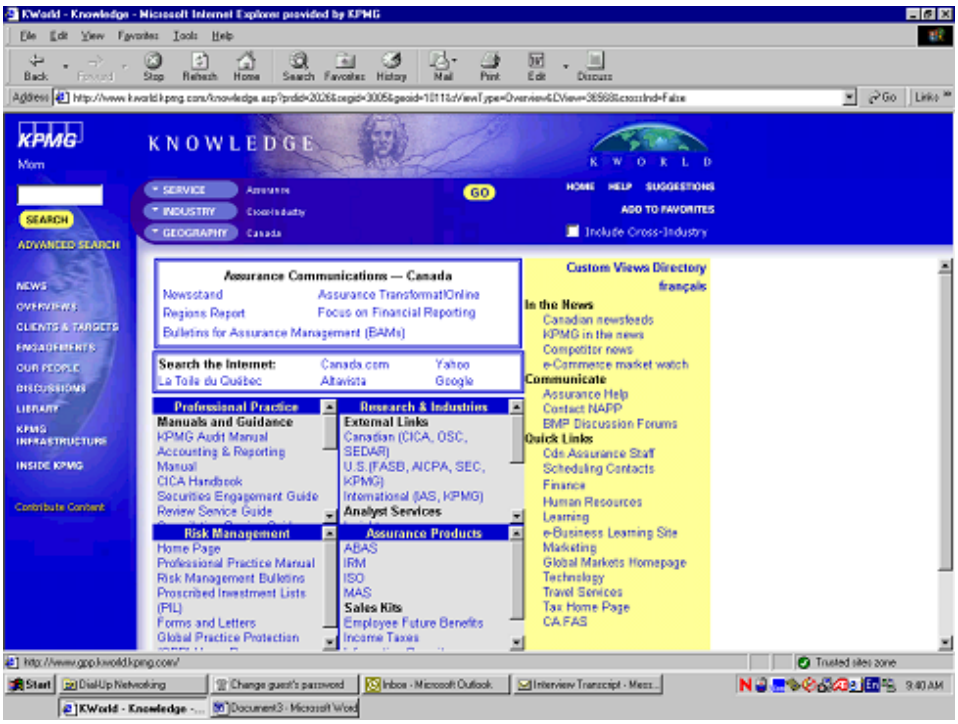

Figure 5.4: Custom View for Canada, Assurance, Cross-Industry
Source: KPMG, Reproduced with Permission

However, also notice that both the options along the upper frame and the navigational options in the left side frame have changed. These are frames and are not a part of the specific custom view. The upper frame is now expanded to show the full triplet selection. Additionally, on the right side of the upper frame two new options are added:

- "Add to Favorites" makes easily visible the ability to add this Web page to the user's "Favorites" list in Internet Explorer, allowing one-click access to the page; and,
- "Include Cross-Industry" expands the filter of the industry selection in the triplet on the left side of the upper frame. "Cross-Industry" was originally intended to be a "bucket" in the triplet for items that did not fit anywhere else, but it was quickly realized that many items legitimately fit in many industries. If a specific industry is selected in the triplet, say "Banking," then only items related to

banking are returned unless the “Include Cross-Industry” check-box is checked, then all cross-industry items (including banking) are shown.

Now the user is provided with navigation options for:

- “News” provides access to external information sources (*e.g.*, news-papers) filtered to the selected triplet;
- “Overviews” provides a general overview KPMG does in a particu-lar triplet selection. This will include strategies, vendor lists, client lists, *etc.*;
- “Clients & Targets” provides information about clients and potential clients of KPMG;
- “Engagements” provides information about both on-going and past engagements;
- “Our People” provides the CVs of the leadership of the practice and there is a link to the firm’s CV database which provides the CVs for all of the firm’s employees;
- “Library” provides access to the firm’s methodologies, tools, internal and external research tools;
- “KPMG Infrastructure” provides access to administrative, finance, risk management, training, and other web sites within the com-pany by the selected triplet; and,
- “Inside KPMG” provides access to another set of internal communi-cations (*e.g.*, practice newsletters, *etc.*)

Additionally, there is a “Contribute Content” option. Selecting this option walks the user through the contribution process:

- What kind of content do you want to contribute (is it a new submis-sion or an update to an existing item)?

- What type of content (information for "Engagements," a person's CV for "Our People," information for "Clients & Targets," *etc.*)?
- What triplet does it apply to?
  - Geography,
  - Service (down to the most granular level appropriate), and
  - industry
- A description of the contribution.
- The author's name and other metadata.

The alternatives to going to a specific custom view would be to go to:

(1) A list of all the custom views available (see Figure 5.5 below); or,

Figure 5.5: List of All Custom Views
Source: KPMG, Reproduced with Permission

(2) The "Library" for a particular triplet (see Figure 5.6 at the top of the following page). The library is a listing of all of the documents held in a particular triplet. The library listing can be expanded to provide more information (see Figure 5.7 at the bottom of the fol-

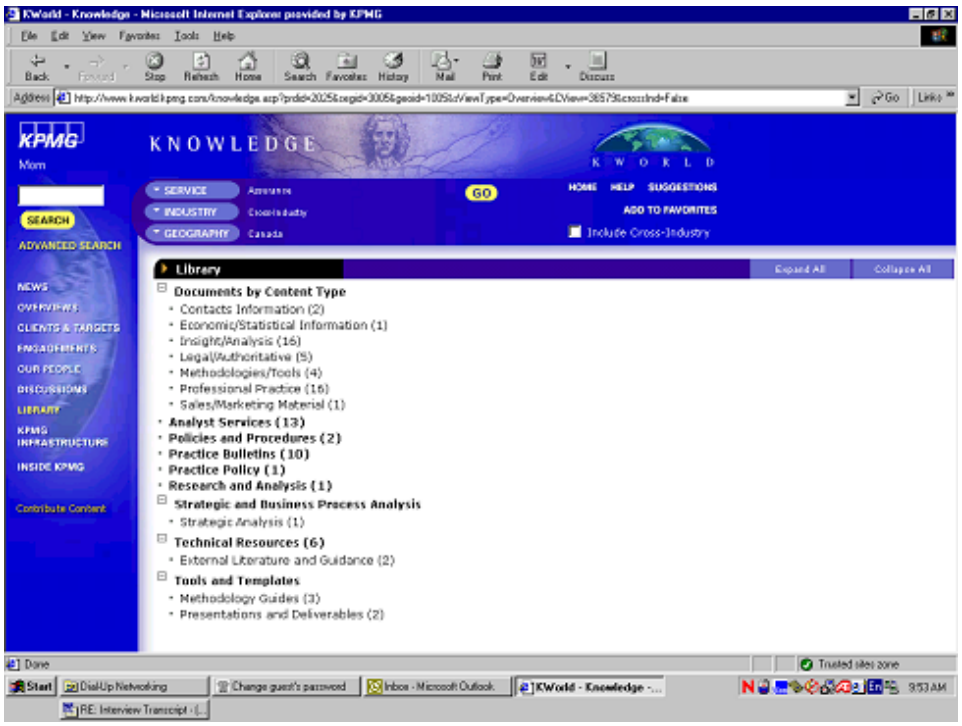

Figure 5.6: The Library for Canadian Assurance, Cross-Industry
Source: KPMG, Reproduced with Permission

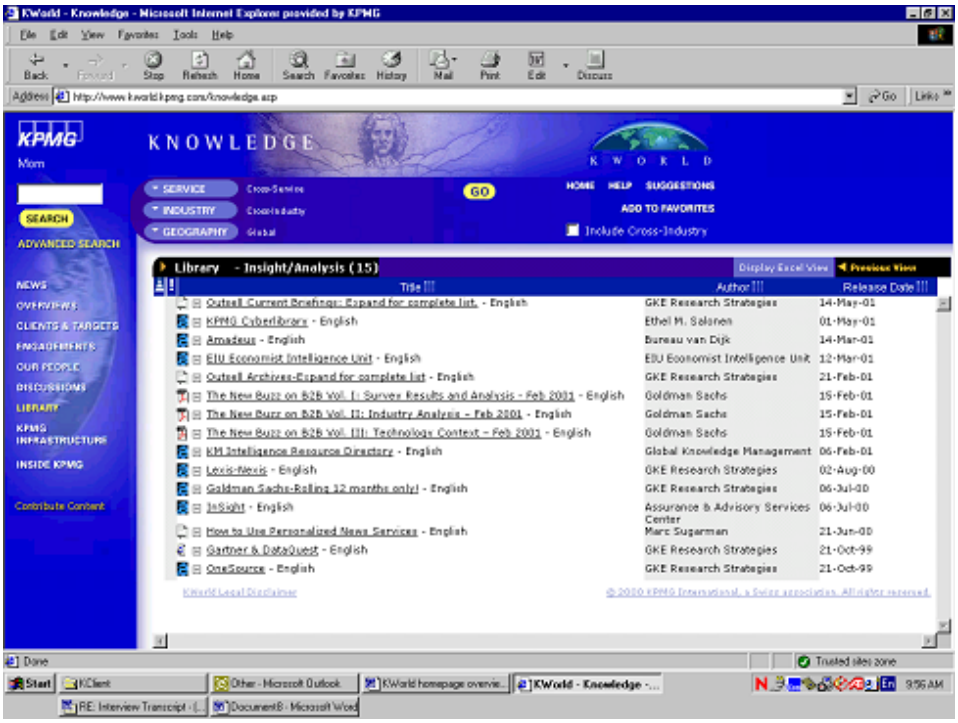

Figure 5.7: Expanded Library View
Source: KPMG, Reproduced with Permission

lowing page). In this view each of the columns (Title, Author, and Release Date) can be sorted either alphabetically or by reverse alpha, and the small square beside each title is a filter that provides a text search capability for that specific column.

5.5 K-Client

"K-Client" is the knowledge management system's external collaboration space. It allows clients to collaborate with their KPMG engagement teams and is capable of real-time business presentations conducted over the Internet and allows users to not only exchange information, but to together create work-like project deliverables in a secure, confidential environment.

5.6 Institutionalization

The goal of this study was to determine if there was evidence of the institutionalization of the process of knowledge management as a result of the implementation of a formal, computer-aided knowledge management system in a company. In the opening chapters of this document I said that evidence of institutionalization of the process of knowledge management is found when there is evidence that users of the formal knowledge management system have altered their day-to-day work life to incorporate the use of that system. This would mean that the use of that system has become routine for them.

I interviewed nine (9) users at KPMG. Even in the best of circumstances, a sample of nine cannot be considered representative of an organization with 110,000 employees, but this is a qualitative study. In the case of KPMG, with three quite distinct service lines (Assurance, FAS, Tax and Legal) and the history of differences between the national practices, such a sample can only be considered to provide some small indication of the organization's culture. Of the nine users, six (6) were in the United States practice, two (2) were in the Canadian practice, and one (1) was in the United Kingdom practice; also seven (7) were from the Assurance service line and two (2) were from the FAS service line.

My user respondents were (the names have been changed to ensure confidentiality):

- Deborah, an Assistant Accountant in the United States Assurance practice who has been with KPMG for approximately one year.
- Tim, an Assistant Accountant in the United States Assurance practice who has been with KPMG in a professional position for approximately nine months, but had been in a clerical position for approximately two years before that.
- Bob, a Staff Accountant in the United States Assurance practice who has been with KPMG for approximately one year.
- George, a Supervising Senior Accountant in the United States Assurance practice who has been with KPMG for approximately three months. George had prior accounting experience overseas.
- Mark, a Supervising Senior Accountant in the United States Assurance practice who has been with KPMG for approximately six months. Mark had prior accounting experience.
- Anna, a Supervising Senior Accountant in the United States Assurance practice who has been with KPMG for approximately six months. Anna had prior accounting experience.
- Ken, an Assurance Manager in the United Kingdom Assurance practice who has been with KPMG for approximately five years. Ken had prior accounting experience.
- Eleanor, a Director in the Canadian FAS practice who has been with KPMG for approximately eight years.
- Matt, a Partner in the Canadian FAS practice who has been with KPMG for approximately twenty-five years.

From these users I found some evidence that the process of knowledge management is becoming institutionalized at KPMG; however, the bulk of that

evidence was not based on the use of KWorld, but on a CD that was distributed monthly by the practice (United States Assurance) to which most of my respondents belonged. One of my other respondents, from the U.K., did not use KWorld at all, other than as a portal to the legacy system, UK-Now, which he rarely used. Only my two Canadian respondents seemed to believe that KWorld really provided value to them. In all, the respondents were from three different countries and three different practices, and had three very different sets of responses. This certainly does provide much evidence for the movement towards globalization desired by the international leadership, but the disparity actually should have been expected given the controversy that has swirled around KWorld and the attempt to devour the national practice legacy systems in order to deploy KWorld.

Given the lack of reported utilization, I received very few comments about the system; however, there are clear indications of organizational resistance to the system. Additionally, there was one infrastructure problem that was regularly mentioned, access from client sites when deployed on an engagement.

5.6.1 Routine Use of the Knowledge Management System

It is not that the respondents were not familiar with KWorld; they knew about it and they used it regularly. However, they used it more as an administrative tool rather than as a knowledge management system. Deborah, an Assistant Accountant with approximately one year of experience, said, "*...it's pretty much where you do everything; HR is on there, as well as our timecards and things like that, but it's where you go to find out industry information... Basically I've used it more industry information at my level...*". The majority of the respondents spoke of the administrative tools available on KWorld.

In this same vein, when I asked Anna, a Supervising Senior Accountant with approximately six months experience with KPMG, about her use of KWorld

she said, "*To get to my timesheet, and that's about it. I haven't really been instructed as to how to really utilize it and get the best out of it*."

However, Bob, a Staff Accountant with approximately one year of experience, was quite familiar with KWorld. He said that KWorld was a system of, "*…making use of various knowledge in transforming business… One of the means that they're using right now is, because of the goal of the company to become a global firm…".* But, when I asked him if he used KWorld, he replied:

> *…Not too regularly at this stage and time of my own job basically. Yes, you do use it to, because everything about the firm is supposed to be on the KWorld, I mean the travel services, the, every little thing about the firm, you know, so the library, the KM library, and many other things, so basically I don't use it frequently, but I do visit there sometimes.*

Again, the administrative use, but when I asked Bob how he kept up with changes in his industry, he replied:

> *I do get Assurance CDs every month… It's an off line format of most of the things, the key things that would be necessary to conduct your audit and assurance services, so an off line shoot from what's on the KWorld, yes… because, again, most of the time, you have to understand, as auditors, external auditors, we are mostly at client sites, and most of those client sites, even if they are hooked up to the Internet, for some reason will not allow you a major access to the Internet, so you pretty much always want to have something handy that you can refer back to to do your research.*

So Bob does routinely use part of the knowledge capital of the United States Assurance practice of KPMG; but he uses a CD that is sent to him instead of KWorld. All of the U.S. Assurance practitioners interviewed said that they preferred to use the CD rather than KWorld on the Internet. The reasons given were that the CD is off-line and easier to search.

Interestingly, this monthly CD is being used for knowledge dissemination in the way that KWorld is intended to be used; however, these CDs were never mentioned by any of the knowledge management professionals that I inter-

viewed. Speaking of how these CDs are used, George, a Supervising Senior Accountant with only approximately three months experience with KPMG, said:

> *Let me tell you my experience… whenever I was required to know about the automated audit working papers including standard work papers… I used the firm standard US audit manual, contained under Assurance CD ROM, provided to us every month. In addition to that, this CD also contains features like Accounting and Auditing research tools, BMP Methodology Guide, Risk Modules, Business Model, Audit Committee Presentation templates, PPL, IAS, FASB and related pronouncements, etc. etc.*

Clearly this CD program is a direct competitor to KWorld insofar as Assurance practitioners in the United States are concerned.

Ken, the U.K. Assurance practitioner, said that he makes no distinction between KWorld and UK-Now, the legacy knowledge management system of the U.K. national practice. He does infrequently use the system for:

> *…particular documents, engagement letters which are contracts we use for the assurance department basically telling our clients exactly what we're going to do and what the terms and conditions of our involvement is going to be, so I use it as a search engine for that, on similar assignments where I'm doing something for the first time, and also for industry technically, technical issues, I'd do a search through there, but that's about the limits of what I've used it for in the past.*

So when he does use the system, he is using it in its content management role to provide examples of documents. Beyond this he said:

> *What the culture I feel in the UK… we have very tight knit specialist groups, so if I've got a particular query, I think it's quicker and easier for me to pick up the phone and ask someone. They might not necessarily know, but they can point me in the right direction quicker than it would be to find something that specifically relates to the question I have.*

It was the two Canadian respondents who were the most positive about KWorld. Eleanor, a Director in the Canadian FAS practice said:

> *…knowledge management really is sort of being able to filter this information from one group of people within the company to another group, as well as within separate groups. For instance, in corporate*

> *finance we do a lot of deals, we close a lot of transactions, and because we're a national practice, if there wasn't a knowledge management tool there would be no means by which to transfer this information, so really to me the knowledge management is controlling the vast quantity of information that exists within the company and making sure it's accessible to everyone.*

While Matt, the head of the Canadian FAS practice, said:

> *…I'm not sure that the word 'management' is a word that I'm particularly comfortable with, but certainly knowledge and knowledge sharing is… one of the very foundations of our business and the way that we accumulate it, the way that we sort it and organize it, and the way that we share it and utilize it as between us to the betterment of ourselves and our… markets or clients, to me defines in many respects the success of the business… We are using some… of the facilities that KWorld provides, much more now than we were two or three or four years ago when whatever the predecessor systems to KWorld that existed were available to us. Are we… now extensive users? Again, that's a relative term, so it's hard for me to say whether we're extensive users or not. We are certainly using it more than we were.*

So there is solid evidence that the Canadian FAS practice is routinizing the use of KWorld in their daily work. Interestingly, I was told by some of the Canadian knowledge management professionals that their FAS practice had not been strong users of Canada's previous, or legacy, system. When I asked Matt why, he said:

> *A lot of the content, a lot of the templates, a lot of the business development, just a lot of the tools that are available to us now are not tools that were developed here in Toronto or in Canada for that matter. They're developed in one place, they're produced efficiently, they're there, they're accessible to everybody, and I just think, you know I mean it's one small piece in building the global business and the global brand, in fact, that we're trying to build…*

Here is a good argument for globalization; the Canadian FAS practice is getting good use from content and tools developed in another practice (largely the U.K. in this instance) and made available over KWorld. I was also told that the Canadian Assurance practice draws heavily on content and tools developed by the U.S. Assurance practice, and has also become quite supportive of KWorld. Glob-

alization, KWorld, and the ability to leverage knowledge developed throughout the organization; the Canadian practice appears to be institutionalizing KWorld and knowledge management.

5.6.1.1 Synopsis

Several interesting observations arise from the responses in the previous section concerning awareness of the firm's knowledge management system. First, there are the distinctly different answers from the U.S. Assurance practitioners, the U.K. Assurance practitioner, and the Canadian FAS practitioners. With its AssuranceTrak CD program, the U.S. Assurance practice appears to have set up a competitor to KWorld in the area of knowledge dissemination. Based on only one interview, it does not appear that the U.K. Assurance practice has strong support for KWorld, but Ken described the practice as being made up of "…*we have very tight knit specialist groups*" and, this being the case, personal communication, the traditional means of knowledge sharing, would be very effective. However, the Canadian FAS practice, also described as a small and tightly knit group, took the opposite position because it found the ability to leverage global knowledge quite valuable. Finally, it must be noted that given the compartmentalization of the KPMG organization, mine was a very small sample and I am particularly concerned about the relative inexperience (within KPMG) of the U.S. Assurance practice respondents. Their lack of use of the knowledge management facilities in KWorld may just be based on their relative length of time with the firm; however, given the fact that their practice seems to have established a competitor to KWorld in the dissemination area, I doubt that. Additionally, I was also led to expect differences between the service lines in my conversations with several of the knowledge management professionals.

Second, the United States Assurance practice has added another method of knowledge dissemination – the monthly AssuranceTrak CDs. This is done by the business organization, not the knowledge management organization, and it

is not done in Canada. The information on this monthly CD is reported to be very similar to that on KWorld, and it is distributed in this fashion, as mentioned by several users, to avoid the Internet access problems for practitioners who are deployed to client sites. At first this method of dissemination seemed a problem to me, as if it were in competition with the firm's knowledge management system. To an extent that seems to be the case, but if one returns to the purpose of "knowledge management," the use of the CDs seems to be a viable solution to a real problem. The question then arises concerning how to integrate the AssuranceTrak CDs with KWorld.

The final observation is one that I had been led to expect from my conversations with several of the knowledge management professionals; the one British user saw no difference between KWorld and UK-Now and, in fact, doesn't really use them in any case. Even though he services a global client, he does not seem to have "bought in" to the advantages to globalization in KWorld.

5.6.2 Limitations to the Routine Use of KWorld

The limitations that users mentioned for not more fully utilizing KWorld fall into two major categories: infrastructure problems and organizational problems. Each of these problem areas will now be explored in more detail.

5.6.2.1 Infrastructure Problems

5.6.2.1.1 Access from Client Sites

Most of the U.S. Assurance practice respondents spoke to their lack of Internet access when they were deployed to a client site for an engagement. Speaking to this issue, Tim, an Assistant Accountant with approximately nine months of professional experience with KPMG, said, "*Well, with KWorld what a lot of people don't know is that as an auditor you're rarely in the office, which means you don't always have an Internet link, which means you can't always get onto the Web site*...". But, as with many of the other U.S. Assurance practice respondents, this was not a major concern to him because:

> *…the CD is… more convenient than having, trying to find a link to the Internet. I don't use KWorld as much because I have the CDs, and plus it's sometimes a hassle trying to navigate through. The CDs are strictly like, they're downloaded quickly, and we basically have a better chance of navigating through that than waiting to see if a window's going to pop up or not.*

5.6.2.2 Organizational Problems

5.6.2.2.1 Organizational Resistance

The issue of organizational resistance was not addressed by any of the user respondents. However, it was quite strongly addressed by almost every knowledge management professional interviewed. There is no question that there has been significant organizational resistance to KWorld, but most of this resistance has been ascribed to its globalization objective and not its knowledge management objective. Unfortunately, since I found so little use of KWorld in its knowledge management role, it is somewhat difficult to determine if there are infrastructure or data management issues beyond the access problem addressed above. But in my mind two issues stand out. First, if there were no serious infrastructure and/or data management issues with KWorld, why would the U.S. Assurance practice establish a competitor to KWorld for their practitioners? The emphasis by the knowledge managers on the source of the resistance being the globalization mission may, and I emphasize "may" because there is no strong evidence to this point, be hiding other structural issues with KWorld that could and should be addressed.

The second issue that stands out is the resistance indicated in the U.K. This is more in the nature of a denial of the need for a knowledge management system, although there is an element of defending the legacy system. With only one respondent from this practice, certainly no conclusions can be drawn. But other organizations have been confronted with a basic rejection of the need for any knowledge management system, and this may be in play in the U.K.

If either or both of these organizational resistance issues have any foundation, they present serious problems for the institutionalization of knowledge management at KPMG. Therefore, the knowledge management organization would need to look more closely at the root causes of the acknowledged resistance to KWorld and determine if there are issues that can be addressed.

5.6.2.2.2 User Training

User training in the use of the knowledge management capabilities of KWorld does not appear to be an important issue at KPMG. Speaking for the U.S. Assurance practitioners, Deborah said:

> *…there was a presentation for everyone at the beginning of how KWorld was even started and what it's used for and things like that… it was more of how to actually use it, how to go in and look for what you need, such as, you know for us starting was how to fill out your timecard, how to, and how to go in and look at the industry information, you know, like where to go within KWorld.*

Asked about training in knowledge management capabilities, Bob said, "*More emphasis…* [was] *placed basically on the assurance CD set*."

While Anna said of her training:

> *Actually, I was not able to attend that due to my work schedule… I had one day of just kind of introductory training that every employee gets, whether they're admin or professional, and that was just, this is how you fill out your timesheet, that sort of thing…*

5.6.2.3 Synopsis

In the U.S. Assurance practice, the only practice from which I received comments on training, it seems clear that very little emphasis is placed on training in KWorld as a knowledge management system. New hires appear to leave their training with the impression that KWorld is an administrative tool (time cards, *etc.*), while the AssuranceTrak CDs are their knowledge management system. If this is the case, it is little wonder that they do not make much use of KWorld in this role.

5.7 Summary

The mission statement for KPMG states:

> *"To turn knowledge into value for our clients, our people and our communities."*

The mission statement for the Global Knowledge Management organization states:

> *"Knowledge connects our people, clients, and communities through an inherent process practiced across boundaries"*

Clearly, the two statements are quite similar and emphasize the importance of knowledge to the entire organization.

KPMG has devoted significant resources over the last several years to developing and deploying KWorld as a global system, yet, based on the small sample of users talked to, KWorld is not being used for its intended purpose, insofar as that intended purpose is knowledge management. I believe that the reasons for this are simple. First, the goals for KWorld were too ambitious. Most organizations have found that the goal of developing a knowledge management system for the "simple" purpose of knowledge sharing is quite difficult in itself. Some senior KPMG International officers assumed that the knowledge-sharing goal could be easily met and expanded the system goals to include firm-wide globalization and development of a go-to-market product.

Second, and related to the first, globalization was apparently the primary goal of KWorld, and to effect this goal the firm attempted to impose the system in a top-down manner. The user needs appear to be almost an after-thought, and the existing national practice knowledge management systems appear to have been seen by some knowledge management officials as nuisances.

In defense of the knowledge management professionals, many appear to have known that a top-down imposition was not the best way to approach the problem and certainly many of them knew that developing a workable knowl-

edge management system was goal enough for the development and deployment of KWorld. However, many of the development and deployment decisions appear to have been made in response to top management direction rather than other considerations.

The net result is that KWorld is a quite elegant solution to the knowledge management problem, but a solution that has not been adopted by the practitioner base of the company. It has, in fact, generated significant organizational resistance to aspects of KWorld. To say that it has failed in its goals would be unfair because there are success stories (*e.g.*, the Canadian FAS practice), but globalization has been a long-term and continuing problem for KPMG and was probably not an appropriate goal for KWorld.

5.8 The "Re-Visioning" of KWorld

Just in the past few months the International Board was presented with the proposal to spin-off the go-to-market product, "Cering." The Board voted not to accept this proposal and it is now dead. That has caused some staff disturbance in the Global Knowledge Management Office, because many of them had assumed that approval would be given and had made plans accordingly.

Additionally, the Board apparently decided that globalization was too ambitious a goal for KWorld and has directed a reduced emphasis on that goal. Globalization is still a goal of KPMG International, and the knowledge management system is still seen as one of the ways to eventually meet that goal; but it is apparently now accepted that knowledge management cannot be the primary driver and that it cannot be forced.

What does this mean for KWorld? In some ways that will not be answered immediately, but, for the most part, I think that the re-visioning is good for KWorld. It allows the knowledge management professionals to get on with the "*operationalizing*" of KWorld that the current Global CKO has announced as his mission (well before the re-visioning) and steps are being taken in that direction.

KWorld will no longer be "*K-Borg*" assimilating those that resist aspects of the imposed system, as one knowledge management professional described it. KWorld is now to be developed as a portal to the "best of breed" among the various national practice knowledge management systems.

The question is "Are these changes, and the others that are coming, enough to overcome the organizational resistance that has been generated?" KWorld may have been seen as the "*Americanization*" of the firm in other parts of the world, but that surely could not be a major issue in the United States Assurance practice. Yet their training program does not appear to have given much emphasis to KWorld's knowledge management features, and their Assurance-Trak CD program raises questions of their support for KWorld as a knowledge management system.

Chapter 6: PricewaterhouseCoopers

The international partnership of PricewaterhouseCoopers is the largest accounting and business consultancy in the world, with approximately 160,000 employees in 150 countries. The partnership was created on July 1, 1998, from the merger of two "Big Six" accounting firms: Price Waterhouse and Coopers & Lybrand. This case study focuses strictly on the Management Consulting Services (MCS) division of PricewaterhouseCoopers.

As with the other two corporate participants in this study, PricewaterhouseCoopers (PwC) is openly identified; however, all individual participants are identified by pseudonyms. A list of the pseudonyms and a brief description of the job responsibilities for each individual is found in the appendices of this study. The pseudonyms and the position descriptions for the PwC participants are found in Appendix "E" on page 373 of this report.

6.1 History of the Company

6.1.1 History of Coopers & Lybrand

In 1898, the United States progenitor of what became PricewaterhouseCoopers began as Lybrand, Ross Brothers & Montgomery in Philadelphia, Pennsylvania. By 1902, Lybrand, Ross Brothers & Montgomery had opened its first branch office in New York City, and the firm was considered one of the pacesetters of the newly professionalizing accounting field. During the 1920's the American firm not only established branch offices across the United States, it also established a presence in Berlin, Paris, and London – beginning the firm's globalization.

Lybrand, Ross Brothers & Montgomery emerged from World War II as one of the largest accounting firms in the United States. However, in order to meet the demands of a changing economy, in 1952 the firm entered the field of

management consulting services. This was the first of what would become a wide array of consulting services, as well as information services and special software packages with the advent of personal computers. By 1974, the firm was the first to establish a career track in accounting for those with computer skills.

With the establishment of the European common market in 1957, the firms of Cooper Brothers & Company (U.K.), McDonald, Currie and Company (Canada), and Lybrand, Ross Brothers & Montgomery (U.S.) merged to form Coopers & Lybrand International. However, in the United States the merged firm's branches retained their old name, Lybrand, Ross Brothers & Montgomery, until 1973. In that year, the firm's management decided to adopt a single name for the entire global network of branch companies, which were by now located on all five continents. While the firms, in over 120 countries, remained autonomous, they shared common goals and policies.

By 1977, Coopers & Lybrand was ranked the third largest accounting firm in the United States and was still among the "Big Six" accounting firms by 1993. In 1981, Coopers & Lybrand became the first U.S. accounting firm to expand into China, and during the 1990s, following the fall of communism, the firm established branch offices in Hungary, Poland, Czechoslovakia, Berlin, and Russia.

6.1.2 History of Price Waterhouse

The British portion of the history of what became PricewaterhouseCoopers began in 1849 when Samuel Lowell Price established his accounting practice in London. In 1874, through a series of mergers and name changes, the firm of Price, Waterhouse and Company was established. By the end of the century, Price, Waterhouse and Company was recognized as one of Britain's leading auditing, accounting, and financial consulting firms. As many of its European clients also had operations in the United States, in 1890 the firm opened a branch office in New York City. Following this opening, the firm quickly opened other branch offices across the country.

After World War II, the overseas expansion of many of the firm's clients led to a demand for Price Waterhouse to develop a stronger international operation. In concert with the British arm of the organization, the Price Waterhouse International Firm was established in 1945 to promote uniform accounting standards for all Price Waterhouse offices around the world. A management consulting service known as the "Systems Department" was formed in 1946 as a part of the evolution of the manual accounting systems that the firm had been developing. The leadership of Price Waterhouse was quick to realize the growing importance of electronic data processing. By 1969, Price Waterhouse counted almost one hundred of the "Fortune 500" as clients.

The financial crises of the 1980s were hard on all of the major accounting firms, causing not only blows to corporate reputations, but also financial losses due to major lawsuits. In 1984, Price Waterhouse discussed a merger with Deloitte, Haskins & Sells, another of the "Big Eight" accounting firms, with the intention of creating an organization of such proportions that no other accounting firm could gain a competitive advantage over it. While the U.S. partners voted to approve the merger, the British partners of the firm vetoed it, and the merger fell apart.

The failure of the proposed merger between Price Waterhouse and Deloitte had raised the possibility of creating a giant accounting firm, and many of the "Big Eight" partners discussed little else besides potential mergers. After Ernst & Whinney merged with Arthur Young on June 22, 1989, to create Ernst & Young, within four weeks four other firms announced plans to merge: Deloitte, Haskins & Sells with Touche Ross, and Price Waterhouse with Arthur Andersen.

The proposed merger of Price Waterhouse and Arthur Andersen seemed doomed from the start. While Andersen thought it would be acquiring an auditing practice, Price Waterhouse thought it was acquiring a consulting practice;

and neither firm wanted to give the impression that its services were being "acquired" by the other. Negotiations were ended after three months.

Entering the 1990s, Price Waterhouse was expanding its services to clients. The firm offered accounting, tax, and consulting products and services in relation to information systems technology, corporate finance, financial services, petroleum, public utilities, retailing, entertainment, and other industries. With the highest partner earnings and more blue-chip clients than any other "Big Six" accounting firm, the future for the Price Waterhouse partners looked brighter than that for most of the others in the "Big Six."

6.1.3 The 1990s and the 1998 Merger

Both Coopers & Lybrand and Price Waterhouse increased their emphasis on consulting in the 1990s. Following the financial problems of the 1980s, auditing was proving risky and expensive. By the mid-1990s, many insurers refused to even cover the auditing practices of the "Big Six" firms, forcing both C & L and PW, and the other "Big Six" firms, to set aside money to cover themselves.

Price Waterhouse made yet another attempt at a merger in 1997, this time with Coopers & Lybrand. Although the merger was voted in by both partnerships, it met with some opposition from both clients and financial regulators under fears that such mergers reduced the choice for auditing services and increased conflicts of interest. Specifically, there were serious concerns from the financial regulators about conflicts of interest between the auditing and consulting branches of the "Big Six" firms, but all of these did not stop the merger, which was completed on July 1, 1998. This was a combination of the fourth and sixth largest firms of the "Big Six," and it resulted in a new industry leader in terms of size and revenues. In the area of management consulting the merger caused little overlap because the two founding firms specialized in separate industries, and it created a consulting practice that was second only to Andersen

Consulting (now known as Accenture and another of the case studies in the research) in income (Grant, 1998).

Since the merger, PricewaterhouseCoopers (PwC) has continued to grow, acquiring several European consulting firms in 1999 (including the Belgian practice of KPMG Consulting).

6.2 Corporate Organization

As already discussed, the international partnership of PricewaterhouseCoopers is the largest accounting and business consultancy in the world. The company goes to market in six (6) lines of business:

- *Audit, Assurance and Business Advisory Services: Innovative, high quality and cost-effective solutions to organizations' financial control, regulatory reporting, shareholder value and technology issues.*
- *Business Process Outsourcings: Services in the areas of finance/accounting, internal audit, tax compliance, applications process, procurement, human resources, and real estate services.*
- *Corporate Finance & Recovery Services: Comprehensive financial, economic, and strategic advice to companies with complex business problems and disputes. In the US, known as Financial Advisory Services (FAS).*
- *Management Consulting Services: Consulting in the areas of strategic change management, process improvement, and technology solutions.*
- *Global HR Solutions: An integrated array of human resource and insurance management services.*
- *Global Tax Services: Formulating effective strategies for optimizing taxes, implementing innovative tax planning, and effectively maintaining compliance* (PwC, 2001).

Again, this case study is only focused on the Management Consulting Services (MCS) line of business. PwC MCS is organized by geography, service market, and industry sector. The service markets are:

- *Strategic Change: Strategic change helps a company to maximize its market value within the context of its industry and the societies in which it operates. To understand which strategic changes are needed, it is best to analyze change in manageable, related areas. Five types of analysis cover all the possibilities:*
  - *Corporate strategy;*
  - *Operations strategy;*
  - *IT strategy;*
  - *Organizational strategy;*
  - *Change strategy; and,*
  - *Performance Improvement.*
- *Performance Improvement: Organizations become fit and agile across their business by working with us to understand their operation from strategic orientation to implementation. Businesses need the ability to anticipate and react to change in a balanced and cohesive way across the whole organization. This seems to be a simple approach - but making it happen is another matter.*
- *Technology Solutions: Information technology, once a back-office function, now dictates all business processes within a company. The management of IT is a fast-paced balancing act between the issues facing the business, technology problems and opportunities and the IT management agenda itself* (PwC, 2001).

The industries sectors are grouped in five clusters:

- Consumer and Industrial Products;
- Energy and Mining;

- Financial Services;
- Services; and,
- Info-Communications and Entertainment.

There are approximately 35,000 consultants in MCS, divided among three (3) global regions:

- The Americas Theater;
- The Europe, Middle East, and Africa (EMEA) Theater; and,
- The Asia-Pacific Theater.

So the MCS practice is organized along global, theater, and country lines. The practice is led by the "MCS Executive Board;" however, there are theater-level and country-level executive boards also. The strategic direction of the practice is focused around those people who have taken either full-time management roles on these various boards or the client-facing people who are at very senior levels in terms of heading up an industry group or a service market.

When asked about the role of knowledge management in the strategic direction of the firm, Jane, the Global Leader for Knowledge Management, said:

> *I think there's two sides to that. There's one which is whether the whole organization takes knowledge seriously, and whether we really think about the knowledge of the organization; where we should be focused and where change is happening, and so on. And that definitely is true.*
>
> *The other side to it is... am I included in those discussions? Recently, because of the massive changes that e-business has brought we have gone through a big series of visioning sessions which involve seventy partners, and I was one of those people. So we had three two-day meetings to pull together the new vision for the firm and how we were going to reorganize. Also, I'm involved, or KM is involved managerially. We report through to the People and Knowledge leader, which is the partner in charge of Human Resources, Learning & Professional Development, and Knowledge Management. He's on the Main Executive of the firm, so he has a say at that level as well...*

In mid-2000, PwC announced plans to spin-off its consulting division (MCS) due to financial regulators' continuing concerns with possible conflicts of interest between the consultants and the auditors in the large consultancies. At one point, it was reported that the division would be purchased by Hewlett-Packard, but that later fell through. However, according to Giselle, the Americas KnowledgePoint Manager, "...*I think the firm...* [is] *setting down the path for separation... we've done a lot to get separated from the firm with regards to KM, technology, benefits, HR*...." At the time of the interviews that comprise this case study, and at the current time, MCS was still a division of PwC; however, apparently virtually all of the employees of MCS expect this to change in the near future.

6.3 PwC and Knowledge Management

6.3.1 A History of Knowledge Management at PwC

To understand the history of knowledge management at PwC, one must first look at the history of knowledge management in its two predecessor companies. Prior to their merger, both Price Waterhouse and Coopers & Lybrand had formal knowledge management programs, and fortunately both of these programs were Lotus Notes-based. However, in both companies, the earliest knowledge management efforts started not as formal organizational efforts, but with small groups of people, possibly stimulated in part by the Lotus Notes product itself, informally attempting to find ways to better utilize their group's knowledge resources. Some of these attempts did not get much beyond electronic mail, but others began to create Notes databases to enable the group to work together using these databases as knowledge sharing applications.

Typically in those early days, within an individual country or possibly just within an individual office, a group would recognize that consultants, as they progress through putting together the proposal, analyzing the problem, defining the solution, and delivering that solution, must have done something similar be-

fore, and so the question was asked, “Can we not leverage our past efforts to help us do this quicker, to save us from reinventing the wheel?”

So in both of the predecessor companies there was both a history of knowledge sharing and a history of using Lotus Notes databases to facilitate that knowledge sharing. However, prior to the merger, both companies were beginning to develop formal knowledge management organizations and procedures, but from a knowledge management perspective, the merger presented several challenges:

- As a “pure play” in the area of knowledge management, their most immediate need was to know what they knew – and who knew it.
- Two disparate groups of people needed to quickly learn about each other and how to use or leverage what the other knew, or could do, for maximum client benefit.
- The two predecessor companies had to immediately share knowledge about clients, skills, experience, experts, methods, methodologies, policies, *etc*.

Information essential to all PwC employees, no matter what they did or where they were located, premiered on July 1, 1998 (the day the merger was effective), via “The Bridge.” In December, 1998, PwC began deploying its global intranet, “KnowledgeCurve.” KnowledgeCurve integrated the global content of “The Bridge” with home pages for each service line, industry, and geography, offering a multi-dimensional intranet that supports the firm’s knowledge-sharing, communications, continuous learning, and virtual office strategies with a home page that is the portal through which all PricewaterhouseCoopers partners and staff can view the firm.

When I asked Kent, a Principal Consultant, about his perspective of the knowledge sharing capability of KnowledgeCurve, he said, “*The only difference is we have progressed from paper-based systems that were very hard to create and*

not very easy to use to electronic systems, network-based, through the Internet, through our intranet… that give us significantly enhanced capabilities both to add to them and to use them…". What better endorsement can a computer-aided knowledge management system have?

6.3.2 The Knowledge Management Organizational Structure

The global knowledge management organization is led by the "Global Leader for Knowledge Management" in PwC MCS. According to Jane, the Global Leader, she is responsible for "…*facilitat*[ing] *the overall management and sharing of knowledge across the MCS. I also have responsibility for facilitating the whole of the network of knowledge management people involved around the firm*."

Among those who report directly to the Global Leader are the three "Theater Leads for Knowledge Management" (the Americas, the EMEA, and the Asia-Pacific theaters). According to Paul, the Asia Pacific Theater Lead, theater leads are "…*responsible for establishing the connection with the theater-based knowledge management staff, as well as the consultants operating in the theater and then also responsible for managing implementation of the global KM initiatives as well as aligning the local KM initiatives with the KM strategy within the theater…*".

Also reporting directly to the Global Leader are the "MCS Knowledge Management Global Technology Leader," the "Knowledge Consolidation Program Director," the "Global Network Lead for MCS Knowledge Management," and the "Communications and Change Management Lead for MCS Knowledge Management." Kurt, the Technology Leader, said that he is responsible for "…*all aspects of the systems which enable us to share explicit knowledge. It's not just the technology; I actually have our content strategy team reporting in to me as well.*" Carrie, the Knowledge Consolidation Program Director, is responsible for the "…*project to reinvent our knowledge architecture, our knowledge system to more accurately reflect the integrated structure of our firm between our industries and*

our service market...", while Rebecca, the Global Network Lead, is responsible for:

> *...coordinating the network of professionals that we have developed... and put in place globally, and making sure that all KM professionals are bought into the global strategic programs, are getting the support that they need, are connected and sharing and mutually beneficial to each other and to the entire process. We believe very, very strongly... that the technology is the small piece, the people is the huge piece, the knowledge management professionals is the grease that makes the wheels turn... and so my job is to keep that grease flowing.*

This internal staff organization is shown in Figure 6.1 below:

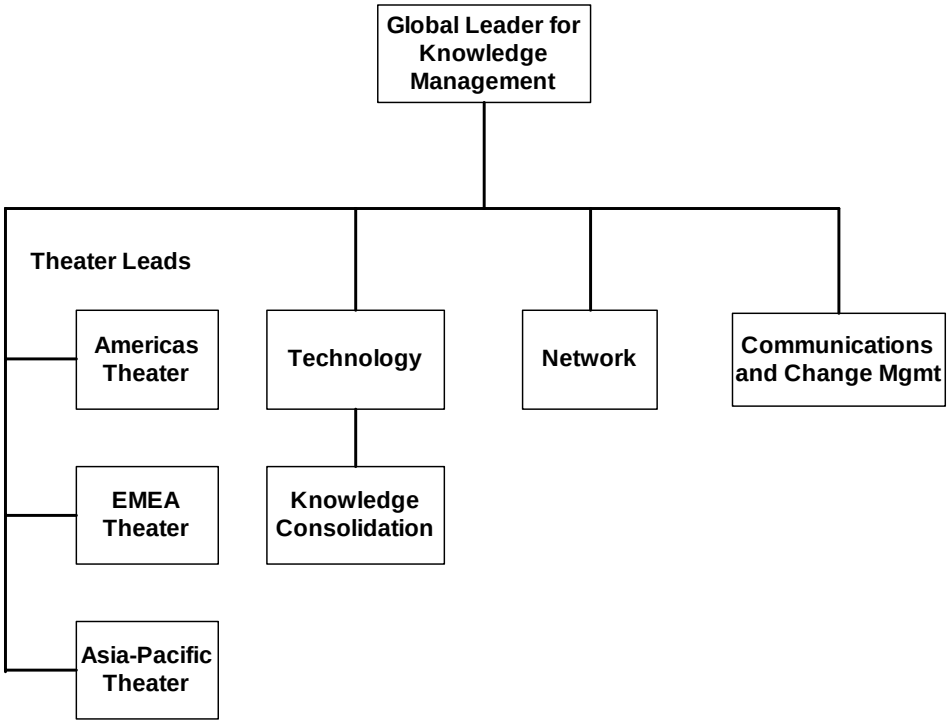

Figure 6.1: PwC MCS Global Knowledge Management Internal Organization

In each of the service and industry lines there are "Knowledge Managers" who work with the partners and other practitioners to make sure that the needed knowledge capital is readily available to all. These Knowledge Managers and the "Knowledge Brokers" who work for them are the knowledge management professionals who are deployed to the various service and industry lines.

As such, they formally report to the partners responsible for those lines, but they work with/for the Theater Leads for Knowledge Management to implement the global and theater KM initiatives. The Knowledge Managers also function as content managers for the documents from their area of specialization that are going in the knowledge repositories.

Finally, the industry and service market groups are starting initiatives to identify Subject Matter Experts (SMEs) and to dedicate their time to reviewing the documentation that gets submitted, and to "Gold Star" those documents that are particularly relevant. While only a few groups actually have the funding and the staff available to do this currently, there is an increasing awareness that knowledge management requires the input and review of the line community. See Figure 6.2 below:

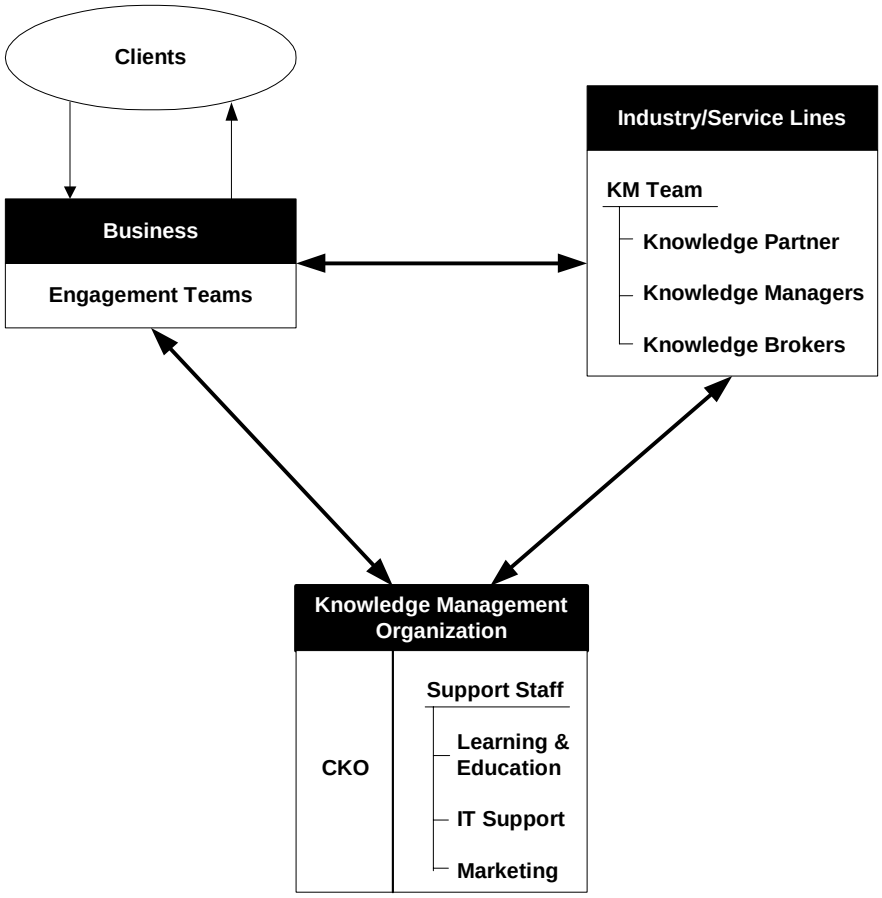

Figure 6.2: PwC MCS Knowledge Management External Organization

6.3.2.1 Knowledge Point Help Desks

MCS Knowledge Point is a global help desk service offering PwC's consultants a single point of contact for help in finding the knowledge they need to serve clients and themselves. The help desk personnel assist the user in locating the knowledge held in the firm's knowledge base and also facilitate contact with subject matter experts and other knowledge resources. Other areas covered by Knowledge Point include best practice research; methodology materials; company, industry, and technology information; continuing education and training information; and practitioner tools. Calls are answered by a trained knowledge professional with access to the knowledge databases of the entire global practice plus lists of contacts across the knowledge management community within MCS. In-depth queries on a service or industry market or on a client account are directed to the appropriate Knowledge Broker who will make contact within 24 hours of accepting the enquiry.

Knowledge Point is managed by the Global Operations Lead (a collateral duty of one of the Theater Leads) who is responsible for coordinating the operations of the knowledge management help desks based in Sydney, London, and Dallas.

As an example, the Americas' Knowledge Point office is made up of a manager, three professional researchers, and three "tour-of-duty" personnel. A tour-of-duty person is a line consultant who is assigned for a one-year tour to the Knowledge Center in order to learn about knowledge management, and ultimately to become a "Knowledge Champion." Tour-of-duty personnel act as the Knowledge Point front line call takers.

Knowledge Point personnel are not simply trained to assist in access to the knowledge repositories; they can also respond to administrative questions. Their knowledge is not as deep in these administrative areas, but they can put the requestor together with the correct office if they don't know the information

requested. Knowledge Point has adopted this customer service attitude to increase the likelihood that when a PwC practitioner has a question, they will turn to Knowledge Point. Or, as Giselle, the Americas' Knowledge Point Manager, said:

> *We want people to start with a silly benefits question and then get to a work question where we could really help them, you know, use us, use the phone number, call us, we can help you, we can point you in the direction, and… when they're satisfied they tell their friends, and then their friends tell someone…*

6.3.2.1.1 Tour-of-Duty Personnel

The front line call takers in the Americas Knowledge Point office are called "Tour-of-Duty" personnel. The typical tour-of-duty person is someone who has already had one to two years of business work experience, not administrative experience, with the firm. They are not higher level consultants because those individuals are better served by experience on projects. The tour-of-duty personnel spend a one-year tour in Knowledge Point and then would typically return to their line practices as "Knowledge Champions," where they can share their newfound knowledge with their fellow practitioners and do some client project member training.

6.3.2.1.2 Researchers

While the front line call takers, the tour-of-duty personnel, are practitioners from the field who are on a temporary assignment, the researchers who back up the call takers are all professional researchers and all have Library Science degrees.

6.3.3 Knowledge Management Technical Infrastructure

Since prior to the merger both companies were utilizing the same Lotus Notes infrastructure foundation, it was somewhat easier to merge the two systems, but only somewhat. According to Carrie, the Director of the Knowledge Consolidation project:

> *When Price Waterhouse and Coopers & Lybrand merged about two and a half years ago the two companies brought with them thousands of Lotus Notes repositories, each owned by typically an industry or a service market group… as a result it was very hard to share knowledge, both between industries and service markets, and also between geographies… just to share knowledge on a particular ERP package like SAP, we identified over thirty knowledge management databases globally, and so even within one small community of interest, it was very difficult to actually share knowledge… at PwC our industries have their own set of funding, typically, and our service markets do, and as a result they were able to proliferate a large number of Lotus Notes databases, none of which looked alike, none of which functioned alike…*

Because none of these Lotus Notes databases "*looked alike*" or "*functioned alike*," every time a consultant wanted to find a document from the database of a particular industry or service market, the consultant had to either learn to use a new database or relearn how to use it, if they had worked in it before. Each database was a completely different system, none of which looked alike or worked together. Additionally, there was no integration between the industry systems and/or the service market systems This left the consultant with the dilemma of where to put a document from a deliverable because if it went in one of the industry databases, it was not visible to the service markets and *vice versa*. As an example, if the project was an SAP implementation for a Human Resources project, there were probably ten or twenty databases that might be appropriate.

In order to address the problems involved in sharing knowledge across these "silos" in which the knowledge had been stored, the Global Leader for Knowledge Management established the strategic direction of creating an integrated knowledge management architecture that would allow the seamless sharing of information around the globe between industries and service markets. This was intended to create a knowledge architecture that would reflect the organizational structure of the firm, so that the industries and service markets would be integrated. In order to accomplish this goal, an integrated suite of databases would be built in a project known as "KnowledgeView."

The KnowledgeView project involves the consolidation of the hundreds of legacy databases into nine (9) knowledge repositories. The nine repositories are:

1. MCS Proposals;
2. MCS Marketing;
3. MCS Engagement Experience;
4. MCS Engagement Work Products (EWP);
5. MCS Business Practices;
6. MCS Encyclopedia;
7. MCS Alliance.Edge;
8. MCS Discussion Catalogue; and,

This knowledge consolidation project is a reinvention of PwC's knowledge architecture in order that it will more accurately reflect the integrated structure of the firm between its industries and its service markets.

The project to integrate the legacy databases into the KnowledgeView suite had been underway for approximately a year and a half at the time of the interviews (October, 2000). In a subset of that project, Web-based interfaces for each of the industry and service market groups to that suite were also being constructed. Using an interface, known as a Network of Excellence Interface (NoE-I), users can seamlessly find the information relevant to them, but the same documents can then be shared between an industry and a service market, because each interface simply looks at the suite in a different way. At the time of the interviews, PwC had rolled-out eight of the nine repositories and was just beginning the roll-out of the Networks of Excellence interfaces.

However, Notes-based databases do have restrictions on their size; so these nine repositories are made up of a number of building blocks, none of which exceeds the Lotus Notes database size limit. The building blocks are integrated by what PwC calls its "Knowledge Pump Solution," which can duplicate the different pieces, so a piece of content may, in fact, be duplicated in a number

of different places. The "Pump" ensures that the repositories are synchronized and that if any changes are made to any copy of a document, that change is promulgated everywhere the document appears. As an example, if the instruction to delete the document globally is issued, then anywhere the document appears it is deleted.

One of the advantages of this building block structure is that PwC can take the enormous knowledge resources of one of its large practices, the U.S. or the U.K., and make everything available in other major geographies, or, if they have a small practice, for example Oman in the Middle East, with only a small server, that practice can select only the blocks that apply to the type of work that they do.

By reducing the knowledge base to just nine databases, the responsibility of the user to know "where" a certain type of content "should" be stored is greatly reduced and their searches can be more effective. Because the knowledge repositories are Lotus Notes databases, this data architecture would be quite difficult to implement and manage without PwC's "Knowledge Pump Solution." Each of the nine repositories would easily exceed the Notes individual database size restrictions, but the "Knowledge Pump" allows Lotus Notes to string databases like building blocks while remaining transparent to the user.

It is important to note that the KnowledgeView repositories are NOT a complete archive of the firm's documents in each category; they are a selection of what is intended to represent the best of the firm's thinking in that category. As Kurt, the Global Technology Leader, said:

> *I've made the distinction between doing the work and sharing... relevant reusable pieces with the global community. I'm clear that our knowledge management system is not about capturing everything that we do. It would just be impossible... No one really knows but I'm not completely surprised if we produced 50,000 proposals a year in this organization. We do not want 50,000 proposals made available on the knowledge management system.*

The determination of which documents will be held in the KnowledgeView repositories is the responsibility of the Knowledge Managers in the various industry and service lines. The Knowledge Managers work with the Subject Matter Experts (SMEs) within their community and identify what is relevant and reusable, in other words "the best of the best."

As with the other case studies, each of the industry and service lines has considerable autonomy and this is reflected, among other things, in the ways that the Knowledge Managers manage the documents in the portions of the knowledge repositories for which they are responsible. Some of the Knowledge Managers have developed "Guided Tours" which point the user to that "best of the best" information, which would be anywhere from seven to fifteen documents in a specific area. Other Knowledge Managers are working with their SMEs to "Gold Star" those documents that are considered to be particularly relevant. Either approach is intended to direct the user to the most usable documents that apply to the user's specific community.

While these different approaches do cause a degree of dissimilarity within the repositories and their interfaces, as Jane, the Global Knowledge Management Leader, said:

> *...there are a lot of equivalent issues probably across the different Networks of Excellence* [author's note: the interfaces] *and how they deal with things, and the issue for me is whether it confuses consultants or not, and I think at times it does, that they can go into different parts of the knowledge management system and they'll see things slightly differently because of how that group has chosen to do it. But I think there's a flip side to it which is we're an enormous organization, we have lots of very talented people at all sorts of levels in the organization, and part of getting the best of them is allowing difference and allowing development... there's a guy called John and the "Gold Star" system came from him, and so Bill adopted it because he thought it was great, and now some of the others are adopting it, and give it a year and they'll all have adopted it.*

The goal of this experimentation is to find "the" way to identify the "best of the best" and make it easily available to the consultants. The interesting point here

is the close cooperation between the knowledge management organization and the business organization in trying to make this happen.

Finally, while the knowledge management system is built of a Lotus Notes infrastructure, the decision was made not to utilize the Lotus Notes interface, but to move to a Web interface. The use of a Web interface reduces some of the access problems found with the Notes interface when the user is located at a remote site and not using the firm's network.

6.4 KnowledgeCurve

As previously discussed, KnowledgeCurve, PwC's global intranet, integrates global content with home pages for each service line, industry, and geography, offering a multi-dimensional intranet that supports the firm's knowledge-sharing, communications, continuous learning, and virtual office strategies with a home page that is the portal through which all PwC partners and staff can view the firm.

Profiling is employed so that each individual's home page is dynamically generated, pulling forward information of relevance to that individual based on their professional needs and interests. Profiling does not restrict access to any other parts of the intranet, but it reduces information overload, putting the most relevant content right up front. A "Global User ID" consolidates all KnowledgeCurve services, both internal and external, under one login at the start of each session. As a part of this profiling, the user can determine which screen will be their default when entering KnowledgeCurve.

The default KnowledgeCurve entry screen is the "Global KnowledgeCurve" screen seen in Figure 6.3 on top of the following page. As can be seen, the bulk of the screen is taken by "**NEWS*break worldwide***," which provides links to global news from a PwC perspective. Note that along the right hand side of the screen there are three options:

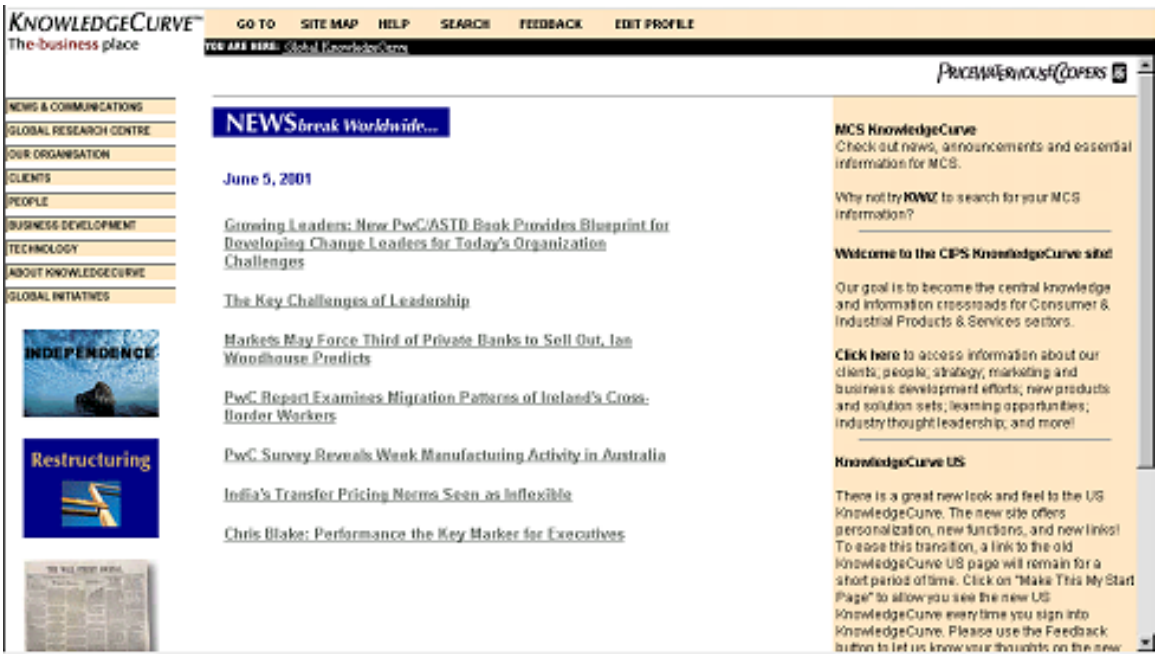

Figure 6.3: The Global KnowledgeCurve Screen
Source: PricewaterhouseCoopers
Reproduced with Permission

- A link to "MCS KnowledgeCurve" for news, announcements, and essential information from an MCS perspective. Also included is a link to "KWIZ," a search tool for MCS information;
- [For this particular user] A link to the "CIPS KnowledgeCurve" site which says "*Our goal is to become the central knowledge and information crossroads for Consumer & Industrial Products & Services sectors.*" The link provides access to information about either an industry or service line's clients; people; strategy, marketing, and business development efforts; new products and solutions sets; learning opportunities; thought leadership; *etc.*; and,
- [For this particular user] A link to the "KnowledgeCurve US" site which is highly personalizable and will be discussed in more detail shortly.

Along the left-hand frame there are standard navigation links to:

- “News & Communications;”
- “Global Research Centre;”
- “Our Organization;”
- “Clients;”
- “People;”
- “Business Development;”
- “Technology;”
- “About KnowledgeCurve;” and,
- “Global Initiatives.”

Also there are special (temporary) navigation links to:

- “Independence” which is an annual review of stock ownership for the financial regulators;
- “Restructuring;” and,
- A link to the “Wall Street Journal.”

The user may decide to let geography drive the personalization of their KnowledgeCurve screen or may simply decide to go to that screen. The “KnowledgeCurve US” screen is shown in Figure 6.4 on the following page. On this page along the left-hand frame is a new set of navigation options:

- “Independence;”
- “Research Center” (Note that the spelling of “Center” has changed to its US version from the British version on the global page);
- “News;”
- “Clients;”
- “Restructuring;”
- “HR/Benefits;”
- “Our Organization;”
- “Discussion Forums;”

- "Technology;"
- "Learning;"
- "Policies;"
- "Marketing & Communications;" and,
- "Directories & Calendars."

Below these navigation options is a button "Make US my Start Page."

Figure 6.4: The KnowledgeCurve US Screen
Source: PricewaterhouseCoopers
Reproduced with Permission

As can be seen, the remainder of the KnowledgeCurve US screen is made up of sections:

- "PwC Spotlight" – News that PwC wants to have high visibility;
- "Front Page News" – A customizable space for news that is important to the individual user. This may be external company news, industry news, publication headlines, or internal PwC news;
- "My KnowledgeCurve Links" – A customizable space for the user's favorite KnowledgeCurve links for one-click access;

- "Quick Links" – A list of useful links;
- "My Weather" – A customizable space for the selected city's weather forecast or get a three-day forecast for any US city by entering a zip code in the provided box; and,
- "My Stocks" – A customizable space for the user to list their preferred stock quotes. According to Mary, the Americas Theater Lead, when PwC was working with one of their clients:

> *...we talked to the partners on the project first* [about their] *user requirements, and they told us... if you don't have a way for our consultants to track their stocks, you're going to lose them, because we can tell you that 50% or 60% of them are under the age of 26, and they're making good money and they're all investing, they're all doing their e-Trade and stuff like that, and if you can't make this a place where they can go to get to that information, you'll lose them. We don't like it, but that's what their first concern is relating to the Web...*

PwC took that bit of knowledge from a client to heart in their own system.

Among the other options from the Global KnowledgeCurve screen, available as one of the navigation options along the left-hand frame is the "Technology@PwC" home page which is shown in Figure 6.5 at the top of the following page. This is provided as an example of the various home pages that are a part of the KnowledgeCurve system. These home pages provide easy navigation to information and news related to the selected home page.

At the heart of the knowledge sharing application is the "Knowledge Resources" screen shown in Figure 6.6 at the bottom of the following page. The left-hand frame provides navigation options to:

- "New Archive;"
- "Our Organization;"
- "Knowledge Resources" – The screen that is shown;

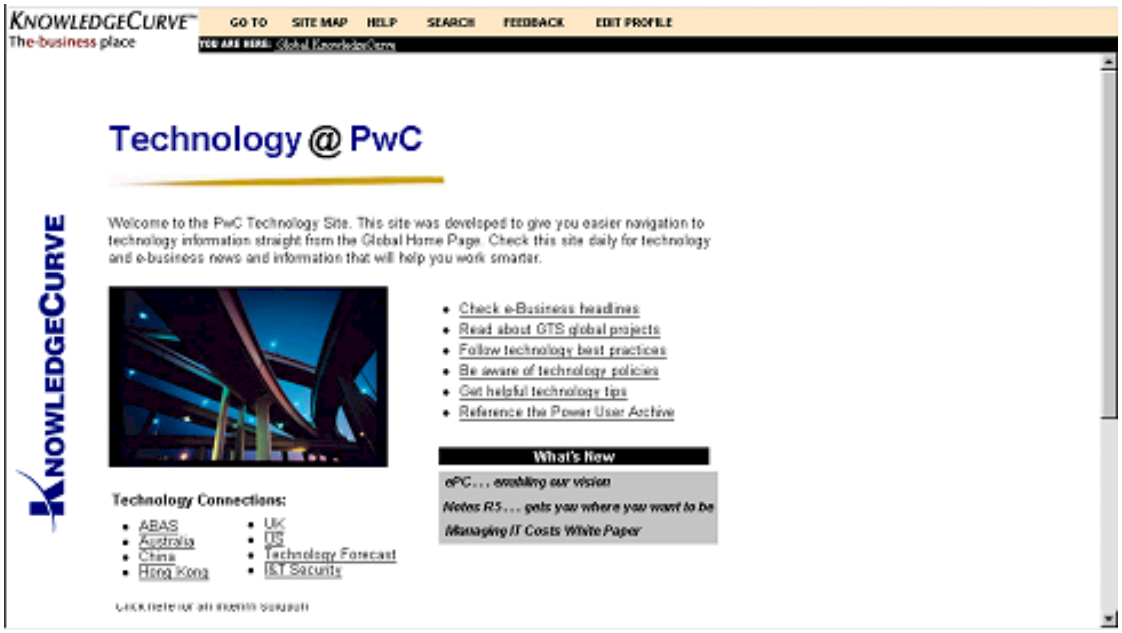

Figure 6.5: The Technology@PwC Home Page
Source: PricewaterhouseCoopers
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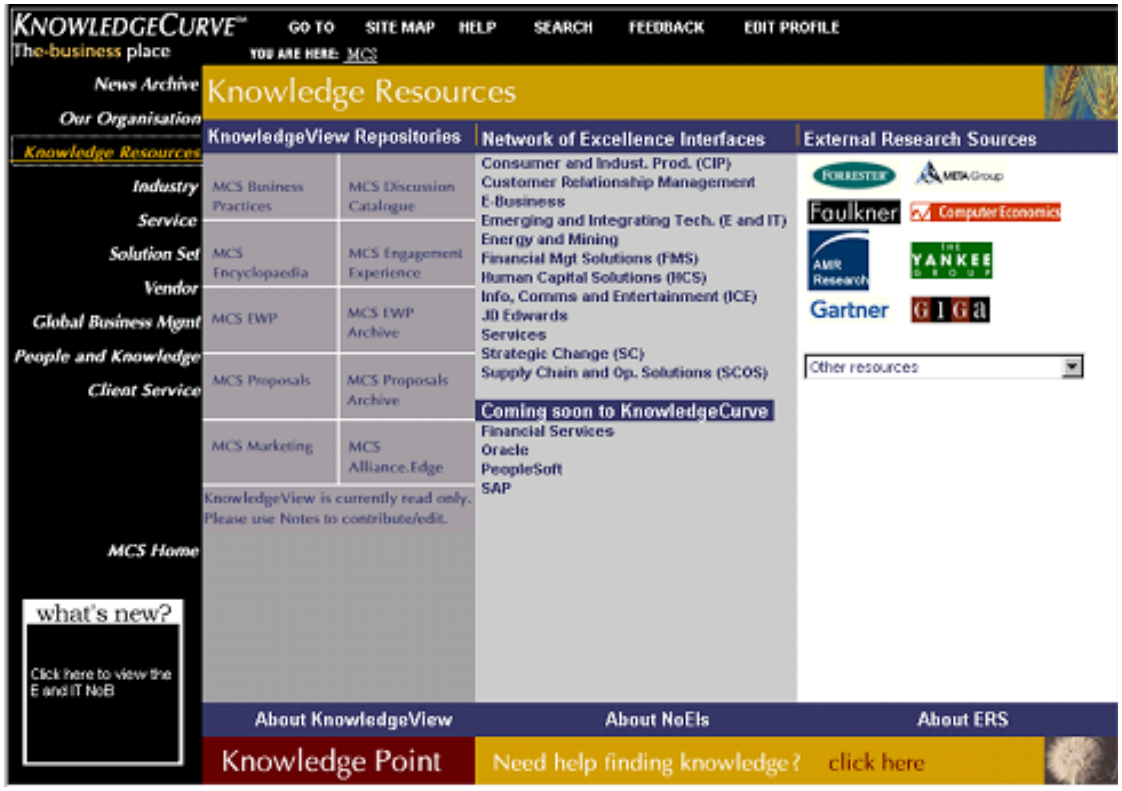

Figure 6.6: The Knowledge Resources Screen
Source: PricewaterhouseCoopers
Reproduced with Permission

- "Industry;"
- "Service;"
- "Solution Set;"
- "Vendor;"
- "Global Business Mgmt;"
- "People and Knowledge;"
- "Client Service;" and,
- "MCS Home."

However, the heart of this page are the sections for:

- The "KnowledgeView Repositories;"
- The "Network of Excellence Interfaces;" and,
- The "External Research Sources."

6.4.1 The "KnowledgeView Repositories"

As can be seen in the "KnowledgeView Repositories" section of Figure 6.6, the "Knowledge Resources" Screen, there are ten (10) links to the various repositories. In the discussion of these repositories in the "Technical Infrastructure" section of the chapter, I stated that there were nine (9) KnowledgeView repositories. A comparison of the earlier list of repositories (see page 232) to the links listed on this screen shows that there is no link to the "MCS Expert Information" repository, and there are links to repositories for "MCS Proposals Archive" and "MCS EWP (Engagement Work Products) Archive." The separation between a complete archive and items from those archives that represented the "best" and were deemed worthy of sharing was discussed earlier; however, one can see the desirability of providing access to these archives. The expertise repository is still under development and will be added later. However, as I was told by Mary, the Americas Theater Lead:

> *When knowledge management first got started and they were talking about knowledge management in the consulting organizations, they used to say, "hire one, get fifty thousand". Yeah, it's probably*

> *not so true; however, you should have access to a large expert community…*

I would expect to see access to the firm's experts repository at some time in the future.

Each of these repositories is designed to have the same look and feel, the same taxonomy, so that as a user switches between repositories they will find the same tool bar and the same navigation options. Thus, once a user learns how to use one of the repositories in the system, how to create a document or find a document, they know how to use the entire suite of repositories.

Finally, the user can search for documents using either the tools provided in the repositories themselves or using one of the Network of Excellence interfaces. The same documents can be found with either method because they are all drawn from the same repository suite.

6.4.2 The "Network of Excellence Interfaces"

Although a user can search from the repositories, the repositories are just that – they hold all of the information from every industry or service market. The user typically does not need to see, or search through, information from all of the different communities, only the information pertaining to his or her community. This is the role of the Network of Excellence Interface; it does an initial pick of the information by industry or service market so that practitioners that belong to a particular industry or service market can see their information. This means any information that pertains to their area, even though it may not have been created by their area because it's all feeding from the repository suite. So the NoE interfaces are intended to provide a more efficient means of getting to information of interest to users in the community for which the interface was developed. As can be seen, not all communities are served by NoE interfaces, but more are being developed and rolled-out every day. An example of an NoE in-

terface, this one is for the FMS (Financial Management Solutions) community, is shown in Figure 6.7 below.

Figure 6.7: The FMS Net NoE Interface
Source: PricewaterhouseCoopers
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Just as with the repositories, all of the interfaces have the same look and feel, they have the same taxonomy, so that as a user switches between one interface and another they will immediately recognize the same tool bar, the same navigation system, the same taxonomy, the same form. Thus, there should be an almost seamless transition for the user, so their learning curve should be much shorter, although there is still a learning curve.

6.4.2.1 Taxonomy

Both the repositories and the interfaces share the same taxonomy. A taxonomy is a classification system, a part of the common body of knowledge of the organization; it is a common vocabulary. In an article by the partner-in-charge of

knowledge management in PwC MCS's Asia-Pacific Theater, he states that the use of a common:

> *Vocabulary impacts whether people know what is meant when something is said or written. Without a common vocabulary, employees might misunderstand each other. For example, "tolerance" does not mean the same thing to a pharmacist as it does to a technical engineer. And there are cultural factors too. In Japan, to "table a topic" means to consider a subject, while in the US this means to postpone its consideration.*
>
> *In other words, a common vocabulary:*
>
> - *is a pre-condition for an architecture that organizes information;*
> - *reduces the chance that experts will talk past one another, especially in newly-merged organizations;*
> - *increases efficiencies in knowledge processing and storing. A consistent categorization of content will give end-users a better chance of finding information*." (Nakazawa, 1999).

6.4.3 The "External Research Sources"

At PwC consultants are given access to a number of valuable external research sources. This section of the "Knowledge Resources" screen provides links to:

- "Forrester;"
- "Meta Group;"
- "Faulkner;"
- "Computer Economist;"
- "AMR Research;"
- "The Yankee Group;"
- "Gartner;"
- "Giga;" and,
- Other resources.

Finally, if the user is having difficulties with using these external services, or any other services, there is a link to "KnowledgePoint" at the bottom of the page.

6.5 Institutionalization

The goal of this study was to determine if there was evidence of the institutionalization of the process of knowledge management as a result of the implementation of a formal, computer-aided knowledge management system in a company. In the opening chapters of this document I said that evidence of institutionalization of the process of knowledge management is found when there is evidence that users of the formal knowledge management system have altered their day-to-day work life to incorporate the use of that system. This would mean that the use of that system has become routine for them.

I interviewed seven (7) users at PwC. Again, a sample of seven cannot be considered representative of an organization with 150,000 employees. As described in the Methods chapter, these user respondents were selected by PwC with a view to my parameters. However, I wanted to interview more users about their experience with PwC's system and, while I would have wished for more diversity in their communities, all of these users are from the Supply Chain Management community. Finally, I had hoped to be allowed to interview a partner-level user, but this could not be arranged. While I am concerned about these shortcomings, the users do present a range of experience, and could provide a sound foundation for my study of the institutionalization of knowledge management at PwC MCS. However, my greatest concern in this section is not with the actual users; it is with the fact that the system that I have described is so new that my user respondents have little experience with it. My user respondents were (the names have been changed to ensure confidentiality):

- Julie, a Level One Consultant in the Supply Chain Management practice who has just finished her new hire training.

- Tom, a Level One Consultant in the Supply Chain Management practice who has just finished his new hire training.
- Bill, a Consultant in the Supply Chain Management practice. Bill has been with PwC for approximately two (2) years.
- Alan, a Principal Consultant in the Supply Chain Management practice. Alan has been with PwC for approximately two (2) years.
- Kent, a Principal Consultant in the Supply Chain Management practice. Kent has been with PwC for approximately eight (8) and has approximately nineteen (19) years of consulting experience.
- Pat, a Principal Consultant in the Supply Chain Management practice. Pat has been with PwC for approximately three (3) years.
- Dick, a Practice Leader in the Supply Chain Management practice. Dick has been with PwC for approximately three (3) years.

From these users I found evidence that the process of knowledge management is beginning to be institutionalized at PwC; however, the KnowledgeCurve system, with its suite of KnowledgeView repositories and its Networks of Excellence interfaces, was still quite new[9] and users were still adjusting to it. Some of the comments received from the users may be referring to the previous legacy databases.

6.5.1 Routine Use of KnowledgeCurve

Is there a routine use of the knowledge resources available in PwC's KnowledgeCurve? "*...I probably don't use it enough... if I look back over the last couple years, I don't know how many different deliverables I invented myself.*" Said Kent, a Principal Consultant. But Pat, another Principal Consultant, said that he does regularly use the system, and that:

> *...the first place I'll tap into is to see if I've got anything similar, and oftentimes I do. Then the next place I do, and I do it every time*

[9] At the time of the interviews, the entire system had not yet been rolled-out.

> *whether I've got a similar engagement or not, is I will then go into "Scholar,"* [author's note: Scholar is the legacy database of the Supply Chain Management practice] *usually tap into the logistics and fulfillment area, to see what all is out there.*

However, the strongest statement of use came from Dick, a Practice Leader, and the most senior of the respondents. Dick said:

> *I'm a regular user and I'm also a keeper of sorts and organizer and distributor of knowledge. Because I'm running the practice, I get a lot of inquiries from people that may not use the databases or like to go out and search databases on their own, so they'll call me and say, this is exactly what I'm looking for, do you have it, or can you tell me where to get it. So I get a lot of those things.*

Dick's comment sums up the situation; he is a "*regular user*," but as a practice leader he hears "*...from people that may not use the databases or like to go out and search databases on their own...".* So both sides of the coin, use and non-use. However, I believe that at least some of the non-use that Dick mentions is a result of the difficulties of working with the legacy databases. This can be seen in Kent's reason for not using the system often enough:

> *...they've got a long way to go with a product like "Scholar" before we reach a point where it's really easy to get to something quick and where you don't cull through a lot of material that's 1998-based... I still think they've got some work to do before they cull that all out...".*

The knowledge managers would respond to this comment by saying that Kent's concerns have either been addressed or are being addressed in the KnowledgeView consolidation project. This, of course, remains to be seen.

I did note one positive point for the new system; it has apparently been well accommodated in the firm's new hire training. I spoke with two Level One Consultants who had just completed their new hire training, and they both appeared quite confident of their abilities to access needed knowledge resources and knowledgeable about the firm's knowledge management system. Tom described his understanding of the need for the system with "*consulting and*

knowledge management, it all goes hand in hand. With consulting you strive for efficiency, and knowledge management is a tool to help achieve a greater efficiency because of less duplication of effort or work or information...". When new consultants are taught to expect assistance from the firm's knowledge management system, one can hope that they will routinely use the system.

However, PwC seems to have taken the common approach (at least common to the other two case studies) to training its more experienced consultants. According to Kent, the only experienced respondent who commented on his training, "...*they have been sending out Lotus Notes messages on a regular basis... you really don't need, I think, a formal training...*". A lack of training in the use of the system could severely limit its full employment. However, one must understand the difficulties involved in attempting to provide this type of training to 50,000 consultants, and the new hire training appears to have been adjusted to remedy this problem over time.

6.5.2 Limitations to the Routine Use of KnowledgeCurve

Ideally I would be more prone to address limitations that were mentioned by several of the user respondents; however, I only was able to interview seven users and two of those were new hires with no experience. Therefore, I will address any problem that was mentioned by the PwC users.

The limitation addressed in Kent's comment above was clearly concerned with one of the legacy systems; however, the firm can learn of some of its users' concerns for the new system by listening to their comments about the legacy systems. From these comments I found evidence of elements in the old system that hampered users' reliance on that system. These elements should be addressed in the new system or they will continue to hamper the users. Limitations in the old system were found in the following areas:

- Infrastructure Problems:
  - The system does not adequately address a personalization strategy.

- Data Management Problems:
  - The content of the system is not perceived as being current; and,
  - The content of the system is not linked to business needs.
- Organizational Problems:
  - Some people are resistant to the idea of sharing knowledge;
  - There is evidence that various communities are continuing to build and maintain informal knowledge repositories outside of the KnowledgeView suite; and,
  - There is little provision for a personal knowledge management system.

6.5.2.1 Infrastructure Problems

6.5.2.1.1 Provision of a Formal Personalization Strategy

While this was not addressed by any of the users, in my description of the repositories I mentioned that the expertise database had not been implemented. In its current state, PwC's knowledge management system is primarily a content management system under a codification strategy. It remains to be seen when, or if, a personalization component will be implemented, although the senior knowledge management leadership appeared to be aware of the need for such a component.

6.5.2.2 Data Management Problems

6.5.2.2.1 Knowledge Must be Current

It is a constant effort to maintain knowledge bases. In the rapidly changing world of management and technology consulting, consultants perceive anything over even a few months old with suspicion. Kent's comment about the age of the documents (...*you don't cull through a lot of material that's 1998-based...*) in the knowledge repositories has already been presented, but this is a continuing problem for any knowledge management organization.

6.5.2.2.2 Content Must be Perceived as being Linked to Business Needs

PwC has built what is largely a content management system. The problem with this approach is that, while it may serve its user communities well in the early phases of an engagement, it does not seem to provide equal service in the later phases. Speaking of his use of the system, Bill, a Consultant, said:

> *I have used them always during the first of the project… what I've always looked for is planning, documents that I need for planning or managing a project, and I've always tried to gather those things at the beginning of the project…*

6.5.2.3 Organizational Problems

6.5.2.3.1 Resistance to Knowledge Sharing

Organizational resistance takes many forms and occurs for many reasons; however, one of the most serious forms of organizational resistance is the objection that many people have to sharing their knowledge. This is the old "knowledge is MY power" problem. While speaking with Giselle, the Americas KnowledgePoint Manager, she said that there are individuals who are, "…*not going to participate in knowledge management, they don't believe in it, they think it's a waste of time, a waste of money, a waste of energy*…". PwC is the only company in which someone said this so straightforwardly, but the problem surely exists in all companies regardless of the predominant culture. Ultimately, this form of resistance severely impedes long-term the institutionalization within an organization because it acts as a counter to a culture of knowledge sharing.

6.5.2.3.2 Continuing Growth of Informal Knowledge Databases

PwC's knowledge management organization has spent the last two years attempting to consolidate all of the legacy databases that grew up prior to the merger; however, Bill, a Consultant, reported that there are still:

> *…are home grown databases, if you will. Sometimes those are communities of interest, standard communities of interest, that are developed out of necessity or just ignorance of the current system, and*

> *it's typically, I believe, more a part of the latter than the first. Others are more project oriented or office oriented, regional type repositories that were developed specific for that region or for that project, not maintained by a Knowledge Manager per se, but maintained by an individual or a group of individuals whose intent is to go towards some form of knowledge management without maybe even identifying it as being that…*

PwC has devoted significant effort to its KnowledgeView project with the intent of consolidating the large numbers of Notes databases, yet it appears that they continue to proliferate. While I was writing this chapter, I had some questions about the KnowledgeCurve screens and I was unable to contact the knowledge management professional who I had interviewed concerning the NoE interfaces. Fortunately for me, the PwC MBA class was on campus at that time and I spoke with four (4) of those students (all MCS consultants); none of these students used the knowledge management facilities of KnowledgeCurve, and they seemed only vaguely aware that they existed. Interestingly, one of the students told me that it was easier for him to use the "home grown" databases that had been developed by his office. So these unofficial databases still present a challenge to the formal knowledge management system.

6.5.2.3.3 Need for a Personal Knowledge Management System

I have already discussed the need for a personal knowledge management system to supplement the firm's organizational system. In order for maximum benefit to be achieved from the organizational system, the firm should help its individuals reconvert organizational knowledge capital back into individual knowledge that is ready to be used. Many consultants have their own personal treasure trove of knowledge artifacts; a set of tools to manage these personal databases would be beneficial. At PwC, Dick spoke of his personal database:

> *I'm building my own knowledge repository using their structure, and so I'm using their databases that they provide to store knowledge that I think is relevant. They're not usually telling me what needs to be stored per se; I'm, at this point I would say I'm more engaged with trying to make sure that what I think is needed…*

Dick is using the firm's corporate repository, but he is a practice leader and has easier access to these repositories. Should not all consultants be provided with a set of tools to build their own knowledge base?

6.5.2.3.4 Organization Problems Synopsis

PwC faces a degree of resistance to its knowledge management efforts, although nothing to the degree seen at KPMG. In mentioning the problem of "home grown" databases, Bill said he thought that the problem existed because of a lack of understanding of how the formal knowledge management system operated. Giselle spoke of individuals who resist sharing their knowledge. Both of these are forms of organizational resistance that need management. Only time will tell how well PwC's new system and its knowledge management organization respond to these problems.

6.5.2.4 Synopsis

Again, consultants of yet another company see their firm's knowledge management system in its content management role and really only helpful in the early phases of an assignment. In the more advanced phases of an engagement, or with complex problems, they still tend to turn to their personal informal networks. One of the Theater Leaders, Mary, said that there was:

> *…we used to talk about the "Spray and Pray" method, which is that before knowledge management you picked up the phone and you called everybody you knew and prayed that they would come back with some information for you, and now we have these other steps that you can take, using databases and so on and so forth, but that doesn't diminish the information that you get from direct discussions with experts…*

Unfortunately, there appears to be some distance to go before these "*other steps*" are fully institutionalized.

6.6 Summary

In 2000, the book “Wisdom of the CEO” from PwC was published. Consisting of interviews with twenty-nine CEOs of global firms, the book identifies eight (8) issues that affect business organizations today. These are:

- “Disruptive Technology,” calling attention to the hidden virtues of technology-led disruption. In this book, Larry Bossidy of Allied-Signal reflects on the Internet as not merely a driver of change, but “an enabler of a new business model for the twenty-first century.”
- “Knowledge Management” underscores the imperative of unifying knowledge and action. Timothy Koogle of Yahoo! considers the importance of context and structure, as well as the very real danger of information overload.
- “Innovation,” illuminating the real bottom-line benefits of this much-touted quality. Nobuyuki Idei of Sony reveals what sets his company apart: a risk-tolerant trust in innovative individuals, even when their ideas refute market surveys.
- “Globalization amid Rapid Change,” calling for an aggressive strategy focused on sector dominance and a willingness to take risks. Niall Fitzgerald of Unilever shares his expertise on going global while staying local, or as he sees it “multi-local multi-nationalism.”
- “Growth,” exploring the importance of supporting each expansion with targeted reinvention. Among CEOs, Michael Dell of Dell Computer Corporation discusses the challenge of creating and managing “hypergrowth.”
- “Shareholder Value,” highlighting the power of linking corporate strategy directly to value. John Antioco of Blockbuster reveals his own path to shareholder value: a revolutionary reshaping of his company's supply chain.

- "Organization," uncovering the keys to transforming restrictive organizational architectures: employee creativity and commitment. Ralph S. Larsen of Johnson & Johnson shares the secret of success of his own organization – decentralization (Dauphinais*, et al.*, 2000).

KnowledgeCurve and the associated KnowledgeView repositories, which combined comprise the heart of the PwC MCS knowledge management system, can easily be seen as a part of PwC's strategy for confronting these challenges. Their strategy involves:

- Deploying technology such as their intranet to enable the flow of explicit knowledge throughout the organization;
- Setting up people systems to facilitate the capture and sharing of information throughout the organization; and,
- Creating a network of "champions" or leaders to maximize the capture, organization and use of knowledge.

The PwC approach to a knowledge management system appears to reduce many of the common complaints from users of these systems:

- Access is improved through the use of a Web-based interface;
- User confusion as to where a document "should" be is reduced by the consolidation of all databases into a suite of nine (9) clearly defined repositories; and,
- Programs such as "gold starring" increase user awareness of what is considered the "…*best of the best*."

However, even in this extremely well-designed system we still see the difficulties involved in institutionalizing a new way of doing business. It appears that PwC is well down the path to, but not yet arrived at, the goal that Mary mentioned of "…*hire one, get fifty thousand*."

Chapter 7: Results and Findings of the Case Studies

This research was initiated by a desire to increase our understanding of knowledge management systems, as well as to determine whether the presence of a computer-aided knowledge management system has an impact on the institutionalization of the process of knowledge management within an organization. Prior to the beginning of this research, I proposed that those organizations in which there was evidence of the institutionalizing of the process of knowledge management could be considered "Learning Organizations," and that they "should" have a competitive advantage over those of their competitors who were not so advanced in this institutionalization. While the research results tend to reinforce my belief that organizations that are in the process of institutionalizing knowledge management in their operations are "learning" from their past experience and "should" be becoming more competitive, I have no evidence as to their relative competitiveness.

In line with those beliefs, I developed three (3) research objectives as a preliminary step in my study design. The research objectives were:

1. To describe the structure and policies governing the development and use of computer-aided knowledge management systems within the organizations selected for analysis;
2. To describe how these structures and policies contribute to the institutionalization of knowledge management within the overall organization; and,
3. To refine a series of research propositions and then to develop these propositions into hypotheses that can be empirically tested at a later stage in the body of research that this study begins.

The structure and policies governing the development and use of the computer-aided knowledge management systems deployed within the three organizations that were my case studies (Accenture, KPMG, and Pricewaterhouse-Coopers) were described in Chapters 4, 5, and 6 of this dissertation. Again, these organizations were selected for study because “knowledge” is their stock-in-trade and because consultancies are driven to be on the “cutting edge” of systems implementations such as a knowledge management system. The same three chapters also began the discussion of how their various structures and policies contributed to the institutionalization of knowledge management within the individual organizations. This chapter will continue that discussion with a cross-case analysis of institutionalization within the three organizations.

The goal of almost any organizational information system is the more effective and profitable operation of the organization implementing the system, and this is equally true in the implementation of an organizational knowledge management system. Unfortunately, this goal is exceedingly difficult to measure; however, following the lead of Orlikowski and Robey (Orlikowski, 1992; Orlikowski and Robey, 1991), I wished to begin to investigate whether the institutionalization of the system might be used as a good surrogate for its actual goal. Therefore, institutionalization, which is described within the framework of the Theory of Structuration, has been used as a surrogate for a successful implementation in this study. The three structures from Giddens’ (1976; 1979; 1982; 1984; 1993) work then define institutionalization. These are:

- The Structure of Signification;
- The Structure of Domination; and,
- The Structure of Legitimation.

This chapter continues the discussion, now across the three cases, of how the structure and policies governing the development and use of the computer-aided knowledge management systems described in Chapters 4, 5, and 6 have

contributed to the institutionalization, or lack thereof, of the process of knowledge management in each of the three organizations studied.

7.1 Drivers for Knowledge Management

Each of the three companies involved in this study has been drawn to their knowledge management efforts in similar ways, and each firm has followed three converging paths along their journey towards knowledge management. However, there are actually three quite divergent goals at the end of these different paths, although all have come to be included under the aegis of "knowledge management." The first path to emerge, and it emerged long before these organizations were formed, was the traditional means of sharing knowledge: a more experienced member of the organization passing on his or her experience to a neophyte. The next path to emerge was first traveled informally, as small groups of consultants attempted to discover ways in which they might reutilize the artifacts and findings of their previous work. In some cases, early on this became a more formalized goal of the organization too, but it started as an informal effort. The final path emerges as organizational leaderships recognize that "knowledge management" would have a homogenizing effect on their organizations, and could lead to the development of a common image and business model. This common image and business model is seen to confer competitive advantage in a rapidly globalizing business environment.

7.1.1 The Desire to Share Knowledge

Humans throughout their existence on earth have passed their experiential learnings from one generation to the next. This is true knowledge sharing, because the learning generation does not have to go through the same experience to possess and to be able to use the knowledge gained from that experience. Whether it was a primordial hunter/gatherer passing on survival tips to a younger member of the tribe, a mother telling her child that the stove is hot and will hurt if the child touches it, or an experienced consultant training a newly

hired member of the firm on how to approach a certain problem, all of these are examples of one generation sharing knowledge with another; and they are part of the reason that societies/organizations have developed and prospered over the years.

The consultancies studied, like all organizations, depend on this type of traditional person-to-person knowledge sharing. Like many other organizations, these consultancies have extended the reach of this person-to-person approach by adopting formal training procedures for both their newly hired members and the more experienced members looking to expand their expertise; however, most of the training, the expansion of an individual's expertise, is due to either that individual's own experience or the informal passing of another individual's experience on to others in the organization – on-the-job training. The goal of any knowledge management system is to, in some measure, replicate this traditional person-to-person sharing of experience and knowledge.

Virtually every user respondent indicated that, with at least some types of problems, they prefer to discuss the problem with another individual, an expert, rather than read about possible solutions. This is the foundation for the need for a personalization strategy in developing a formal knowledge management system, as such a strategy most closely replicates the traditional means of sharing knowledge.

7.1.2 The Desire to Leverage Past Work

The earliest group knowledge management efforts in at least two of the three companies studied were not the result of large, formally approved, organizationally sanctioned projects; they were the result of small groups of people looking to create kinds of databases that would enable them to work together more efficiently by leveraging the products of their earlier work. These efforts might be seen as much as publication mechanisms as they were knowledge sharing mechanisms. The earliest example discussed in the case studies was Accen-

ture's (then Andersen Consulting) use of "subject files" as far back as the mid-1960s. While this eventually became a semi-formal project of the organization, it first began when individual consultants saw the advantage of not only reusing some of their own previous work but also of reusing previous work by other consultants. Certainly this was not an earth-shattering discovery, but how would they locate the pieces of others' work that were applicable to their current need? They then went further to develop common files and other means to assist in the identification for reuse of these work products. Ultimately these files and other means resulted in very structured formats for the subject files. Additionally, while the above example is from the Accenture case study, a very similar discussion is found in the PwC case study.

While we call this knowledge sharing, it was really more in the nature of clerical efficiency – it was easier to reuse particularly well written sections of documents than to recompose those sections each time a new document was written. This was not, and still is not, the true sharing of knowledge; it is simply an efficiency measure. In fact, this approach can lead to rote solutions that are implemented by individuals who no longer understand all that is implied in the adopted solution. However, efficiency is typically a goal of any organization, and it is a very reasonable goal for a knowledge management system.

The bulk of the effort in all three of the knowledge management systems studied is in content management, a codification strategy. Much of the justification for a content management system is found in this desire for efficiency in leveraging past work.

7.1.3 Globalization and the Desire for a Common Image

All three of the companies studied have corporate histories that reach back at least a century. Each of these companies started as a small shop and grew as opportunities presented themselves. At the same time, there were other similar small shops in the same business and in the same cities that did not

grow like the subjects, although surely they were presented with similar opportunities. Why did these companies grow while others languished and even died? What was the source of their competitive advantage? Their histories seem to suggest that at least part of the answer lies in these firms' use of their knowledge resources. As the respective history sections show, each of these firms became acknowledged leaders in their fields.

As each of these firms grew, it became increasingly difficult to continue using the traditional person-to-person knowledge sharing methods that had apparently served them so well in the past, and the firms reacted to these difficulties in different ways. Accenture, which was apparently quite proud of its organizational culture of knowledge sharing, struggled to maintain its traditional methods with meetings, workshops, and other face-to-face venues until it became obvious that an alternative had to be found. But Accenture faced its growth problems much later than either KPMG or PwC. While all three companies began life as accounting firms and grew significantly in the first half of the twentieth century, Accenture split from its parent firm in 1989; and its history was presented from the perspective of the management consultancy, which did not see its major growth begin until the 1980s and 90s.

The predecessor firms of both KPMG and PwC had seen significant growth of their accounting organizations in the first half of the twentieth century. As communication was much more difficult at that time, both firms reacted to their growth by adopting very decentralized management models. Individual offices had significant autonomy and, magnified by differing legal systems and business cultures, different national practices were virtually autonomous. Accenture, even with its growth in the last quarter of the past century, showed some evidence of this same decentralization and office autonomy.

All three companies were positioned to benefit from the growth in global business ventures following World War II, and a significant portion of their indi-

vidual corporate growths is as a result of their expansions globally to serve their expanding clients. As a response to their individual global expansions, each of these companies determined that presenting a common image and common business model would convey some competitive advantage, and they began to search for ways to accomplish this goal.

This was easiest for Accenture which had always grown through internal expansion and had a central executive leadership with a more clearly defined position of power. However, for KPMG and PwC, both of which were the recent amalgams of powerful equals, the road to a common image and business model was much more difficult. KPMG appears to have had the most difficulty in addressing their leadership's desire for globalization and commonality. In part this may be because KPMG is the only accounting firm in the study, and its progenitors all had established accounting practices who were fierce competitors prior to their merger. Whatever the reason, the executive leadership of KPMG saw their KWorld system as a means to further their goal of globalization and, as has been seen, this clearly worked to the detriment of KWorld as a knowledge management system. PwC is an even more recent merger of former competitors, but in the case of the Management Consulting Services, the subject of the PwC case study, one competitor was dominant in the U.S. with only minimal operations in Europe, while the other was dominant in Europe with only minimal operations in the U.S.. This is not to say that there were not merger difficulties, but they do not appear to be of the same magnitude as seen in KPMG, and the executive leadership did not saddle KnowledgeCurve with the same globalization goal.

Interestingly, while each of the three companies has approached their globalization from somewhat different paths, each company has adopted a rather decentralized, matrix form of organization in their internal operations. The rationale appears to be that the disparate communities of practice that make up a consultancy require a degree of freedom to pursue their own needs. Again, what-

ever the reason, the adoption of this matrix form of organization would seem to be contrary to the clear goals of common image and business model. Here Accenture and PwC appear to have been more successful, but the executive leadership of KPMG is quite clearly committed to developing such an image and business model.

If the effectiveness of a common business model was the rationale for the enlistment of knowledge management in the cause of globalization, I would agree that this was a reasonable solution. I suspect that many of the players in the various organizations would argue that it is effectiveness that is their goal, an ability to provide better services to their clients, but I suspect that image and competitive stature are at least equally as important. As Peter, one of KPMG's National CKOs, said:

> *...what I find too often is that people want to make decisions that really aren't using their knowledge to the greatest leverage... because they're more concerned about how something might look or something trivial about it that's different from somebody else... I think, if you want to globalize, you give up the right to make trivial decisions... you leave to perhaps a central organization who can make them on a bigger basis...*

Of course one person's trivial decision may seem quite important to another, and who is to say that a central organization makes better decisions?

From an organizational perspective, increasing size and globalization, along with the astonishing advances in information technology in the past decade, have been the primary drivers in the development of knowledge management systems. While I do not suggest that the other two paths have not also played important roles in the decisions to develop and deploy these systems, it seems unreasonable to suggest that these organizations would have been willing to take on the massive costs involved in these systems if their increasing size and global needs did not mandate them.

7.1.4 Synopsis of Drivers for Knowledge Management

Each of the three companies studied has spent many millions of dollars and untold effort in developing their knowledge management system. More than the differences between the systems and their implementing policies, it is interesting to me just how similar the systems and their policies are. This similarity may be due to the fact that each of the companies has traveled a similar path on their knowledge management journey. I have detailed three separate paths with three disparate goals for this journey. The goals are:

- The desire to share knowledge;
- The desire to leverage past work or to be more efficient; and,
- The desire to present a common image and business model, hopefully to be more effective in serving clients.

Clearly these disparate goals set up conflicting demands on any system. In my opinion, the response of the three companies has been to focus on the second and third goals to the detriment of the first goal. All three companies have emphasized the codification strategy in implementing their knowledge management systems. Codification, or content management, may lead to greater efficiency in producing new work and it may be more effective in producing a common image, but it does not mean that knowledge is necessarily shared. The fairly common desire of the individual consultants to discuss their problems with other knowledgeable individuals not only states the case for a personalization strategy, but indicates that each of the companies has a further journey ahead if they are to reach the goal of the institutionalization of knowledge management.

7.2 Comparison of the Systems: Knowledge Xchange, KWorld, and KnowledgeCurve

This section provides a brief overview of the technical infrastructures, the systems and their limitations, and the organization's progress towards the institutionalization of knowledge management with each of the three systems. A summary of this section is shown in Table 7.1 below:

Table 7.1: Comparison of Knowledge Management Systems

	Accenture's Knowledge Xchange	KPMG's KWorld	PwC's KnowledgeCurve
Technical Infrastructure			
■ Repositories	Lotus Notes-based	May have a variety of data formats including Lotus Notes and HTML	Lotus Notes-based
■ Front-End	Lotus Notes-based	Web-based using Internet Explorer	Web-based using Internet Explorer
System			
■ Content Management	Yes	Yes	Yes
■ Community Support	Yes	Yes	Yes
■ Group Collaboration	Partial	Yes	Yes
■ Expert Identification & Networking	Minimal	No	No
Institutionalization			
■ Evidence that the Process of Knowledge Management is being Institutionalized	Yes	No, organizational resistance to the system has clearly hampered its adoption	Some, but the system is quite new and more evidence is needed
Infrastructure Problems			
■ System Difficult to Access from Client Sites	Yes	Yes	Not Found
■ System does NOT Provide for Easy Retrieval of Content	Yes	Not Found	Not Found
■ System does NOT Adequately Address a Personalization Strategy	Yes	Not Found	Yes
Data Management Problems			
■ System Content is NOT Perceived as being Current	Yes	Not Found	Yes
■ System Content is NOT Linked to Business Needs	Partial	Not Found	Partial
Organizational Problems			
■ Personnel are NOT Afforded Adequate Time to Make System Contributions	Yes	Not Found	Not Found
■ Personnel Invovled in the Content Review are NOT Perceived as THE Experts in the Content Area	Yes	Not Found	Not Found
■ Personnel are NOT Adequately Trained in the Use of the System	Yes	Yes	Not Found
■ There is Little Provision for a Personal Knowledge Management System	Yes	Not Found	Yes
■ Organizational Resistance	Not Found	Yes	Yes
■ Individual Resistance to Knowledge Sharing	Not Found	Not Found	Yes

7.2.1 Technical Infrastructure Comparison

7.2.1.1 Accenture's Technical Infrastructure

Of the three systems studied, Accenture's Knowledge Xchange is the oldest. The Knowledge Xchange was first developed approximately ten (10) years ago and is based, both in its repositories and its front-end, on an older version of Lotus Notes. Although Accenture has certainly been well served by its Knowledge Xchange, there is a clear perception among many of the Accenture personnel, both users and knowledge management professionals, that Notes is a dated technology. While Notes may be a dated technology it is not without its strengths; foremost among these is its replication ability. Replication is the method by which Notes manages its databases; either on demand or on a schedule old copies of a database are updated to include any changes made to the master copy. This functionality allows users to select databases of interest and to on demand replicate them to their local hard-drives and reduce the amount of time that they need to be on-line; however, to replicate all of the databases of the global systems takes from between twenty-four (24) and seventy-two (72) hours. The weaknesses of Notes are more in the area of user access and search capability; the general perception seems to be that a more Web-like front-end would provide better user functionality in these areas. It seems accepted that the Knowledge Xchange is due for an upgrade to a newer and more Web-like technology. The other two systems are examples of the two most likely paths that this upgrade might take.

As discussed in the case study, Accenture is developing a second knowledge management system with a much more focused audience; this is the Global Markets Portal, and it will be focused on Accenture's senior management. The Global Markets Portal retains Accenture's primary reliance on Lotus Notes for its repositories, but replaces the front-end with Plumtree's Corporate Portal. In this project, Accenture is experimenting with the same product mix that PwC

has utilized in their KnowledgeCurve system. The use of the Plumtree Portal adds a Web-based functionality to the proven data management functionality of Lotus Notes.

However, Accenture has also announced that its long term intent is to focus its development direction on Microsoft products; this could lead the firm in the direction taken by KPMG with its KWorld system. KWorld is Microsoft-based with a reliance on Internet Explorer as the user front-end and Microsoft Exchange for its server management. Similar to the Plumtree Portal, this application combination allows the use of a number of data formats for its repositories. KPMG is currently most reliant on a combination of Lotus Notes and Oracle databases, but others are also used.

It appears clear that Accenture will upgrade its technical infrastructure in the near future and, while it is not at all clear what direction this upgrade will take, it is likely that it will be similar to one of the other two systems studied unless a new and more promising technology is identified. Lotus is also working to improve their product, Notes, as a knowledge management system and its latest version is reputed to include a Web-based browser user front-end and more support for communities and expertise analysis on the server side. Therefore, Accenture has at least three directions to which it might turn should it decide to upgrade the infrastructure of its Knowledge Xchange.

7.2.1.2 KPMG's Technical Infrastructure

Version 2.0 of KPMG's KWorld system was just a couple of months old at the time of my initial interviews with KPMG; in fact, my initial interviews were delayed until after the roll-out of Version 2.0 was completed. Version 2.0 is almost an entirely new product in that it had adopted an Active Server Page (ASP) model of content delivery, whereas the various releases of the Version 1 product had been based on a static Web page model. One of the principal advantages of the ASP model is that any changes to the data repositories are virtually instan-

taneously available globally, avoiding the replication delay seen in a Notes-based system such as that of Accenture or PwC. KPMG had actually experimented some years before with ASP technology, but the technology had failed miserably during an aborted launch and had been abandoned. The return to the ASP model was made possible by improvements in Microsoft's server management software; however, Version 2.0 is not built on the latest Microsoft product, Exchange 2000, and it is anticipated that a future upgrade will include this newer package which is reputed to have superior support for data storage, communities, and collaboration efforts.

KPMG's reliance on the Microsoft software provides benefits, but causes some detriments. On the benefit side, the Microsoft solution is fully Web-enabled and the perception is that this improves user access, especially when the user is accessing the system's content using a narrowband pipe, as well as search capabilities. This will be discussed further in the section, "Limitations to the Systems;" however, there have been some reported access problems with KWorld. On the detriment side, the Microsoft solution does not provide the replication functionality of Lotus Notes, and this is perceived as a significant loss by some in KPMG.

KPMG originally conceived of KWorld as a replacement for its global stable of legacy, or national practice, knowledge management systems. Under this concept, KWorld would have become the single global repository for the knowledge capital of the firm. This would have required the porting of locally held repositories into the single repository; however, there were some significant problems with this concept. In any case, the concept of a single global repository has been abandoned with the re-visioning of KWorld, and now the firm's knowledge repositories will be a mix of the KWorld global repository and the local, or national, repositories. This mixture of data locations may cause some user confusion; however, the combination of KPMG's taxonomy, the "triplet," and its system model should reduce this confusion.

7.2.1.3 PwC's Technical Infrastructure

During my initial interviews with PwC, the firm had just begun to roll-out its first Networks of Excellence interfaces as a part of its KnowledgeView consolidation project. In many ways, I find PwC's technical infrastructure to be superior in its organization, and, in my opinion, it is the KnowledgeView consolidation project that makes it superior. PwC has retained its previous reliance on Lotus Notes for its data repositories; however, unlike Accenture's older data management model that requires the user to have some familiarity with over one hundred commonly used databases, under the KnowledgeView consolidation project, PwC has developed a suite of only nine repositories which are designed around the way that the firm goes to market. The use of this suite of only nine repositories greatly simplifies the user's learning curve in mastering the system.

While this solution seems simple on the surface, it was technically challenging to implement. There are size restrictions on a Notes database, and these restrictions would seem to have made it impossible for an organization the size of PwC to hold its repository suite to only nine. Actually there are many more databases involved in this repository system, but PwC has developed its "Knowledge Pump" solution to, in effect, link these databases into a chain that to the user appears to be one repository. This certainly reduces the complexity that the user faces in either searching or contributing to a repository.

A user can search or do other work within the repositories, thus combining the functionalities of Notes and the Portal, or the user can enter the system through the NoE interfaces. These interfaces are designed to assist the user and will be discussed more in the next section, but the important point is that the user can choose to work either from the repositories or the interfaces.

7.2.1.4 Synopsis of the Technical Infrastructures

The three systems studied present a range of technical solutions; unfortunately, both KPMG's and PwC's solutions are so new that it was difficult to

gather detailed information on their adoption success. However, technology in this area is changing very rapidly; for example, while KPMG's KWorld is quite new, it is built on what Microsoft, KPMG's technology provider, considers to be a dated platform. It is difficult to assess the relative merits of the three technical platforms; all appear to support the current codification strategy reasonably well, although, in my opinion, PwC has adopted a superior organization model for its content storage.

7.2.2 System Comparison

As previously mentioned, each of the three systems is based primarily around a codification strategy. As such, each of these systems functions, in large measure, like a library: patrons use a taxonomy to select documents that may be of interest and then can "check out" those documents. The documents are the artifacts of other individuals' experience and through the documents a user can learn from others' experience.

7.2.2.1 Accenture's System – The Knowledge Xchange

As one might expect from a system that is Notes-based, the Knowledge Xchange presents the user with an extensive set of tools to find and obtain desired documents. The user may issue a one-time request for documents in a specified area with "KX DocFinder" or may design a continuing call for documents in a specified area with "KX Profiler." Similarly, the document selection can be done for the user by any community with which the user affiliates through various community resources. However, the Knowledge Xchange does not provide adequate support for team collaboration or expert identification and networking. Finally, the Knowledge Xchange also provides a limited set of personal knowledge management tools in "Personal Clippings."

7.2.2.2 KPMG's System – KWorld

KPMG's KWorld serves as both a knowledge management system in its own right and as a portal to the various legacy, or national practice, knowledge

management systems. As a stand-alone knowledge management system, KWorld is almost entirely a content management system; however, the overall system also includes "K-Client," which is an external collaboration space. Additionally, within KWorld there is the "Collaboration" tool that takes the user to Microsoft's Net Meeting and provides access to those collaborative tools (*e.g.*, white boards, chat rooms, *etc.*). Finally, through its "Custom View" function, KWorld provides some support for communities; however, there is little support for expertise identification and networking.

7.2.2.3 PwC's System – KnowledgeCurve

KnowledgeCurve provides its user with a selection between three resources: the KnowledgeView repositories, the Networks of Excellence interfaces, and external research sources. If the user selects the KnowledgeView repositories, the experience is like an individual trip to the library; the user can search for and select needed documents. If the user selects the Networks of Excellence interfaces, the experience is like a guided tour, or a visit to a special collections room, of the library; however, the user still will be accessing the same repositories of knowledge. Finally, if the user selects the external research sources, he or she will find access to a number of commercial databases that pertain to information technology and business. Thus, while the interfaces provide support for communities, there is little support for collaboration or expertise identification and networking.

7.2.2.4 Synopsis of the Systems

So beyond the technical issues, and these issues are not that important to the intended users of these systems, all three of the knowledge management systems are quite similar in function. They have been designed to implement a codification strategy, although each of them also gives some service to a personalization strategy. Thus, it seems that these systems are designed to serve the organizational goals of efficiency and the development of a common image and busi-

ness model but, as discussed earlier, the drives for efficiency and a common image are different drivers than the drive for true knowledge sharing, the type of knowledge sharing that would, as Mary at PwC said, reach the goal of "...*hire one, get fifty thousand.*"

7.2.3 Institutionalization within the Organizations

Based on the data available from this study, only Accenture is clearly progressing towards the institutionalization of knowledge management. Quite frankly, the users that were interviewed from KPMG were for the most part too inexperienced, too new to KPMG, to really provide what I consider to be a reliable picture of that organization; however, it is very obvious that the degree of organizational resistance that greeted the very recent deployment of KWorld must have hampered the process of institutionalization. The problem is similar at PwC; again this is a very new system and the number and range of the user respondents reduces the reliability of the evidence that they provided. However, there is evidence of a routine use of the system and this suggests that institutionalization is beginning to take hold at PwC.

7.2.4 Limitations to the Systems

While in a macro sense each of the systems is indeed quite similar, at the micro level there are significant differences. Given the depth of data available, these differences tend to be revealed in limitations perceived in individual systems rather than strengths. I doubt that the limitations revealed in any one system are comprehensive, and I am certain that the fact that a particular limitation was not revealed is not evidence of it not being a limitation of the system. A qualitative study reveals the perceptions of the individuals involved in the study, not the reality of the organizations which they represent. It could be argued that since a qualitative study reveals the respondents perceptions, that the limitations revealed may not be limitations at all. I would agree that a more generalizable study might indicate that some of the limitations revealed in this study are

only seen as such by a minority of the organization but, in this case, the perception of a limitation by a user is a limitation of the system. Each system must be designed in such a manner that it persuades the potential user that use of the system will be beneficial. Thus, perceived limitations tend to reduce the routinization of use of the system within the organization and, therefore, impede the institutionalization of knowledge management within that organization.

Limitations perceived by the users fall into three categories:

- Infrastructure Problems;
- Data Management Problems; and,
- Organizational Problems.

7.2.4.1 Infrastructure Problems

Infrastructure problems are those issues that are inherent to either the technical infrastructure or the system itself. Three infrastructure problems were identified:

- The system can be difficult to access by employees deployed to a client site;
- The system does not provide for easy retrieval of its content; and,
- The system does not adequately address a personalization strategy.

7.2.4.1.1 Access Difficulties

We generally think of the Internet as providing almost instantaneous access to its resources from anywhere in the world. However, this research points out that in two of the three organizations studied, access was reported as remaining a problem. Why is this so? Clearly most of these organizations' line employees are deployed to client sites at any one time, and access is clearly more difficult from many of these sites in comparison to access from a company office. However, there also appears to be some element of the "grass is greener on the other side of the fence" in the varying positions taken by users in the different organizations. Users in Accenture, a firm reliant on Lotus Notes, seem to think

that Web-enabled access would be superior, while users at KPMG, with its Web-based system, also commented on their difficulties in access from client sites. Additionally, I was told by Peter, a National CKO at KPMG, that he believed that a Notes-like replication capability would be useful.

The fact is that technology has still not reached a ubiquitous state of capability that pleases the bulk of these organizations' users. Just as Gerry, an Accenture user, said, "...*I think sometimes at Andersen we get spoiled...*," or Jane, the PwC Global Leader, said, "*We aspire to be able to type in what we want and perfection reappears...*," users at all of these companies want the "instant" access that "may" be possible on their own networks, but is frequently not attainable when they are deployed to client sites. Jane, at PwC, was correct when she said, "*...because how ever we talk about technology, the tools aren't keeping pace with what people aspire to*." While we can certainly expect that technological advances will bring broader "pipes" for Web-enabled access, organizations need to recognize that, as another Jane, this one an Accenture user, said, many of their potential users are willing to "...*abandon using* [their knowledge management system] *because it takes too long*." Clearly the perception of an access problem must be solved, and there are many ways that this might be accomplished.

How can the perception of an access problem be solved? At Accenture there is a goal to provide direct broad-pipe network access for their consultants, at least at their larger engagement sites, and there is still the belief that a well-thought-out replication strategy would reduce the need for much of the current access needs. The idea of reducing the need for access is also being considered at KPMG. Peter, a National CKO at KPMG, spoke of an Ernst & Young idea of carefully managed "Power Packs" that can be replicated; this may be an appropriate solution. A Power Pack is a community managed database that is held to a size consistent with being replicated to users' local hard drives. This database would contain the current "best of the best" information and could be regularly

kept up-to-date through replication, downloading, *etc*. In other cases, the KPMG use of CDs may be the way to go. In any case, the real difference between a downloadable Power Pack and the AssuranceTrak CDs is simply their method of distribution.

7.2.4.1.2 Content Retrieval Difficulties

In addition to the problems of providing access to the system, a knowledge management system must provide its users with a set of tools that provides an easy means of retrieving the elements of the knowledge repositories that they need. Additionally, the repositories must be organized in a manner that simplifies the definition of a search for the users. Several of the users at Accenture complained that it is too difficult to find the needed materials in the Knowledge Xchange, and a PwC user made a similar complaint about their previous system.

7.2.4.1.3 Lack of an Adequate Implementation of a Personalization Strategy

The three organizations studied have clearly devoted the majority of their efforts towards a codification strategy, but a knowledge management system must also facilitate and enhance communication between those with a certain expertise and those needing access to that expertise. In fact, all three organizations have attempted to do this, but it seems to have proved much more difficult than implementing a codification strategy. For the most part, employees of these three organizations have continued to use their own informal networks for a more traditional and individual personalization strategy. However, in a global organization, reliance on these informal networks may not be enough.

Jane, the Accenture user, said:

> *The informal knowledge management process is the good old network, whereby you happen to know… of an individual who's on that project or know of someone who just works in that particular industry, give them a phone call, ask them… I'd say that happens very frequently in our organization. I consider it part of our knowledge management…*

But can a global organization base even part of its knowledge management strategy on its employees just happening to know someone? No formal system will ever replace these informal networks, because they are essential to the firm; but a formal system can extend their reach and be more accurate in connecting with the right people who have the needed expertise.

Additionally, many users find that for some types of knowledge that is needed, reading a document on the subject is not sufficient. Jane, at Accenture, also said:

> *For me… picking up the written word of something is great if you're looking for a format… For the actual application of that, I would say you're 30% there, and I usually have to rely on myself for the other 70%… but I'm one that just thinks it adds so much more when you can have the two-way dialog between people.*

Users in all three companies spoke of their preference to have Jane's "*two-way dialog between people*;" clearly a knowledge management system that facilitated this need would be positively received.

7.2.4.1.4 Synopsis of the Infrastructure Problems

In order for a firm's knowledge resources to be utilized, they must be accessible to the knowledge management system's potential users. Accessibility means both connection to the network and connection to the system's content. While the connection speeds of even a telephone modem are exponentially faster than even the fastest network speeds of just a few years ago, if users perceive the speed to be a hindrance – then it is a problem that needs to be addressed by the knowledge management organization. Many of the user respondents reported that access to their company's network was difficult, for a variety of reasons, when they are deployed to client sites.

Once a user connects to the knowledge management system, they then have to connect to its knowledge content. If the systems are not user-friendly, potential users will not be drawn to use the systems; and many current users

will eventually give up on the system. Again, the issue is the users' perceptions. It does not matter that the knowledge management professionals think that the system is user-friendly; their clients, the users, must believe that the system is user-friendly.

Finally, there are two strategies for managing knowledge: a codification strategy, that is largely about content management, and a personalization strategy, which is concerned with facilitating communication. Some have argued that a firm cannot successfully implement both and must focus on one or the other. However, this does not account for the way that people work, and it certainly does not address probably the major issue that arises from this study. Virtually all of the users that I spoke with would prefer to speak with someone rather than rely on a document from a repository, and the more complicated their problem, the greater their desire to speak to someone. Many of them saw the use of the document from the repository as a preparation to speak to its author. Clearly, communication, the personalization strategy, is important to many users of these knowledge management systems.

All three of the current knowledge management systems have elements intended to facilitate communications (*e.g.*, forums, expert directories, *etc.*); however, it seems that more work is needed in this area.

7.2.4.2 Data Management Problems

Data management problems are those issues that are inherent to the quality of the content held in the system's repositories. Two data management problems were identified:

- The system's content is not perceived as being current; and,
- The system's content is not perceived as being linked to the business needs of the firm.

7.2.4.2.1 Knowledge Must be Current

Once again, this is an issue that addresses the users' perceptions. There is no absolute measure of what is no longer current enough; the content must simply be perceived by the users as being the best and most current content available within the FIRM, not just within the firm's knowledge management system. This is, in large measure, a part of the ongoing housekeeping effort that must be undertaken. In the Accenture case study, it was mentioned that early in its development of the Knowledge Xchange, they realized that it was not enough to gather content – that content needed to be maintained. Users from all of the firms studied said that they only wanted to see current documents.

Clearly, a knowledge management system needs a continual review of the contents of its knowledge base to ensure that the content is still current. Each of the firms studied used "review by" dates to address this problem, but it would appear that the problem, or at least the perception of the problem, still exists in the minds of the users.

7.2.4.2.2 Content Must be Perceived as being Linked to Business Needs

The knowledge management system must be clearly capable of solving business problems such that it is worthy of the concomitant changes in the organization's structure and policies that it will cause. The business problems that the various knowledge management systems were intended to address are those that arise in the progress of an engagement; these systems are not aimed at the internal business problems of these consultancies. Thus, if the knowledge management systems are intended to assist in engagement related business problems, they should be able to assist in the problems that arise in all phases of the engagement lifecycle (beginning, middle, and end).

Certainly, given the significant resources that must be expended to develop and deploy a global knowledge management system, the upper manage-

ment of the firms must believe that there is a "clear link to the business objectives," or as George Shaheen, former CEO of Accenture (then Andersen Consulting), said, "...*we had to do it to keep us, to be competitive. This was a strategic imperative that we had to do...;*" or as KPMG CEO Paul Reilly called their KWorld, "...*the No. 1 priority of the global firm*." (Cone, 1999). However, again it is ultimately the potential users of the system that must be convinced; otherwise as, "...*Peter Lawton, a PricewaterhouseCoopers Principal Consultant, says the implementation of Intranets and Notes databases can easily lead to the 'development of knowledge landfills.' He says knowledge cannot merely be put in databases*." (Wunsche, 2000). If the potential users of these systems are not convinced that the systems have a clear link to their individual problems, then, regardless of the investment made by the firm, the contents of the knowledge repositories will become a "*knowledge landfill*" (Wunsche, 2000).

In the three companies studied, the problem is not that the content is not linked to a business need, it is that the content is primarily linked only to the beginning phase of the engagement process. Many users in all three companies told me that they only used their knowledge management system at the beginning of a project and that it was not very helpful as they became more involved in the project. Surely there are issues that arise in the latter phases of an engagement that a knowledge management system could provide assistance with.

7.2.4.2.3 Synopsis of the Data Management Problems

If the primary strategy driving the implementation of a knowledge management system is codification, then the content of that system must draw, must persuade, users into the use of the system. If users perceive the content to be dated and no longer applicable to their needs, they will abandon the system and seek assistance elsewhere. If users find that the system's content is only useful in the early stages of an engagement, they will seek assistance elsewhere when they have progressed to the middle and latter stages of their engagement. Given

the investment in these knowledge management systems, it would seem that efforts would be made to address both of these issues.

7.2.4.3 Organizational Problems

Organizational problems are those issues that are related to both the policies that govern the development and maintenance of the system and those policies that define the relationship between the knowledge management system and those communities that it is supposed to support. Six organizational problems were identified:

- Personnel are not afforded adequate time to make contributions to the system;
- Personnel involved in the content review process are not understood/perceived by the users of the system to be THE experts in that content area;
- Personnel are not adequately trained in the use of the system;
- There is little provision for a personal knowledge management system;
- The system may face significant organizational resistance; and,
- Some individuals are resistant to knowledge sharing.

7.2.4.3.1 Personnel are NOT Afforded Adequate Time to Make Contributions to the System

Each of these systems depends on the line communities which the system supports to make regular contributions of knowledge to the system. It is these regular contributions that make it possible for the content to be kept current and for the content to represent the “best of the best.” However, in all three organizations the users spoke about how busy they were, and many mentioned that they had something to contribute, but that they had not found the time to do so. Even at Accenture, which shifts much of the responsibility for making contributions to the engagement’s Knowledge Champion, the one Knowledge Champion inter-

viewed said that he was continually pressed for time. The problem appears to be that employees, including the Accenture Knowledge Champion, are expected to find the time to make their contributions around their other responsibilities. It would seem that this indicates that making contributions is not quite as important as those other responsibilities, no matter what might be said about the importance of making contributions. If making these contributions is important to the organization, then the engagement process work plan should include regular periods of review in order that the engagement team members can discover, articulate, and contribute their learnings.

7.2.4.3.2 The Personnel Involved in the Content Review are NOT Perceived by the Users of the System as being THE Experts in the Content Area

In order to provide knowledge of sufficient quality, the firm must first have a way of identifying what is "quality." Each of the three organizations studied relies, at least in part, on Subject Matter Experts (SMEs) from their line, or client-facing, communities for the review of the contents of their knowledge bases. One knowledge management professional at Accenture said that she looked for comments on material by acknowledged experts in that area, but the problem is that she, the knowledge management professional, is actually doing the content review.

When a user in a particular community sees a document vetted by someone of their own community, someone who they recognize as an expert, then that document will be much more readily accepted as an example of quality. Unfortunately, they do not necessarily perceive the knowledge management professionals as having that expertise. Gerry, an Accenture user, said:

> *I know we have a real problem here with the image of some of our staff functions. When you relegate knowledge management to staff functions, and now you're trying to do some of the things we're trying to do with ramping it up and making it much more easy, mak-*

> *ing it Web-based, those sorts of things, you can't do that with the B-team. So I think we've got a ways to go in terms of valuing the people that do that job and valuing the expertise it might take to do that job well.*

This perception may not be fair; the knowledge management professionals involved in a particular content area may have a deep knowledge of that area, but if the user community does not perceive that to be the case – then there is a problem. As harsh as the "*B-team*" comment may seem, this appeared to be a common perception of staff from the line communities.

The use of SMEs, as opposed to knowledge management professionals, lends credibility to the contents of the knowledge base, but the same effect might be accomplished by finding ways to increase the visibility of the knowledge management professionals. Whatever solution is adopted, the users must be convinced that the content of their knowledge management system has been carefully reviewed and represents the best that the company has to offer.

7.2.4.3.3 Personnel are NOT Adequately Trained in the Use of the System

Across all three organizations, there seems to be an assumption that "our personnel are very bright and don't need training in our knowledge management system. Besides, we designed it to be very intuitive." Yet many users have reported that they don't really understand the features of their company's system. Of all of the problems facing an organization in deploying a knowledge management system, it would seem that providing adequate training would be most obvious.

Whether it is new hires, experienced hires being familiarized with the firm's systems, or long-term employees, across all three organizations training does not seem to be being seriously pursued; and many users acknowledge that they do not know how to fully utilize their firm's knowledge management system. Given the investments made in these systems, there seems to be an element

of “penny wise, pound foolish” in not ensuring that users understand how to utilize the system.

7.2.4.3.4 There is Little Provision for a Personal Knowledge Management System

Each of the organizations studied has devoted significant resources to developing their organizational knowledge management system. The rationale for doing so is obvious; the corporate vision statement for Accenture is, “*To be one global firm committed to quality by having the best people with knowledge capital, partnering with the best clients to deliver value*.,” while the mission statement for KPMG is, “*To turn knowledge into value for our clients, our people and our communities*..” Clearly, these organizations formally recognize the importance of their organizational knowledge in providing value to their clients; however, Accenture also says, “...*having the best people with knowledge capital...,*” and KPMG says, “*To turn knowledge into value for... our people....*” It is not enough that these firms capture vast amounts of individual knowledge, store it, and make it available for dissemination; they must also facilitate their employees turning that organizational knowledge back into individual knowledge in order that they may use it for the benefit of clients. The missing piece of these systems is the set of tools to assist in that final piece of knowledge transformation.

In virtually every organization, a user interviewed had a similar story to the one told by Gerry, an Accenture user, “...*I kind of keep, and I know a lot of people that do this, a set of best practices like on my own hard drive....*” Speaking of these personal “stashes” of best deliverables, Peter, one of KPMG’s National CKOs, said, “...*they spend time keeping them current, or maybe they’re not current. Wouldn’t it be nice if they could just rely on the fact that there’s a little stash that relates to what they want somewhere in the system*....” At PwC another user spoke of building his own knowledge repository.

In their study of the U.S. Army's "Center for Army Lessons Learned" or "CALL," Baird *et al.* (1997) recognized that observers on the Center's collection teams did not collect information randomly. They followed the phases of learning framed in Daft and Weick's (1984) three phases:

- Scan – The identification of the elements to be captured;
- Interpret – Synthesizing the newly captured elements with previously held knowledge capital in an effort to make sense of what has been found; and,
- Act – Deploying the new resources and taking action upon them to produce results.

These three phases are shown in Figure 7.1 below:

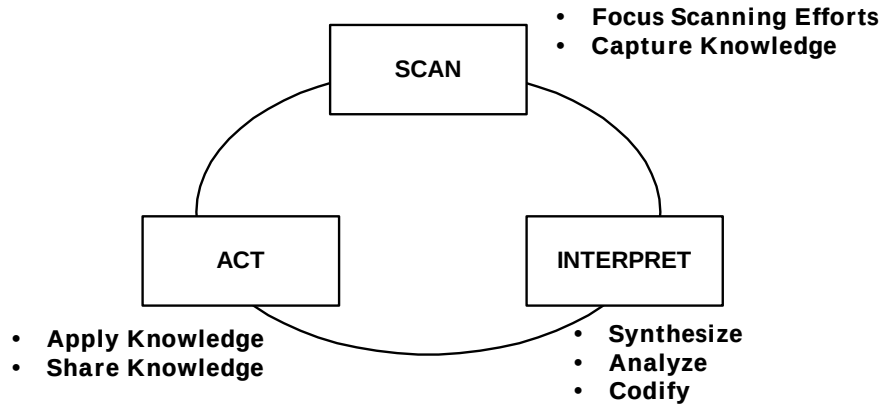

Figure 7.1: Daft and Weick's Phases of Learning

An organization does not act on its knowledge, it is its employees that "act." Therefore, an organization can only truly implement the first two of these phases (scanning and interpretation). Once an organization has scanned (identified those elements of the engagement experience that potentially add value and then captured them) and interpreted (synthesized the newly captured experience with previously captured and interpreted knowledge, analyzed it within the appropriate schema, and codified it) the learnings from the experience, it then can

only disseminate these newly acquired elements of its knowledge capital to its employees.

The process of learning shown on the previous page in Figure 7.1 is also appropriate for individual learning. Therefore, when the organization disseminates its newly acquired knowledge capital, each of its individual employees must go through a similar process of scanning and interpreting before they are individually able to act using this new knowledge. In other words, the organizational process, facilitated by the knowledge management system, takes individual knowledge and converts it into organizational knowledge capital; but, before this organizational knowledge capital can be put into use, it must be reconverted into individual knowledge at the new point of need. The evidence suggests that the provision of a set of tools that could be described as a personal knowledge management system working in conjunction with the organizational system would assist the individual employees in their process of reconverting the organizational knowledge capital back into individual knowledge ready for application at the time of need. The combination of these two knowledge management processes is shown in Figure 7.2 below:

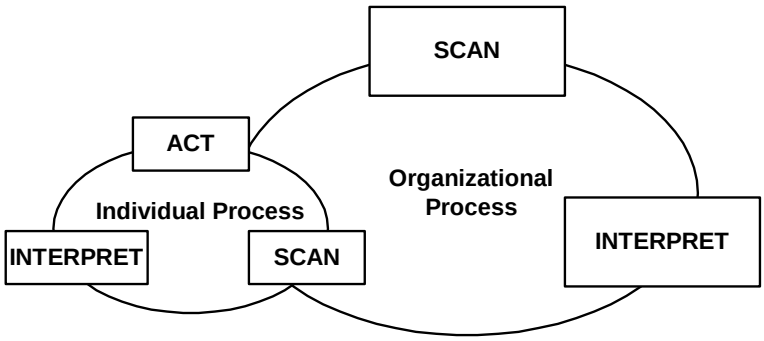

Figure 7.2: Combined Organizational and Personal Learning

As can be seen, “Act” in the “organizational process” has been replaced by the “individual process” because the individual is the intermediary of organizational action. The combination of an organizational system and personal know-

ledge management tools allows the individual to be as selective in identifying and capturing elements of the organizational knowledge capital as the organization is in the same part of the process from the larger body of experience. Thus, individual employees of the organization are assisted in assimilating new knowledge at their own pace.

In one sense, knowledge management in consultancies started when individual employees started keeping copies of what they thought were good deliverables, so that they could leverage that earlier, good work. Modern computer-aided organizational knowledge management systems have advanced that capability, but ultimately it comes down to what does this one individual employee know. Users in the two organizations from which I found examples have recognized the need for their own system beyond what is provided by their firm. How much more effective would those systems be if the firm provided better tools to assist them in this process? I did not find a user example in the third company, but clearly some of their knowledge management professionals have been thinking about the issue.

7.2.4.3.5 Management of Organizational Resistance

The implementation of a knowledge management system may challenge some of the individual interpretive schemes and/or group norms within the organization and may cause some level of organizational resistance (sanction). Organizational resistance can take many forms: it can be an attempt to kill the program entirely, it can be an attempt to starve the system of resources, or it can be an attempt to simply marginalize the system. However, all organizational resistance is not bad; sometimes the resistance comes from an identification of shortcomings in the system that should be addressed. Therefore, the managers of the knowledge management system must realize that the term “organizational resistance” should not always be used in a pejorative sense – the reasons for the resistance must be carefully considered in each individual case.

Clearly, the best example of organizational resistance to a knowledge management system is found in the KPMG case study. As discussed in the chapter describing the KPMG case study, their knowledge management system, KWorld, was seen as a vehicle for three very significant, and different, goals:

1. To be the catalyst for globalizing what still remained a "federation of national practices;"
2. To spin-off a go-to-market product; and,
3. To be the global firm's online messaging, collaboration, and knowledge sharing tool.

Just in the past few months, KPMG's International Board was presented with the proposal to spin-off the go-to-market product, "Cering." The Board voted not to accept this proposal and it is now dead. Additionally, the Board apparently decided that globalization was too ambitious a goal for KWorld and has directed a reduced emphasis on that goal. This was a very significant re-visioning of KWorld, and it caused some degree of turmoil in the firm's knowledge management organization. Why did it happen? Was the organizational resistance in the firm not properly managed?

KWorld was imposed in very much of a "top-down" manner, with little regard for the desires of the national practices that it would serve. In fact, those national practices with functioning knowledge management systems were, at one time, expected to shut their systems down and port their content into KWorld. Speaking of the functioning systems of the national practices, Sandy, one of KPMG's knowledge management professionals, said:

> *First, it will amuse you, I'm sure, if I point out that the name of that site is UK-Now, not U-Know. I don't think there are more than a few people around here that realize that, and this is a subtle observation on perspective, global applications... They're provincial, why would I bother to learn how to pronounce their Web site name properly? Good heavens, we're going to subsume them anyway. We're upwind, we've got our sails trimmed and the poor things are dead in the water. All we're really doing, now that we've taxed them to death, is*

> *waiting for their own people to wake up and realize they're paying twice, cut off their funding, and then we'll go ahead, pick their pockets of all the beautiful content that they've got, shit-can the rest, and be off to the races. Conquest! Onward!*

This expresses a unique attitude towards the clients that one is to serve.

The other two firms have found that deploying a global knowledge management system is challenging enough without setting up other major goals. This is not to say that globalization is not a desire of all three firms. However, apparently some of the executive leadership at KPMG failed to recognize what virtually all of the knowledge management professionals understood and Mitch stated, "*They've got their own legacy systems that… they were happy with before KWorld came along*." Bill, another knowledge management professional, summed it up with, "...*but the realization was maybe we tried to go too far too fast and perhaps pissing people off along the way, people that had pretty nice legacy systems*…," and, because of this, the organization's resistors won.

7.2.4.3.6 Individual Resistance to Knowledge Sharing

The examples discussed in the above section are forms of a top-down resistance, in many ways a simpler form of resistance to manage as one can oftentimes see where it is coming from. However, as in the other two firms, at PwC there are individuals who, as Giselle said, are "...*not going to participate in knowledge management, they don't believe in it, they think it's a waste of time, a waste of money, a waste of energy*...." Ultimately, this may be the most serious type of organizational resistance; this is the resistance that impedes long-term the institutionalization within the organization. Again, all of the firms face this type of resistance; it was seen to a degree in the user comments from all three case studies.

How does a company manage these types of resistance? By constantly "selling" the process of knowledge management, or as Rebecca, a senior knowledge manager at PwC, said, "*I don't want to say sell the knowledge management*

program, but to make it clear to people what it was we were trying to accomplish...." But in making it clear what the knowledge management system is trying to accomplish, she is "selling" the system. In this case, the selling is in addressing the concerns of the skeptics and showing them how the system can benefit them – this is an appropriate managerial response to organizational resistance.

7.2.4.3.7 Synopsis of the Organizational Problems

As can be seen, the majority of these organizational problems are not so much involved with the knowledge management system as they are involved with some degree of resistance to the needs of that system. In the case of at least two of the companies studied, Accenture and PwC, the line community was apparently willing to accept the cost of developing and deploying a knowledge management system and has accepted that the resulting system provides some value[10]; however, they appear to have been resistant to making the changes in their procedures to enable their consultants to meet the needs of the knowledge management system. These needs are important to the continued value of the systems and the changes (*i.e.*, time to make contributions, time to review the content, and time to go to training) needed would have significant impact on the line community where time is possibly their second most important resource (knowledge being the first). However, there are examples of other companies that have recognized that "...*whatever a man sows, that he will also reap*" (Galatians 6:7). Possibly the best example is "3M" where in order to foster innovation, their core competence, employees have the option of directing themselves for fifteen percent (15%) of their time. During this time, they can work on projects of their own choosing, their own design, without management approval. Yet 3M is

[10] At KPMG the cost of developing and deploying KWorld was also accepted by the line community. The question is whether the line community ever gave the system a chance to prove its value as was apparently done in the other two companies.

world famous for its innovative products and has been spectacularly successful (Coyne, 2001).

Another type of resistance is more open; there are clear examples of the need to manage organizational resistance in all three of these case studies, but one only has to look at the KPMG case study to realize how truly critical this factor really is. KWorld is an elegant solution; however, systems are rarely successfully imposed "top-down." Now that the knowledge management organization at KPMG has a clear mandate to support the knowledge sharing function throughout their global organization, I suspect that future resistance will be met in a different, and more positive, manner.

Again, it is also important to recognize that organizational resistance is not always a negative. If the resistance exists for good reason, then its appropriate "management" is to address the problem – be it a perception that the knowledge in the knowledge base is dated, or that Lotus Notes is "*clunky*," or an unwillingness to give up extremely valuable "legacy" systems. Sometimes the users' perceptions are true and must be accorded the respect, and response, that they deserve.

Finally there is the individual resistance to knowledge sharing. This is a very real issue and, while it is not the focus of this study, other authors have written extensively on this subject. It is, however, another form of resistance that must be addressed and managed.

7.3 Synopsis of the Cross-Case Comparison

A cross-case analysis covering four major categories:

- Drivers for knowledge management;
- Comparison of the systems;
- Institutionalization with the organizations; and,
- Limitations to the systems;

has been conducted and a summary of my findings can be seen in **Error! Reference source not found.** on page **Error! Bookmark not defined.**. As has been seen, the three companies studied have followed similar paths on their journeys towards knowledge management and have developed remarkably similar systems, but have had even more remarkably different results. The limitations analysis provides my understanding of the reasons for both these different results and why none of the companies can be said to have fully institutionalized the process of knowledge management within their organizations.

The limitations section becomes similar to a critical success factor analysis of the development and deployment of a knowledge management system. This was an unstated objective of this study in that many of the *a priori* propositions were derived from critical success factor analysis of earlier information system implementations. The *a priori* research propositions that were defined for this study were:

1. There must be a “committed champion” who is willing and able to support the KMS.
2. There must be “appropriate resources” available to the technical infrastructure of the KMS.
3. The knowledge stored within the KMS must show a “clear link to the business objectives” of the organization.
4. The KMS must be managed in such a way as to overcome “organizational resistance.”

5a. The technical infrastructure of the KMS must provide appropriate “management of data.”

5b. The technical infrastructure of the KMS must provide for knowledge of sufficient “information quality.”

6a. Efforts to capture knowledge must be “timely.”

6b. Provision should be made to assist in the "process of making tacit knowledge explicit."

7. A system for "focusing limited resources" on the most probable productive sources is required.

8a. Provision should be made for a "dedicated organization" for knowledge management.

8b. Provision should be made for a series of "reviews" of the input, interpreting it in terms of the previously accumulated knowledge.

8c. Provision should be made for "comprehensive cataloguing and retrieval."

The three case studies and the concluding cross-case analysis provide strong qualitative evidence of the viability of these *a priori* propositions; however, to say that a firm has a problem with the management of its data (Propositions 5 a and b) is too broad to be of assistance in correcting the problem. I found that refinements to this broad categorization emerged. These refinements are now stated as a set of related propositions:

5a. The infrastructure of the KMS must provide for knowledge of sufficient "knowledge quality" (actually 5b of the *a priori* propositions).

5b. The infrastructure of the KMS must provide for knowledge presented in a "concise manner".

5c. The infrastructure of the KMS must provide for knowledge of a "timely nature".

5d. The infrastructure of the KMS must provide for knowledge from both "internal and external sources".

Finally, had I been confident of my ability to develop a comprehensive set of propositions *a priori*, the study just completed would not have been necessary. However, as discussed in Chapter 3 of this dissertation, I believed that more understanding of the development and operation of knowledge management sys-

tems was necessary prior to developing a more "predictive" set of research objectives.

Chapter 3 also discussed the role that the qualitative analytical software package, NVivo, played in this research. Again, the software package did not direct the analysis; it merely assisted by enhancing my ability to analyze my data – approximately one thousand pages of interview transcripts. Moreover, it was from my analysis of this data, using NVivo, that a number of new themes, or refinement to existing themes, were constructed.

As I did with the *a priori* themes that I identified, I have restated these emergent themes as a set of propositions to be added to the *a priori* propositions already developed. The emergent propositions are:

9a. The infrastructure of the KMS must provide for "efficient access" to the resources stored in its repositories.

9b. The infrastructure of the KMS must provide for "ease of retrieval" of the resources stored in its repositories.

10. Potential users of the KMS must receive "adequate training" in the functioning and use of the KMS.

11. The infrastructure of the KMS must support the development of a "personal knowledge management system."

12a. The infrastructure of the KMS must facilitate and enhance "communication" between those with a certain expertise and those needing access to that expertise.

12b. The infrastructure of the KMS must support the formation and vitality of "communities of practice/interest" within the organization.

Again, the rationale for the viability each of these propositions (*a priori*, refined, or emergent) is clearly evident in the case studies and the concluding cross-case analysis of this dissertation. The ultimate goal of the research discussed in this dissertation is to develop from these propositions, a set of testable

hypotheses that can be acted upon in the next phase of this study. These hypotheses will be presented in the following, and final, chapter of this dissertation – Chapter 8.

Chapter 8: Conclusions and Hypotheses

8.1 Summary of the Research

I developed three (3) research objectives as a preliminary step in my study design. These research objectives were:

1. To describe the structure and policies governing the development and use of computer-aided knowledge management systems within the organizations selected for analysis;
2. To describe how these structures and policies contribute to the institutionalization of knowledge management within the overall organization; and,
3. To refine a series of research propositions and then to develop these propositions into hypotheses that can be empirically tested at a later stage in the body of research that this study was to begin.

The first two of these objectives lay the foundation for the goal expressed by the third objective, that of refining a series of research propositions and then developing those propositions into testable hypotheses that can be empirically tested at a later stage in the body of research.

In order to accomplish these objectives I conducted extensive interviews with knowledge management professionals, users, and senior executives of three global professional service organizations (Accenture, KPMG, and PwC). In all, a total of fifty-six (56) interviews with fifty-five (55) different individuals were conducted (a further break-down of these interviews can be found in "Table 3.2: Data Collected for the Study" on page 61 of this dissertation). These interviews were transcribed and then analyzed under the protocol for constant comparative analysis. The results of each of the individual case studies were then written up

in Chapters 4, 5, and 6 of this dissertation. Then the findings of my analysis were concluded in the cross-case analysis presented in Chapter 7.

As I said in the previous chapter, had I been able to develop a comprehensive set of propositions *a priori*, the study just completed would not have been necessary. However, again as previously discussed, I believed that more understanding of the development and operation of knowledge management systems was necessary prior to developing a more "predictive" set of research objectives, in other words, the testable hypotheses that will be presented later in this chapter. I am now confident that this was the correct approach to be taken in this research as my *a priori* propositions were significantly refined and expanded as presented in the conclusion of Chapter 7.

8.2 Key Findings of the Research

8.2.1 The Knowledge Management Debate

In the "Statement of the Problem" in the "Introduction" chapter of this dissertation, I discussed the debate that is raging around the topic of knowledge management today. Some see knowledge management systems as simply a "sub-set" of information management and *"...suspect that nothing more substantial than 'terminological inflation' is taking place..."* (Davenport, 1999), while others see them as the natural evolution of the earlier information management systems, but an evolution that is reaching a higher plane and that is more or less clearly delineated from their information management systems forebears.

Based on my study I now conclude that if the development of knowledge management systems is restricted to, or even largely restricted to, the development of systems intended to implement Hansen *et al.'s* (1999) codification strategy, then these systems would simply be a sub-set of well-established information technologies. At its core the implementation of the codification strategy results in a simple content management system. While the idea of such a system is both well-established and simple, as always "the devil is in the details" and the

devilish details of this type of system are in its classification taxonomy – a set of details that the three companies studied are still struggling to completely address. However, classification taxonomies are hardly new; library science practitioners have been struggling with them for many years.

However, if the development of these systems is expanded to include the development of systems intended to fully implement Hansen *et al.'s* (1999) personalization strategy, then this study suggest that these systems should be seen as a natural evolution that is reaching a higher plane and that is more or less clearly delineated from their information management systems forebears. In a sense one of the goals of information technology has always been to replicate the way that the human mind works, but this goal has never been fully attained because of the almost infinite complexity of the human mind. An implementation of Hansen *et al.'s* (1999) personalization strategy would surely involve some form of expertise mapping over a global organization, and I consider this to be an evolutionary advance to a higher plane of information technological capability.

It must be noted that none of the three companies that I studied have even come close to achieving this type of system. It is not that they are not aware of the need; their users are virtually screaming for it. The current problem is that none of these companies know how to achieve such a system. They are all experimenting with various applications that "promise" such functionality[11], but, to date, none have implemented such an application. Given the organizational difficulties that the companies are experiencing with supporting their content management systems, I suspect that there will be significant organizational resistance to a significant expertise mapping application.

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[11] For example, each of these organizations has experimented with Tacit Knowledge System's (Palo Alto, CA) Expertise Automation products; but none of the organizations have, at least currently, adopted the package in part because of a fear that it will be perceived as a "Big Brother" presence.

8.2.2 Process versus Technology

The knowledge managers of these organizations "want" to believe that there is a technology either out there, or on the horizon, that will enable them to deploy a successful system; success in the terms of this study would be to enable them to institutionalize knowledge management in their organization. However, they "know" that knowledge management is much more about process than technology.

In analyzing the factors that appeared to be limiting the full adoption and institutionalization of the various systems, I found that these factors could be grouped into three major categories:

- Infrastructure problems;
- Data management problems; and,
- Organizational problems.

But, by far, it appears that the most difficult problems for these organizations to solve are their organizational problems[12]. In fact, most of the infrastructure and data management problems are directly related to the organizational problems. Users would probably find it easier to retrieve their desired content from the system if they were fully trained in the system's use. The perception of the content not being current would probably be reduced if all users had sufficient time allotted to make contributions to the system and if the subject matter experts had sufficient time allotted to make regular and comprehensive reviews of the repository content. Finally, there would probably be quality content linked to all phases of the engagement process if, again, more time was allotted to contribution and review. Thus, solutions to their organizational problems would probably

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[12] This is, of course, based on their current efforts to implement the codification strategy. An attempt to implement the personalization strategy would undoubtedly run into many significant technological problems, but even here I suspect that the organizational problems would eventually prove more difficult.

see an immediate reduction in their infrastructure and data management problems.

Thus it appears that it is the organizational issues related to the overall process of running a knowledge management system that are causing the most difficulties for the knowledge management organizations, and these are process issues. Progress is being made. Accenture's knowledge management organization appears to be moving from being perceived entirely as a staff function to being more closely associated with the line organization, and that may assist in the solution of some of its organizational problems. But the process changes needed to the structure of the organization, its policies and methods of doing its work, are demanding, and changes may be slow in coming. This issue will be more fully addressed in the coming section on institutionalization. However, it is quite clear that, as stated at the beginning of this dissertation, technology is only a small piece of the knowledge management "pie" and that the process issues (those involving the organization's structure and its people) represent the majority of that pie.

8.2.3 The Human Metaphor for a Knowledge Management System

In an effort to make sense of the structure of an organizational knowledge management system, I proposed the use of the human memory system as a metaphor for the organizational system. I anticipated that both the human and the organizational systems would be faced with limited resources and more potential inputs than could possibly be addressed within those resource constraints. However, the most important similarity seemed to be that both systems would have the same goal – that of making an individual better able to make sense of and react to his or her environment. Thus, it seemed to me that the use of this metaphor would aid in understanding the operation of a system.

For me the use of the metaphor was quite useful; others may find it less so. However, the true importance of the metaphor derives from the fact that it is

a constant reminder of the fact that both the human and organizational systems do share the same goal and that is what the organizational system must be focused on. It seemed that there was a tendency in the three organizations studied to focus on the knowledge repositories themselves rather than the reconversion of these resources back into knowledge held by a new set of individuals and available to be applied to a problem at hand.

8.2.4 Institutionalization or a Successful System

The goal of almost any organizational information system is the more effective and profitable operation of the organization implementing the system, and this is equally true in the implementation of an organizational knowledge management system. Unfortunately, this goal is exceedingly difficult to measure; however, following the lead of Orlikowski and Robey (Orlikowski, 1992; Orlikowski and Robey, 1991), I wished to begin to investigate whether the institutionalization of the system is a good surrogate for its actual goal. Therefore, institutionalization, which is described within the framework of the Theory of Structuration, has been used as a surrogate for a successful implementation in this study. The three structures from Giddens' (1976; 1979; 1982; 1984; 1993) work then define institutionalization. These are:

- The Structure of Signification;
- The Structure of Domination; and,
- The Structure of Legitimation.

This section continues this discussion, now across the three cases, of how the structure and policies governing the development and use of the computer-aided knowledge management systems described in Chapters 4, 5, and 6 have contributed to the institutionalization, or lack thereof, of the process of knowledge management in each of the three organizations studied.

8.2.4.1 The Structure of Signification

The modalities of structuration provide lines of mediation between *"structure"* and *"interaction*." The modality of interpretive schemes provides this mediation for the structure of signification. "Interpretive schemes" are communal properties of the human actors (Bryant and Jary, 1991). These schemes are the commonly held bodies of knowledge that allow communication and understanding between individuals. This common, or background, knowledge is normally taken for granted and is rarely articulated, but it is the knowledge that the actors use to interpret meaning, behavior, *etc.* However, this taken-for-granted knowledge is never fully accepted and, in certain circumstances, some element of it may have to be defended by one or more of the actors involved. Thus, this knowledge is not an absolute; rather it is continually being reproduced as a part of the interactions between the human actors (Giddens, 1993).

Three sets of responses are presented below to illustrate the range of possibilities for both the acceptance of knowledge management within a firm and the changing of interpretive schemes within an organization. The individual responses are not meant to be representative of the respondent's organization, but each is believed to be representative of a type of employee found in each organization.

8.2.4.1.1 Routinization, or the Changing of Interpretive Schemes

When I asked one user, Jane, about her understanding of knowledge management at Accenture, she replied, "*When you say knowledge management system, are you taking into account our formal and informal structures, or, and are you talking about just our Knowledge Xchange or more past that?*" Clearly, she was already seeing beyond the "system" to the "process." I found similar responses from several other Accenture employees, so it would seem that the process of managing knowledge is becoming a part of the way Accenture employees approach their work.

Talking about how knowledge management affected her work, the same user said:

> *There was at the beginning a team of executives that got together and said 'We need to build up our knowledge capital specifically for SAP because we need to differentiate ourselves with that knowledge capital', and that tool kit that I talked about was a key differentiator in our selling of SAP projects, and it was a very intentional process to determine what kind of knowledge capital we wanted out there, targeting key clients to have the opportunity to build that knowledge capital and then use those specific clients and capital to go out and sell other places, so they came up with specific databases, specific tool kits, specific packages, white papers explaining how to use all of the knowledge capital that we've created. It was a very intentional effort, and the difference between when I first started, I was on the very first large-scale SAP implementation that we did, through now, it's amazing how almost rote it's become because of the number of best practices that you can choose from…*

So a process that was developed from a deliberate effort to build up knowledge capital has now become "*almost rote*" in the firm. In becoming rote, the knowledge has become a part of the commonly held bodies of knowledge that allow communication and understanding between individuals.

8.2.4.1.2 The Knowledge Management System = Knowledge Landfill

When I asked Anna, a KPMG user, about knowledge management, she replied, "*A new term, because I haven't heard that here*." This user, I am afraid, unfortunately represents many users in all three firms, although she is possibly a little more honest than most would be. For this type of user, the knowledge held in an organization's knowledge base has become simply a "*knowledge landfill*" (Wunsche, 2000) because its resources cannot be incorporated into her ways of approaching work if she doesn't know that the resources exist.

8.2.4.1.3 The Change to Knowledge "Sharing" is Power

Pat, a user at PwC, spoke of the old paradigm, "*I think that there are certain people that believe knowledge is power and if I've got this knowledge, then they need me*," but then he said, "*I've got enough confidence in my abilities, I'm*

going to hit a project regardless, and the fact I have knowledge in that doesn't mean that I can't share it." This is the real problem for the institutionalization of knowledge management in organizations; how do you shift people from the old paradigm of "Knowledge is Power" to the new one of "Knowledge Sharing is Power?" This is particularly difficult when there are "certain people" who are obviously opposed to the shift.

8.2.4.1.4 Synopsis of the Structure of Signification

As stated previously, interpretive schemes are the commonly held bodies of knowledge that allow communication and understanding between individuals. This common, or background, knowledge is normally taken for granted and is rarely articulated, but it is the knowledge that the actors use to interpret meaning, behavior, *etc.* But interpretive schemes are quite clearly the sole property of the individual possessing them. They are commonly held to the extent that in order to be understood, or to understand, actions and communications within a group, there needs to be a similarity of understanding.

All individuals within a particular group, institution, society, *etc*. share this similarity of understanding to some degree. In other words, all individuals understand a great deal about the conditions and consequences of what they do in their day-to-day lives within their particular group, institution, society, *etc*. Such knowledge is not wholly propositional in character, nor is it incidental to their activities. Understanding embedded in practical consciousness exhibits an extraordinary complexity – a complexity that often remains completely unexplored, especially by those who have adopted the philosophical stance of viewing technology as an objective, external force that would have an impact on things such as organizational structure.

However, the utility of structuration theory in this research lies in that it allows for consideration of both viewing the knowledge management system as an objective, external force as seen in the critical success factor variables, and in

adopting a more subjective view of the strategic choice and social action being taken by the individuals who are interacting with and determining the knowledge management system's impact on their day-to-day lives.

As the interviews show, Giddens' actors, the respondents in my case studies, can, in general, describe what they do and their reasons for doing it. For some of these users, their corporate system is simply a "knowledge landfill," its contents untouched and having no impact on the method by which they approach their work. Other users are beginning to see the advantages of such a system and, although there is still some motivation not to share and use others' knowledge, these users are beginning to adopt the system. In the case of both KPMG and PwC, the current study does not provide enough detail to determine the phase of adoption the company is in. Typically it is during either Rodgers' (1962) "Innovator" or "Initiator" phases that brave individuals are willing to adopt a system in the face of peer pressure against adoption. Finally there are other users who have experienced the benefits of the system and are beginning to routinize its use. However, for the most part these descriptions are geared to the flow of day-to-day conduct, not the deeper issues of strategic choice or social action.

These issues are normally only addressed when the individual's actions are puzzling – if it appears either to flout convention or to depart from the habitual modes of conduct of a particular group. In the case of this research, the puzzling action might be "Why did you not utilize the knowledge management system provided?" Or it might also be "Why did you decide to utilize the knowledge management system when your peers were opposed to its use?" From an objective perspective, we would expect them to use the system, unless it was technologically flawed, because their firm provided it for their use. However, as we have seen, the reasons are many, ranging from Anna's "*A new term, because I haven't heard that here*" to the various technical complaints seen in the analysis

of the critical success factor variables to some people possibly not having "enough confidence" to act differently from what "certain people" think is appropriate.

Whatever the reason, it is these individuals' "interpretive schemes" that are, in many cases, driving their decision to engage in what might be seen as puzzling behavior. Unfortunately, the problem is that their failure to utilize the facilities may not be seen as "puzzling" within the group that they are involved with in their day-to-day work life. In such a case, the process of knowledge management, at least that process as represented by the firm's knowledge management system, has not yet become institutionalized within that particular group within the overall organization. In order for the organization to achieve an institutionalization of their process of knowledge management, it must in some manner persuade the individuals that make up the organization to modify their interpretive schemes to include the use of the organization's knowledge capital resources in their day-to-day work.

Therefore, a study of the users' day-to-day work life is integral to an analysis of institutionalized practices, or those practices that the organization hopes to see institutionalized. It is in their day-to-day work lives that we see the "physical" evidence of their interpretive schemes. The day-to-day work life of at least most individuals has a repetitive character – the "*almost rote*" nature of SAP implementations at Accenture due to their investment in developing their knowledge capital around this area.

Routine, which is psychologically linked to the minimizing of unconscious sources of anxiety, is the predominant form of day-to-day social activity. In routinizing an activity, we no longer have to directly consider whether this is the appropriate action to be taken at this time. Most of our daily practices are not directly motivated because of our use of routine in addressing those daily practices. If the use of the firm's knowledge capital resources became routinized, or institutionalized, then the individuals' interpretive schemes must have been

changed as regards that issue. This change is demonstrated by the fact that the decision of whether or not to use these resources would no longer be up for active consideration; their use would simply be expected by the individual. Routinized practices are the prime expression of the duality of structure in respect to the continuity of social life. The reenactment of a routinized practice is molded by previous actions and has become structural in nature, but its current reenactment tends to reinforce in future use and is reinforcing the current structure. In the enactment of routines, individuals sustain a sense of ontological security.

8.2.4.2 The Structure of Domination

The modality of facilities provides the mediation for the structure of domination. "Facilities," or both the material and non-material resources of the organization, are properties of the institutions rather than of the actors (Bryant and Jary, 1991). These facilities are the institutional means through which *"...intentions are realized, goals are accomplished, and power is exercised..."* (Orlikowski and Robey, 1991). Thus, it is the application of these facilities by the actors that allow them (the actors) to achieve specific outcomes (Thompson, 1989).

8.2.4.2.1 Facilities that are Unimportant to the User

For example, when I asked Shirley, an Accenture employee who had approximately three years experience with the company, about her use of the Knowledge Xchange, she said, "*Actually I have never had an occasion to use the Knowledge Xchange on a client, and I was on the main line consulting...*". Obviously, from her perspective the facilities provided in the Knowledge Xchange were not necessary to accomplish her goals, and this particular exercise of power by her organization was ineffectual. One of the reasons for this type of attitude may be found in Jane's, another user, comments.

> *I still have a question about our quality management. I would have, rather than people who are, I'm trying to think how the nice way to say this is, we don't put our best and brightest and our experts on monitoring the Knowledge Xchange... I know we have a real prob-*

> *lem here with the image of some of our staff functions. When you relegate knowledge management to staff functions, and now you're trying to do some of the things we're trying to do... you can't do that with the B-team. So I think we've got a ways to go in terms of valuing the people that do that job and valuing the expertise it might take to do that job well.*

The perception of the firm's knowledge management professionals as the "*B-team*," may or may not be correct (although it certainly did not seem to be correct in my experience), but that is immaterial because it is her belief, her "interpretive scheme." The fact that the more junior analyst did not use the Knowledge Xchange is a somewhat different issue. During the time that this junior analyst was on an engagement, Accenture had not yet issued its analysts notebook computers (they have done so now), so it would have been physically difficult for her to have utilized the firm's knowledge repositories; however, the failure of those supervising her to see that she was aware of, and had access to, these repositories may be an indication of a similar set of "interpretive schemes" on their part to those of the more senior user expressed above. Whatever the case, both are a clear indication of the limitations upon the organization in exercising its power of "facilities." More prosaically, these are examples of "you can lead a horse to water, but you can't make it drink."

8.2.4.2.2 Facilities that are Important to the User

Alternatively, the resources on KWorld are important to at least some of the users in Canada. Cheryl, a Canadian KPMG knowledge management professional, said:

> *The driver for Canada, and they've been closely linked with the US and they're always matching initiatives, is that we can leverage from each other, so the Canadian tax people clearly can leverage from US tax people, their money, their tools, their people, because there are so many more and the practice is bigger in the US than it is in Canada, so there's a lot of leverage there, and we are also becoming regionalized so we're working towards becoming the Americas, so there is a driver there.*

Here we see the exercise of the power of "facilities," when the users see the benefit of the facilities to themselves, the getting of more "bang for the buck," then the provided facilities have the opportunity to persuade the users to continue their use. While the globalization objective of KWorld may have led to its revisioning, in the example above, communities within the Canadian national practice that had not been strong proponents of KPMG Canada's legacy system were "brought into the fold" of KWorld by its ability to provide tools that were previously unavailable to them.

8.2.4.2.3 Inappropriate Provision of Facilities

Access problems are a problem in all of the organizations. As one user at PwC, Bill, put it, "*...part of that problem stems from the way we do work. When we go out to a client site, we're not necessarily, and typically aren't, connected to our internal system...*". In order for the organization to exercise power from the provision of facilities, then at a minimum those facilities must be available. Here is an example, and an example that was repeated several times in each of the three organizations, of how the objectivist view of technology as expressed through one of the critical success factor variables is clearly defeating the objective of the firm in the deployment of its knowledge management system.

8.2.4.2.4 Synopsis of the Structure of Domination

Many of the issues discussed in the critical success factor propositions reappear as objective properties in the modality of facilities. When the critical success factor propositions are perceived as being well met, that user may be strongly drawn to the use of the particular knowledge management system, or there may be other elements of individuals' interpretive schemes that still stifle their acceptance of the firm's knowledge management system. But clearly if the user perceives that these objective propositions are not being appropriately met, then the knowledge management system has little impact on how they do their job. The provision of these facilities is typically seen as an exercise of the organi-

zation's power, but it is really more an exercise of the organizations' efforts to persuade in the case of the consultancies.

The examples in this section demonstrate both the way in which the modality of facilities is supposed to work (by providing resources that are valued by the users and that persuade the users to give the system a chance) and the limitations of that modality (by either providing resources that the users do not value or by providing them in a manner that makes it too difficult for the user to access the resources). While there are clearly limitations to an organization's exercise of power, and perhaps more than most in consultancies where their knowledge workers can easily go elsewhere, the study of power cannot be regarded as a second-order consideration in the study of the development and deployment of knowledge management systems. Power cannot be tacked on, as it were, after the more basic concepts of the study have been formulated. There is simply no more elemental concept within organizations than that of power. Moreover, power is one of several primary concepts of social science, all clustered around the relations of action and structure. Power is the means of getting things done and, as such, directly implied in human action. It is a mistake to treat power as inherently divisive, but there is no doubt that some of the most bitter conflicts in organizational life are accurately seen as "power struggles." Such struggles can be regarded as to do with efforts to subdivide resources which yield modalities of control within the organizations. By "control" I mean the capability that some individuals, groups, or types of individuals have of influencing the circumstances of action of others. In power struggles the dialectic of control always operates, although what use individuals in subordinate positions choose to make of the resources available to them differs very substantially between different organizations. As we have seen in the three case studies, individuals in these organizations seem to have considerable ability to fail to avail themselves of the provided resources and apparently to suffer no consequences.

8.2.4.3 The Structure of Legitimation

The modality of norms provides the mediation for the structure of legitimation; moreover, the structure of legitimation, through its modality of norms, seems to provide an interface between the structure of domination, clearly an institutionally controlled property, and the structure of signification, which is just as clearly an actor controlled property. This is because “norms” are the properties of both the institutions and the actors, although institutional and actor norms do not have to be congruent. Institutional norms are the rules of the institutions that are used in the evaluation of the conduct of the actors (Bryant and Jary, 1991). Actor, or informal, norms are the rules of the actors that are used in the evaluation of the conduct of either the institution or of other actors. Norms, both institutional and actor, provide a commonly held sense of what is proper or appropriate and what is not, although within the same organization, particularly if it is a large one, there may be groups of individuals with differing commonly held senses of what is proper and appropriate on a particular issue. This leads to the possibility of there being different, and opposing, norms as regards an issue between the institutional norm, which is determined by the leadership of the organization, on the one hand, and one or more sets of actor, or informal, norms on the other. As with interpretive schemes, these norms are not an absolute; rather they are continually being reproduced as a part of the interactions between the human actors. Therefore, the norms of one side, either institutional or actor, can eventually be changed through the interplay of the three structures (Giddens, 1993). This appears to argue that there is a strong relationship between individual interpretive schemes and the commonly held sense of what is appropriate within a group of actors that make up a norm. Within the group that has formed a commonly held sense on an issue, a norm, each of those individual actors will share a similar individual interpretive scheme on that issue. So norms are formed when the individual interpretive schemes of a group of

people are congruent and that group of people acts in concert and develops "rules" for how to evaluate and react to activities regarding the issue at hand.

8.2.4.3.1 Congruent Organizational and Actor Norms

In all of my interviews with Accenture employees, I was impressed with how consistent they were in saying that there was a knowledge sharing culture in the organization. Possibly Jane, an Accenture user, expressed this best with:

> *I consider it* [the organizational culture of knowledge sharing] *part of our knowledge management, because we are, it's an environment where that sort of knowledge sharing is not only generally valued and encouraged, but it's expected, so you don't consider something that you've created just yours…*

This is an example of organizational and actor norms being congruent, and it appears to have aided the company in its efforts to deploy a knowledge management system.

8.2.4.3.2 Conflicting Organizational and Actor Norms

The story of the globalization efforts at KPMG, which were discussed in depth in the KPMG case study, provide the classic example of the clash of corporate and group norms. In this case the corporate norm established a need to establish a common global presence, while the actor norms, actually the multitude of organizational norms of the various national practices, opposed the hegemony of this common presence. While the actor norms in this example were developed by formal organizations within the larger international organization, they also can be seen as that of small groups within a larger organization. Here this clash of norms worked to the detriment of the firm's original set of expectations for KWorld.

8.2.4.3.3 Synopsis of the Structure of Legitimation

The story of knowledge management comes down to an organizational norm that knowledge can and should be shared and the question of whether the individuals within the organization, as a group, share that norm. When the two

are congruent, progress is made; when they are not, organizational resistance occurs.

I accept that Accenture has an organizational culture of knowledge sharing; while the other two organizations also said they had a similar culture, they always added a caveat that some in their organizations did not "buy into" this particular element of their culture. However, at Accenture there was simply an absolute belief by all that I talked to that a member of the firm, when asked, would share what they had for the benefit of another member regardless of whether they knew each other or that it might be inconvenient to take the time to do so. Why there is such a strong acceptance of knowledge sharing at Accenture is a larger question and was not the focus of this study. However, this is a question on which structuration theory can shed additional light.

Different Accenture members suggested that the culture is inculcated at their corporate training facility at St. Charles or impressed upon them by those senior to them in the firm. Restated in terms of structuration theory, the corporate training facility at St. Charles is an exercise of the modality of "facilities" within the structure of domination – it is an exercise of power, as is the performance evaluation process for seniors over juniors another exercise of power. The decision of an individual in the Accenture organization to indeed participate in the sharing of their knowledge is brought about because they have formed a personal belief, an "interpretive scheme," in the appropriateness of doing this. Exercises of power, such as the training received at St. Charles or the performance evaluation process (both of which are strongly supportive of knowledge management), cannot force the acceptance of a particular "interpretive scheme;" however, they may act to persuade the individual that acceptance of the particular belief is appropriate for them or, along with similar peer pressure which would be an exercise of a "norm," they may act to persuade the individual that they are not a "good fit" at Accenture and that they should move elsewhere. The training

facilities at St. Charles have been in operation for many years; if over these years, the organization has been using these “facilities” and all of the other “facilities” it has at its disposal through the structure of domination to inculcate the “interpretive scheme” of knowledge sharing within newly hired members of the firm, and to reinforce it among those returning for additional training, then it could very easily have been successful in developing an institutional “norm” that is commonly shared across the organization, as this one is.

The knowledge management professionals at KPMG would say that “KPMG is a knowledge sharing organization, but…” (The preceding was not a quote, but a paraphrase of the comments of several members of the KPMG organization). Unlike Accenture, KPMG does not have the benefit of a single global training center such as that at St. Charles. KPMG’s training is first handled on a national and then a community of practice basis. Additionally, in a large national community of practice, such as the U.S. Assurance practice, training is held in multiple locations (most recently, Los Angeles for the western half of the country and Atlanta for the eastern half), so there is not a central focus for its training activities.

Also, apparently the “norm” of many members of KPMG is to see themselves first as members of their national practice and only second as members of the global organization. The obvious comparison is to citizens of the Southern states just prior to the American Civil War, even for those such as Robert E. Lee who had been proudly serving in the United States Army. His ties as a “Virginian” were stronger than his ties as a citizen of the United States. When Virginia seceded from the Union, Lee left the U.S. Army to go with Virginia and fight against the Army he had served so well, although he was apparently quite troubled by the choice. This illustrates the conflict and the change that can occur when an individual “interpretive scheme” changes and comes in conflict with

that individual's previous acceptance of a group "norm." Also illustrated is that these types of conflict can, and do, occur in all aspects of life.

At KPMG the situation is even somewhat murkier. Many of its members may never have accepted the institutional "norm" of knowledge sharing outside of their specific area, and there may be an actor, or informal, norm of presenting a "closed shop." Members of both Accenture and PwC spoke of an earlier time in those organizations when it was very much "the local office rules" and there was little interaction between offices. If this is the case, and my current research does not have enough depth to address that question, then what I have referred to as actor, or informal, "norms" may in fact be also seen as national practice institutional "norms" in conflict with the overarching international organization's institutional "norms." This would then possibly explain some of the organizational resistance to KWorld within KPMG.

The two examples discussed, Accenture and KPMG, may be seen as opposite sides of the coin of legitimation represented by the modality of "norms." When the institutional "norms" are congruent with the actor, or informal, "norms," such as at Accenture with the norm of knowledge sharing, then there can be powerful support for the knowledge management system from the individual members acting from their own strategic choice and social action agenda. However, if these two forms of "norm" are not congruent, as MAY be the case at KPMG, then the actor, or informal, "norms" may lead the groups holding these "norms" to fight a rearguard action against the international institutional "norm."

8.2.4.4 Summary of the Structuration Analysis

Many researchers in the past have adopted philosophical stances that either limited them to viewing technology as an objective, external force that would have an impact on things such as organizational structure, or a more subjective view of strategic choice and social action determining technology's impact

on these same issues (Orlikowski, 1992). In Giddens' theory of structuration, social reality is the aggregate of subjective human actors and of objective institutional properties. Giddens calls this the "*duality of structure*" and defines it with the idea that the structures (institutional properties) of social systems (or organizations) are both the construction of human action and the constructors of future human action. Thus, explanations of social phenomena (*e.g.*, organizational adoption of technological innovation) must consider both human actions and the impact of existing institutional properties, because both of these will help explain the changes to future institutional properties that will occur along with future human actions. It is Giddens' theory of structuration that defined a part of the focus of this research.

While it is in some ways tangential to the topic of knowledge management, the issue of globalization at KPMG is another excellent example of the interactions that are addressed in Structuration Theory. As discussed, in the "History of the Company" section of the KPMG case study (Chapter 5), the international organization of KPMG had been attempting to globalize the organization since its merger in 1986; in fact, globalization had been an issue in some of the predecessor firms before the merger. However, previous efforts at globalization had not been completely successful, and the International Executive Board saw the development of an online messaging, collaboration, and knowledge sharing tool, which is the firm's current knowledge management system, as a vehicle to further their globalization objective or norm.

In terms of Structuration Theory, there are two sets of "norms" at play in this issue. There is the international institutional "norm" of globalization, which may be seen in the mission statement of the Global Knowledge Management Organization, "*Knowledge connects our people, clients, and communities through an inherent process practiced across boundaries*." And there is an alternative, or actor/informal, "norm," which is apparently shared by many of the partners and

employees of the various national practices, that KPMG is a "federation of national practices." Here is an example of the structure of legitimation acting as an intersection between the structures of domination and signification. The individual members of the organization that are a part of either group that holds to a particular "norm" on this issue do so because their individual "interpretative schemes" as regards this issue lead them to ally with their group. When the group has a commonly held sense of what is right, then that group understanding is known as a "norm." The ability of the International Executive Board to direct that the online messaging, collaboration, and knowledge sharing tool, KWorld, was to be used as a vehicle for its "norm" of globalization is clearly an exercise of the structure of domination through its modality of "power." If the various members of the firm wanted to avail themselves of the many desirable features of KWorld, then by default they almost had to accept the idea of globalization, thereby possibly beginning to change their individual "interpretive schemes" and diluting, or eliminating, that commonly held sense that had led to the formation of the group with an alternative "norm" on this issue in the first place.

However, while an organization holds tremendous power in its control of its "facilities" and it can set its own organizational "norms," it cannot force a particular set of "interpretive schemes" on a particular individual and, therefore, cannot force a change of an informal "norm" if a group of individuals commonly holds an "interpretive scheme" which is different from what the organization would desire them to hold. As can be seen, this is simply a restatement of the idea of formal and informal networks in the terminology of Structuration Theory. Thus, the organization must try to persuade its members, which it potentially can do through the exercise of its control of "facilities." But in the case of KWorld and globalization, this effort to persuade or force (the evidence suggests that it was a raw effort to force) the acceptance of globalization clearly failed. The re-

cent re-visioning of KWorld away from one of its primary goals being globalization back to the simpler goal of being a knowledge sharing system is a clear statement of the inability of that organization, KPMG, to force on its individual members a belief that they did not wish to accept. The organization might have been successful in forcing a small group of individuals to either change their individual "interpretive schemes" or leave the organization, but when a large enough and powerful enough group, or coalition of groups, formed an alternative "norm" and the organization failed to persuade them to change, the organization was doomed to failure in its efforts.

In the issue of globalization at KPMG as played through the vehicle of KWorld, which was a focus of this research into knowledge management, we see a clear example of Giddens' Theory of Structuration and its "duality of structure." If one viewed technology simply as an objective, external force that would impact KPMG's organizational structure, then one would have expected that the goal of globalization would have been achieved or KWorld would have failed. KWorld did not fail as a knowledge management system, although it has not succeeded to the degree that was hoped for; but it did not succeed in forcing acceptance of globalization, and the objective external force view has no way to explain how this could happen. If one takes the more subjective view of strategic choice and social action determining technology's impact on this issue, then there is an explanation of why KWorld did not succeed in its mission of globalization and yet could still have a degree of success as a knowledge management system. Thus, the use of the lens of structuration theory allows us to see KPMG revisioning KWorld, modifying its organizational structure, as a part of this conflict of "norms" and the inability of the organization to exercise absolute power through the deployment of its "facilities."

This example suggests a number of guidelines for the overall orientation of my continuing research. First, this research has a necessarily cultural, ethno-

graphic or "anthropological" aspect to it. This is an expression of what one might call the double hermeneutic[13] which characterizes social science. The sociologist has as a field of study phenomena which are already constituted as meaningful. The condition of "entry" to this field is getting to know what the individuals within the field already know, and have to know, to succeed in the activities of their day-to-day work. The concepts that the researcher invents are "second-order" concepts in so far as they presume certain conceptual capabilities on the part of the individuals to whose conduct they refer. But it is in the nature of the social sciences that these can become "first-order" concepts by being appropriated within social life itself. The use of Structuration Theory as a surrogate for the effectiveness of a knowledge management system, and therefore ultimately as the dependent variable in my future study, appears to be supported by my analysis. However, it will be more difficult to develop testable operationalizations for the independent variable than for the dependent variables.

8.2.5 The Research Questions

As stated in "Section 1.7: Questions of the Study," beginning on page 8, while the focus of this study was on the institutionalization of knowledge management within an organization, that is the changes in organizational structure and policies which occur as a result of the development and use of knowledge management systems. I also thought that by studying the use of these systems in the three "cutting edge" organizations, as exemplars of the alternative views of knowledge management systems, the effect of the various system structures on institutionalization could be identified. In this vein I proposed five research questions to be addressed in the study; these were:

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[13] What is "hermeneutic" about the double hermeneutic? The appropriateness of the term derives from the double process of translation or interpretation which is involved. Sociological descriptions are interpretive categories which also demand an effort of translation in and out of the frames of meaning involved in sociological theories.

1. Does the implementation of a knowledge management system necessarily result in significant changes to the organizational structure of that firm?
2. Is the implementation of an organization's knowledge management system differentiated by Hansen *et al.'s* (1999) strategies of codification and personalization or can these strategies be pursued in tandem?
3. Are these structural changes supported by corresponding changes in the human resource and other policies of the firm?
4. How do these various structures and policies contribute to the effectiveness of the knowledge management systems and, through these systems, to the overall effectiveness of the organizations employing them?
5. How do the various organizations measure the success of their knowledge management systems?

As stated when these questions were first presented, these are very broad questions and, while I did not expect to get definitive answers to all of the questions, I hoped to begin the process of answering them. Based on the research just completed, I present my current understanding of the answers to these questions.

8.2.5.1 Does the Implementation of a Knowledge Management System NECESSARILY Result in Significant Changes to the Organizational Structure of that Firm?

Clearly the answer to this question is "NO;" in fact, the implementation of a knowledge management system does not necessarily result in ANY changes to the organizational structure of the firm. KPMG's implementation of KWorld most clearly demonstrates that implementation is simply not enough. The implementation of a major system, such as a knowledge management system, is

likely to result in some degree of organizational resistance, and that resistance must be managed in such a way as to minimize its impact on the system in question.

In the case of KWorld, the organizational resistance that arose was quite significant and, in my opinion, was not well-managed. In making this assertion, I am not simply relying on the benefit of hindsight and its knowledge that the resistance led to a re-visioning of KWorld; my assertion is based on basic systems development procedures – in order to successfully implement an information system, one must typically persuade its potential users of its benefits so that they will, in fact, use the system. A large part of the change management process is devoted to this type of persuasion. The executive leadership of KPMG knew that there would probably be significant resistance to the globalization objective of KWorld, but they apparently believed that KWorld could be imposed on the organization and, that through its use, the globalization objective would be accomplished. As stated in the discussion of Giddens' Structure of Domination, there are limits on the power of an organization to impose its will. KWorld's globalization objective apparently exceeded the limits of the organization's power to impose, and the system failed because people simply did not use it. Structuration theory would lead us to suspect that if a system is not used by the members of an organization, there will be no significant structural changes simply because the system exists.

In introducing the research questions at the beginning of this study, I indicated that I expected that this research would raise more questions in its attempts to answer the ones proposed. This is certainly the case with this question. It is no surprise that a failed system, even if it failed because its objectives were unreasonable as is the case of KWorld, would not result in significant structural changes. But to what degree must the implementation be successful in order to result in significant changes? And, for that matter, what type of structural

change related to the implementation of a knowledge management system should be considered significant? The beginnings of the answers to these questions, or at least the rationale for the questions themselves, may be found in the Accenture case.

Accenture's Knowledge Xchange is the oldest of the systems studied, and Accenture appears to be furthest along the path towards institutionalization of the three organizations studied. Therefore, one would expect to see evidence of structural change and, in fact, there is evidence of that structural change. The most significant structural change is the reorganization that moved Accenture's knowledge management organization from being clearly a part of the company's staff function into the larger organization that includes the company's line communities. In my opinion, for knowledge management to be institutionalized it must be seen as integral to the line communities that it serves, and the tightening of the organizational ties between the two is a significant structural change.

However, Giddens makes it clear that some structural changes can be just for show. In the case of knowledge management, if the movement of the knowledge management organization into the larger line organization does not also result in a series of cascading procedural changes to reinforce this new-found closer relationship, then is the reorganization truly significant? My interviews occurred very shortly after the reorganization became effective and, while many of the procedural changes that I would look for had been called for, there had probably not been sufficient time to see if the procedural cascade would occur. Therefore, the reorganization should be seen as evidence of the beginnings of significant change and not significant change in and of itself.

The Knowledge Xchange has been in existence for approximately a decade, and there are clearly many in the Accenture organization that believe that it is reasonably successful; so why has it not already resulted in clearer evidence of significant structural change? I believe that the answer lies in the words "rea-

sonably successful." The Knowledge Xchange is certainly successful to a degree – but it has not yet reached the potential predicted for a knowledge management system, it has not yet become that truly innovative system that conveys significant competitive advantage that was predicted by its early supporters. Why is this the case? The evidence suggests that it is because the Knowledge Xchange has not yet fully implemented a codification strategy (my respondents identified a number of issues within the codification implementation that need to be addressed) and Accenture is even further from successfully implementing a personalization strategy. Users at Accenture have apparently begun to routinize the codification features of the Knowledge Xchange; however, these features only support them in a small portion of their responsibilities on an engagement. These same users appeared to need a solid implementation of a personalization strategy if the Knowledge Xchange was going to be important to them throughout the life of an engagement, and the Knowledge Xchange does not currently have this type of strong implementation. I expect that as this functionality is added to the Knowledge Xchange, there will be more and stronger evidence of significant structural change resulting from the SUCCESSFUL implementation of the knowledge management system.

8.2.5.2 Is the Implementation of an Organization's Knowledge Management System Differentiated by Hansen et al.'s (1999) *Strategies of Codification and Personalization or Can these Strategies be Pursued in Tandem?*

The three systems that I studied are clearly differentiated in their implementation of one of Hansen *et al.'s* (1999) strategies – unfortunately all three had implemented the same strategy: codification. While I have not studied a system that implements the personalization strategy, Hansen *et al.* (1999), in addition to studying Accenture (then Andersen Consulting) and Ernst & Young (now Cap Gemini) as examples of the codification strategy, studied three strategy consult-

ing firms: Bain & Company, Boston Consulting Group, and McKinsey & Company. Their analysis presents these companies as examples of a personalization strategy implementation; therefore, I assume that it is possible to differentiate a system based on either strategy.

Hansen *et al.* (1999) presented these two strategies, codification and personalization, and argue that an organization must choose between the two strategies. They stated:

> *…companies that use knowledge effectively pursue one strategy predominantly and use the second strategy to support the first. We think of this as an 80-20 split: 80% of their knowledge sharing follows one strategy, 20% the other. Executives who try to excel at both strategies risk failing at both. Management consulting firms have run into serious trouble when they failed to stick with one approach.*

While this statement makes intuitive sense – by specializing on one strategy predominantly one would expect that the organization's probability of successfully implementing that strategy would increase – the results of my analysis do not appear to support this position. Earlier in this chapter (see "Section 8.2.1: The Knowledge Management Debate" beginning on page 295), I stated that even a completely successful implementation of the codification strategy is simply the application of established information technology and that only the successful implementation of a personalization strategy would be innovative and would move knowledge management systems to the next higher plane in information technology. The only justification for this research would be the expectation that it is studying an application that will move our understanding of the uses of information systems forward.

My understanding of the evidence of this study, particularly in the case of Accenture which was also a study participant in the Hansen *et al.* (1999) study, seems to suggest that, in order to reap the full reward from their knowledge management systems, many companies should ultimately implement both a codification strategy and a personalization strategy – this is in stark contrast to

the Hansen *et al.* study. In the case of Accenture, the past decade has been spent refining a codification strategy, and Hansen *et al.* present the company as an example of an appropriate codification implementation. Hansen *et al.* describe companies like Accenture as "*...typical of consulting companies where the efficient reuse of codified knowledge is essential because they are dealing with similar problems over and over."* This is clearly NOT the way that the Accenture respondents in this study saw their services being provided, their complaint was that the codification strategy was only appropriate for the "*efficient reuse of codified knowledge,"* but that the more specialized, and difficult, problems that they faced in the middle and later stages of their engagements did not lend themselves to a codified solution. Hansen *et al.* would agree that problems requiring custom solutions require the support of a personalization strategy, but they do not agree that this need exists in a significant degree in a firm like Accenture. Thus, this evidence seems to strongly question the Hansen *et al.* findings.

In practice some companies may find that it is only desirable or necessary to implement one or the other of these two strategies with only the minimal support of the other strategy as recommended by Hansen *et al.* However, my understanding of the evidence in this study suggests that in those companies, similar to those involved in both the case studies in this research and in the Hansen *et al.* (1999) study, where knowledge is a part of their core competence, that they should ultimately implement both a codification strategy and a personalization strategy. In these instances, while it may be advisable to utilize a phased development and implementation schedule in order to avoid the compound difficulties of implementing the two strategies simultaneously, the evidence suggests that their master development plan should allow for the development and implementation of both strategies.

Finally, my results suggest that the two strategies are complementary, not competitive. This would seem to be in direct contrast to Hansen *et al.'s* (1999)

statement that, "*Management consulting firms have run into serious trouble when they failed to stick with one approach."* Clearly more research is indicated in this area, but my current understanding of the data is that the strategies are complementary and would ultimately be pursued in tandem in a successful knowledge management system in companies where knowledge is a strong component of their core competence.

8.2.5.3 Are these Structural Changes Supported by Corresponding Changes in the Human Resource and Other Policies of the Firm?

As indicated in the discussion is Section 8.2.5.1, above, if the implementation of a knowledge management system does result in structural changes, it should also result in a series of cascading procedural changes in the human resource and other policies of the firm to reinforce the structural change. It is this cascade of procedural change that gives evidence to the structural changes. As an example of changes in human resource policies, each of the companies studied include comments on the individual's contribution to and use of the company's knowledge management system in their employee performance evaluation. This would tend to indicate that contribution to and use of these systems would be important to the employees, but many employees, including managers responsible for writing the evaluations, indicated that these factors were not very important in the consideration for promotion and pay raises. In fact, the more traditional evaluative criteria involved with their individual productivity on their engagements were the items that counted most for promotion and pay raises. Were there to be a policy change so that the consultants realized that contribution to and use of the knowledge management system would have a more significant impact on the promotion/pay raise possibilities, that would be evidence of a structural change having occurred within the organization.

8.2.5.4 How do the Various Structures and Policies Contribute to the Effectiveness of the Knowledge Management Systems and, Through these Systems, to the Overall Effectiveness of the Organizations Employing Them?

It seems clear that a critical success factor analysis of the three systems studied indicates that the degree of institutionalization of the knowledge management systems is strongly effected by the various structures and policies associated with that system. However, there is sufficient data available in this study to measure the effectiveness of a specific system, nor is there sufficient data with which to measure a system's impact on overall organizational effectiveness. However, the organizations themselves appear to be convinced that they are obtaining value from their investment. More work is clearly needed in this area.

8.2.5.5 How do the Organizations Studied Measure the Success of Their Knowledge Management Systems?

All three organizations studied have developed sets of metrics for their knowledge management systems, but none of the organizations was satisfied with those metrics. The metrics used include things such as the numbers of hits to the system and to individual documents within the system; percentage of the workforce using the system; numbers of documents in the system; numbers of contributions; *etc*. However, the Global CKO at KPMG said of their metrics, "…[they] *are not telling us anything,*" and the Global Leader of PwC's knowledge management organization told me that, if I could develop a solid measure of success for a knowledge management system, I would not need to complete my doctorate because I could write a book and make my fortune. At this point it is still necessary for me to finish this dissertation and complete my doctorate.

The information systems field has seen many attempts to define an appropriate dependent variable for its research. DeLone and McLean (1992) said:

> *If information systems research is to make a contribution to the world of practice, a well-defined outcome measure (or measures) is essential. It does little good to measure various independent or input variables, such as the extent of user participation of the level of I/S investment, if the dependent or output variable - I/S success or MIS effectiveness - cannot be measured with a similar degree of accuracy.*

In that same article they reported their analysis of the measurements used in one hundred different studies and categorized the measures in a number of different ways; however, this debate goes on and there a numerous models purporting to measure information system success. Prior to beginning this study I was skeptical of these measures and models, and that skepticism is what drew me to structuration theory as a surrogate for success.

The results of this study do not answer the question of how to measure the success of a knowledge management system. Many of the metrics used by the three organizations studied are similar to measures discussed in DeLone and McLean's (1992) article, and the companies are not satisfied with these measures. More work is needed in this area.

8.3 Validity of My Results

Chapters 4 through 7 present the results of my research, but how can the validity of these results be judged? In "Section 3.6: The Study Protocol," beginning on page 68, I discussed the procedures that I used in collecting the data, analyzing that data, and writing up the results of this research. In particular, I focused on the areas of reliability, validity, and generalizability, and discussed my methods for addressing each of these issues. These issues are critical to researchers working within the quantitative paradigm, and I believed that it was necessary for me to address these issues in ways that quantitative researchers might accept; however, like Leininger (1994), I believe that research conducted within the qualitative paradigm should be evaluated using evaluative criteria that are consistent with the purposes, goals, and philosophical assumptions of that qualitative paradigm. Having followed the methods put forth in "The Study Protocol"

section, can I now claim that the results of my research must be valid? I do not think so.

Leininger (1994) argues that criteria such as reliability and validity, while appropriate for the quantitative paradigm, are inappropriate for the qualitative paradigm and that a new set of criteria, more appropriate to that paradigm, must be developed. She proposes six criteria for supporting and substantiating qualitative studies; these are:

- **Creditability:** The "truth" or "believability" of the findings as known through the experience of those being studied. Creditability may be established through prolonged participation with those informants.
- **Confirmability:** This refers to repeated direct evidence, either participatory or documentary, that supports the findings. Confirmability may be established by getting additional evidence from the informants concerning the correctness of the researcher's findings.
- **Meaning-in-Context:** This refers to the requirement that the data become understandable within its complete environment. The focus then of the findings is on the context in which the data was collected.
- **Recurrent Patterning:** Just as "Confirmability" requires repeated direct evidence, "Recurrent Patterning" refers to repeated instances of statements, experiences, *etc*. that tend to follow a pattern, to recur over time in similar ways. Recurrent Patterning may be supported through numbers and percentages.
- **Saturation:** This is another name for Eisenhardt's (1989) "theoretical saturation;" it refers to acquiring a comprehensive account of the phenomena being studied. Again, this point is reached when the researcher finds no significant additions to the data from addi-

tional interaction with informants and, in fact, begins seeing redundancy in the new data.

- **Transferability:** This refers to the ability to transfer particular findings from a qualitative study to another similar context. Although the goal of qualitative research is to produce rich understandings of a specific phenomenon, not to produce the generalizations expected in quantitative research, knowledge applicable in one context may be useful in understanding other situations in which the contexts are similar (Leininger, 1994).

While some of these evaluative criteria are similar to the criteria used in quantitative research (*e.g.*, transferability has similarities to generalizability and confirmability has similarities to reliability), they more directly address the philosophical underpinnings of qualitative research and provide a better foundation from which to answer the question, "Are the findings of this research valid?".

8.3.1 Creditability

This research is based on three case studies that involved a total of fifty-six (56) interviews with fifty-five (55) different individuals. These individuals were interviewed concerning either their role in operating their company's knowledge management system or their use of that knowledge management system. The fifty-six (56) interviews produced just under a thousand pages of transcript that detail a prolonged interaction with the informants and begins to establish the creditability of the findings.

8.3.2 Confirmability

As the transcripts would demonstrate, during the interviews I would frequently say "Let me repeat back to you what I think you said and then you can correct me where I am wrong." This was one effort to ensure that I was hearing what the respondent was actually saying. These interviews were taped and then transcribed; I then reviewed the written transcript against the tape recording.

Then, each transcript was sent to the particular respondent in order that they might have the opportunity to review and correct any misunderstandings in their transcript. While not many of the respondents actually returned corrected copies of their transcripts, those that were returned had very few corrections indicating that the original transcription was accurate. Finally, the individual case studies (Chapters 4, 5, and 6) were sent to the appropriate contact person for review and correction. Only one of the organization's responded to this review; Accenture reviewed both the first draft and the final copy of their case study.

These repeated uses of "member checks" were done to ensure that my understandings of what the respondents said were an accurate reflection of their experience. The member checks provide the evidence of the confirmability of the findings.

8.3.3 Meaning-in-Context

The first half of each of the case study chapters provides a detailed description of both the organization being studied and its knowledge management system. These descriptions provide the context for both me as the researcher and for the reader to understand the experiences that the respondents then relate. It is the context in which they work that makes meaning of their experiences.

8.3.4 Recurrent Patterning

Certain patterns of events have continued to occur both within each case and across all cases. One is that the users of these systems tend to rely on their knowledge management systems only in the early phases of an engagement. The users would prefer to talk to someone when they are faced with a complex problem. These patterns are directly related to the codification strategy that has been adopted by each of the companies studied. While the details of their implementations may differ, the underlying strategy remains the same and the patterns of response reoccur.

While these patterns are reported in the body of this report, they may be most clearly demonstrated in the coding of the interview transcripts. Appendix "B" beginning on page 367 provides a set of tables showing the number of instances of each coding element (a "node" in NVivo's parlance) so that the reader can see how the patterns reoccur.

8.3.5 Saturation

As discussed in the Methods chapter, there is a balancing act between reducing the number of cases in order to obtain a rich understanding of what is happening within the case and increasing the number of cases in order to form a solid foundation for any theory generated from the analysis of the cases studied. While I determined at the beginning of the study that three cases would be investigated for this study. I viewed my decision to investigate three cases as a minimum number to be studied. However, as I was finishing the interviews and initial analysis of the second case, I realized that, with some notable exceptions, many of the same themes were appearing. It was clear in the third case that most of the emergent concepts were becoming theoretically saturated.

As I believed that I had reached the point of theoretical saturation, I did not believe that any more cases were required to complete this phase of my body of research.

8.3.6 Transferability

The similarity of the contexts of each of the three organizations studied, the strategy that they implemented in developing and deploying their knowledge management systems, and the experiences of the users interviewed across the cases makes a strong argument for transferability, at least across these three case studies. The question remains as to whether knowledge gained in this study can be expanded as other types of organizations are studied. While this question can only be definitely answered through further research, the three case studies in this research were selected in part because "knowledge" is their stock-in-trade

and because consultancies are driven to be on the “cutting edge” of systems implementations such as a knowledge management system. My intent in selecting this type of organization was that there would be a degree of transferability, at least to those organizations that highly value their “knowledge” as a part of their core competence.

8.3.7 Synopsis of the Evaluation of Validity

The documentation of this research provides solid evidence that the findings are creditable, confirmable, provide meaning-within-context, show recurrent patterns, are comprehensive to the point of saturation, and appear to have some degree of transferability. The combination of these factors provides a solid foundation for accepting the findings of this study as being valid. These findings were presented in the previous section of this chapter.

8.4 Implications to be Drawn from this Research

The previous section of this chapter presented the key findings of this study. These findings were:

- Identification of a series of critical success factors applicable to the development and deployment of a successful knowledge management system;
- Evidence that the implementation of a personalization strategy represents an evolutionary change in information systems and is worthy of additional study;
- Confirmation that changes to organizational process have greater ramifications in the successful deployment of a knowledge management system than do technological issues;
- Support for the viability of the human memory metaphor for an organizational knowledge management system;
- Support for the value of institutionalization as a surrogate for success in the implementation of any new information system; and,

- My current understandings as to the research questions posed at the beginning of this study:
  - The implementation of a knowledge management system does NOT necessarily result in significant structural changes to the implementing organization;
  - Knowledge management systems appear to be differentiated by the two management strategies (codification and personalization), but that these two strategies should be seen as complementary and, in at least some cases, both strategies should ultimately be pursued in order to deploy a successful knowledge management system;
  - That the structural changes expected from the successful implementation of a knowledge management system are in part evidenced by a cascade of procedural changes to support and reinforce those changes;
  - That this study did not provide sufficient data to draw conclusions as to the varying degrees of effectiveness of the three systems' structure and policies or the impact of these systems' structure and policies on the overall effectiveness of their implementing organizations; and,
  - The lack of acceptable metrics for the measurement of the success or failure of knowledge management systems.

These findings form the basis for a series of implications that can be drawn from this research.

8.4.1 Implications for Researchers

The last several years have seen a debate raging in academic circles as to whether knowledge management is the next evolutionary step for information systems or is simply an example of marketing legerdemain. This research points

out both the need for the implementation of a personalization strategy in knowledge management systems and the rudimentary state of development of such a strategy in three organizations that one would be forgiven for expecting them to be in the forefront of such development. There may well be other organizations that have more advanced implementations of a personalization strategy, but the companies studied have excellent reputations in the field of management and technology consulting[14]. Certainly I contend that this study demonstrates that, unlike Davenport's assertion that it is dead, knowledge management as a research topic is quite vital and that there is much work left to be done.

Additionally, this research contests the Hansen *et al.* (1999) contention that an organization must focus its development efforts on either one or the other of the codification and personalization strategies. The comments of the users across the three case studies seem to make it clear that the implementation of just a codification strategy is insufficient, yet it is equally clear that there are significant productivity gains that can be achieved from just this strategy's implementation. It seems increasingly clear that a successful knowledge management system will be equally capable at both the codification and personalization strategies. However, the implementation of a successful personalization strategy will require the development of an innovative set of technologies to enable expertise mapping and facilitate the sharing of expertise globally. These technologies and the organizational policies necessary to support them should be a fertile area of academic investigation for a number of years to come.

Orlikowski and Robey (Orlikowski, 1992; Orlikowski and Robey, 1991) proposed that Giddens' theory of structuration would be an excellent framework for investigating the interaction between organizations and IT. They argued that

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[14] Certainly KPMG at the time of my interviews had spun-off its management and technology consulting practice, but its KWorld system was largely developed while that practice was still a part of the organization that I studied.

structuration theory holds great potential for exploring the structural and cultural changes that must occur as an organization institutionalizes a new system or technology. This research begins to substantiate their argument and to illustrate that institutionalization, within the tenets of structuration theory, can be used as a surrogate for success in the implementation of any new information system.

The use of institutionalization as the dependent variable in studies of information systems would extend the definition of an appropriate variable significantly beyond the categories found in the work of DeLone and McLean (1992) and those that have followed. The importance of using institutionalization as the dependent variable comes from its ability to address both the objective view of technology as an external force and the subjective view of users being capable of strategic choice and social action. This might well lead to a richer understanding of the use of information systems.

This richer understanding could lead to more definitive answers to questions surrounding what constitutes significant structural change and how successful a system must be to engender such change, or it could lead to the development of better metrics by which to judge the value of a knowledge management system.

8.4.2 Implications for Practitioners

This work can primarily be seen as the beginnings of a critical success factor analysis for the implementation of knowledge management systems. Given the cost and complexity of these systems, this type of analysis should be very beneficial to any organization considering the development and deployment of a knowledge management system.

A focus on the human metaphor allows practitioners to see the “big picture” of the system that they may be considering developing and deploying and it continually focuses them on the goal of an organizational knowledge manage-

ment system – assisting an individual become better able to make sense of and react to his or her environment. All decisions involved in developing and deploying such a system should keep this goal in mind.

Particularly important for practitioners to note is the degree to which structural changes must occur in the line communities supported by a knowledge management system in order for that system to provide good support to the community. Knowledge management cannot be seen as simply a back-office or staff function. Too many knowledge management practitioners seem to be too wedded to technological solutions to their knowledge management problems. This research seems to clearly indicate that it is procedural issues that are the most difficult to unravel and that as the Global Lead for PwC's knowledge management organization said, "*…knowledge management systems should be about giving people access to the best information so that they can leverage it and make better use of it… because however we talk about technology, the tools aren't keeping pace with what people aspire to*."

Finally, as in the "**Implications for Researchers**", practitioners should note that a successful system may need to provide for the implementation of both the codification and personalization strategies of managing knowledge. Certainly there may be organizations in which a simple codification strategy implementation may be sufficient, but organizations considering the development of a knowledge management system should give careful consideration to their knowledge requirements before selecting a strategy or strategies.

Additionally, if the decision is made to attempt a tandem strategy implementation, extremely careful consideration is needed in the phasing of such a project. As with any major information system implementation, knowledge management systems may become the focus of significant organizational resistance and the system's development and deployment schedule should take this potential into consideration. While implementing a codification strategy may be an

application of proven technology and processes for the most part, the experience of the three companies studied indicates that it is still a challenging endeavor. If the intent is to also implement a personalization strategy, the combination of strategies in a single development/deployment phase may prove too much for many organizations to easily accept.

8.5 Future Research

8.5.1 The Next Step – A Survey

As stated in the introductory chapter of this dissertation, this study was designed as the opening piece of a body of research. One of the goals of this study was to develop the final set of propositions that was presented at the end of Chapter 7. Now I will transform these propositions into a set of testable hypotheses. These hypotheses will form the foundation of the next phase in my body of research, a survey to be conducted with one or more of the same firms.

The eleven (11) research propositions, or sets of propositions, both *a priori* and emergent, that were refined and accepted, by this study were:

2. There must be "appropriate resources" available to the technical infrastructure of the KMS.
3. The knowledge stored within the KMS must show a "clear link to the business objectives" of the organization.
4. The KMS must be managed in such a way as to overcome "organizational resistance."

5a. The infrastructure of the KMS must provide for knowledge of sufficient "knowledge quality" (actually one of the *a priori* propositions).

5b. The infrastructure of the KMS must provide for knowledge presented in a "concise manner."

5c. The infrastructure of the KMS must provide for knowledge of a "timely nature."

5d. The infrastructure of the KMS must provide for knowledge from both “internal and external sources.”

6a. Efforts to capture knowledge must be “timely.”

6b. Provision should be made to assist in the “process of making tacit knowledge explicit.”

7. A system for “focusing limited resources” on the most probable productive sources is required.

8b. Provision should be made for a series of “reviews” of the input interpreting it in terms of the previously accumulated knowledge.

8c. Provision should be made for “comprehensive cataloguing” and retrieval.

9a. The infrastructure of the KMS must provide for “efficient access” to the resources stored in its repositories.

9b. The infrastructure of the KMS must provide for “ease of retrieval” of the resources stored in its repositories.

10. Potential users of the KMS must receive “adequate training” in the functioning and use of the KMS.

11. The infrastructure of the KMS must support the development of a “personal knowledge management system.”

12a. The infrastructure of the KMS must facilitate and enhance “communication” between those with a certain expertise and those needing access to that expertise.

12b. The infrastructure of the KMS must support the formation and vitality of “communities of practice/interest” within the organization.

It is these eleven (11) research propositions, or sets of propositions, that will now be restated as the dependent variables in my hypotheses. The independent variables of these hypotheses were never stated as propositions, but are derived from Giddens’ (1976; 1979; 1982; 1984; 1993) Structuration Theory.

8.5.1.1 The Hypotheses

According to Pedhazur and Schmelkin (1991), a hypothesis is:

> *...a conjectural statement about a relation between two or more variables... we use the term 'relation' broadly to refer to designs in which no distinction is made between independent and dependent variables, as well as in ones where such distinctions are made.*

Thus, hypotheses are deductions or derivations from a more or less formal theoretical explanation of the phenomenon under study; they are predictive in nature. This study was intended to provide the background material needed to set the next phase of this body of research in the proper theoretical and empirical perspective, and the study has accomplished that purpose.

8.5.1.1.1 Provision of "Appropriate Resources"

Hypothesis 1: The more resources provided to the knowledge management system, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.2 Shows a "Clear Link to the Business Objectives"

Hypothesis 2: The more clearly linked to the objectives of the business that the facilities provided by the knowledge management system and the contents of its knowledge repositories are, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.3 Managed to Overcome "Organizational Resistance"

Hypothesis 3: The better that knowledge management system is managed to recognize and address organizational resistance, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.4 Provision of Sufficient "Knowledge Quality"

Hypothesis 4a: The higher the users' perception of the knowledge quality of the contents of the knowledge management system's

knowledge repositories, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.5 Presents Knowledge in a "Concise Manner"

Hypothesis 4b: The more concisely the users perceive the responses to their queries of the knowledge management system to be presented, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.6 Provision of Knowledge of a "Timely Nature"

Hypothesis 4c: The more timely the users perceive the contents of the knowledge management system's knowledge repositories to be, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.7 Provision of Knowledge from both "Internal and External Sources"

Hypothesis 4d: The more the users perceive the responses to their queries of the knowledge management system include knowledge from both internal or external sources, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.8 Efforts to Capture Knowledge are "Timely"

Hypothesis 5a: The more timely the efforts to capture knowledge for the knowledge management system, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.9 Provision Made for Assistance in the "Process of Making Tacit Knowledge Explicit"

Hypothesis 5b: The more assistance provided to users in the process of making their tacit knowledge explicit and captured for

the knowledge management system, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.10 Provision Made for "Focusing Limited Resources"

Hypothesis 6: The better that the knowledge management system is managed to focus its limited resources on the needs of the business, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.11 Provision Made for a series of "Reviews"

Hypothesis 7a: The more time provided to the Subject Matter Experts for the review of the contents of the knowledge management system's knowledge repositories and the more frequent those reviews are conducted, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.12 Provision Made for "Comprehensive Cataloguing"

Hypothesis 7b: The better the users perceive the contents of the knowledge management system's knowledge repositories to be properly and comprehensively catalogued, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.13 Provision for "Efficient Access"

Hypothesis 8a: The easier the users perceive the access to be to the knowledge management system's resources, wherever those users may be physically located at their time of need, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.14 Provision for "Ease of Retrieval"

Hypothesis 8b: The easier the users perceive it is to retrieve the knowledge management system's resources, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.15 Provision for "Adequate Training" of Users

Hypothesis 9 The better the training provided to users in the use of the knowledge management system, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.16 Support for Development of "Personal Knowledge Management Systems"

Hypothesis 10: The better the facilities, called personal knowledge management systems, to assist the users of the organizational knowledge management system in transforming the organizational knowledge resources back into personal knowledge resources, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.17 Facilitates and Enhances "Communication"

Hypothesis 11a: The more the users perceive the knowledge management system to facilitate and enhance communication within the organization, the greater the degree of institutionalization of that knowledge management system.

8.5.1.1.18 Support for "Communities of Practice/Interest"

Hypothesis 11b: The more the users perceive the knowledge management system to facilitate and enhance the vitality of communities within the organization, the greater the degree of in-

stitutionalization of that knowledge management system.

8.5.1.2 The Revised Research Model

A key element of the preliminary research model was the human memory metaphor; while the use of this metaphor was supported by my analysis, the preliminary research model implies a longitudinal study. A longitudinal study is a very appropriate method of tracking the structural changes that occur over time due to institutionalization, but I do not anticipate beginning a longitudinal study in the next phase of this program of research. Therefore, my preliminary research model must be revised.

The hypotheses developed in the preceding section were largely developed from critical success factor analysis; these hypotheses can be categorized into four separate groups, which are:

- Organizational Factors – These factors are similar to the Executive Control Processes of the human system; they reflect the allocation of resources required for the functioning of the system.
- Infrastructure Factors – These factors are similar to the human neurological system; it is through these factors that signals are passed.
- Codification Factors – These factors combine elements of both Short and Long-Term Memory, along with the processes involved in the processing, storage, and retrieval of knowledge.
- Personalization Factors – These factors combine elements of both Short and Long-Term Memory, along with the processes involved in the processing, storage, and retrieval of knowledge.

8.5.1.2.1 Organizational Factors

Organizational factors include those hypotheses that are related to the knowledge management organization's structure, policies, and procedures. The hypotheses included in this category are H1 (appropriate resources), H2 (clear

link to business objectives), H3 (organizational resistance), H5a (timely capture), H5b (tacit to explicit), H6 (focus limited resources), and H9 (adequate training).

8.5.1.2.2 Infrastructure Factors

Infrastructure factors include those hypotheses that are related to the knowledge management system's technical infrastructure, tools, data management, and technologies. The hypotheses included in this category are H8a (efficient access), H8b (ease of retrieval), and H10 (personal KMS).

8.5.1.2.3 Codification Factors

Codification factors include those hypotheses that are related to the knowledge management system's facilities for supporting Hansen *et al.'s* (1999) codification knowledge management strategy. The hypotheses included in this category are H4a (knowledge quality), H4b (concise manner), H4c (timely nature), H4d (internal and external sources), H7a (series of reviews), and H7b (comprehensive codification).

8.5.1.2.4 Personalization Factors

Personalization factors include those hypotheses that are related to the knowledge management system's facilities for supporting Hansen *et al.'s* (1999) personalization knowledge management strategy. The hypotheses included in this category are H11a (communication) and H11b (communities of practice/interest).

The revised research model is shown in Figure 8.1 on the following page.

8.5.1.3 The Metrics

The next phase of this body of research will be to conduct surveys at the three organizations involved in this phase of the research in order to test the predictive power of the hypotheses developed. In this next phase the various hypotheses will be operationalized into a set of treatment conditions specific to the individual organization being surveyed. It is not my purpose to discuss those individual treatment conditions, or metrics, in this dissertation; that will occur in

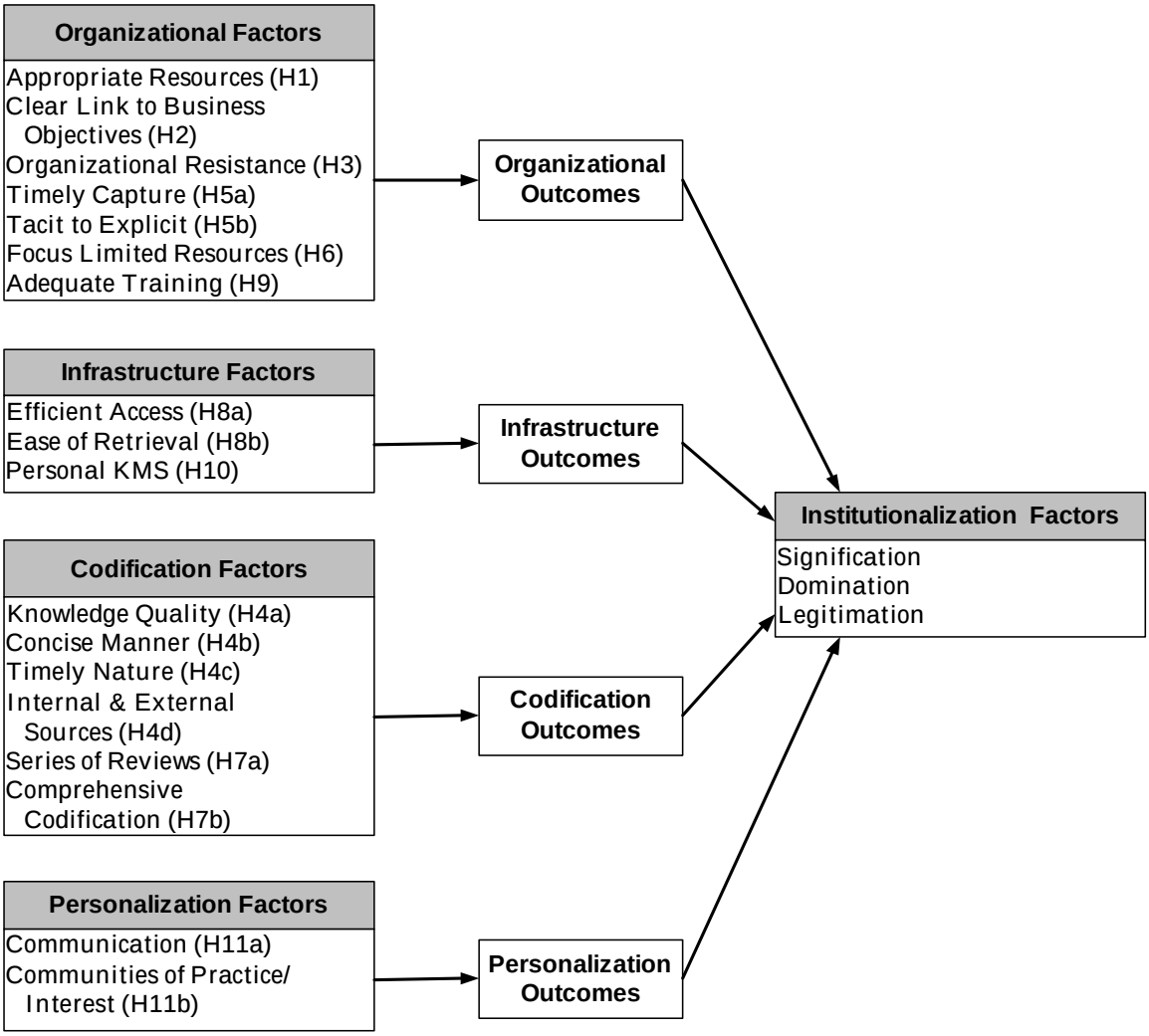

Figure 8.1: The Revised Research Model

the design of the individual survey instruments in the next phase of this body of research. However, the interviews collected for the three case studies provide a wealth of operational detail and should easily support the design of those survey instruments.

8.5.2 Other Venues for Future Research

The three case studies are rich in detail and indicate a number of other areas that would be excellent for future research. Obvious areas are:

- How and why did the organizational culture of knowledge sharing develop at Accenture?

- What is the full story of the organizational turmoil that led to the re-visioning of KPMG's KWorld?
- Will the improved functionalities of the latest versions of Lotus Notes and Microsoft Exchange reduce the infrastructure and data management problems found in the three systems studied?
- Are there cross-cultural differences in attitudes towards knowledge sharing?
- What technologies are promising in the area of expertise mapping and the implementation of a personalization strategy within a knowledge management system?

In fact, there are almost endless opportunities for future research in the area of knowledge management and, contrary to Davenport's assertion that the field is dead as a research topic, I contend that this will be a vital area of research for years to come.

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Appendix A: Anticipated Interview Scripts

As discussed in Section 3.3.1: Interviews beginning on page 88, my interviews were conducted under an active interview format as opposed to being strictly scripted; however, I did prepare a set of questions based on the type of respondent being interviewed. To the extent possible these questions were followed in the various interviews. The questions below were written for the Accenture (then Andersen Consulting) employees; however, the same questions with minor modifications for company name, system name, *etc*. were used in the interviews for the other two case studies.

Line consultants who use the KX and KM services (6-8 people)

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how the knowledge management system impacts how you do your job.
4. Have you ever used the KX service? If so, would you say that you use the KX regularly? Please describe your experiences with KX? Were they positive? How could KX be improved? How do you decide to use the KX? How do you decide to not use the KX?
5. Do you have any profiles setup on the KX? If so, could you describe them? If not, why? Do you believe that this information helps you in your job? If so, how? How could the system of profiles be improved?
6. Have you ever used the Knowledge Center Network research services? If so, would you say that you use these services regularly? Please describe your experiences with the Knowledge Center Network? Were they positive? How could the Knowledge Center Network be im-

proved? How do you decide to use the Knowledge Center Network research services? How do you decide to not use the Knowledge Center Network research services?

7. When faced with a need for knowledge, do ask other Andersen employees for help? If so, how do you determine whom to ask? How do you decide to ask someone else? How do you decide to not ask someone else? Why do this instead of using the KX or Knowledge Center Network research services?
8. Have you ever made an individual submission to the knowledge management system? If so, how did you decide to make the submission? What was the process for making the submission? If not, why have you never made a submission? What would you consider appropriate for submission? How do you decide to make a submission? How do you decide to not make a submission?
9. As a part of a team assignment, have you ever participated in developing a KM submission? If so, would you describe what happened.

Line consultant who does not use the KX and KM services (1-2 people)

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how the knowledge management system impacts how you do your job.
4. Have you ever used the KX service? If so, would you say that you use the KX regularly? Please describe your experiences with KX? Were they positive? How could KX be improved? How do you decide to use the KX? How do you decide to not use the KX?

5. Do you have any profiles setup on the KX? If so, could you describe them? If not, why? Do you believe that this information helps you in your job? If so, how? How could the system of profiles be improved?
6. Have you ever used the Knowledge Center Network research services? If so, would you say that you use these services regularly? Please describe your experiences with the Knowledge Center Network? Were they positive? How could the Knowledge Center Network be improved? How do you decide to use the Knowledge Center Network research services? How do you decide to not use the Knowledge Center Network research services?
7. When faced with a need for knowledge, do ask other Andersen employees for help? If so, how do you determine whom to ask? How do you decide to ask someone else? How do you decide to not ask someone else? Why do this instead of using the KX or Knowledge Center Network research services?
8. Have you ever made an individual submission to the knowledge management system? If so, how did you decide to make the submission? What was the process for making the submission? If not, why have you never made a submission? What would you consider appropriate for submission? How do you decide to make a submission? How do you decide to not make a submission?
9. As a part of a team assignment, have you ever participated in developing a KM submission? If so, would you describe what happened.

Engagement Knowledge Champion

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.

3. Please describe how the knowledge management system impacts how you do your job.
4. Have you ever functioned as the Engagement Knowledge Champion? If so, please describe what an Engagement Knowledge Champion does.
5. Did you receive any special training or instructions prior to acting as an Engagement Knowledge Champion? If so, could you describe that training? Would additional training have improved your functioning as an Engagement Knowledge Champion? If so, please describe what that additional training should be.
6. Thinking of the assignment for which you functioned as the Engagement Knowledge Champion, could you describe your involvement in the "knowledge planning" for that team? How successful was the attempt to preplan the knowledge requirements of that team? Do you think that knowledge planning is a viable part of team management? How could the idea of knowledge planning be improved?
7. Thinking of the assignment for which you functioned as the Engagement Knowledge Champion, could you describe your involvement in making the knowledge submissions for that team? How could this process be improved?

Client Team Knowledge Services Team

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how the knowledge management system impacts how you do your job.

4. Have you ever functioned as a part of the Client Team Knowledge Services Team? If so, please describe what a Knowledge Services Team does.
5. Did you receive any special training or instructions prior to acting as a member of the Client Team Knowledge Services Team? If so, could you describe that training? Would additional training have improved your functioning as a member of the Client Team Knowledge Services Team? If so, please describe what that additional training should be.
6. Thinking of the assignment for which you functioned as a member of the Client Team Knowledge Services Team, could you describe your involvement in the "knowledge planning" for that team? How successful was the attempt to preplan the knowledge requirements of that team? Do you think that knowledge planning is a viable part of team management? How could the idea of knowledge planning be improved?
7. Thinking of the assignment for which you functioned as a member of the Client Team Knowledge Services Team, could you describe your involvement in making the knowledge submissions for that team? How could this process be improved?

Contribution Reviewer (must also include someone who catalogues)

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe how you review a contribution to the KM system. Do you have the final review authority for contributions in your area? If

not, who does? What would you do if the submission simply confirmed your existing understanding of a process or procedure? What would you do if the submission seemed to deny your existing understanding of a process or procedure? What would you do if the submission were different from your understanding of any existing process or procedure?

5. Once you have accepted a contribution, how does it get catalogued? Is this just for your Community of Practice or are other communities involved/notified of the contribution? Could the cataloguing system be improved? If so, how?
6. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

Knowledge Center Network person

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe the research services at Andersen Consulting. Are these services provided on a “pull” or a “push” basis? Please describe how they are provided.
5. Could the research services provided be improved? If so, how?
6. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

Content architecture/managed vocabulary

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe what is meant by "content architecture/managed vocabulary". How does this fit in the knowledge management system at Andersen Consulting?
5. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

Thought Leadership

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe what is meant by "thought leadership". How does this fit in the knowledge management system at Andersen Consulting?
5. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

KM Strategy Team

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.

3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe what the “KM Strategy Team” does. How does this fit in the knowledge management system at Andersen Consulting?
5. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

KM Partner

1. Please give me a short description of your job at Andersen Consulting.
2. Please describe how the knowledge management system works at Andersen Consulting.
3. Please describe how your job affects the knowledge management system at Andersen Consulting.
4. Please describe how knowledge management contributes to the overall mission of Andersen Consulting?
5. I believe that Andersen Consulting has a “Chief Information Officer”, would you describe your position as an equivalent to “Chief Knowledge Officer”?
6. What metrics do you use to measure the effectiveness of the knowledge management system at Andersen Consulting?
7. Do you foresee a time when someone who had always worked in knowledge management could be made a partner at Andersen Consulting?
8. What do you see as the future for knowledge management at Andersen Consulting?

9. What is your academic and Andersen training background for your position? Would additional training improve your ability to do your job? If so, please describe what that additional training should be.

The range of knowledge management professionals interviewed was greatest at Accenture; therefore, there questions for job types for which there are no equivalent interviews in the other two case studies. Additionally, in the other two case studies, there were a few job types without an equivalent at Accenture; however, the questions for these individuals followed the same pattern as seen above.

Appendix B: Transcript and Coding Statistics

A total of 989 pages of transcripts were collected for this study. The chart below shows the distribution of these pages among the three case studies and between the respondents (knowledge management professionals and users). There was actually a third category of respondent, senior executives, but their interviews have been combined with either the professionals or the users in the chart below.

Interview Transcript Statistics

	Pages	Page Averages	Node Averages
Accenture			
KM Professional (13)	349	26.85	14.15
User (8)	113	14.13	35.75
Total (21)	462	22.00	22.38
KPMG			
KM Professional (12)	260	21.67	30.42
User (9)	65	7.22	13.11
Total (21)	325	15.48	23.00
PricewaterhouseCoopers			
KM Professional (7)	128	18.29	12.29
User (7)	74	10.57	20.00
Total (14)	202	14.43	16.14
Total Interviews			
KM Professional (32)	737	23.03	25.59
User (24)	252	10.50	15.00
Total (56)	989	17.66	21.05

The column entitled “Node Averages” refers to the coding of these transcripts using NVivo. The word “node” is the term that NVivo uses for a coded phrase, paragraph, or group of paragraphs – each is one instance of a node. On

the following pages are charts showing the number of instances of each node (subdivided by “free” and “tree” nodes). A free node is a stand-alone category, while a tree node is a larger category with related sub-categories. The process by which elements were coded and categories were defined was discussed in the methods chapter.

Free Nodes	Passages	People	% of Respondents	Accenture	KPMG	PwC
Access	29	11	20.00%	Pro: 0 User: 5 Total: 5	Pro: 4 User: 0 Total: 4	Pro: 1 User: 1 Total: 2
Clear Link to Business Objectives	34	17	30.91%	Pro: 8 User: 4 Total: 12	Pro: 3 User: 0 Total: 3	Pro: 2 User: 0 Total: 2
Communities of Practice	14	11	20.00%	Pro: 3 User: 0 Total: 3	Pro: 4 User: 0 Total: 4	Pro: 4 User: 0 Total: 4
Default Desktop	11	5	9.09%	Pro: 0 User: 0 Total: 0	Pro: 3 User: 0 Total: 3	Pro: 2 User: 0 Total: 2
Direction	37	10	18.18%	Pro: 1 User: 0 Total: 1	Pro: 8 User: 0 Total: 8	Pro: 1 User: 0 Total: 1
Focus of Limited Resources	8	5	9.09%	Pro: 3 User: 1 Total: 4	Pro: 1 User: 0 Total: 1	Pro: 0 User: 0 Total: 0
Global Markets Portal	13	2	3.64%	Pro: 2 User: 0 Total: 2	Pro: 0 User: 0 Total: 0	Pro: 0 User: 0 Total: 0
Globalization	63	14	25.45%	Pro: 0 User: 0 Total: 0	Pro: 9 User: 1 Total: 10	Pro: 4 User: 0 Total: 4
History	60	19	34.55%	Pro: 6 User: 1 Total: 7	Pro: 6 User: 0 Total: 6	Pro: 3 User: 3 Total: 6
Incentives	22	16	29.09%	Pro: 3 User: 5 Total: 8	Pro: 2 User: 1 Total: 3	Pro: 2 User: 3 Total: 5
Knowledge	38	8	14.55%	Pro: 2 User: 2 Total: 4	Pro: 2 User: 0 Total: 2	Pro: 1 User: 1 Total: 2
Knowledge Champion	16	6	10.91%	Pro: 0 User: 4 Total: 4	Pro: 1 User: 0 Total: 1	Pro: 1 User: 0 Total: 1
Legacy Systems	37	12	21.82%	Pro: 0 User: 0 Total: 0	Pro: 8 User: 0 Total: 8	Pro: 3 User: 1 Total: 4
Librarian Function	45	16	29.09%	Pro: 7 User: 5 Total: 12	Pro: 1 User: 0 Total: 1	Pro: 3 User: 0 Total: 3
Metrics	18	3	5.45%	Pro: 0 User: 0 Total: 0	Pro: 3 User: 0 Total: 3	Pro: 0 User: 0 Total: 0

Free Nodes	Passages	People	% of Respondents	Accenture	KPMG	PwC
Off the Record	10	1	1.82%	Pro: 0 User: 0 Total: 0	Pro: 1 User: 0 Total: 1	Pro: 0 User: 0 Total: 0
Organization	279	44	80.00%	Pro: 11 User: 9 Total: 20	Pro: 10 User: 1 Total: 11	Pro: 9 User: 4 Total: 13
Organizational Culture	113	31	56.36%	Pro: 6 User: 9 Total: 15	Pro: 6 User: 0 Total: 6	Pro: 7 User: 3 Total: 10
Personal Knowledge System	10	7	12.73%	Pro: 0 User: 3 Total: 3	Pro: 0 User: 0 Total: 0	Pro: 1 User: 3 Total: 4
Return on Investment	14	9	16.36%	Pro: 3 User: 2 Total: 5	Pro: 3 User: 0 Total: 3	Pro: 1 User: 0 Total: 1
Single Repository	20	12	21.82%	Pro: 0 User: 0 Total: 0	Pro: 6 User: 0 Total: 6	Pro: 5 User: 1 Total: 6
Taxonomy	21	9	16.36%	Pro: 1 User: 0 Total: 1	Pro: 5 User: 0 Total: 5	Pro: 2 User: 1 Total: 3
Technology	16	2	3.64%	Pro: 0 User: 0 Total: 0	Pro: 0 User: 0 Total: 0	Pro: 1 User: 1 Total: 2
Thought Leadership	5	1	1.82%	Pro: 1 User: 0 Total: 1	Pro: 0 User: 0 Total: 0	Pro: 0 User: 0 Total: 0
User Training	37	33	60.00%	Pro: 2 User: 11 Total: 13	Pro: 2 User: 9 Total: 11	Pro: 2 User: 7 Total: 9
When Not Used	12	5	9.09%	Pro: 0 User: 5 Total: 5	Pro: 0 User: 0 Total: 0	Pro: 0 User: 0 Total: 0
When Used	13	13	23.64%	Pro: 0 User: 8 Total: 8	Pro: 0 User: 0 Total: 0	Pro: 1 User: 4 Total: 5

Tree Nodes	Passages	People	% of Respondents	Accenture	KPMG	PwC
Management of Data						
Ease of Retrieval	95	35	63.64%	Pro: 6 User: 8 Total: 14	Pro: 7 User: 4 Total: 11	Pro: 7 User: 3 Total: 10
Comprehensive Cataloguing	34	17	30.91%	Pro: 2 User: 3 Total: 5	Pro: 6 User: 2 Total: 8	Pro: 3 User: 1 Total: 4
Knowledge Quality	42	22	40.00%	Pro: 4 User: 5 Total: 9	Pro: 6 User: 0 Total: 6	Pro: 5 User: 2 Total: 7
Review of Knowledge Base Input	41	18	32.73%	Pro: 6 User: 5 Total: 11	Pro: 3 User: 0 Total: 3	Pro: 4 User: 0 Total: 4

Tree Nodes	Passages	People	% of Respondents	Accenture	KPMG	PwC
Management of Data						
Timely Capture	25	14	25.45%	Pro: 6 User: 4 Total: 10	Pro: 0 User: 0 Total: 0	Pro: 2 User: 2 Total: 4
Capture of Tacit Knowledge	43	18	32.73%	Pro: 6 User: 8 Total: 14	Pro: 2 User: 0 Total: 0	Pro: 2 User: 2 Total: 4
Restrictions	7	6	10.91%	Pro: 1 User: 3 Total: 4	Pro: 2 User: 0 Total: 2	Pro: 0 User: 0 Total: 0
Negatives	27	11	20.00%	Pro: 2 User: 2 Total: 4	Pro: 3 User: 0 Total: 3	Pro: 4 User: 0 Total: 4
Archive	9	9	16.36%	Pro: 2 User: 1 Total: 3	Pro: 1 User: 0 Total: 1	Pro: 5 User: 0 Total: 5
Push	25	11	20.00%	Pro: 3 User: 5 Total: 8	Pro: 1 User: 0 Total: 1	Pro: 1 User: 1 Total: 2
Personalization	32	14	25.45%	Pro: 2 User: 3 Total: 5	Pro: 6 User: 0 Total: 6	Pro: 3 User: 0 Total: 3
Communication	66	23	41.82%	Pro: 4 User: 8 Total: 12	Pro: 3 User: 0 Total: 3	Pro: 5 User: 3 Total: 8
Contribution	45	23	41.82%	Pro: 0 User: 9 Total: 9	Pro: 6 User: 0 Total: 6	Pro: 5 User: 3 Total: 8
External Content	3	3	5.45%	Pro: 0 User: 0 Total: 0	Pro: 1 User: 0 Total: 1	Pro: 2 User: 0 Total: 2
Appropriate Resources	34	14	25.45%	Pro: 6 User: 3 Total: 9	Pro: 4 User: 0 Total: 4	Pro: 1 User: 0 Total: 1
Organizational Resistance	73	18	32.73%	Pro: 5 User: 0 Total: 5	Pro: 9 User: 0 Total: 9	Pro: 3 User: 1 Total: 4
Structure of Domination						
Modality of Facilities	162	44	80.00%	Pro: 10 User: 7 Total: 17	Pro: 9 User: 6 Total: 15	Pro: 8 User: 4 Total: 12
Structure of Legitimation						
Modality of Norms	142	43	78.18%	Pro: 7 User: 10 Total: 17	Pro: 7 User: 6 Total: 13	Pro: 7 User: 6 Total: 13
Structure of Signification						
Modality of Interpretive Schemes	75	20	36.36%	Pro: 9 User: 3 Total: 12	Pro: 4 User: 1 Total: 5	Pro: 1 User: 2 Total: 3

Appendix C: Accenture Pseudonyms

Psuedonym	Type	Description
Betty	KM Pro	Senior Manager, Global Portals Project
Karen	KM Pro	Partner in Charge of the KM Organization
Karl	KM Pro	Senior Manager, KM Strategy Team
Kay	KM Pro	Manager, Global Chemicals Call Center
Martha	KM Pro	Specialist, Engagement KM Team
Rebecca	KM Pro	Knowledge Manager, Global Thought Leadership Marketing & Communications
Russ	KM Pro	Director, Global Knowledge Management
Sue	KM Pro	Project Manager, Content Architecture/Managed Vocabulary
Theresa	KM Pro	Manager, E-Commerce, Communications & High Tech
Tom	KM Pro	Research Manager, Supply Chain Management
Bill	User	Manager, Finance, Performance Management
Charlie	User	Senior Manager, Customer Relationship Management, Communications & High Tech
Ellen	User	Manager, Electronics & High Tech
Gerry	User	Manager, Organization & Human Performance
Gerry	User	Manager, Organization & Human Performance
Jane	User	Manager, Organization & Human Performance
Jason	User	Manager, Resources
Jeff	User	Manager, Technology, Government
Jim	User	Associate Partner, People Communications & High Tech
John	User	Experienced Consultant, Financial Services, Customer Relationship Management
Shirley	User	Consultant, Process

Appendix D: KPMG Pseudonyms

Psuedonym	Type	Description
Bill	KM Pro	Manager, Change Management
Bill	KM Pro	Manager, Change Management
Cheryl	KM Pro	Manager, Knowledge Management Group, KPMG Canada
James	KM Pro	Senior Manager, Content Strategy
John	KM Pro	Senior Analyst, Global Knowledge Management
May	KM Pro	Director, Knowledge Management Group, Assurance and Advisory Services Center
Mitch	KM Pro	Manager of User Support & Reporting Development
Paul	KM Pro	Global Deployment of Knowledge Sharing
Peter	KM Pro	Director, Knowledge Management Group, KPMG Canada
Peter	KM Pro	Director, Knowledge Management Group, KPMG Canada
Rob	KM Pro	Global CKO
Sandy	KM Pro	Team Leader for Problem Resolution & Architect
Anna	User	Supervising Senior Accountant in the US Assurance practice with approximately 6 months experience with KPMG, but with previous experience
Bob	User	Staff Accountant in the US Assurance practice with approximately 1 year of experience
Deborah	User	Assistant Accountant in the US Assurance practice with approximately 1 year of experience
Eleanor	User	Director in the Canadian FAS practice with approximately 8 years of experience
George	User	Supervising Senior Accountant in the US Assurance practice with approximately 3 months experience with KPMG, but with previous experience overseas
Ken	User	Manager in the UK Assurance practice with approximately 5 years experience with KPMG, but with previous experience
Mark	User	Supervising Senior Accountant in the US Assurance practice with approximately 6 months experience with KPMG, but with previous experience
Matt	User	Partner in the Canadian FAS practice with approximately 25 years of experience
Tim	User	Assistant Accountant in the US Assurance practice with approximately 9 months experience in his current professional role, but approximately 2 years more experience with KPMG in a clerical role while in college

Appendix E: PricewaterhouseCoopers Pseudonyms

Psuedonym	Type	Description
Carrie	KM Pro	Program Director, Knowledge Consolidation
Giselle	KM Pro	Americas KnowledgePoint Manager
Jane	KM Pro	Global Leader for Knowledge Management in PwC MCS
Kurt	KM Pro	MCS Knowledge Management Global Technology Leader
Mary	KM Pro	Americaa Theater Lead for Knowledge Management in PwC MCS
Paul	KM Pro	Asia Pacific Theater Lead for Knowledge Management in PwC MCS
Peter	KM Pro	Knowledge Manager, Financial Management Solutions
Rebecca	KM Pro	MCS Knowledge Management Global Network Leader
Sue	KM Pro	Team Lead, NoE-Interface Rollout Process, Knowledge Consolidation team
Alan	User	Principal Consultant in the Supply Chain Management practice
Bill	User	Consultant in the Supply Chain Management practice
Dale	User	Practice Leader in the Supply Chain Management practice
Jay	User	Principal Consultant in the Supply Chain Management practice
Julie	User	Level One Consultant in the Supply Chain Management practice who has just finished her New Hire Training
Pat	User	Principal Consultant in the Supply Chain Management practice
Tom	User	Level One Consultant in the Supply Chain Management practice who has just finished her New Hire Training