TACIT KNOWING THEORY AND KNOWLEDGE-BASED COMPETITION: A GROUNDED THEORY LOOK AT HIGH-TECH KNOWLEDGE STRATEGIES

by

JOSEPH G. GERARD

(Under the Direction of Ann K. Buchholtz)

ABSTRACT

This dissertation serves three major functions in strategic management literature. First, Michael Polanyi's philosophy of knowledge is reexamined and applied to organizational assets and their use under strategy's knowledge-based and resource-based views. Second, theory-building takes place using exploratory and explanatory qualitative analysis to inform management theory. Third, a quantitative content analysis is performed to compare low- and high-performing organizations' sustained competitive advantage evaluated through Barney's (1986; 1991) indicators of sustained competitive advantage value, rareness, inimitability, and nonsubstitutability. Specifically, six hypotheses are tested using the Wilcoxon-Mann-Whitney non-parametric statistical test for paired rankings. Strong support for the notion of sustained competitive advantage and difference between strategic language content between low- and high-performing organizations is found. This study provides one of the first tests of some basic assumptions of knowledge- and resource-based views as well as on of the first tests of sustained competitive advantage.

INDEX WORDS: Explicit and tacit knowledge, knowledge-based competition, knowledge-based strategy, sustained competitive advantage, high-tech organizations, value, rareness, inimitability, nonsubstitutability, knowledge-based view, resource-based view, Polanyi, epistemology.

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JOSEPH G. GERARD

B.A., The California State University, Los Angeles, 1990

M.B.A., Arizona State University, 1997

M.I.M., American Graduate School of International Management, 1998

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements of the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2003

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JOSEPH G. GERARD

Major Professor:	Ann K. Buchholtz
Committee Members:	Allen C. Amason
	Melenie J. Lankau
	Marcus M. Stewart
	Karen E. Watkins

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
December 2003

DEDICATION

This work is dedicated to my family:

Reena Elizabeth Lederman Gerard who has been my partner in many adventures including Seattle, The Wedding, The Honeymoon, Phoenix, Marriage (in progress), The In-Laws, Families of Origin, Childbirth, Parenthood, Graduate School, Comprehensive Exams, and The Dissertation

Aidan Gabriella Lederman Gerard who has taught me more at four years of age than any other individual I have met. She's funny, intelligent, sensitive, caring, and strong – and a great daughter.

Dulce because she's such a good dog and the best running partner a man could ask for. She's very insistent.

ACKNOWLEDGEMENTS

Beyond my family I owe a great personal and professional debt to my friends and colleagues from the Management Department at The University of Georgia. My “dream committee” was as great as it was not just because they were a diverse group of thinkers from different academic backgrounds but also because they are quality people who were generous with their time. Ann, my advisor, dissertation chair, mentor, role model, and friend is unlike anybody I know. Ann talked me in to focusing on a topic I absolutely loved instead of taking the safe and “easy” path. She was the reason my dissertation happened in its current form with a topic that sat so well with me. Allen’s professional advice was always on-the-mark. Whether saying how to make a presentation more impactful or pointing out the two or three things an essay absolutely needed, his economically short, sweet, and to-the-point professional advice made quite an impact. Allen’s expert and timely use of other more colorful verbiage too was the best thing since sliced-bread or beer-in-a-can. Melenie and Marcus brought an organizational behavior mind-frame to my dissertation that ended up very strongly influencing the design of the interview protocol as well as its qualitative and quantitative content analysis. Both Marcus and Melenie also were very generous with their time spent helping me to understand survey-based research which did not make it into the dissertation. I spent about six months bouncing between their two office doors. While all my committee members made their mark on the dissertation, Karen’s input early on set us all down an interesting path that we, in the management department, would in all likelihood not have lead toward qualitative data collection and the critical incident technique. She provided yet another unusual twist to the dissertation that bore unexpected fruit.

I have to thank all of The Terry College's Management Department Ph.D. students for doing what we do best - suffering and losing what little sanity we had upon entrance to the program. I've heard that the goal of really good programs is to "break" the minds of their students "because once they're broke, they have more room for other stuff!" Thankfully, none of us had to go it alone. Physical and mental health begin to return between the acceptance of the first position and the approach of graduation. Special thanks to everybody for those little things that made the program better:

- Bryan Shaffer - for Freecell, a great Lumburg impression, and outspending me at Starbucks.
- Mark Ciavarella - for data collection, putting your foot down on Compadres, your great Amish sense of humor, and never being too humble.
- Hettie Richardson - for making us all look good by readjusting that bar. Hey, like we needed the stretch!
- Matt Rutherford - for your meat-and-potatoes logic, teaching evaluations that couldn't be beat…really, your passion for Barberitos burritos, and looking nonchalant no matter what.
- Bryan Dennis - for spinning and smoking, breaking bones and tearing cartilage and getting back up again. Never say never again! You're the older version Sean Connery of the Ph.D. program.
- Bob Carton – for Thanksgiving dinners, The Big Green Egg, and two porpoises in a corral , one with a top hat and the other wearing a Stetson.
- Carl Betterton – for the dustless office, desk feng shui, and an eye for quality.

Thanks to all the Terry College's Management Ph.D. students for your help. I sure did miss being around my last year when I was exiled to the Bank of America building.

Thank you Dana and Roscoe for looking out for the "little people."

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CHAPTER 1

INTRODUCTION TO THE DISSERTATION

This dissertation is essentially composed of two essays. The first essay is found in Chapter 2's, "Knowledge and the theory of tacit knowing: A non-dichotomous perspective for knowledge-based organization and management theories" and focuses solely upon theoretical issues. The second essay is Chapter 3's, "Building theory in knowledge-based competition: A resource-based look at explicit and tacit knowledge in organization" which takes an empirical look at knowledge-based competition using the foundation concepts the first essay introduces. This grounded theory approach thus utilizes a known and logically established theory as a measure against which to examine the more real-world practice whereby organizations and their individuals use knowledge to compete.

The theoretical work in Chapter 2 focuses upon issues surrounding Polanyi's widely-used but poorly understood "tacit knowledge" concept by more closely examining the root theory Polanyi provides as the context for this concept (Polanyi, 1966). Chapter 2 therefore examines Polanyi's epistemological theory of tacit knowing and, within that theory's framework, Polanyi's personal knowing concept (Polanyi, 1958). This paper's elaboration of the theory of tacit knowing distinguishes the theory from other knowledge-based theories by highlighting its more dynamic conception knowledge. Instead of knowledge conceived of as a static product of learning or experience, knowledge is defined by an active "knowing" which may change (i.e., augment, clarify, solidify, or otherwise shift) depending upon context. This perspective recognizes knowing (the verb) as being set within a specific time and space and subject to

various influences versus knowledge (the noun) that is viewed as a more constant, almost physical object or asset. Personal knowing takes this one step further to recognize the individual and social aspects of knowledge and knowing given the human condition. While personal knowing appears to focus upon the individual from a psychological perspective, most likely due to the field of psychology's influence on philosophical thought, psychology-based language is always employed under the assumption that individuals are inextricably tied to their environments by social forces. That is, no one individual exists without reference to the complex, overarching, and influential social communities to which that individual is bound. Personal knowing theory is also important, then, in knowledge-based studies because it does not separate individual from group as is commonly done because of the predominant foci of the respective fields of psychology and sociology. It provides an effective bridge across the psychology-sociology divide that causes academic work to fall into either individual or group-based perspectives.

The empirical work in Chapter 3 is supported by grounding in tacit knowing and personal knowing theories presented and elaborated in essay one. This theoretical grounding results in special attention paid to constructs and their operationalization in various spheres. First, explicit and tacit knowledge are related because they are both part of a larger construct known as tacit knowing but they are measured separately because they are conceptually distinct constructs themselves. The result is the measurement of explicit knowledge where it is normally ignored and an expressed set of assumptions about their relatedness (especially through personal knowing) where such relationships are solely dichotomous in nature. The result is a more finely tuned conceptual and empirical treatment of explicit and tacit knowledge than has previously been employed in knowledge-based research – owing to a more faithful interpretation of

Polanyi's core theories than has been used in the past. Second, the empirical work in Chapter 3 contains both theory-building and theory testing components with regard to knowledge in organizations, especially relevant to knowledge-based and resource-based theories. From a theory-building perspective, the use of tacit knowing and personal knowing theories has provided new insights into the status of knowledge as a primary organizing force as is the case with knowledge-based theory or the ability of knowledge to sustain competitive advantage as the resource-based view proposes. This is evident in findings within Chapter 3 concerning the interpretation and role of concepts such as organizational constructs like resources, competition, performance, organization, and strategy. This is, in many ways, unsurprising if we consider that a major change in perspective based upon knowledge-based and resource-based views is likely to enact or highlight changes in perspective in other key constructs. For example, if the organization's reason for existence and rate of growth is theoretically tied to knowledge as its key driver, then it is likely that knowledge will also change the way and organization's strategy is viewed under such a theory. Much past theory is likely to be explained very differently under such a perspective – and this is supported in the theory-building efforts of this work as well. Chapter 3's theory-testing perspective focused almost exclusively on the tie between performance and sustained competitive advantage as these related to empirical indicators or drivers of sustained competitive advantage which included value, rareness, inimitability, and nonsubstitutability. Because knowledge, under the resource-based view, is theoretically the most valuable of firm assets, the strength of the associations between value, rareness, inimitability, and nonsubstitutability with sustained competitive advantage should be measurable. Additionally, because these relationships are critical within the resource-based view especially, a correlation between those drivers and performance in the form of sustained competitive

advantage should be evident in a test of those relationships. This was supported by the empirical findings presented at the very end of the chapter.

The findings of the theory-building and theory-test portions of the empirical sections of the dissertation support the theoretical value of tacit knowing and personal knowing theory. First, a more fine-grained look at knowledge that included explicit and tacit elements reveals aspects of knowledge that are useful in understanding the functioning of knowledge-based organizations and the competitive act using knowledge resources. Second, tacit knowing and personal knowing theories offer different explanations of the functioning of knowledge-based organizations and the knowledge-competitive act without violating assumptions made by knowledge-based and resource-based theories. In addition to supporting and building upon assumptions, the utilization of the theories elaborated in essay one appears to better explain organizational and strategic behavior and allow deeper exploration of those topics. Finally, the use of exploratory and explanatory content analysis for the empirical portions of this dissertation have built nicely upon existing theory while executing tests on that theory – especially the relationship between value, rareness, inimitability, and nonsubstitutability and performance – that have not been possible in the past. The dissertation uses the theory from the second chapter to inform the empirical work and interpretation of that work in the third chapter to provide what should be a useful expansion of tacit and personal knowing theories from an epistemological perspective while adding to the practical application of knowledge-based organization and strategy theories in management research. Additional implications for theory and practice are discussed in Chapter 4 to bring the dissertation to its conclusion.

CHAPTER #2

KNOWLEDGE AND THE THEORY OF TACIT KNOWING: A NON-DICHOTOMOUS PERSPECTIVE FOR KNOWLEDGE-BASED ORGANIZATION AND MANAGEMENT THEORIES

Abstract

An over-reliance on dichotomous thinking has impacted the emergent state of work in knowledge construct development. This, added to the infrequent expression of supporting assumptions and their impact on subsequent empirical testing confounds our understanding of knowledge-based investigations. In essence, a less-than-perfect translation of theory to practice and the subsequent interpretation of practice by theorists have slowed the development of emergent knowledge research. This sometimes leads to cognitive "discomfort" or "unease" for those dealing with such knowledge-based investigations. For example, even though reliance upon knowledge's "tacit" aspect in firm and strategic knowledge studies continues to grow, it also faces increasing criticism (Acar & Burns, 2001; Gerard, 2001; Gray, 2001; King & Zeithaml, 2001; Kogut & Zander, 1992) both for its utility and its falsifiability (Bacharach, 1989). Different conceptions of knowledge present in other fields, such as the philosophy and sociology of knowledge fields, offer a rich source of alternative frames that should enhance our understanding of knowledge in organizational and managerial theory and practice. This paper introduces a theory based upon Polanyi's theory of tacit and personal knowing to advance one such alternative of a *connected* and *related* rather than dichotomous perspective on tacit and

explicit knowledge. (Keywords: Organization Knowledge, Strategic Knowledge, Tacitness, Explicitness, Tacit Knowing)

Polanyi and Tacit Knowledge

Tacit knowledge is often identified as a key intangible resource (Jacobson, 1990) and primary strategic attribute of certain human resources (Coff, 1999). However, like many intangible resources the question arises as to whether tacit knowledge may be a source of sustained competitive advantage (Barney, 1986b; Barney, 1991). If tacit knowledge is indeed an intangible, can we then observe and discuss tacit knowledge and comment on its utility for organizations? Many researchers and practitioners, who base tacit knowledge's value within organizations on its complexity and opacity, fail to explain how tacit knowledge helps to sustain firm competitive advantage (Baumard, 1999: 2).

The primary purpose of this article is to introduce the tacit knowing framework. This paper's framework uses Polanyi's tacit knowing theory (Polanyi, 1958a/1962; Polanyi, 1958b; Polanyi, 1966), which argues that a dynamic and complex relationship exists between explicit and tacit knowledge. While various uses of the terms tacit and explicit knowledge appear in practical and theoretical literature, they often do not possess the dynamic suggested within this paper. This particular viewpoint on tacit knowing (1) provides a unifying framework for tacit and explicit knowledge that adds clarity to organization knowledge discussions in general, and (2) more usefully illustrates how knowledge may translate to knowledge-based firm practice.

These assertions are supported within the paper by employing the tacit knowing framework in conjunction with the resource-based view's "empirical indicators" of sustained competitive advantage (Barney, 1991: 106). The tacit knowing viewpoint helps clarify apparent contradictions in the theoretical and practical treatment of tacit and explicit knowledge in a firm's

quest for sustained competitive advantage. Testable propositions relating explicit and tacit knowledge to firm performance are developed, illustrating the utility of both the framework and the tacit knowing assumption. Implications for research and practice are generated, and recommendations for future research are provided.

Redefining Tacit Knowledge

This section distinguishes Polanyi's dynamic treatment of tacit knowledge - that employed within this paper - from various other definitional treatments of tacit knowledge. The uses of tacit knowledge in organization knowledge and other literature are not only diverse; they frequently operate under different assumptions that impede the application of theory and transfer of ideas. Divergence in use, meaning, and understanding of the tacit knowledge term can lead to very different conclusions by organization knowledge theorists and management practitioners. One of the advantages to using Polanyi's theory in the tacit knowing framework is the clarity it affords to tacit knowledge discussions. Some of the more common uses of the tacit knowledge term are presented within this section to draw attention to the range with which tacit knowledge may be understood and clarify its meaning within the tacit knowing framework.

Tacit Knowledge Defined

The most frequently used description of tacit knowledge is "we can know more than we can tell" (Polanyi, 1966: 4). This highly portable statement was never intended by Polanyi to stand alone as a definition of tacit knowing. For one thing, the ambiguity of the phrase used in isolation leads to the creation of many different definitions of tacit knowledge that may not mean the same thing to their users. The "we can know more than we can tell" declaration was intended to serve as an appetizing introduction to his more complex theory of tacit knowledge that he designed to reconstruct the western modernist view that knowledge is and must be explicit in

nature (Gill, 2000). Under such a view, any definition of knowledge necessitates full articulation and objectivity or, as Gill points out results in a condition whereby one only "knows" when one can say what one knows (p.52). The wide-spread use of Polanyi's easily comprehensible surrogate definition of tacit knowledge combined with the theory's idiosyncratic terminology have undoubtedly slowed the adoption of Polanyi's more complex and ultimately more useful theory of tacit knowing.

Polanyi's use of the word 'tacit' to label his theory may also have contributed to the inconsistent use of both tacit and explicit knowledge. This is because tacit, as it is normally understood, is highly dichotomous. Unfortunately, as Ferreiro (1994: 179) states, the dichotomy conveys the meaning of a number of other non-homogeneous dichotomies. Tacit knowledge, when treated as a polar end to a continuum, may be linked with either explicit knowledge or some other supposed opposite as its antonym to suggest a meaning congruent with unconscious versus conscious (i.e., available to awareness), idiosyncratic versus shared (i.e., expressed through socially shared symbols), or "common sense" (i.e., socially shared) versus scientific knowledge, just to name a few. This would make the tacit part of tacit knowledge synonymous with things like unconscious, idiosyncratic, intuitive, or common sense knowledge. These terms are clearly not synonymous within the context of Polanyi's theory (Berg, 1994; Gill, 2000; Polanyi, 1966; Sanders, 1988). Tacit knowing and knowledge for purposes of discussion within this paper should not be confused with unconscious knowing (i.e., the type of knowledge that, even while in use, is unknown to the knower), pre-conscious knowing or non-conscious knowing (Casey, 1999; Clement, 1994; Hatsopoulos & Hatsopoulos, 1999: 141; Nonaka & Takeuchi, 1995; Schelling, 1968). My use of Polanyi's tacit knowledge model for this paper provides a non-

polar expansion of the tacit knowledge concept using a more detailed application of Polanyi's theory than may be found in other works.

In cognitive psychology, for example, the term tacit knowledge is widely used by a group of researchers engaged in intelligence testing and job performance prediction (Sternberg, Wagner, & Okagaki, 1993; Sternberg, Wagner, Williams, & Horvath, 1995). While this group cites Polanyi's 'know more than we can tell' statement and frequently use of the term "tacit knowledge" to define their approach, they equate tacit knowledge with Ryle's "know-how" (Ryle, 1949) and, more frequently, to practical or "everyday" intelligence (Mercer, Gomez-Palacio & Padilla, 1986; Sternberg et al., 1993; Sternberg et al., 1995; Sternberg & Wagner, 1986; Wagner, 1986; Wagner, 1987). Polanyi's theory of tacit knowing, however, uses *both* intellectual and practical knowing (Polanyi, 1966: 7) by integrating Ryle's "know-how" *and* "know-what" concepts in the model (1949). Polanyi's theory, therefore, employs a much broader portion of Ryle's philosophy than does the everyday intelligence group. Polanyi's theory also more explicitly emphasizes Merleau-Ponty's conception of knowing that emphasizes a relationship between body and psyche (Merleau-Ponty, 1962: 157, 166; 1963). These emphases in Polanyi's tacit knowing theory are included here to confer a unique multidimensionality to the paper's framework.

A final important contrast between Polanyi's conception of tacit knowing and other literatures concerns their respective motives. Work on everyday intelligence, for example, has focused primarily on the development of a testing instrument to broaden or complement general intelligence (IQ) testing. Polanyi's work, on the other hand, deals with a more general question of how people come to know what they know - that is, how knowing happens. This paper's framework advances theory in organization knowledge by bringing much-needed dimensionality

to the discussion while employing a rigorous model that directly addresses the fundamental question of how people come to know what they know.

Introducing the Tacit Knowing Framework

Polanyi's tacit theory is a seminal work in knowledge-related fields due, in part, to its practical and common sense appeal. More important, however, are the theory's sound logic and basic assumptions that make Polanyi's work a unique contribution to the theory of knowledge literature (Grene, 1977; Prosch, 1973: 201; Sanders, 1988). In constructing the framework, Polanyi's basic assumptions and work of tacit knowing theory scholars (Gill, 2000; Grene, 1977; Prosch, 1986; Sanders, 1988) are employed. Following some of their examples, this paper limits its use of Polanyi's idiosyncratic terminology to provide greater access to Polanyi's underlying theory and to avoid some of the discord and confusion that has surrounded tacit knowledge. The straightforward language of the framework should encourage the adoption of a more dynamic view of the tacit and explicit knowledge relationship based upon a model that is more representative of the human condition.

The Framework's Central Assumptions

The framework is based upon two sets of assumptions central to tacit knowing theory. These include assumptions concerning:

The Tacit/explicit knowledge relationship

- True discovery cannot be satisfactorily explained using explicit language.
- Tacit knowledge underlies and logically precedes explicit knowledge.
- It is impossible to make all knowledge explicit.

The personal nature of knowing

- Knowing is a personal, intentional activity.
- Awareness, activity and cognition (personal coefficients) are central dimensions of personal knowing.
- Personal coefficients are integrated and inseparable from the act of knowing.
- All personal coefficients are present in the act of knowing.
- All personal coefficients include pre-verbal content.

The first set pertains to the nature of the tacit and explicit knowledge relationship. These assumptions pertain most directly to the rectangular boxes labeled knowledge, tacit knowledge, and explicit knowledge in Figure 2.1 below. The second set of assumptions relates intentional human involvement as critical to the act of knowing. These assumptions pertain most directly to the elliptical items in Figure 2.1 labeled focal object, subsidiary clues, and coherent pattern. These items are representative of a very personal component of human experience that essentially connects tacit knowledge with explicit knowledge. The integration of assumptions about the tacit-explicit relationship with assumptions about the personal nature of knowing cause the framework to function as it does. Our understanding of this integration along with details about each set of assumptions allows us to put the framework to use.

The Tacit-Explicit Relationship

The connections between tacit knowledge and explicit knowledge with knowledge in general (again, represented by their corresponding boxes in Figure 2.1) depend upon the extent to which the human animal, through experience, perceives and is capable of understanding a "hidden reality" (Polanyi, 1958a/1962: vii).

Beginning with the first set of assumptions, then, and working our way downward through the bulleted list, true discovery, including that which progresses science, cannot satisfactorily be explained through explicit language. This means that no matter what we may know about a certain subject explicitly, discovery must pull upon that which we know non-explicitly or tacitly. It is for this reason that the explicit knowledge box in the framework is smaller and within the confines of the tacit knowledge box. This argument is also related to the second assumption, which states that unspecified or tacit knowledge underlies and logically precedes explicit knowledge. The explicit knowledge box is therefore represented within the tacit

knowledge box. The next assumption is that it is impossible to make all knowledge explicit. Some non-explicit knowledge when made explicit changes in meaning. That is, the change of state of some knowledge from tacit to explicit also changes how that knowledge is understood. The conversion, in effect, also transforms our understanding. The tacit knowledge box logically should, in the framework layout, always contain and never be congruent with the explicit knowledge box. This would imply that no further discovery is possible. Additionally, the knowledge box, it should be mentioned, recognizes some greater knowledge, maybe even an ultimate truth, for which societies of humans are in search. This aspect of the framework was included to accurately represent a Polanyian view of "personal knowledge" which is neither traditionally objective nor traditionally subjective. Polanyi describes this more as a fusion of the personal and the objective (1958a/1962: vii). Although his complex arguments are beyond the scope of this paper, some feel for the personal knowledge concept can be found in the following section.

Personal Knowing

That knowing is a personal, intentional activity is another assumption central to tacit knowing, and is the first assumption in the second set in the bulleted list above. This personal aspect factors human experience into the knowledge equation through the additional assumption that human awareness, activity, and cognition are central components in human acquisition of knowledge. These three factors (awareness, activity, and cognition) are discussed at length by Gill (2000: 31-69) and are part of what Polanyi calls the "personal coefficient" necessary to all knowing (Gill, 2000: 53) - another assumption. One reason for this is that they are descriptive of the human condition during the discovery process, i.e., the course of coming to know what we know. The awareness, activity and cognition factors are inseparable dimensions of tacit knowing

that manifest through a simultaneous mixture of focal and subsidiary awareness, bodily and conceptual activity, and tacit and explicit cognition. This inseparability is the last assumption listed in the second group of assumptions.

Because these personal coefficients are assumed central to knowing, they serve as useful tools in the analysis of the tacit and explicit knowledge relationship. For example, persons are more likely, in attending to these three personal factors, to direct their focus toward likely explanations for the relationship between tacit and explicit knowing. It is also more likely that an examination of the relationships between each of the personal coefficients themselves and their components would result in a better understanding of the relationship between tacit and explicit knowledge itself.

Adapting an example from Gill (2000: 32), as a reader focusing on the meaning of the very words on this page, you are but subsidiarily aware of the fact that they are written in English, and that they follow certain rules of grammar, and so on. In framework terminology the focal object is the meaning of specific text while subsidiary clues consist of things like "written in English," "adjectives generally precede the nouns they describe," and others - including things not yet made explicit and things not specifiable. These two items address the awareness dimension (focal and subsidiary) related to this type of knowing. In terms of the activity dimension (bodily versus mental) while you are engaged in the mental act of reading, you are focally aware of the markings on the page, but rarely more than subsidiarily aware of the movements of the muscles controlling your eyes (a bodily activity). Tacitness and explicitness in cognition can be described primarily using a combination of the awareness and activity dimensions.

While all three dimensions are important, a narrowing of our attention on any set of its dimensions may serve as a helpful bridging mechanism for the theorist or researcher hoping to generate insights. The framework encourages and can even force extensions of the researchers' perspectives toward their integration with other fields of study. Figure 2.2 below highlights the focal and non-focal perspective to illustrate my point.

As we focus upon any particular activity whether it is understood as primarily attending to some physical task like raking up leaves or making a difficult decision, we rely upon non-focal clues. In the instance where the raking up of leaves is our focus, we are only subsidiarily or non-focally aware of our relationship with the rake. The rake becomes, to a certain extent, an extension of the human body and a very personal experience, via the grip of hand on wooden handle, the sensation of soil and grass and leaves transmitted by vibrations up through the handle, and so on. A coherent pattern of the entire experience, represented by the darkened oval in Figure 2.2, is only possible through the integration of focal and non-focal awareness (Gelwick, 1977: 71). Thus, we discern pattern only in relation to the simultaneous focus upon task, decision, or some other aspect of life while relying upon those subsidiary clues. A change in our use of the rake – essentially a change in focus - to grab something from a tree or dig channels in a Japanese rock garden changes the way we make meaning of and understand that rake. Then, as meaning is made, explicit language is used to represent aspects of the experience. However, the generation of meaning through the production of explicit linguistic impressions does not negate the knowers' tacit understandings of the experience. Explicit linguistic support does, however, become a source of focal and non-focal information of that knowing. Explicit language is therefore created in part by the pre-explicit knowing and by any subsequent production of meaning in some way related to the knowing event.

While it may be obvious that any physical activity takes a certain amount of mental activity, that any mental activity requires some corresponding physical activity may not be so obvious. For example, the extreme case of sitting still and thinking, though it looks like non-activity, requires physical exertion to maintain stability. Sitting in one place for too long gets uncomfortable and the physical effort of "just thinking" increases. No matter how pure the physical or mental activity seem, such activities will necessarily and automatically include the other. This is why the framework assumes reciprocity and integration between bodily and conceptual action. These dimensions are central to the human experience and must impact human knowing. This aspect of Polanyi's personal knowledge readily identifies the human element in the act of knowing and acknowledges that the "mind-body reality constitutes a unique mode of existence in the world as we know it" (Gill, 2000: 38).

To summarize, tacit knowing is accomplished through a process Polanyi calls indwelling or "immersing oneself in the particulars of subsidiary awareness by means of embodied activity until these particulars come together as a meaningful whole in an 'integrative act.' When this act takes place, the knowing agent interiorizes the holistic Gestalt, or locus of meaning, and thus can be said to be indwelt by it" (Gill, 2000: 52). This effectively links the above assumptions to the framework and explains the bond between elements within the framework, which means we can now use the framework in an example.

Applying the Framework to a Mysterious Face

Polanyi states that we may know the face of a friend and even pick that face out among a crowd of a million faces. But we still may not be able to describe how we go about doing this (Polanyi, 1966: 4). Thus our long-term familiarity with a face apparently allows us to understand something about it. Yet what that is largely remains a mystery. Thankfully, our inability to

explain does not hinder our ability to effectively use what must be a rather large body of tacit knowledge.

The recognition mystery is assumedly true with a famous face as well. The face of Leonardo da Vinci's Mona Lisa, for example, is by many accounts the most widely recognized face ever (Gombrich, 1995: 300; Kurtz, 1987: 2; Storey, 1980: 5). What is it about her face that supports its widespread recognition? Can you list specific items? That is, can you explicitly state what it is about her face that you recognize as distinct from other faces? Is there something about her coloring or is it some other feature? Maybe it is a combination of things, rather than isolated features, that you actually notice. If so, what is this combination? Do you think your list of explicit terms will be similar to others given the same task? It soon becomes evident that describing even this bit of tacit knowledge explicitly is a chore of considerable size.

Perhaps the introduction of a puzzle restricted to but one aspect of the Mona Lisa's face will simplify things - especially since explicit solutions to the puzzle already exist.[1] It seems that because her facial expression is hard to determine it is hard to tell whether she is smiling or whether she is not (Gardner, 1986: 604). "She seems to change before our eyes and to look a little different every time we come back to her…sometimes she seems to mock at us, and then again we seem to catch something like sadness in her smile" (Gombrich, 1995: 300). Different groups (e.g., artist, art historian, scientist) have provided what seem like reasonable explanations to this problem. Some of their responses to this dilemma are found below where they are discussed in terms of the tacit knowing framework.

The first type of response comes from the artist-technician's perspective and is highly skill and process-oriented. In describing the smile, for example, much attention is paid to the

[1] I also recommend having a good copy of the portrait close by as it will add to the experience and allow you to scrutinize the mystery for yourself.

'sfumato' effect - Leonardo's own invention, which consists of blurring outlines and employing mellow colors that allow a commingling of form (Gombrich, 1995: 303). The sfumato technique used on the Mona Lisa, when examined under X-ray, reveals innumerable applications of thin, superimposed layers of glaze. This emphasizes the unparalleled dexterity and patience demanded from the artist to skillfully bring about the effect (Bramly, 1996: 11). From the artist's perspective the use of chiaroscuro, the arrangement and contrast of dissimilar qualities like light and dark, is also important in explaining the mystery of the Mona Lisa's smile. This technique, it is said, was often used by Leonardo to intentionally disguise the human psyche (Gardner, 1986: 604; Merriam-Webster's, 1999).

The artist-technician's response also pays close attention to the act of rendering expression, the basis for which rests upon details in the corners of the mouth and eyes (Bramly, 1996: 68-69; Gombrich, 1995: 303). According to Gombrich, the mystery of the smile is in large part explained by indistinctness in these details, such that we can never pin down the Mona Lisa's mood (1995). This perspective, then, is concerned with the procedures and prerequisites skills required to produce the ambiguity of the "smile."

The historian's perspective, on the other hand, is less practice-oriented and more concerned with context. Explanation here seems to center upon Leonardo's role as artistic pioneer in 15th century Europe, or his distinct set of experiences and idiosyncratic talent. For example, Leonardo by his own account painstakingly dissected at least thirty cadavers. This is suggested by the historian to be responsible for Leonardo's advanced understanding of complex facial muscles and, consequentially, a possible reason for the enigmatic smile (Kurtz, 1987: 133). Bramly, on the other hand, suggests that the smile is such a mystery due to Leonardo's practice

of cataloguing facial features one by one, a system much like the Bertillon system used by police sketch artists today (1996: 19).

Other historian-based responses focus upon a societal interpretation of the art. For example, Gardner suggests that the romantic nineteenth century may have made too much of the enigma of the "smile" in the first place (1986: 604) while Bramly points out that the Mona Lisa's fame only really began in 1830, and exerted no great fascination with generations prior to that point (1996: 62). The implication almost seems to be that the mystery of the smile is an artifact of social construction. From the historian's perspective, then, the effect of ambiguity is a result of Leonardo's pioneering role in history, his development of idiosyncratic skill, or society's construction of a mystery where one need not exist.

An example of the scientist's perspective was found in a recent article in the science section of the ***New York Times***. According to the article, the answer to Mona Lisa's puzzling smile is best explained by recent work on visual processing including computer-aided manipulations of the Mona Lisa that simulate human physiological processing (Blakeslee, 2000). The author of the article interviewed Harvard neuroscientist Dr. Livingstone who, upon examining the famous image, experienced a sort of flickering sensation. According to Dr. Livingstone, the Mona Lisa's smile comes and goes because of how the human visual system is designed, not because the expression is ambiguous. The central area of the eye (the fovea) is the part that detects color, fine print, and detail while the area peripheral to the fovea deals with black and white, motion, and shadows. Dr. Livingstone says that whether or not we perceive a smile depends upon where our gaze is focused. When we look at Mona Lisa's eyes we are more apt to believe Mona Lisa is smiling and when we look at her mouth we are more likely to think she is not. This scientific perspective for the enigma, in this case a viewpoint provided by a

member of a field of science that focuses on perception and neurology, offers an unsurprisingly physiological explanation.

Although a number of other diverse perspectives and sound explanations exist, one final explanation will be given – that provided by Dr. Sigmund Freud (1916, 1964) in his psychoanalytical interpretation of the Mona Lisa's origins. According to Freud, the Mona Lisa's fascinating and puzzling smile was defined on the fabric of Leonardo's dreams which were based upon his childhood experience (1916: 85). This upbringing, among other things, included an overbearing and erotic love from his natural mother that led to Oedipal conflict and latent homosexuality (Freud, 1916: 85, 92, 94). Among the many products of his strong and conflicting emotions for his mother is the Mona Lisa's ambiguous smile. The psychoanalytic explanation, unlike the others, is rooted within the psychic interior of the painter Leonardo and explains more the human psychological source of the smile rather than an effect. Freud does touch on why the viewing public might find the smile unreadable, though. According to the psychoanalyst, Leonardo expressed in his art "his most secret psychic feelings hidden even to himself, which powerfully affect outsiders who are strangers to the artist without their being able to state whence this emotivity comes" (1916: 78-79). The psychoanalytic explanation brings its own unique perspective to bear on the mystery that concerns the psychic motivation of the painter himself.

When these perspectives are combined, what conclusions can be drawn about the Mona Lisa? What do we know exactly about her mysterious smile? Are we even sure she has a smile, or are we just as confused as before? Representatives from the above groups certainly do not appear to agree on a conclusion. Nor, does it appear, do they pull from the same body of evidence. Can we even hope to reach a conclusion by drawing upon other perspectives? That is,

would viewpoints offered by representative art critic, marketing specialist, professional printer and poet add something to our knowledge or would they serve to further confuse the issue?

Thankfully, my purpose has been to introduce the functionality of the framework and Polanyi's theory, and that these four perspectives look at the same phenomenon in different ways provides a nice test of the framework's utility. Conclusions supporting "evidence" by each representative group are listed in the first and second columns in Table 2.1, respectively. These are used below to discuss tacit and explicit knowledge and, especially, focal and subsidiary awareness. The third column pertains to the apparent emphasis given by each perspective. Each emphasis has the potential to enrich our understanding of the Mona Lisa phenomenon but there are even greater implications for our discussion of explicit and tacit knowing. Discussion of the third column underscores the value potential of each viewpoint for each of the other groups and thinking that gets in the way of realizing that potential.

A Focal and Subsidiary Look at the Enigma

A major assumption of tacit knowing theory is that all explicit knowledge emanates from our tacit understanding of things, what diSessa refers to as "machine under the façade" (1994: 51). In the above case, whether individuals were assigned to the task or came to it on their own, they all committed to explaining the mystery of Mona Lisa's smile and, in so doing, acknowledged there was a mystery to be solved. The identification of this or any problem, the motivation to attend to it, and the commitment to continue putting energy into its resolution all derive from a tacit understanding that a mystery does indeed exist (that something is happening) in the first place.

Each of the individuals in each of the representative groups at least shared this tacit knowledge and began their investigations with the same focal object, i.e., what is it with the

Mona Lisa's smile? What they did not share, however, was a congruent set of subsidiary clues. This led to differences in that integration between focal and subsidiary awareness and variation in the resulting emergence of pattern and coherence. Each group came to the meaning of the mystery differently and ultimately their understanding diverged. This deviation in understanding sometimes manifests itself in a shared explicit language that differed in meaning and sometimes resulted in the use or creation of explicit vocabulary that was altogether different. This explains why the neurologist says the smile is not ambiguous, the artist says it is, and the historian says the whole mystery was overblown beginning in the nineteenth century. That their conclusions contradict one another, however, is not so worrisome as the sense of finality that these conclusions appear to convey. Mixed with the high levels of contentment, faith, and rationality within any given field such decisiveness potentially stunts exploration and learning. Each group housing each perspective possesses an internal homogeneity in its tacit and explicit knowledge that will potentially limit its understanding of and undermine the legitimacy of each of the other perspectives.

The Enigma and a Look at Explicit Clues

The attention to a focal object, however, has brought these very diverse groups together at least in their interest in the same phenomenon. This means that while individuals across groups possess some idiosyncratic tacit knowledge they also possess some common tacit knowledge. This should result in some commonalities in their explicit expression of knowledge, especially between the painter and the art historian groups given the overlap in their training, and the bodies of traditional or inherited explicit knowledge they share.

What about the commonalities in the psychoanalytic and the artist-technician perspectives, though, or the similarities between neurophysiologist and the artist-technician

perspectives? The Freudian examination and explanation of Mona Lisa's smile focuses on the early development of the artist and its effect on his art. The result of the Freudian perspective in our examination of the Mona Lisa (see column three in Table 2.1) is a deeper examination of the linkages between Leonardo's past and present as well as an increased attention toward his interior life. Although psychology has generally informed the artist-technician perspective and has influenced the art in general, it is interesting that dialogue on Mona Lisa's mysterious smile in this article should represent the psychological perspective focused so heavily on psychoanalysis, neglecting other psychological viewpoints. There are, of course, many potential linkages between the foci of each perspective and opportunities to inform each perspective. This is true in the above case focusing on the Mona Lisa riddle and in other areas of their work as well.

A comparison of the conclusions each group makes is enlightening in and of itself. The tacit knowing framework, however, goes further in pointing out many prospective linkages between those conclusions by drawing upon an examination of focal and subsidiary awareness and other dimensions of the knowing experience to link the tacit with the explicit. Explicit knowledge may actually lock in commitment to a perspective that will lead to a restricted set of conclusions. For example, the term chiaroscuro is generally used to refer to contrast between light and shadow, but it can refer to contrast of a deeper variety. In Leonardo's portrait of the Mona Lisa, chiaroscuro also refers to a contrast between a wild and fantastic landscape and the Mona Lisa's composed expression and posture (Gombrich, 1995: 303; Storey, 1980: 14). A hypothesis forwarded by art historians is that this chiaroscuro also adds to the conflict the viewer experiences with the Mona Lisa and her smile. Only a neurophysiologist who also possessed a deeper understanding of the chiaroscuro concept (e.g., a broader definition, greater experience

with the concept) would successfully transfer some of that which was useful from that explicit and typically art-related term. This points to the caveat that even the apparently explicit has tacit roots that affect its transfer.

Two important observations deserve highlighting. First, even explicit items are rooted in tacit understanding so there is always more going on that meets the eye. One implication is that imitation and knowledge transfer may be more complex than previously thought. Two, even tacit knowledge is likely to generate some explicit evidence that helps to reveal that tacit knowledge in some way. Knowledge transfer should be more effective between individuals or groups that share similar bodies of tacit knowledge as well as similar sets of explicit clues. A better look at the relationship of tacit and explicit knowledge in the setting of a number of familiar business foci, both theoretically and empirically, should help to identify other costs and benefits as well. While most business literature has treated the explicit and tacit dimensions as dichotomous some studies appear to at least conceive of or consider other alternatives. A next logical step is to more openly state the assumptions underlying both conceptualization and operationalization of knowledge variables. Only then can it be clear that knowledge is actually being measured in a manner congruent with its conception. As Spender notes, models of mind and knowledge are "relatively naïve" and are still predominantly based upon a von Neumann utility theory computations (Spender & Eden, 1998: 4).

A strength of the tacit knowing model is the dynamic tension assumed to exist between tacit and explicit knowledge. For one thing, it allows its user to reframe current problems assumed to exist for both explicit and tacit knowledge in the literatures that employ it as a key variable. The assumptions it makes regarding a more complex tacit and explicit knowledge relationship allow deeper insight into knowledge issues without building a model that is overly

complex. Basic definitions of the explicitness, tacitness and other related variables, however, will need more careful construction and testing in order to branch out in the direction suggested within this paper.

Is explicitness the polar opposite of tacitness under the above-proposed alternative? That is, are things like formulas found in things like equipment or documents, or product specifications, patents, routines, and standard operating procedures (Choo, 1998: 112; Nonaka & Takeuchi, 1995) necessarily easy to communicate? Polanyi's theory suggests that knowledge perceived as explicit should also have its tacitness component that is somehow related to the explicit but will not exclusively represent that which is not formally expressed or that which is not codified (Choo, 1998: 111).

Many theory-building and research opportunities exist given the complexity of the knowledge topic. For example, a great need appears to exist for the use of a variety of investigative approaches to include rigorous qualitative, quantitative, and mixed methods. Research into knowledge as a topic and knowledge as an applied resource, process, or contextual phenomena appears essential to our better understanding of how knowledge resources may be combined with other knowledge resources, how knowledge shapes interactions between individuals and groups and if, as the knowledge-based view asserts, knowledge influences the size, scope, rate of and limits to growth, and functioning of the firm.

In a more practical sense, given that human intellectual involvement in the modern day delivery products and services appears to be growing, it would also appear that knowledge theory from many different perspectives (i.e., organizational, strategic, psychological, epistemological) would increase rather than decrease in both urgency and importance. Of course, this is a much grander scheme than simply testing tacit and explicit knowledge or building

competing or complementary theory. Within the tacit and explicit domain, opportunities exist to examine conditions under which the apparently explicit actually sits atop a vast support system of the tacit. Is there evidence to suggest that tacit and explicit knowledge can be studied in some instances more easily than in others? Are they indeed connected? Although the idea does hold some face validity, we may actually need to identify and differentiate between other types of knowledge as well. A good starting point for examining some of the above questions exists in "personal coefficients" said to connect individuals to knowledge and perhaps even indicate the type of knowing taking place.

The immediate opportunity exists for developing a more helpful measure of tacitness and explicitness which holds important implications for the measurement of knowledge in the management of strategic alliances, international joint ventures, knowledge transfer and best practices. Opportunities also exist for reconceptualizing knowledge in the management of international capital, technology and innovation – the focus of most work within project management and R&D research. Attitudes toward and conceptions of knowledge's tacitness and explicitness are unmistakable antecedents of managerial and strategic action. For the researcher, those same attitudes influence what is and is not viewed as scientifically valuable, measurable or, indeed, real.

Other areas that may benefit from a closer examination of knowledge are those economic theories of the firm that place special emphasis on knowledge as either a key resource or determinant of firm boundary and growth, in particular, the resource- and knowledge-based views. The former views knowledge as *the* principal resource responsible for firms' ability to sustain competitive advantage and the latter emphasizes how knowledge determines firm boundaries and limits its future growth.

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Knowledge

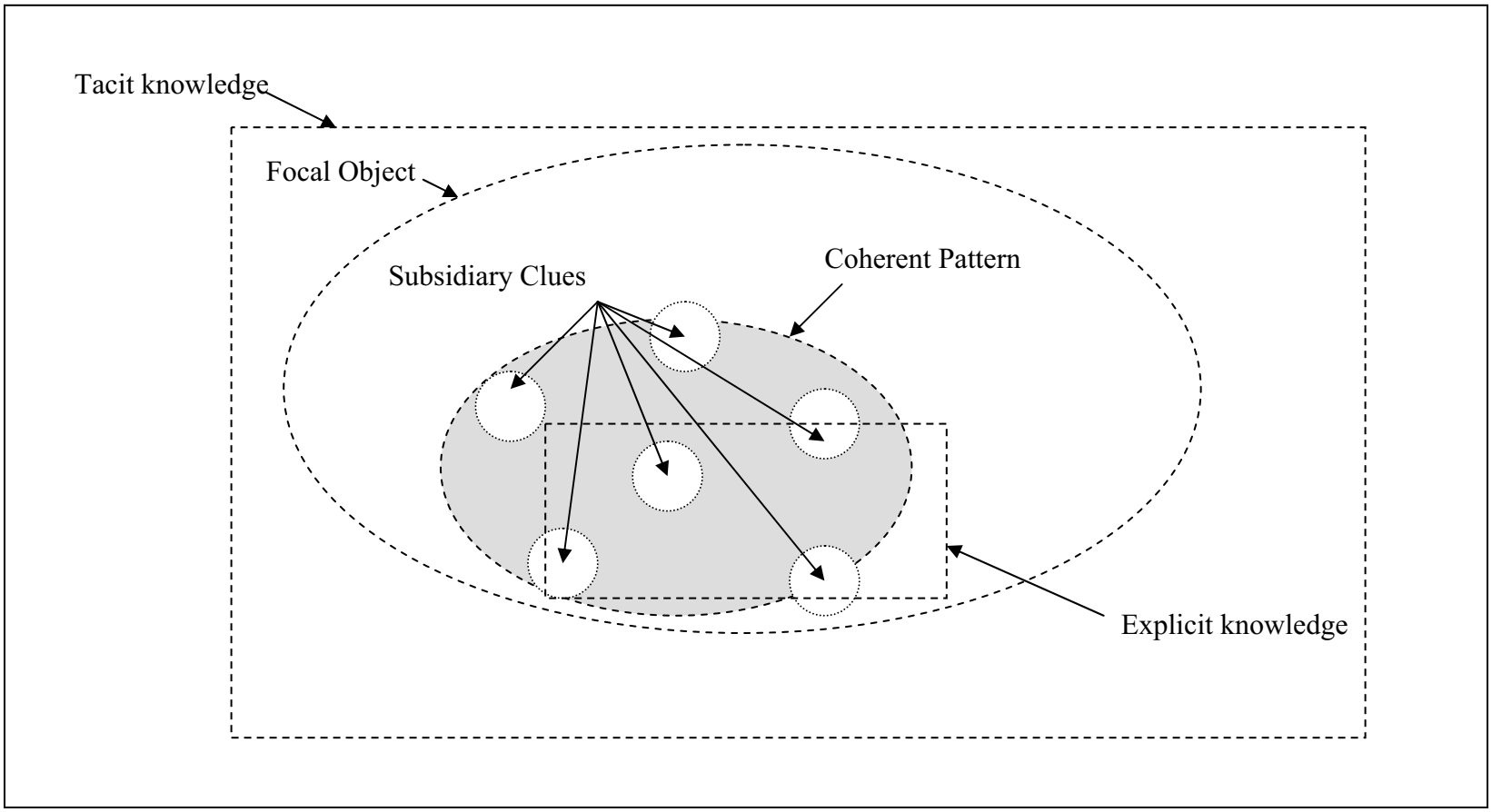

FIGURE 2.1
A FRAMEWORK FOR UNDERSTANDING PERSONAL AND TACIT KNOWING ASSUMPTIONS[a]

[a] Dotted lines indicate the ambiguity regarding the separation of entities in the model. The figure depicts neither causal nor linear relationships. The framework depicts neither relative size nor relative importance. Arrows above are used to clarify labeling.

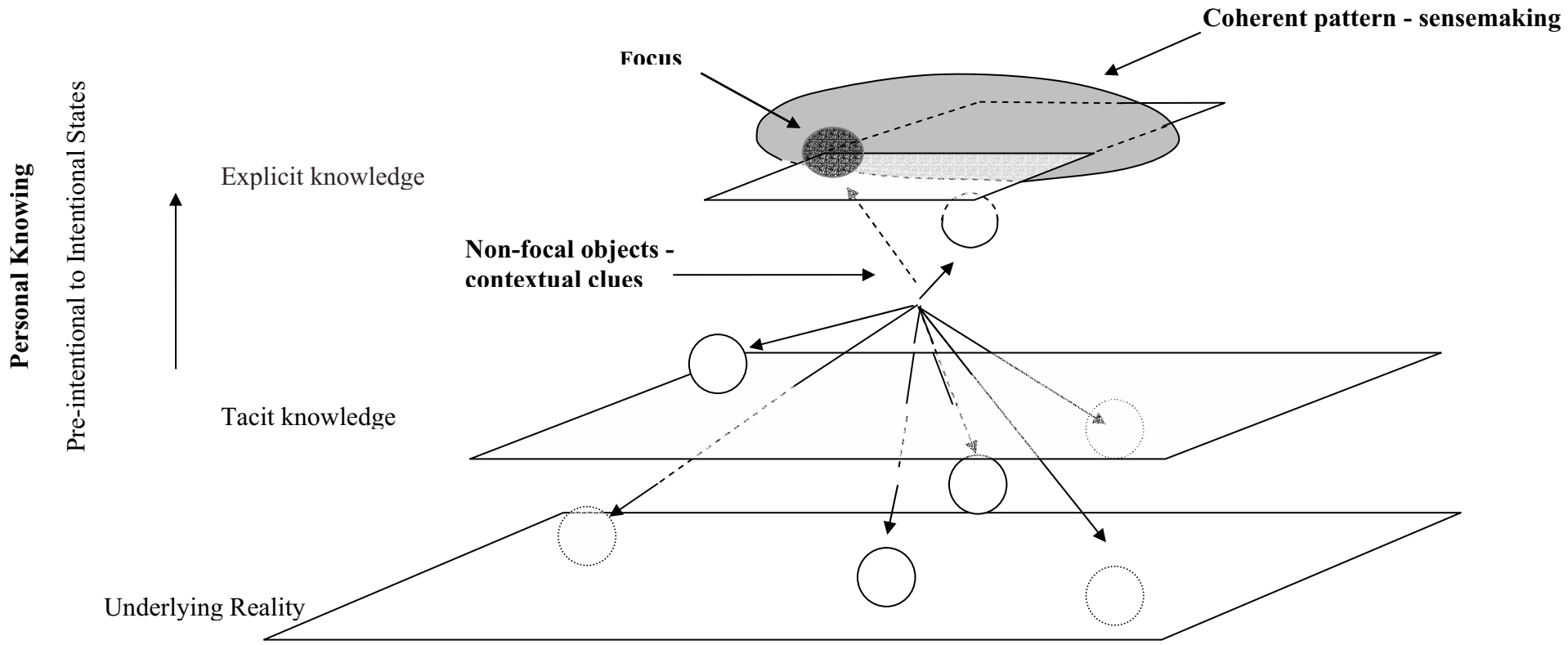

FIGURE 2.2
A FRAMEWORK FOR APPLYING PERSONAL AND TACIT KNOWING

TABLE 2.1
CONTRASTING VIEWS EXPLAINING THE ENIGMA AND NEW ATTENDANT FOCI

The Knower	Answering the Riddle	Key to Understanding	Some Suggested Resulting Foci
1. The painter	Smile painted to be ambiguous.	Style - chiaroscuro & sfumato. Details in composing expression - attention to eye and mouth. Attention to procedure	Communication between artist and public. Manipulation of audience. Exploration. Skill development.
2. The historian	Mystery behind smile artifactual. Advance in knowledge made smile possible.	Attention to historical context. Societal inventions. Ebb and flow of fads and other popular influences. Artist's personal history as engineer, interest in science, renaissance man, etc.	Focus on societal and historical influences. Look at advances in science. Examine consequences of discovery.
3. The neurophysiologist	Smile not ambiguous at all. Perception of the viewer to blame.	Attention to the sense organs of the viewer. Reaction to representations of shade and light.	Physiological look at the viewing public. Examine physical limitations of the public. Examine the interface between man and environment.
4. The psychoanalyst	Confusing smile a reflection of love & hate conflict toward mother. Homosexuality latent in artist.	Attention to past personal history of the artist. Dreams link artist to his past. Family history, childhood, parental relations, etc. Current behavior gives clues to past events.	Link present to past of individual. Link the internal private (and sometime unknown) world of the individual to the external world. Look at the influence the psyche exerts on action.

CHAPTER 3

BUILDING THEORY IN KNOWLEDGE-BASED COMPETITION: A RESOURCE-BASED LOOK AT EXPLICIT AND TACIT KNOWLEDGE IN ORGANIZATIONS

Abstract

One widely held assumption within resource- and knowledge-based views is that knowledge-based resources, especially those "tacit" in nature, are primary sources of sustained competitive advantage because of their intangibility. Because of their assumed importance, this paper takes a look at knowledge-based competition and its explicit and tacit components that relate to competitive success and failure, seeks evidence confirming or refuting resource- and knowledge-based assumptions about knowledge' primacy in defining both firm and firm strategy, and tests resource-based view hypotheses that superior awareness and knowledge resource use will exist in successful competitive knowledge incidents when compared to competitive knowledge incidents identified as not successful. Finally, this paper makes a contribution to knowledge-based competition by using an inductive, theory-building approach designed to advance understanding in the area of explicit and tacit knowledge in business. This is especially true as that knowledge pertains to an organization's sustained competitive advantage utilizing academe's empirical indicators (e.g., value, rareness, imitability and nonsubstitutability). Implications for general and strategic knowledge research and knowledge management practice are provided.

This paper begins to test the primacy of knowledge resources as a source of firm sustained competitive advantage (Barney, 1991, 2001) by examining incidents of critical knowledge-based competition as well as taking a more in-depth look at explicit and tacit knowledge in the strategic management of knowledge in business. Although knowledge's importance to firm competitiveness is often "recognized" by practitioners and holds face validity for researchers, how knowledge adds value to the firm remains, in large part, a mystery (Baumard, 1999). This study takes a closer look at the knowledge-resource and sustained competitive advantage relationship by examining the composition of each in turn. First, this paper employs an expanded conception of knowledge that assumes a more closely related but separate treatment of the explicit and tacit constructs central to much work in knowledge research (Gerard, 2001). This extends to the empirical "split" between explicit and tacit knowledge to ensure that characteristics of each are measured and that a more finely-tuned empirical treatment of explicit and tacit knowledge ensues. This empirical extension allows us to take a closer look at sustained competitive advantage and allows a deeper examination of the unique contributions that explicit and tacit each bring to the competitive use of knowledge. Second, the logic of treating each explicit and tacit construct separately has been empirically supported in a recent study (Gerard, 2003). Therefore, research suggests that, in addition to examining explicit and tacit knowledge's individual characteristics in greater detail, a deeper examination of their relationship to one-another is also merited (Gerard, 2003; Polanyi, 1966). A second important contribution of this paper is its deeper look at how explicit and tacit knowledge – both separately and together – help shape competitive advantage through knowledge-based competition.

This paper therefore focuses upon the central research question, "How do businesses successfully use knowledge to sustain competitive advantage?" by analyzing 24 critical competitive knowledge incidents based primarily upon interviews and supported by observation and survey data. The interview data is transcribed and content analyzed, in a qualitative sense, to further provide evidence concerning the secondary research question, "How do knowledge resources and strategic knowledge management behaviors compare in successful versus unsuccessful knowledge-based competition?" This paper tests the hypotheses that successful knowledge-based competition will be measurably different and statistically distinct from unsuccessful knowledge-based competition. Indeed, differences between successful and unsuccessful knowledge-based competition was found in both explicit and tacit terms.

Separate from this study's reported empirical findings, the inductive portion of the study yields sufficient additional and supporting evidence concerning the relationship between sustained competitive advantage indicators (i.e., value, rareness, inimitability, nonsubstitutability) and knowledge-based competition. With the combined use of inductive critical theory and content analysis, this study advances: (1) our understanding of the link between sustained competitive advantage and knowledge (via Barney's empirical indicators, Peteraf's rents); (2) our understanding of knowledge and competition through resource- and knowledge-based views; and (3) our understanding of the characteristics of explicit and tacit knowledge and their relationship to one-another as competitive forces within organizations. In essence, this study has provided one of the first tests of core resource- and knowledge-based view assumptions while at the same time advancing our understanding of knowledge "in action." Additionally, insights into the relationships between value, rareness, imitability and

nonsubstitutability with competitive advantage (a.k.a. sustained competitive advantage) have been provided by investigating the context of the strategic use of knowledge in organizations.

This study benefits from the use of interview, content analysis, and observation as data collection techniques and methodologies to advance study in knowledge, especially under the resource- and knowledge-based views, while responding to calls for more dynamic theory-building and testing. This study does, for example, better link its design, its findings, and its discussion to strategic management questions concerning "knowledge-based theories of competitive advantage, resource-based theories of the firm, resource-based theories of innovation, and resource-based theories of inter-firm cooperation" (Barney, 2001: 54). Additionally, knowledge resources and reliance upon knowledge's "tacit" aspects continue to grow in strategic management research, as do conceptions (intentionally plural) of tacit knowledge. Finally, this study's findings help to address increasing criticism of and dissatisfaction with the tacitness dimension by adding to and testing knowledge theory at the center of such concerns (Acar & Burns, 2001; Gerard, 2001; Gray, 2001; King & Zeithaml, 2001; Kogut & Zander, 1992). This study therefore advances our understanding of knowledge-based resource investigations and moves this theory toward improved utility and falsifiability (Bacharach, 1989).

The overall model this study tests is found below in Figure 3.1 and can be broken into two conceptually different sections. These two sections look at: (1) firm knowledge resource strategy and competition, (2) firm knowledge resources/strategy and sustained competitive advantage. In other words, this study provides partial answers to the question, "When can we expect the use and management of knowledge resources to provide a firm with sustained competitive advantage?" Knowledge resource competition also provides the context for a

discussion of the relationship between explicit and tacit knowledge in organizations, particularly as it effects the successful versus unsuccessful execution of knowledge-based competition. This general model contains a much-needed exploration-based, theory-building component for the advancement of knowledge-based strategy.

Theoretical Background

The resource-based view places much importance on intangible knowledge resources and their affect on sustained competitive advantage (Barney, 1991; Penrose, 1959); while the knowledge-based view of the firm (Grant, 1995; Spender, 1996a; Spender, 1993) focuses on the importance of knowledge resources as those key factors that allow for superior firm performance. Both theories point to the importance of leveraging intangible knowledge resources but, aside from forwarding basic assumptions and theoretical propositions, leave empirical work largely undone. One reason for this from the resource-based perspective is that a need for greater theoretical and operational structuring of those indicators of value, rareness, imitability, and nonsubstitutability (VRIN) and sustainability exists (Barney, 2001). From a knowledge-based perspective it is knowledge's intangible nature (e.g., its tacitness) that provides its possessor firm its greatest rents (Castanias & Helfat, 1991; Peteraf, 1993) for the longest period of time (Godfrey & Hill, 1995; Jacobson, 1988a; McEvily, Das, & McCabe, 2000; Zander & Kogut, 1995). Firm competitive advantage and its sustainability based upon knowledge, within both perspectives, rely heavily upon a paradox whereby value is created by tapping an intangible resource that by nature is itself a barrier to its own appropriation (Gerard, 2001; King et al., 2001). If the value of knowledge resources is in large part determined by the extent of its tacitness, however, then we must carefully specify what that tacitness is or is not and begin to explain how this may be the case. In short, we must attempt to explain the paradoxes surrounding

the use and value of those knowledge intangibles while better explaining how tacitness (and knowledge's other characteristics) contribute to the long-term competitiveness of a firm. Currently, what this "tacitness" is changes from paper to paper. Most often, researchers pull from Polanyi merely to set the theoretical context but fail to clearly elaborate their conceptualization of tacit knowledge prior to operationalization. This paper takes an explicit stance on Polanyi's work, based upon the uniqueness Polanyian scholars attribute to Polanyi's theories (Gelwick, 1977; Gill, 2000; Grene, 1977; Jha, 2002; Sanders, 1988), as well as the unique place his work already holds within management research. That view is then used as the lens through which the content analysis (Carley, 1993; Gottschalk, 1995; Krippendorf, 1980: Neuendorf, 2002) of interview data on knowledge-based competition takes place. This will be discussed in greater detail in the methodology section of this paper.

Sustained Competitive Advantage

Under the resource-based view (Conner, 1991; Wernerfelt, 1984), the firm is viewed as a grouping of resources and capabilities that are not freely bought and sold in the spot market (Barney, 1986; Conner, 1991; Rumelt, 1987; Wernerfelt, 1984). A firm gains a competitive advantage to the extent that it can improve its efficiency and effectiveness in ways that competing firms cannot, either in terms of strategic advantage (Barney, 1991: 106), economic rents (Barney, 1986a; Jacobson, 1988a; Peteraf, 1993), above-average industry returns (Priem et al., 2001a; Schoemaker, 1990: 1179) or one of the many other definitions of competitive advantage (Eisenhardt & Martin, 2000). If a firm can then extend that competitive advantage for a strategically important period of time, it is said to possess a sustained competitive advantage (Barney, 1986b, 1991; Dierickx & Cool, 1989; Rumelt, 1984).

Much of the development within the RBV in strategic management has focused on those characteristics of firm resources that can contribute to sustainable competitive advantage, such as resource value, rareness, imitability and nonsubstitutability (Barney, 1986a, 1991; Peteraf, 1993) also commonly known as VRIN indicators. As Priem & Butler (2001a) state, however, much of RBV's conceptual and empirical work (Bates & Flynn, 1995; Brush & Artz, 1999; Litz, 1996; McWilliams & Smart, 1996; Michalisin, Smith, & Kline, 1997; Mosakowski, 1998; Powell, 1992a, b; Rindova & Fombrun, 1999) stops short by paraphrasing or citing Barney's article without due conceptualization and operationalization.

Complementarily, Barney suggests that work in the resource-based view may benefit from the abandonment of "competitive advantage" in favor of an explicit statement of a firm's competitive position, including the type of advantage expected and how that advantage should be measured. Barney expects this to improve the explanatory power of research in competitive advantage by providing details on a business's competitive and contextual backdrop. This paper specifically looks at ventures using knowledge resources (i.e., the competitive backdrop just mentioned) within a clearly defined context of knowledge-based competition.

Critical incidents involving competition and sustainability via knowledge provide rich data, allowing a deep and unique analysis of knowledge managers believe leads to sustained competitive advantage. Enough data should exist whereby categories for key indicators like value, rareness, imitability and other resource-based indicators of sustained competitive advantage can be analyzed. Other theoretically important rent capturing, management and protection mechanisms can also be included while the critical competitive knowledge incidents are analyzed for other emerging patterns that are revealed in the analysis of that language common in the management of a business's knowledge resources (Penrose, 1959; Peteraf, 1993).

In short, the data should permit the identification of patterns, should they exist, in descriptions of key competitive knowledge incidents, and lend insight into how organizations try to maintain a competitive edge through such competition. This is precisely what resource-based researchers have claimed is needed. This study provides us with one detailed examination of the type of advantage sought in competing with knowledge, as well as where management's strategic focus has been directed and how success in managing knowledge is, perhaps, measured. This study does not suggest that a universal strategic knowledge wisdom has been found. It does, however, provide one of the first qualitatively explanatory and exploratory studies upon which our understanding of competitive knowledge and its strategic management can be based. This should provide a timely addition to a body of information that will fortify our base-line understanding of knowledge-based strategy. In other words, this research is not expected to provide the definitive answer to the question, "How does knowledge sustain competitive advantage?" But it does provide insight into how *some* knowledge-based competition is viewed and does help ground knowledge theory in the competitive behaviors of the knowledge worker and manager within knowledge-based organizations. One of this study's strengths, built into its design, is that while it looks for evidence supporting the current state of theory in resource and knowledge-based views, it remains open to other patterns that are also identified within the data.

Explicit and Tacit Knowledge

This study refers to both explicit and tacit knowledge in order to make a distinction between two constructs. In much research, because they are assumed dichotomous, the explicit of the pair generally subsumed in a focus upon high and low tacitness (Ferreiro, 1994, Gerard, 2001). For example, evidence of high tacitness generally assumes a low explicitness condition or, more commonly, tacit knowledge is assumed valuable while explicit knowledge is treated as

if it were valueless. While this is not evident in much conceptual work making reference to tacit knowledge, closer scrutiny often reveals that such assumptions exist and are especially evident in tacit knowledge's operationalization, as scales and interview questionnaires omit measures of explicitness. This omission could not reasonably take place without the assumption of either dichotomous or continuous explicit and tacit knowledge.

As has been stated previously, this study neither assumes a dichotomous/continuous relationship between the two constructs, nor does it therefore summarily exclude explicit knowledge. This is, in part, due to the influence of Polanyi's theories and in part because the measurement of both types of knowledge and their characteristics is of interest to this study. One advantage in the failure of this paper's assumption of dichotomy is that, should a dichotomy exist between explicit and tacit knowledge, it may still be measured without building such a dichotomy into the model beforehand. Also, if a dichotomy does not exist, as Gerard's (2003) empirical study of explicit and tacit knowledge suggests, the conceptualization and operationalization of a non-dichotomous explicit and tacit knowledge also permits the collection of data that may support other models, without assuming away past research. Another, perhaps more important reason, for suspending the common dichotomy assumption is found within Polanyi's work itself. His theory makes several specific and important assumptions about the nature of the tacit-explicit relationship (Gerard, 2001; Gill, 2000; Polanyi, 1966; Prosch, 1986; Sanders, 1988) illustrated in Figure 2.1. First, non-articulated or tacit knowledge logically precedes explicit knowledge (Polanyi, 1958a/1962), or that knowledge commonly equated with language, speech, writing, computer code, documented procedure, mathematical algorithms and routines (Choo, 1998). In Polanyian terms, these are but products that emanate from the pre-existing and pre-articulated tacit knowledge (in its purest form).

Second, anything made explicit is a product of individuals and groups exercising "intentionality" similar to that used by Searle whereby they exercise "direction at or about or of objects and states of affairs in the world" (Searle, 1983: 1). When an individual or group exercises such intent, they also rely upon the simultaneous convergence of an indeterminate number of non-focal clues, "selected" for such a coming together because of an individual's tacit knowledge, (Polanyi, 1958a/1962; Polanyi, 1958b; Polanyi, 1966). While this supports Polanyi's assumption that explicit knowledge originates from the unarticulable tacit knowledge, it also points to a belief that knowing may also happen differently in different situations because of contextual influences on individual and group focus as well as on the selection of non-focal items.

Under both of the above assumptions, people know what they know before artifacts of articulation – the explicit - are produced. A body of non-articulated and possibly not articulable tacit knowledge influences knowers' foci, intentions, and experiences which combine prior to the production of explicit knowledge. This is conceptually very different from a typology whereby different bodies of knowledge are rated on a sliding scale between the absolutely articulable and the absolutely unarticulable. Indeed, if all explicit knowledge, at some point and it some manner, derives from tacit knowledge, then one would expect different situations would exist where a high need for the use of tacit knowledge also results in the production of explicit knowledge. The natural sciences, for example, appear to depend strongly upon the use of quality documents, written formulae, routines to support its management of tacit knowledge. On the other hand, tacit knowledge need not produce high quantities of explicit knowledge to be useful or to function. In fact, other situations might exist that not only benefit from a high degree of tacit knowledge, but fail to benefit from the production of articulate explicit knowledge. In those instances, one would

expect to find high degrees of tacit knowledge and low production and minor presence of explicit knowledge. Such is the case with Berman, Down & Hill's (2002) study of knowledge in the NBA where much of the knowledge necessary could be made explicit, but making the understanding of the playing styles of basketball team members explicit probably would not be useful to team performance. In fast-paced game play, consulting written and other explicit materials would slow the game down to such an extent that the game itself would undoubtedly change. Therefore, the knowledge in this instance would probably be characterized by a high tacit knowledge and low explicit knowledge mix. This paper advocates measuring both explicit and tacit knowledge to observe when various weights of each type of knowledge appear important both to interpreting the knowledge context as well as better understanding sustained competitive advantage.

Third, a belief in gestalt, or the comprehension of knowledge as an integrated "whole," is central to all of Polanyi's theory (Gelwick, 1977; Gill, 2000). That is, the belief that knowledge is a function of the convergence of various elements in relationship to details surrounding those elements underlies a similar integration of individual and group knowledge in discovery and innovation, body and mind in action, explicit and tacit in cognition, and the focal and non-focal clues in awareness. This paper focuses exclusively on the tacit-explicit relationship in an attempt to observe the gestalt interaction of the two in competitive knowledge contexts. Implications for the explicit-tacit relationship include those potential problems that accompany a move toward a more liquid, dynamic perspective than is commonly employed in management literatures. This may bring with it unease in that logic (the gestalt) which neither fully dismisses nor accepts the belief that knowledge is the mere byproduct of learning. Instead of knowers simply dipping into "knowledge" metaphorically characterized as a vast but static "ocean of facts," this perspective

allows for the possibility that knowers may combine different information from multiple individual and group "reservoirs" that are selected based upon environmental and situational triggers. The knower instead dynamically engages in the quest for understanding and the production of new knowledge that often involves integrating focal and non-focal information in new ways. Individual knowers may also find that integrating their experiences with those of others in the group requires a compromise, of sorts, between their beliefs and the focus, perception, and activity of the group. However, such a view is not entirely alien within the decision-making and cognition literature that examines individual influence upon groups (Thompson, Kruglanski, & Spiegel, 2000), differential logic and its influence on a situation's analysis and interpretation (Allison, 1971; Allison, 1969), and the swaying of groups of individuals by groupthink (Janis & Mann, 1977; Janis, 1982). Such influences can highlight those differences in perspective that become more or less palatable over time. The view of knowledge within this paper provides a dynamic perspective that serves as an alternative to and complement, depending upon the situation, to those more stable states of knowledge whereby "fact" is known and access to the truth requires nothing more than diligent study of a body of knowledge or practice within a fixed set of behaviors.

The case of Erica Feidner, a musical prodigy and the top salesperson at Steinway pianos, provides a case in point. According to one article, her sales talent netted Steinway over $4 million in sales in 1999, yet her superiors at Steinway have no real idea as to what makes a good piano salesperson. Although Feidner is a Juilliard alumna and one-time aspiring concert pianist, Steinway says that playing a piano is not an occupational necessity and that, although most salespeople play a little, that most are not accomplished musicians (Stewart, 2001). Looking at Feidner's abilities from a traditional sense, we might place them into two different categories of

knowing, as is done in the article, for each of her musical and sales abilities. While this categorization helps us discuss what we see as accomplishment and mastery in two different arenas - playing and selling pianos – they may very well be related despite Steinway's observation that musical knowledge is not a necessary condition for superior sales. Feidner's mastery of music may very well be that characteristic that interacts with her knowledge of sales to provide her with success in the sales arena. In other words, some aspects of her musical mastery may "upgrade" what would, without that mastery, be a rather average ability to sell.

What we may be observing, as witnesses to her abilities, could really be a simplistic split based upon context. It is likely that we see Feidner in two different roles, thus splitting her talents into two different categories, because we ex ante define her according to her tasks as musician and piano salesperson. Throughout the article, however, Stewart draws parallels between Feidner as pianist and Feidner as seller as he describes her selling style, which appears to include an extraordinary ability to relate to her customers on both social and technical levels. According to the article, she communicates well – is friendly, asks great questions, and listens to what her customers say while attending to the subtext as well. In a technical sense, she properly identifies the individual's musical preferences and tastes, personal talent, and goals while simultaneously assessing what tones from the piano will produce the most favorable mood for the potential buyer. One of the reasons why Feidner gained the nickname of "the Matchmaker" is her ability to quickly and accurately match the human needs of her buyers with the highly individualized "personalities" of the instruments Steinway crafts. In Feidner's case, it may be less than useful to envision a split that is, perhaps, too forced, just for the convenience of future discussion. It may be more revealing to first identify and then speak about those explicit and tacit knowledge elements that appear to converge during the sale. For instance, both the buyer and

seller possess similar explicit musical knowledge pertaining to composers and their musical pieces (i.e., titles of certain pieces, their complexity). They also possess different tacit knowledge about those same composers and their music concerning the experience of playing certain pieces, or the mood and imagery certain music evokes.

It may be more useful to analyze both the explicit and the tacit to more accurately observe what is communicated when certain things are said between buyer and seller. For example, does a brief mention of Beethoven by Feidner, communicate a type of melancholy mood, symbolize excellence, or passionate musicianship with which the buyer identifies? It may be that the mere mention of Beethoven's Ninth Symphony provokes a fairly uniform gestalt among pianists much like the mention of Amazon.com or EBay epitomizes the "new economy," rapid success, wealth, the Internet, and the technological entrepreneurship experience for many. Delving into those explicit terms that have highly symbolic value demonstrates but one of the many ways that the tacit underlies a highly meaningful but concise, sometimes one word, explicit utterance. The idea of gestalt very much changes the way Polanyi's theory may be applied in both theory and practice.

This article, then, takes three frequently ignored aspects of Polanyi's theory and uses them to inform this study. First, any explicit product is believed to emanate from the pre-existing body or bodies of tacit knowledge. This effectively assumes a tie between that which is made explicit and something which is not. Second, anything made explicit is a product of individuals and groups exercising their intentionality. This means that the context within which meaning is made, on both personal and social levels, gives direction at or about or of objects and states of affairs that influence awareness. This, in turn, influences the integration of focal and non-focal clues that are combined in the production of meaning. Third, meaning made has a potentially

important gestalt element that may be significantly influenced by changes in either focus or dependence upon certain non-focal clues may influence the meaning that is made of certain situations.

Organizational Knowledge and Sustained Competitive Advantage

One of the biggest insights provided by tacit knowing theory is that organizational knowledge can be described in highly explicit terms while at the same time maintaining very high tacitness. This is a condition that simply cannot exist if explicitness is thought of as the descriptive polar opposite of tacitness. That type of explicit (Choo, 1998: 112; Nonaka & Takeuchi, 1995), within knowledge-, and resource-based views is inherently incapable of providing competitive advantage, making sustainability a non-issue. Organizational knowledge may, however, be composed of tacitness characteristics and explicitness characteristics assuming that explicit artifacts – a simplification here that refers to Choo's (1998) and Nonaka and Takeuchi's (1995) easily communicated formulas, documents, product specifications, patents, routines and standard operating procedures – are inherently tied to tacit structures. The characteristics of explicit and tacit knowledge resources, looked at separately, may actually tell us more about the nature of the resources' sustainable advantage and mobility. Likewise, taking a more detailed look at explicitness and tacitness should tell us more about how knowledge resources create and maintain competitive advantage. For this study, greater evidence of the value, rareness, inimitability and nonsubstitutability was hypothesized for firms sustaining competitive advantage. This was, in fact, strongly supported by this study's findings. Descriptions of knowledge factor mobility (i.e., success at transfer, ease of transfer, motivation for transfer) will also be important. For even though Szulanski's paper deals specifically with issues surrounding best practices and their transfer within the firm (Szulanski, 1996), it is

precisely the type of mobility issue relevant to knowledge resources, since their creation, use, transfer and mobility are direct drivers of the VRIN indicators to which they are linked. This should also be evident in descriptions of the critical knowledge competition incidents that comprise this study's main unit of analysis.

Knowledge Resources

In a recent article Priem and Butler (2001a) argue that little prescriptive guidance can be derived from RBV since the definition of firm resources (Barney, 1991; Wernerfelt, 1984) includes almost any firm attribute. Barney (2001) makes the argument, however, that the goal of explaining sustained competitive advantage within RBV is not to produce a list of critical resources every firm must possess in order to gain such advantage. The value of firm resources, rather, depends upon specific market contexts in which they are applied as well as resource attributes.

In a general sense a firm's resources, according to Amit and Schoemaker (1993) consist of tangible and intangible, human and non-human input factors that are owned or influenced by the firm. Tangible and intangible knowledge resources that involve human and non-human input factors are commonly referred to as organizational capabilities and competencies. Skill, know-how, ability, fitness, aptitude and proficiency described by Eisenhardt and Martin (2000) fall under the knowledge resource rubric. Many authors include firm-specific assets, skills, capabilities and knowledge as those items composing competencies (Lado, Boyd, & Wright, 1992; Teece, Pisano, & Shuen, 1997). "In practice," says Barney (2002: 156) "the differences among these various terms are subtle at best." Eisenhardt & Martin (2000), supportive of this view, provide a concise summary of the various labels used to describe resources and capabilities. These include, among others, distinctive competence, core competence,

organizational capabilities and organizational capital. Knowledge resources with certain explicit and tacit attributes should embody the VRIN necessary for sustaining competitive advantage. This argument, a central assumption of the RBV, is detailed in the following hypothesis:

H1 (Sustainable Competitive Advantage): Organizational knowledge [explicit and tacit together] is the main source of sustained competitive advantage.

Because, tacit knowledge – not explicit knowledge - is often proposed to be a resource expected to provide firms with sustained competitive advantage (Conner & Prahalad, 1996; Kogut et al., 1992), the above hypothesis contrasts somewhat with conventional wisdom because it tests the importance of both explicit and tacit sources of knowledge as important to sustaining competitive advantage. While this tests a major assumption of the resource-based view, the knowledge-based view argues that above and beyond its position as one of the most important firm resources for sustaining competitive advantage, knowledge is the predominant driver of firm growth, determining a firm's boundaries. This leads to an even more restrictive, detailed hypothesis for firm knowledge strategy.

H2 (Knowledge-based View): Knowledge resource strategies will be both prevalent and predominant among strategies identified by managers.

To test such hypotheses as those above with content analysis, we do have do assume that successful ventures and their driving strategies within knowledge-based organizations will result in greater incidents of knowledge-based strategies when asked generally about their organizational strategies. This is one limitation of the study. However, the detailed interview data are provided by knowledge managers within knowledge-based contexts and each critical interview contains both shortcomings and successes of knowledge-based strategies. Furthermore the importance of knowledge-based strategies to any given organization should be evidenced in a straight analysis of the strategy portion of the interview text and can then be compared to strictly

knowledge-based competitive sections of the interview transcripts (described in the methodology section. Enough support should then exist to compare successful versus non-successful anecdotes in the first part of the interview. A straight comparison across firms is not a goal of this paper. However, insights will be provided should others wish to more closely compare knowledge-based strategy (e.g., within certain industries, at different levels of the same organization, between organizations).

Strategic knowledge management, as it is defined here, is primarily concerned with those activities that help a firm conceive of and implement a firm's goals and objectives and (utilizing typical knowledge management concerns) focuses on the use, maintenance and growth of organizational knowledge. This includes knowledge identification and acquisition, knowledge development, sharing and distribution, preservation and measurement and may involve knowledge objects. This may, because of this paper's conceptual expansion, include many apparently "pure" explicit support materials like computers, manuals and algorithms, and knowledge sets or practices that may seem representative of "pure" tacit knowledge and knowing (Polanyi, 1958a/1962, 1966, 1969; Probst, Raub, & Romhardt, 2000).

Testing for all hypotheses except Hypothesis 2 was accomplished simply by looking for the statistically significant differences in interview content when comparing low- and high-performing knowledge-based companies on the variables of interest. Hypothesis 2 was different because it looked for evidence supporting or refuting major assumptions within the knowledge- and resource-based view that strategic knowledge strategies will be present and dominant to other strategies within high-tech organizations.

Sustained Competitive Advantage

The first two hypotheses may also be expanded to look at knowledge resources and sustained competitive advantage in greater detail under the argument that the evidence of sustained competitive advantage through knowledge will correlate with strategic indicators (value, rareness, inimitability and nonsubstitutability) of that sustained competitive advantage. This was done by advancing the sustained competitive advantage argument such that organizational differences would also exist between the knowledge resource attributes (VRIN) between more successful versus less successful knowledge-based competition incidents. Again, the analysis primarily depends upon a content analysis on managements' narratives concerning firm strategy and firm knowledge strategy in low-versus high-performing organization.

Valuable

Resources are **valuable**, according to Barney (Barney, 1991: 106) "when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness" and "when they exploit opportunities or neutralize threats in a firm's environment." The value of resources is estimated in many different ways accounting for things like industry, cost leadership and market structure to name a few (Barney, 1997). Activities supporting knowledge distribution, preservation and measurement, etcetera, should be linked to a more efficient and effective management of knowledge mentioned previously. In superior knowledge-based competition, we expect to find larger amounts of greater quality of knowledge-based linkages to opportunity development (e.g., through knowledge identification, acquisition and development) and threat avoidance activities (e.g., easier knowledge distribution, lower costs of protection). In short, we anticipate finding more examples of better-run knowledge management activities that lead to superior knowledge-based activities. Thus:

H3 (Valuable): Higher knowledge-based performance will lead to greater evidence (quantity, depth, breadth) of attention to competitive value-seeking activities than will lower knowledge-based performance.

Rare

According to Barney (2001) a firm resource will generate a competitive advantage when it is rare in the sense that those numbers of firms that possess a particular valuable resource is less than the number of firms needed to generate perfect competition dynamics in an industry (assuming industry is considered in the analysis). As long as perfect competition, in terms of a resource, is not reached, then such a resource may potentially generate or maintain a competitive advantage (Barney, 1991: 107). How rare a particular resource must be before perfect competition based upon that resource perishes will depend upon several attributes of the market structure within which firms are competing. Barney suggests that one could test rareness-based assertions by measuring the extent to which a firm uniquely possesses a valuable resource (in our case, knowledge resources) or by measuring the activities that different firms engage in to improve their efficiency and effectiveness (Barney, 2001). The activities we are interested in include those knowledge identification and acquisition, development, sharing, distribution, preservation and measurement of knowledge mentioned previously. In a superior performing firm we might expect to observe greater occurrence, higher numbers, broader alternatives, more complex systems and greater overall support of such activities (i.e., superior knowledge-based activities). Thus:

H4 (Rareness): Superior knowledge-based competitive performance will produce greater evidence (quantity, depth, breadth) of attention to competitive rarity than will lesser knowledge-based performance.

Inimitable

The concept of imitability received by far the most attention of the four indicators of sustained competitive advantage in Barney's 1991 article because he thought their implications would "be among the most important" to come out of RBV (Barney, 2001). One key attribute of knowledge resources likely to be important is its potentially high costs of imitation. Henderson and Cockburn (1994), for example, measured a couple types of knowledge sets they referred to as "component competence" and "architectural competence." Using research productivity as a measure of performance, they showed the imitability of these knowledge sets to be virtually non-existent (with firm differences in them very stable over time). Unique historical conditions, causal ambiguity and social complexity come in to play here.

For instance, a firm may at some point acquire or develop a unique and valuable technology and, though they suspected the venture was valuable, the technology's extreme success was unforeseen (i.e., a variety of unique historical conditions, maybe luck, worked in their favor). As a result, the firm also developed research and development knowledge specific to the unique, value-producing technology that enabled it to develop other related and tangent technologies. Clearly, not only would it be more costly to attain that firm's position through any attempt at imitation, but the learning and knowledge that accompanied the birth of the technology would likely be missing as well. Furthermore, though the technology may be reproducible, the innovating firm's success may be tied to other factors that enabled the innovation in the first place (e.g., causal ambiguity).

Explicit and tacit knowledge, whose existence is implied in the above reference to learning and knowledge, will likely impact imitability because of their potentially complex and social natures. The explicit language surrounding the technology, for example, may appear quite

mundane. Nevertheless, the term “credit” differs greatly depending upon who utters the word and in what context. The word “credit” used by a tax examiner during an audit may provide differing degrees of relief to its listener. “Credit,” when used by a sales clerk might evoke bad feelings if the recipient wanted, instead, to hear “cash back.” Of course, this is a simple example, having little to do with the innovation above. Yet many words carry multiple meanings that must be interpreted in their context by persons versed in their use in order to operate efficiently and effectively.

Sometimes, only experience can tell you how deeply embedded the most explicit knowledge is in its system of supporting tacit knowledge. This fact alone makes knowledge transfer of any type potentially inefficient or ineffective when its duplication is attempted. The success of a firm’s attempts at knowledge acquisition may be difficult to judge. Mixing acquired knowledge with pre-existing tacit knowledge structures may cause more damage than good, or it could foster the development of new and superior knowledge. Higher performing firms, though, should be more in tune with their tacit structures and should, therefore, combine knowledge and achieve both greater benefits while at the same time avoiding more pitfalls. Thus:

H5 (Imitability): Superior knowledge-based performance will produce greater evidence (quantity, depth, breadth) of attention to competitive imitation than will lesser knowledge-based performance.

Nonsubstitutable

Substitutability is defined with respect to strategic equivalence or equifinality whereby: "Two valuable firm resources...are strategically equivalent when they can each be exploited separately to implement the same strategies" (Barney, 1991: 111). Basically, the issue with nonsubstitutability concerns strategic equifinality that, in a competitive situation, results in competitive parity or the prevention or erosion of competitive advantage. Organizational

knowledge can only provide long-term, durable economic benefits to the firm in the absence of close substitutes for its use and production (Barney, 1991; Dierickx et al., 1989).

However, while the problem of equifinality may exist, it may not be so likely for a firm with superior knowledge to surrender its competitive advantage for a number of reasons. First, should such parity begin to occur, those firms aware of the move toward parity may either take strategic action, in which equifinality, given the differences in firm asset stocks, would depend upon another instance of equifinality *again*. Add to this the heightened complexity involved as firm knowledge resources (i.e., explicit and tacit stocks along with their interrelationship) combine with new resources or, in the case of a spin-off, operate with fewer resources. Parity, if it did occur, should not last long due to newly acquired monopoly rents, the discovery of Ricardian rents, or the creation and application of entrepreneurial and managerial rents. In the case of two firms experiencing above-normal rents and parity with one-another, one may be more likely than the other to slow their slide to normal profit (Jacobson, 1988a). In the case of parity at normal profit, managerial, Schumpeterian or entrepreneurial would play a major role in how change was dealt with or promoted. Either way, if parity did exist or threatened to become a real possibility, then change through action by either competitor will undoubtedly alter the "standoff."

Differences in knowledge resources and how those resources are managed are expected to make the greatest impact on the equifinality condition. It is the managerial knowledge resource in its simultaneous use of inherited resources while planning the acquisition of future resources and, conversely, the divestiture of others in charting the direction of the firm that makes competitive parity condition more difficult to maintain than to change. Managers and their stocks of knowledge influence how they view their respective markets, identify customers and

attach different assessments of value to various potential courses of action (strongly dependent upon knowledge use, identification, acquisition and development). These limit the length of time spent in competitive parity.

Penrose also suggests that "unused productive resources are, for the enterprising firm, at the same time a challenge to innovate, an incentive to expand, and a source of competitive advantage" (Penrose, 1959: 85). What knowledge resources are shared and when, how these are distributed, preserved and measured will undoubtedly be shaped by the interaction of bodies of explicit knowledge and their underlying tacit knowledge support. The focus of managerial entrepreneurship, for instance, will probably differ among firms because of what they do and do not emphasize or use. This is at first a matter of Polanyian awareness in that initial focus and reliance upon non-focal awareness, then an integration of other personal coefficients within the firm, strategic and environmental contexts and the occurrence of the tacit knowing that will differentiate competitors in parity to the greater advantage of one of those competitors.

Sustained competitive advantage requires that close substitutes for unique, valuable, costly to imitate and transfer resources also lack close substitutes capable of bringing about equifinality. Although the condition of competitive parity may be difficult to ascertain with certain groups of competitors, the differences should be much easier to observe between high and low performing firms, as would differences between the tacit knowing mechanisms of those firms. Thus:

H6 (Nonsubstitutability): Superior knowledge-based performance will produce greater evidence (quantity, depth and breadth) of attention to competitive nonsubstitutability than will lesser knowledge-based performance.

In terms of RBV pre-conditions, rarity and value are each necessary but not sufficient conditions for competitive advantage. The managerial knowledge of higher performing

organizations' indicators of explicit and tacit knowledge should generally exceed those of lower performing firms. Findings of this paper's exploratory and explanatory qualitative analysis and its quantitative content analysis support the hypothesized difference between low- and high-performing organizations. Additionally, nonimitability, nonsubstitutability, and nontransferability are each necessary but not sufficient conditions for sustainability of an existing competitive advantage (Dierickx et al., 1989; Priem et al., 2001b). Indicators of each of these three sustainability conditions should exist in greater abundance for higher performing organizations than for lower performing organizations.

Methodology

The inductive case study approach is especially well-suited for this study because of the need for theory development (Eisenhardt, 1989) in both the knowledge- and resource-based perspectives. An inductive method also facilitates the examination of knowledge resources in management situations where those knowledge resources might not be identifiable a priori. Of particular mention in this series of case studies is the unit of analysis – the critical knowledge competition incident – used to study sustained competitive advantage using knowledge resources. The critical incident technique (Ellinger & Watkins, 1998; Flanagan, 1953) is employed to gain access to the thinking behind a pivotal research question, "How do businesses sustain competitive advantage through knowledge resources?" Appendix A lists some of the benefits derived from using this technique as well as benefits to using the case study technique. This more qualitative approach during data collection grants us access to managerial thinking about competitive advantage through knowledge in general before engaging in a more quantitative approach designed to test the differences between more and less successful performance in knowledge-based competition. Additionally, theory in this area is still under

development and academic discourse and understanding surrounding sustained competitive advantage and knowledge resources has not been canonized. Therefore, additional exploration is needed to better understand how we come to know what we know and use that knowledge to compete.

Sample Selection

While high-tech industries (e.g., telecommunications, Internet technology) are likely to prove a rich source for the in-depth interviews needed to better understand sustained competitive advantage through knowledge resources, knowledge-based competition could very well occur whenever knowledge is used to compete. Twenty-four fully elaborated management and decision-makers' narratives were transcribed to form the base data from which to analyze strategically important knowledge-based competitive incidents. These narratives, along with the support of current theory from knowledge and resource-based views, provide the framework through which this analysis takes place, ostensibly augmenting that theory in the process. A semi-permeable contextual boundary is created by variables pre-determined as important by the body of theory thus provided. According to Hitt, Bierman, Shimizu, & Kochhar (2001), resource-based view studies are especially dependent upon the ability to closely examination firm resources thought to aid or establish sustainability and competitive advantage. This paper's focus within knowledge-based competition and resource-based indicators of sustained competitive advantage was used to specifically provide a rigorous test of sustainability (and VRIN) and tap the experience of the "knowledge worker," – in this case the knowledge manager – thus, highlighting the effect of competitive knowledge resources.

A sample universe was first identified by selecting almost 500 public firms from Dun & Bradstreet's Disclosure database under SIC code 5961 (miscellaneous retail – catalogue and mail

order category). Firms that did not contain either a "com," Internet, e-commerce, "web," or "net" within their names were eliminated to yield approximately 198 of the "purest" on-line retailers. Other industry sub-categories identified by industry group CommerceNet were used to account for industry distinctions not currently coded by the traditional U.S. Standard Industrial Classification (SIC code) system and not yet transitioned to the new NAICS - North American Industry Classification System codes. These sectors included web-based business and management consulting services, business-to-business "solutions", computer systems, consumer and business technologies, electronic hardware, and online banking & card services.

Pilot interviews and interviews from respondents specific to this SIC code revealed the importance of not prematurely restricting the sample. Therefore, individuals were selected for an interview if they identified themselves as being centrally involved in strategically important knowledge-based activities. Respondents were asked to read and sign an informed consent form approved by The University of Georgia's Institutional Review Board (see Appendix C) using the interview protocol for guidance (see Appendix D) for in-depth and follow-up questions beyond the basic critical incident structure given in Appendix B. The presence of a competitive situation was also required. However, this was a condition many respondents had difficulty assessing for a variety of reasons which will be discussed at the end of the paper. Respondents were asked whether or not they could identify other individuals who might, based upon the criteria, be willing to interview. This study also relied upon snowball sampling to identify willing and knowledgeable respondents. The subsequent sample contained many individuals from the initial pilot interviews who could not reasonably be eliminated from the study. The study's final sample includes a number of individuals from the SIC 5961 sample frame, a number of individuals in

high-tech ventures in local incubators, commercialization efforts from a large southeastern university, and individuals engaged in the web-based training and learning industry.

Fink and Gantz (1996) support this approach, saying that sample selection at the initial pilot stages of this type of study may be unwise. In this study, the construction of criteria for the selection or rejection of knowledge-based competitive interviewees – given that little was known about knowledge-based competition – rapidly grew to be an impossible task. Another confounding element was the fact that any individual may have access to numerous critical incidents of knowledge-based competition not necessarily tied to their current position within an organization, professional title, or role taken. That is, knowledge-based competitive incidents did not necessarily respond to a recognizable SIC code or industry sector designation but, rather, to a highly significant incident chosen because of its importance to the manager.

CEO, Owner and Manager Interviews

Studies in strategic decision making often begin by asking CEOs to describe distinctive competencies of the firm, major competitors and their performance following Hickson, Butler, Cray, Mallory & Wilson (1986) and Mintzberg, Raisinghani & Theoret (1976). This study differs in its focus on knowledge and its more open-ended approach to eliciting those competencies because the discussion is focused on the most salient knowledge-based decisions. The interviews were also designed such that they would hierarchically elicit – from the macro to micro level – the types of data collection that would serve as one test of the hypotheses. The decision-maker or manager was first asked to consider and list their organizational strategies to put them into the strategic, long-term and organization-level mind frame. They were then asked to think about times when they used knowledge within their organizations to compete. A content analysis then took place within each of these interviews to determine the sources of sustained competitive

advantage within each of these incidents. Comparisons could then be made in terms of competition across similar levels of data collection (hierarchically) at strategy, knowledge-based competition, or VRIN levels. Characteristics of each critical knowledge-based competitive incident, for example, were examined in terms of their goals, competitive processes required, challenges, firm reactions, competitive environment, outcomes, and achievements. Patterns across incidents as well as unique attributes to specific incidents were identified. Questions were left open-ended, but sufficient structure was provided in order to elicit detail within certain areas deemed important to the theory. During pilot interviews, for example, many of the VRIN areas important to resource-based view's sustained competitive advantage were not naturally or necessarily addressed. These were included because they were determined to be important, indeed indispensable variables. For the most part, though, interviews were driven by interviewee responses in order to elicit content most relevant to decision-makers in the context of knowledge competition and sustained competitive advantage (Glaser & Strauss, 1967). Appendix B contains an interview protocol, expanded underneath the level 2 questions, which may be used to guide the probing of details within the context of the strategy interview just mentioned. Of course, a twenty-four-fold iteration of incidents discussed via the interview protocol was more than adequate to provide theoretical saturation within those constructs of primary importance to this study. That is, the analysis of knowledge-based competition at the margin of the twenty-fourth incident, significantly dropped in significance.

Data Analysis

Data analysis is described in three parts based upon the exploratory and explanatory objectives of this paper combined with its final quantitative content analysis. For exploratory-focused research, the search for new or supporting patterns relevant to knowledge-based

competition is undertaken. For the explanatory-type research, a comparison between low and high knowledge performance is made for each of the six hypotheses provided earlier on in this study. The quantitative section of the paper goes even further by statistically testing for statistically significant differences between the strategic and competitive linguistic content between low- and high-performing firms. Tests for statistically significant differences were performed for all but Hypothesis 2.

Congruent with Yin (1994) and Flanagan (1953), each critical knowledge competition incident was rigorously inspected for methodological consistency in part because each narrative, with its set of critical knowledge characteristics, must be fully analyzed, providing categories and properties of those critical incidents prior to advancing to the subsequent case study. This method permitted the careful search for sources of personal bias and established a baseline that allowed for the identification of a saturation point (i.e., that moment when no new patterns appear in the analysis of the data). Because this study looks at the categories and properties of critical knowledge competition incidents, this saturation occurs when no new patterns concerning the process, content, or context of those incidents are observed during narrative analysis. This happened relatively early on for successful ventures since these were captured in earlier interviews. It took longer to achieve saturation with unsuccessful ventures because these appeared in later interviews and because the content of those interviews was strikingly different – requiring additional validating interviews.

NVivo's qualitative analysis software from QSR International was used to assist in the coding and analysis of each critical knowledge competition incident. Specifically, NVivo allowed the importation, creation, and editing of documents. In the case of this particular set of interviews, documents were created using ScanSoft's Dragon NaturallySpeaking voice

recognition software to vocally transcribe each individual critical knowledge competition incident. Those documents were then imported into NVivo. QSR's program allowed text within each document to be coded in multiple ways as well as annotated (e.g., with researcher's notes, observations, questions). An advantage of the NVivo software was that it permitted easy examination of relationships between text, coding, and attributes and simplified analysis by allowing the easy juxtaposition of various categories and variables of interest both theoretically and as emergent patterns in the interview tests. The use of NVivo in this study permitted an ongoing and active exploration and consistent treatment of all the study's documents.

Exploratory analysis

Competitive advantage, VRIN and knowledge variables were measured using a combination of interview questions and the content analysis of responses to those questions present in the interview protocol in Appendix B. Yin's (1994) replication logic was also used, whereby each case (critical competitive knowledge incident) was treated like an experiment either supporting or failing to support propositions about both knowledge resources (i.e., explicit and tacit knowledge) and sustained competitive advantage. Each critical incident interview served as a case used to test the theoretical insights gained from the examination of previous cases, which were then modified or refined. Typically, if saturation does not occur during the analysis of the first few cases, then others are added to the study, to at least partially free the researcher from bias and open the study up to the emergence of testable theory (Eisenhardt, 1989). A close correspondence between theory and data also benefits greatly from the use of a grounded theory approach (Glaser & Strauss, 1967) such that new perspectives may be found in emerging theory in the data, enriching already researched topics (Hitt, Gimeno, & Hoskisson, 1998). This study employed such an approach to look for patterns within each case that

corresponded to existing theory (Yin, 1993), compared successful and unsuccessful knowledge-based competition based upon that theory, and undertook an exploratory investigation to enrich existing theory, grounding it to current knowledge-based competitive practice.

Explanatory analysis

The explanatory portion of this study took an approach similar to that of Brown & Eisenhardt (1998) whereby the study of organizational time-paced evolution was "grounded" to complexity theory. This essay's six knowledge and resource-based hypotheses were tested by choosing incidents that were described by managers and identified by independent raters as being either low- or high-performing. Because this is a qualitative study, evidence was provided by the transcribed interviews in those disparate low- and high-performing knowledge-based competition incidents. The paper's used this evidence in its analysis and its findings are discussed within the context of each of the six hypotheses of interest. The exploratory qualitative section of the study is not meant to be a statistical analysis nor is it a quantitative-based content analysis of the data. The qualitative look focused upon those constructs represented by each hypothesis, yet offered another alternative for approaching the data permitting better understanding of the theory upon which this study builds.

This study's qualitative analysis relied upon greater detail within the managers' interviews. These are considered particularly relevant and well-suited for the collection of germane content that may serve the goal of pattern recognition. These comparisons involved organizational strategy, knowledge-based competition, and sustainability through value, rareness, inimitability, and nonsubstitutability indicators. Specifically, patterns were sought within the disparate language of low- and high-performing high-tech organizations.

Quantitative content analysis

The quantitative content analysis used the Wilcoxon-Mann-Whitney non-parametric statistical comparisons because of the power of the test, its lack of reliance upon normal distributions, and its appropriateness given this study's need to analyze ordinal data. The two independent samples t-test is only slightly stronger but assumes data are measured at the integer level.

The statistical tests are used to compare coding between low- and high-performing organizations to determine whether or not there are any differences between the two groups and whether or not the low performing group ranks lower than the high performing group on a number of levels. Thus, the Wilcoxon test for this study used the one-sided statistic to determine whether or not to reject the null hypothesis that there was no difference between the two samples and any directional relationship could simply be explained by chance.

Parallel to the exploratory and explanatory qualitative analyses above, this section of the study used a concise coding schema when instances of strategy, knowledge-based competition, value, rareness, inimitability, and nonsubstitutability were identified within the interview text. The coding was then used to test the hypotheses that have provided structure for the entire study. More details relevant to quantitative methodology are provided just prior to the discussion of findings within the quantitative content analysis section.

Results

This part of the study is divided into three main sections which correspond to the three different types of analysis just described. The first section provides a description of each of the knowledge incidents, including a basic description of the organization, its strategy, and a brief subjective assessment of its performance following traditional and knowledge-based

perspectives. The second section contains the qualitative findings in some detail such that a better understanding of knowledge-based strategy and competition through knowledge-based resources occurs. This second section is the main exploratory section of this body of qualitative research. The third section comments on the hypotheses in a qualitative sense, using evidence from both high and low-performing firms. Once findings have been provided, the paper concludes with a summary discussion that includes implications for research and practice.

Descriptions of Critical Incidents

After conducting three pilot interviews, a format was settled upon that began with an introduction of the organization's strategy (as described by the interviewee) designed to get the interviewee into a strategic frame of thinking. The introduction was always followed by the critical incident segment of the interview which was, not surprisingly, often the longest and most open-ended of the questions. Interviews most often wrapped up with questions that targeted interviewee assessments of the value, rareness, inimitability and nonsubstitutability of knowledge-based competitive behavior or knowledge-based assets they had mentioned during the critical incident portion of the interview. Descriptions of each organization and its related competitive knowledge incidents are provided in within the discussion of findings in order to characterize and put into context each critical incident used to analyze each organization's knowledge-based competitive behavior. All interviews are included below except for the first pilot interview. It was omitted because the language of the interviewer and the interviewee (an owner/CEO of a new Customer Relationship Management firm) differed to such an extent that the interview made little sense. While the interview is probably the most valuable in the construction of this study – it scarcely resembles the interviews that followed it and did not merit inclusion and comparison within that group. The first "usable" interview therefore began with

the second pilot, which is one of the twenty-four incidents described below. Subjective general assessments of knowledge-based performance and traditionally important indicators of performance are provided in Tables 3.1 and 3.2 for easier access.

All incidents are briefly introduced by their type of business and/or primary organizational activities. This is followed by a listing of those strategies that were provided by interviewees during the first part of the interviews. These strategies are especially descriptive since they comprise some of those critical elements that give the organization its unique character. Each section ends with a paragraph describing the success or failure of an organization by typical performance and knowledge-based criteria using interview transcript evidence and researcher observation. Details (see Appendix G) support the classification of organizations into low- versus high- knowledge-based performance based upon the incidents' outcomes. A listing of organizations and their strategies, along with page and word counts, exists in Table 3.3.

Exploratory Findings

The exploratory findings section has two purposes. One, it is designed to report upon and summarize key findings that shed light upon how managers use knowledge to compete and how, then, knowledge-based competition is described. Two, it is designed to illuminate patterns that were unforeseen and emerged – a main goal of grounded theory according to Glaser & Strauss (1967) – from the data. The following section will split the findings in a couple of different ways. In order to utilize knowledge- and resource-based views, sections dealing with organizational strategy, performance and competition will focus upon those theories to provide a rough framework for the reporting of findings. The first section will therefore focus heavily upon certain a priori, or pre-defined constructs and summarize the discovery of new patterns as they emerge under resource- and knowledge-based frameworks. A second section will focus more

heavily upon ex post and emerging patterns that do not necessarily restrict themselves or fall so neatly into the existing theory of the first section. The second section will not restrict itself to, but will borrow from Polanyi's personal and tacit knowing theories as they have been laid out in Chapter 2. The benefit to this approach is that it utilizes knowledge theory and variables of epistemological importance to make sense of knowledge-based strategy and competition. Both methods in this section may lend themselves to theory-testing and theory-building. However, the focus of this section remains committed to exploration.

As was previously mentioned, this section will deal with constructs commonly of interest within both knowledge- and resource-based views. This includes grounded inspections of knowledge that examine things like its resources, competition, performance, assessments of success and failure, and sustained competitive advantage (looking at resource value, rareness, inimitability and nonsubstitutability). This section does not assume that the above constructs are commonly understood and that their definitions are, therefore, not worthy of investigation. Instead, this section of the study only uses past definitions as a guide and focuses much of its attention in gathering clues that will inform our understanding of their definition in practice. It is expected, then, that a greater quantity of grounded-type theory building will occur in this section than in the explanatory-based section of this study.

Philosophies of Knowledge

Especially relevant for knowledge-based discussions are those theories that have explicitly dealt with ideas meant to advance our understanding of what knowledge is, how knowledge comes into existence, and how knowledge is conceived of and used by individuals. Our discussions of knowledge-based resources may take on greater clarity, therefore, when applying certain knowledge-based frameworks. For example, Polanyi's writing on tacit

knowledge has been helpful to many wishing to emphasize non-spoken (or tacit) aspects of knowledge. Efforts were made to expand upon current uses of epistemology, or philosophies of knowledge, that currently emphasize the tacit. This study includes arguments emphasizing explicit and tacit together (e.g., how they relate, how they're different, how they link to one-another) to help better explain organizational knowledge (Gerard, 2001, 2003). This section's discussion is grounded in the tacit knowing framework (Figures 2.1 and 2.2) because it lends special clarity to the overarching topic of knowledge as well as the discussion of explicit and tacit knowledge in organizations.

Even though empirical studies are beginning to focus on explicit and tacit knowledge similarities, differences, and interactions in some detail, the aforementioned tacit knowing framework is especially helpful. First, it provides a unifying framework which highlights many of the important constructs that help bind explicit and tacit knowledge together (i.e., how perceptions of reality may be shared, how explicit knowledge is produced by the tacit). Second, the framework explicitly deals with the topic of reality and how "true" versus perceived reality plays a part in organizational knowing. Third, the framework shows how perceptions of knowledge shift according to context which is constructed both by individual knowers as well as by groups of knowers acting synchronously. Fourth, the framework, based upon a knowing that conceives of shifting versus unchanging knowledge, explains how the process of knowing occurs. Fifth, linkages between the explicit product of tacit knowing as well as tacit knowing with "reality" are reconciled in order to tie the various aspects of the framework together. The framework is therefore especially useful in discussing organizational knowledge because it ties perceptions of reality to reality itself, it ties individuals and groups of individuals together and

defines organizations based upon those ties, and it allows the definition of knowledge at all levels to be characterized by explicit and tacit components.

Knowledge-based Currencies

Making knowledge and knowing the central currencies or units of analysis makes particular sense within the resource- and knowledge-based views of the firm. Essentially, using knowledge-based units of analysis to discuss phenomena, like the knowledge-based competition central to this study, provides a more cohesive frame under which to view the topic at hand. Cash and coin currencies, stock market performance, and contractual details are certainly relevant to most, if not all, organizations. However, this study focuses more centrally upon knowledge-based units in order to provide a more detailed basis from which to discuss knowledge-based resources and assets so that they may later be linked to such measures of organizational performance. The rationale is that only once organizational knowledge itself has been studied and more adequately defined can we scientifically link knowledge to longer-run organizational performance reflected in measures like Return on Investment (ROI) and Earnings Per Share (EPS), just to name a couple. To sum up, then, the purpose of analyzing and reporting findings in knowledge-based terms is to make that initial link between knowledge held by individuals and knowledge that helps set organizational boundaries. It is anticipated that once that has been done, others may discover with greater accuracy how firm knowledge leads to more traditional measures of performance.

The discussion of findings that follows looks specifically at organizational resources, competition, performance, and sustained competitive advantage from a fundamentally knowledge-based view relying upon the tacit knowing framework to guide the discussion. That is, both findings and their discussion will be rooted in Tacit Knowing Theory (Chapter 2) to

explain organizational knowledge in explicit and tacit terms. In so doing, the conception of organizational knowledge is expanded to include knowledge (i.e., as object), knowing (i.e., as process), and how organizational reality – both "real" and perceived – is at the same time discovered and constructed by individuals and society. Discussions will include Personal Knowing Theory, a type of "subset" or micro theory contained within Tacit Knowing Theory, which focuses more directly upon levels of explicit and tacit knowing within the individual. This is explained in more detail within Chapter 2. However, its application, based upon Polanyi's epistemological work and Searle's linguistic theory, provides shape for our discussions of explicit and tacit knowing by focusing upon more apparently explicit beliefs, intentions, emotions, and speech acts to more deeply tacit individual constraints, mental capacities, stances and attitudes. A simple outline below can serve as a legend, of sorts, to guide this discussion. Reality, the most comprehensive and complex focus, underlies increasingly narrow and simplifying knowledge including tacit knowledge, non-focal objects, contextual clues, focus, coherent pattern identification, sensemaking, and explicit knowledge.

1. Underlying reality
    a. Tacit knowledge
        i. Non-focal objects
        ii. Contextual clues
            1. Focus
            2. Coherent pattern identification
            3. Sensemaking
                a. Explicit knowledge

Stated differently, the proposed link between explicit and tacit knowledge – which represent an underlying reality – operates when knowers move through more tacit, pre-intentional to more explicit, intentional states (in a Searlean sense). Pre-intentional schema (which is more tacit in character) include biological constraints, mental capacities, and stances

and attitudes. The intentional schema lies somewhere between tacit and explicit, including beliefs, intentions, and emotions. Finally, the combined functioning of pre-intentional and intentional schema in our approximations of reality translate to what is commonly understood as the explicit, which we define here as that which is or may be easily expressed in linguistic (spoken or written) form.

The following section deals with topics important to organizational and management researchers by: (1) focusing upon variables important to philosophies of knowledge, and (2) adopting knowledge as the primary currency of organizational importance. The analysis addresses each topic using data collection from transcribed critical incidents previously described. Areas of particular interest include conceptions of resources, competition, performance, organization, strategy, assessments of knowledge-based resources and sustained competitive advantage (looking simultaneously at resource value, rareness, inimitability and nonsubstitutability). These topic headings are by no means assumed to compose an all-inclusive list of organizationally and strategically relevant topics. Their purpose here is to begin to explore the possibility that knowledge itself may constitute a topic important enough to merit greater attention and that knowledge, as a currency, brings very different and much-needed perspective to knowledge- and resource-based views in particular as well as to the individual conceptions just mentioned. A final note before proceeding to the reporting and discussing of this study's findings is that, while some space here is dedicated to the discussion of sustained competitive advantage combining all value, rareness, inimitability and nonsubstitutability indicators, most of that material will be left for the explanatory analysis section where specific hypotheses are examined.

Resources

One of the criticisms of the resource-based view made by Priem and Butler (2001a) has been that RBV is incapable of providing practical prescriptive guidance because of the flexible definition of firm resource can include almost any firm attribute. The apparent paradox, explains Barney (2001), is that the ability to broadly identify or classify firm assets as resources coupled with a focus on the importance on firm resources leads many to assume that an exhaustive list of firm resources must be constructed with the goal of identifying those critical to sustained competitive advantage. Barney (2001) rightfully argues that resources mean little, however, without the benefit of their defining context along with some understanding of their attributes – both of which have been provided by the use of qualitative data collection and analysis within this study.

Firm resources are defined as tangible and intangible, human and non-human input factors that are owned or influenced by the firm (Amit & Schoemaker, 2003), or organizational capabilities and competencies that include skill, know-how, ability, fitness, aptitude and proficiency (Eisenhardt and Martin, 2000). These are often identified and discussed as distinctive competence, core competence, organizational capabilities and organizational capital. For this study, of course, all of these terms simply refer to the knowledge possessed by individuals, groups, or organizations. The purpose of this section, of course, is to examine resources in general under the assumption of knowledge-currency primacy using tacit knowing theory as a basis for explanation.

Analyzing firms exclusively within the "strategy," and "compete using knowledge" questions as context, we are able to isolate - not all, but some – traditional and knowledge-based

firm resources at the macro level. The following, for example, is a synopsis of the cabling company incident:

"Top management believed that cabling, which you could do... it costs about $3000 per home but you could put in cabling to completely wire a home for Internet, multiple computers, of course cable... media/TV type cable... and that was their predicted future. They started to shrink the old business to grow this business. That strategy was adopted just prior to 9/11 and the economy going really poorly. They made a rather large commitment to shrinking the old business so they cut a lot... in terms of what they said was one of their core competencies... their tech support." (I-12)

In future examples, I will focus exclusively on knowledge-based resources and ignore explaining traditional conceptions of resources for two reasons. First, knowledge resources are central to this study's perspective and they are not commonly identified as the central units of commerce, like they are in this study. Second, and corollary, we are very familiar with the traditional conception of resources (thus, the "traditional" label) and can readily identify them without express mention of them in this study.

From a traditional perspective, then, the cabling firm's strategy focuses upon the sale of product and service in the form of cable, including modems, wiring, the contracting of technicians, and support machinery. From a resource-based perspective, we are also accustomed to recognizing top management, employees, and other talent as resources. However, from a knowledge-based and epistemological perspective, I would argue that a number of very intangible knowledge resources played a much more central and critical role and, therefore, were the primary resources of interest. First, top management's beliefs – and specifically their expectations about a future state of their worlds, which implicitly included predictions about

technology, the economy, consumer attitudes (and more, of course) – appeared to be the most influential resource. The power of those beliefs put in motion a drastic reconfiguration of the entire organization making it a very weighty resource indeed. This particular resource could have held positive or negative value for the company depending upon its relationship to other firm resources.

That belief, incidentally, was detrimental - and still might prove fatal to the company - because acting on that belief included a devaluation of another proven and valuable firm resource. The firm decimated their world class technical support team, liquidating their catalogue business, in order to free up cash for the expansion based upon their belief in the future of cable technology. The catalogue company had been one of the most successful companies in the world precisely because of the technical support they had created over a thirty year run in that business. Epistemological theory would say that their beliefs, the intent to speculate, commitment toward their actions, a lack of commitment to their traditional business, their enthusiasm (want) for the cable technology and their lack of attachment to their catalogue business would all constitute knowledge resources.

What appears to have happened is that management undervalued existing knowledge resources while overvaluing available knowledge resources. As the interviewee put it, "Essentially, the company abandoned old knowledge to speculate... and really wanted to corner that market... kept buying up smaller and smaller companies... overbought... oversold." They of course were probably not evaluating their position from a knowledge-based perspective. However, at play, whether they knew it or not, was a battle between the perceived reality of their traditional and successful catalogue business versus the perceived reality based upon a future in the cable industry.

Almost ironically, the catalogue business is still alive, in large part due to knowledge resources that did not totally vanish with the selling off of most of the catalogue business. The interviewee mentions a few important knowledge resources when speaking about the hobbled catalogue business:

"You do have the pride of the company. You have hard-working people. Even the survivors are working hard. The pride that Black Box has... they create superior performance, commitment... that's one of the few things when everything else has been sliced away, that keeps Black Box alive and is expected to keep [us] moving forward in future." (I-11)

The above segment shows evidence of value in other knowledge resources like pride, a work ethic in the form of "hard-working people," commitment…and it is these things primarily which the interviewee credits for the survival of the company. Finally, the interviewee mentions one last thing that highlights the importance of organizational memory (Anand, Manz, & Glick, 1998; Moorman & Miner, 1998; Olivera, 2000; Walsh & Ungson, 1991).

"Our catalog has been the biggest, the most successful and we can grow that again, I believe. We are a huge global company. We've made millions on our catalog and I expect we can do that again if we can get past some of our problems with the cabling fiasco." (I-11)

The above therefore gives some idea of how perspective on firm assets may change when the knowledge-based perspective is employed. In Searlean terms, pre-intentional stances and attitudes that drove intentional beliefs and emotions played a large roll in the unfolding events of the above organizations. This perspective therefore provides a situational and philosophical context within which to view the firm and its resources that lead to very real prescriptions. For the above two incidents, one suggestion would be to actively evaluate competing beliefs, especially when those beliefs potentially determine the course top management may take and

change the form of an entire organization. For example, the top management team could expressly compare the two realities mentioned above – the cable reality versus the catalog reality. In so doing, they might realize that they have much more information about the catalog reality and could better employ their knowledge-based assets.

Competition

Another concept central to organizational and strategic research is that of competition. It is a concept that, within this study, has run into some trouble, and I will explain. The primary purpose of this study was to examine knowledge-based strategy and competition. However, during my pilot interviews, I collected data from one entrepreneur who, clearly immersed in what we would consider "stiff competition" in business schools, insisted that he had no competitors. (This interview was of insufficient quality and lack proper form for its content to be included other than as a general reference) Another pilot interview (I-3) took place in a public institution with a project manager who identified competition in a number of ways: First, competition was identified nationally between similar groups in other organizations for federal funding, organizational funding, and recognition/reputation. Second, competition was said to exist locally between other non-related departments within the parent organization for attention in the form of public relations and for support from leadership at the more macro organization level. The department competed for reputation, funding, the attraction of human resources, and national attention at the organizational level. The fiercest rivalry existed within the organization as its members fought for office space, the support of coalitions, money, advancement, legitimacy, control over specific aspects of the project, suppression of "unwanted" influence, and a whole list of other organization-related assets. At the individual level, the interviewee also

identified rivalry and resistance in the defining of her role, in the establishment and defense of her work's value, and for technological legitimacy, just to name a few.

It became clear with subsequent interviews that the whole idea of competition itself, its use or lack thereof, is an important "knowledge currency" within organizations and especially prevalent (or not) within certain cultures. For example, the interviewee from the biotech incubator expressed reluctance and discomfort in using the word competition and even suggested, early on, that she select out of the study explaining:

"I don't think of ourselves as competitive to Georgia Tech. I mean, you don't hear that very often. In doing what we do and what we are involved in we do not view ourselves as competitive... we're collaborative." (I-14)

She then told me in a somewhat confessional tone that:

"Now there's a nuance there...you have to learn how to collaborate with your enemies. And so there's, you know, it's an interesting issue that you raise in terms of knowledge and how that's played out. I think all the GRA member institutions are very clear about their research areas of... focus where it makes sense for us to truly collaborate and interact and build on strengths. And we do that. At the same time, I can be very clear about... well, and we have these specific niches where UGA is, you know, we're going to go out and kick Tech's butt. And we still think about it like that." (I-14)

Incidents I-2, I-6, I-8 and I-22 are a few other exemplars where the explicit use of the word "compete" was difficult for what seemed like either personal or cultural reasons. The interviewee for I-20, in fact, managed a distance learning and technology center at a mid-sized college. The manager provided distance education, a technology that has been used extensively as a competitive weapon between educational institutions, including his. Additionally, this same

manager worked at a campus where he, in describing the technological environment during our introduction, mentioned – though in non-compete terminology - various departments that competed with one-another for the technology budget, the right to deliver services, and tangible presence on campus. Yet he was so averse to the use and acknowledgement of competition, he stated,

"We don't really compete with anyone. We're an educational institution," in one sentence and in the next saying, "But I know there tends to the rivalry between departments on campus…distance learning and… a lot of the new multimedia hardware and software… kind of crosses borders. Sometimes we end up crossing boundaries with our computer services people… What I guess we try to do is focus on giving the best support and best service that we can to our customers or patrons. Personally I don't see too much competition. Yeah I focus more on giving the best service possible rather than dwell on competition." (I-20)

However, in all cases evidence of competitive activity existed in abundance, especially when the interview was not focused directly upon the competitive issue, which indicated to me that even the conception of competition itself was valuable organizational epistemology. What I mean, in tacit knowing terms, is that explicitly organizational members are stating that no competition exists, but evidence of competitive action is revealed in other explicit evidence and frequently using other terms. In a very macro sense, this appears to be an attempt to adopt one reality where competition does not exist, however, explicit evidence indicates otherwise. For example, I-20's observation about technology "crossing borders" betrays a territorial view of his workplace and possibly a perception that his own territory has been infringed upon. Practically and prescriptively speaking, competition is obviously present and holds huge negative values for this manager. This manager is obviously uncomfortable with the idea of competition, denying its

existence when he can, taking on a tone of resignation, and introverting into the most basic functions of his job, which includes some training and interaction with individuals. Based upon his responses, his organizational pattern identification and sensemaking appear to have atrophied, such that his connection to the institution and awareness of other departments on campus has been impaired. He had the most difficult time of all my interviewees understanding the concept of strategy, mission, vision, and goals.

Practically speaking, it can not be good for an organization when those responsible for advancing its goals, have difficulties recognizing its presence, or conceiving of their own selves within its context. These problems may be manifest within the individual or they may indicate problems at the organizational level. The nice thing is that, viewing competition from a knowledge-based perspective, beliefs and attitudes about managers and organizations and their places in the world can be more easily examined. Mere acknowledgement of competition influences focus, in tacit knowing terms, to provide a type of lens through which impacts pattern identification as it did in I-20, sensemaking, and the production and use of explicit organizational knowledge.

Performance

Organizational performance, in many ways, has been illustrated in each incident, along with its basic description and listing of its strategies. For that reason, examples will be avoided that repeat content already provided in the critical incident description section (in Appendix G).

To summarize the financial versus knowledge performance condition as it appears above, financial performance, at least in the short-term, does not necessarily correspond with knowledge-based performance. It may ultimately be proven that financial performance provides the best measure of firm performance. However, financial performance is based upon an

assessment of conditions, including the expected return on current investments. The ability to err in these assessments along with the fallibility of accounting and financial systems, in very recent times, has washed away many illusions of the "truthfulness." It is therefore important to develop other systems of valuation which offer additional perspective to the "dollars-and-cents" and "bottom-line" assessments. Knowledge-based performance, though not a complete system, does offer unique perspective and insight to inform managerial thinking – and while it is atypical to evaluate firms in this manner, it is not completely unheard of.

For example, the value of entrepreneurial firms and innovative activities by necessity are often based upon assessments that have no financial counterpart. The alternative, whether we explicitly acknowledge it or not, is reliance upon more knowledge-based assessments to inform our judgments, thus allowing some evaluation of new venture viability. One example of this is provided by I-14, the biotech incubator. Anyone familiar with the biotechnology industry knows that profitability, in any traditional sense, can not be used as an indicator of a firm's future success. In fact when asked about how, in her biotech context, organizational knowledge created value, she laughingly replied, "I don't know yet!" Of course, she immediately elaborated with some economic indicators including high-tech job creation, finance raised, grants and contracts procured, and survival. It appeared as if her more knowledge-based indicators were of greater interest. However, she said, it was too early to tell. When asked about knowledge-based indicators, on the other hand, her answer was, "Well, that's considerable." She then listed intellectual property, patents filed and patents awarded, and organizational recognition which included positive attention by the National Business Incubation Association. Interestingly enough, other sources of knowledge-based performance appeared throughout the interview, but these were not mentioned when I asked explicitly about performance. This indicates a possible

standard whereby performance is measured and valued when financial indicators can be produced but are discounted when performance is measured by some other indicator. The incubator mentioned a number of valuable knowledge-based resources including its alliances, its skill at cooperating with other organizations, its ability to leverage their knowledge with that of other organizations, and unique expertise.

One of the oldest and most successful web-based service firms provided one the most disappointing responses to the "what are your firm strategies" question. Essentially, the answer was, "We want to be number one!" However, the rest of the interview was productive. The reason for the trite strategy answer was that this company truly measured performance in knowledge-based terms. For example, the interviewee from I-8 listed her company as the strongest competitor based on their analytical talent and information, stating that ***everything*** they did was based upon business plans, packages, data, etc.

"Strategically we don't make a move unless we understand the impact from a financial standpoint, a growth standpoint, and understand exactly where were going. It enables us to make a fast decision. We believe it is based in as close as we can get to fact because of analytics. So our conclusion should be very close to what we expect. If you have enough historical data that view your competitors and complementary industries or the businesses you try to go in then you can project within a certain amount of probability your success and failure."

With I-8 it appeared that the information, analytics, and knowledge-based activity drove every aspect of the business with the expectation that profit would certainly follow because they would have an interpretation of all the facts that was "closer to reality" than any of their competitors.

Another example of one way business use knowledge-based performance in a rudimentary way is illustrated by I-4, the Knowledge-base HR case that dealt with executive development and leadership. Describing the knowledge-base:

"We supported our lines of business around their people. We did forced-ranking, performance and potential, we did really stringent ratings. That was one of our core businesses. We called it talent planning. It's known by Talent Management. It's basically a top-grade and you trade out your bottom talent. It's GE basically."

While most of the talent planning system just described is based upon financial performance measures, there is an edge of knowledge-based performance built into it, including the ability of management to attract other top talent, the size and perceived importance of the manager's network knowledge (i.e., knowing who possessed what talent and how they all fit together), and what ability they had to motivate the people with whom they worked. Of course, while the talent planning aspect of I-4 was successful, the management of the knowledge-base designed to streamline the talent planning process was not. Still, it is a relevant performance evaluation mechanism designed to assess, in part, the company's most important knowledge-based assets.

Some other relevant examples are found in I-9's ability to identify knowledge-based failure in the insurance industry with regard to their data management and create value by remediating inefficiencies that the industry has typically found ignorable. Of course, the I-11 example of the web-based catalogue company identifies superior knowledge-based assets and performance despite the fact that the company is dangerously close to vanishing. Those knowledge-based assets might be worth salvaging. Incident 17 describes performance in the environmental industry as simply meeting compliance. However, when probed in greater detail

about her personal approach to knowledge management (I-18), performance was only relevant in a knowledge-based sense because her personal use of knowledge was the only advantage-granting activity observed.

The important point here is that attention to knowledge-based performance lends important insight to our more advanced finance-based performance systems. For the insurance industry (I-9), the knowledge-based perspective enabled the identification of an industry opportunity. For the web-based catalog (I-11), a critical firm asset, apparently the glue holding the battered company together, was identified. For the environmental process management case (I-17), it was the knowledge-based view of performance that emphasized anything beyond the essential, but stagnant, compliance issue.

Thus, the knowledge-based view once again appears to lend perspective to apparently understandable issues of performance. From the standpoint of epistemological theory, the tacit knowledge supporting financial performance know-how is informed by the knowledge-based viewpoint. Company pride, in the catalogue case (I-11), is brought in among other financial non-focal objects to differentially explain firm failure. As a result, the focus of firm viability may be directly affected because patterns that would normally emerge take on different shape as black-and-white financial failure becomes informed by the commitment and pride of the organization's members. The sense made from such a situation perhaps then enters into the explicit writing and conversation and commentary produced from that failure. In fact, our explicit definitions of what constitute success and failure may be highly impacted by adopting a knowledge-based perspective – and while the whole issue of success and failure probably does merit greater discussion, this is not included at this particular time.

While a discussion of strategy, given its important focus on performance, seems to be the next logical candidate for discussion, there are important reasons why organization must first be addressed. First, all work in strategic research depends upon what is assumed to be the organizational unit. In economics, this topic is addressed by theories of the firm (Barney, 1991; Coase, 1937; Cyert & March, 1963; Penrose, 1959) and, in some respects, industrial/organization economics (Caves, 1980; Conner, 1991). In sociology, organization theory was, for a while, responsible for addressing issues regarding what constituted the firm. Then, of course, mainstream sociology "disinherited" that arm of the field for a while (Child, 1972; Zucker, 1983). During the Academy of Management's 2000 Toronto Conference, it was widely discussed during the Cranfield Conversations on Knowledge that the idea of organization itself is a metaphor.

Organization

The concept of organization discussed in this study's finding associate most closely with Barnard's (1938) goal-based conception, Penrose's (1959) managerial resource-based conception, and agency theory's (Alchian & Demsetz, 1972; Jensen & Meckling, 1976) cooperative knowledge-sharing. The knowledge-based view might be a more useful notion for organization in that it allows flexibility that is often built-in to the person-organization relationship and emphasized by the critical incident technique used for this study. For example Organization #3, the sole proprietor design consultancy, had difficulties maintaining a separate identity and not getting swallowed up by her client. Essentially, she described an unintentional blending of organizations, warning:

"…One thing that I think is a very important... this is a strategy for me... very important strategy for anybody in doing this kind of work... is to clearly delineate what an instructional

designer does. What are the talents that I'm bringing to the table? Because otherwise I think one of the things that happened to me this time, at least with one of the stakeholders, is I got slotted into like a Web designer jockey position, instead of understanding that I brought this body of knowledge and this skill to bear on the project. That was discounted completely." (I-3)

This led her, incidentally, to adjust her future strategy to include training her clients on the instructional design process by improving her own communication and management of expectations.

The human resource organization focused on management development (I-4), on the other hand, described themselves organizationally as three very different entities. From strongest to weakest these were: The first was the HR unit/group within which most of their activities took shape and were executed. The second was the parent organization and top managers whom they alternately viewed as their clients and, less often, as co-workers. The third was as a large world class organization vying for first place ahead of the General Electrics and the Wal-Marts. In this third role, the interviewee had this to say:

"You know, we always talked about being world class. We wanted to be the most admired company. We wanted to have a world class HR function. We wanted everything to be world class. You know part of my job was to read assessments of executives. And "how is Sir [Such-and-Such] going to make our organization world class?" I saw that all the time. Yeah man, most admired company, we were obsessed. We want to be number one."

Interestingly enough, this was one of the few times that this third "world class" organization was ever mentioned. In reality, it seemed, the interviewee existed within what I will call his "organization of identity," thinking often about what that organization could do for the second "client" organization within the "shell" organization that roughly contextualized them

both. So legally, the interviewee worked for the "shell" organization and would be judged in a stock-market sense by its performance. From a knowledge-based perspective, though, the interviewee had little, if anything, to do with the "shell" organization – except with respect to how well established and managed was the bridge that spanned identity and shell organizations. In this case, the bridge appeared weak, at best.

The interviewee for incident #6 was a high-ranking member of her organization and highly identified with its strategy and vision. However, within the context of incident #6, she spoke as a member of a group of professionals (which was one organization) that was represented by a formal professional association (another group). When she gave this interview, she spoke very much in terms of somebody working to forward the values, ideals, and knowledge of those two aforementioned organizations and impart that knowledge upon her employing organization. By employing this individual, the employing organization has, in a sense, contracted with the professional organization. In a traditional and legal sense, however, the relationship of interest is frequently that between the employee and the employed, with the focus placed upon the employment contract and exchange of money for product.

Defining the incident from the stance of her professional training and identification, she describes knowledge-based competition as a fight for the legitimacy or acceptance of her knowledge of trade with pre-existing or "normal" knowledge:

"Instructional design... technology... it's been kind of a... quite an educational process of letting the faculty know how to do things online. First, you just let them go and let them run free. And you start showing them, well, here's the fence. This is how you need to do it to bring some organization into the whole thing. They don't like it when you go out and just tell them, this is

the way you have to do it. I prefer to let them find it out on their own. To show them, this is how it's done at that place."

She also describes a type of unlearning process as evidence that she has succeeded in doing her job:

"I've seen studies on this. Wouldn't it be nice if you could do A, B, C? And make them think that they came up with the idea by themselves, instead of forcing it down their throats. It's a whole lot easier to work with. But the big thing is trying to get the point across that their does have to be some kind of organization to the classes. The other big thing is trying to get them to release the lectern. Because they are so used to... they're brought up, you know, the teacher talks, I listen, I learned. But in the online arena the teacher becomes a facilitator and the students teach each other and it becomes a whole other ball of wax."

From a knowledge-based perspective, what we see here is very real competition between bodies of knowledge represented by and maintained through professional groups and organizations, as well as long-standing institutions.

The organizations above can easily be described in traditional terms: The first case would involve a sole proprietor/contractor and a school. The second case would involve a single multinational corporation and its HR group. The third would involve a technology manager in her organization. However, informative as these traditional descriptions are, the knowledge-based perspective does shed different light upon equally important "organization" that is defined by identity, a sense of shared values, proximity, shared bodies of knowledge, and many other factors. All of these later definitions of organization may be produced by taking the knowledge-based perspective and looking for the epistemological impacts using the tacit knowing variables provided on pp.60-61, organization may be better understood by examining them in terms of

mental capacities, stances and attitudes, beliefs, intentions, and emotions that people use to create and maintain such organizations. It is through these personal knowledge coefficients that coherent patterns, sensemaking, and explicit knowledge form to define the organization.

Within this study, a group of computer programmers and consultants form an organization based upon a shared stance concerning "how the job should be done" and congruent lifestyle needs (I-7). They almost resemble a herd of maverick "techies" and even describe the business in terms of a "stable of knowledgeable programmers." What is legally considered one corporation (I-11, I-12) is simultaneously described in terms of the new versus old business and the successful versus the failed. In metaphorical terms, it's like a pair of Siamese twins where one of the twins can thrive only at the detriment of the other, up to the point when both expire. While their separate shapes are discernable, the share so many critical systems, that they can not be considered separate entities. In the knowledge coalition case (I-14), the interviewee is so knowledge-based in her point-of-view that while she defines herself primarily in terms of the incubator, she simultaneously defines herself (and her organization) based upon her proximity to other incubators both locally and regionally. She defined herself and her organization based upon their associations with or relationships to other organizations focused upon advancing start-up or new business. She defined her position and her organization by metropolitan area, by state institutions, by high-tech agglomerations at the national level, and by management style. From a traditional standpoint, her organization was easy to define, but from a more informative knowledge-based position, it was obvious that her sense of organization was considerably more complex. It included various roles defined within a range of organizations. It included a complex nesting of and networking with other organizations. It included a sense of geographic and technological space (e.g., California's Silicon Valley or North Carolina's Research Triangle).

One interviewee in the environmental processing field (I-17) essentially described her business as “more governmental” even though it was a privately held organization. This was probably due to the organization’s close “proximity” to government in a strategic and operational sense.

The knowledge-based view of organization, then, would suggest that organizations have many different forms that include the legal and market-based forms, with which we are primarily familiar, as well as more cognition-based forms such as those just described. Of course, they are they same entities, realistically speaking, described from different and probably complementary perspectives. These perceptions of organization influence strategy that is made within their context and those perceptions drive strategy that then defines future organizational structure and action. This, and a brief commentary on manager’s conceptions of the strategy concept itself, is the topic of the next section.

Strategy

Paul Adler recently commented on the mid-management status of the Academy of Management’s 2003 “Distinguished Executive Award” recipient – whistleblower Ms. Watkins from Enron. It was notable, he said, that a middle manager was chosen for the award when they typically go only to chief executives saying:

“She serves as a reminder to all of us that organizations are not "run" solely by their chief executives, but by the thousands of managers and professionals making millions of decisions every day. They know what is really going on, and often persevere to keep organizations operating in adverse environments brought on by executives' mergers, buy-outs, spin-offs and re-organizations.”

Of course, one of the reasons for this perception is based upon a view of organizations rooted in the pre-stock market tradition whereby the owners of the company were also their

managers and an early stock market condition whereby top management most closely represented ownership interests by wielding tight control of organizations (Berle & Means, 1932). This is, of course, at odds with modern-day sharing of ownership, control, and influence brought about by the complexity of organizations. The stakeholder view (Freeman, 1984), for instance, focuses more upon spheres of influence than on a top management view, offering a different perspective for strategic thinking. Nevertheless, Adler observes:

"Our current [management scholars and the Academy's] "cult of the CEO" leads too many to dismiss and devalue that which the vast majority of our students will be doing. Ms. Watkins's principled actions serve to remind us that these managers and professionals can make a history-changing difference."

From an epistemological perspective, what managers are and how they are defined in an explicit sense quite often drives our behavior toward them as researchers, imbuing certain individuals possessing title or authority with decision-making ability, influence, autonomy and discretion that they may not actually possess. Similarly, we strip legitimacy from others who do possess such responsibilities or capabilities, again because of our sensemaking driven, in part, by the explicit labels we use to categorize such individuals.

Taking this perspective and drawing upon the above discussion on organization, it may make more sense (that is, we may learn more about the world of the managers themselves) if we look at not just how they define organization, but how their sensemaking of organization relates to strategic thinking and behavior:

The knowledge-based perspective of organization suggests that in large part, what drives decision-makers' interpretations of strategic possibility and viability is their own conception of context. Managers who define organization in terms of their familiarity with certain bodies of

knowledge, for example, can operate simultaneously from multiple knowledge-bases to forward strategy that meets the needs of more than just their association with their employing organization. Indeed, from a knowledge-based perspective, strategy is influenced by and formulated within a context defined by education, experience, bodies of knowledge, salient awareness of the philosophies of other professionals or thought leaders, and the thoughts and philosophies of decision-makers. Applying the knowledge-based perspective to strategy using examples from the preceding section on organization provides a good illustration of knowledge-based strategizing:

The web design consultant (I-3), for example, described a major change in her organization's strategy after coming in contact with her client. From an epistemological perspective, the challenges both organizations had in dealing with each other can be explained by their possessing very different conceptions of reality. The web designer, after experiencing this "concussion" concluded that the production of explicit shared knowledge between herself and the client would be integral to her future strategy.

"I would get a proposal request from the client upfront. I would want this documented in writing... what their expectations are, what they think their needs are, who are the stakeholders? That package of information would help me in the future to best develop a solution for the client." (I-3)

From a knowledge-based perspective, their shared understanding (or lack of understanding) creates an organization, which may be more or less formalized and supported by more or less explicit knowledge. A knowledge-based strategy of the consultant is to commit energy to build a more explicit organizational structure. Expanding that further, it is her hope

that this explicit structure will provide a mechanism through which the client may better appreciate or value her talent such that she may more effectively leverage her skills and abilities:

"I've come up with a couple of areas that need improvement and so to make that instructional design process work better in terms of the communication, largely in terms of communication and expectations, I understand that need to be able to look at my own skill set... my talents and liabilities... I need to plan for all of those things. I need to use the talents as a selling point and the skill set to actually make the process of actually implementing some sort of instructional design easier. But also the liability end of things... I really need to evaluate where are my weaknesses within the organization and I think I've come up with some weaknesses in organizing what I need to do... weaknesses in communication, or people skills. My strategy right now is to develop some sort of improvement in those, or if not improvement find a way to remediate the problem. So for example, the issue of keeping things organized and on top of the project." (I-3)

The above strategy involved, among other things, more adequately educating her clients as to what she best could or could not do, defined by her profession. That is, she had to instruct her clients in what an instructional designer does, what differentiates individuals with that training from others, and how expertise with certain technologies is important but not the critical knowledge-asset brought to bear by the designer.

The management development interviewee (I-4) described an interesting condition involving both its organization and strategy whereby the parent organization's management development strategy had been canonized. That is, the parent organization subscribed to a management development strategy developed by General Electric that was meant to be quite programmatic and strictly followed. Once adopted, this strategy became a fairly solid component

of the organizational structure supported by set routines that were managed by the HR organization. Essentially, the HR organization was operating within the context of the "strategic structure" established by the parent organization in years past. Strategy, however, was spoken of not in terms of the parent organization but, rather, in terms of the HR organization, because it was with this organization that the interviewee most closely identified.

The HR strategy was, in fact, an attempt to deal with the "strategic structure" put in place by the parent organization. In one way, it seemed that one man's strategy was another man's structure. In this case, the parent organization's strategy was described by the interviewee in very structural terms, a way of thinking turned construction:

"Every year it's the same thing...over...every year. Fourth bleeding into the first quarter was, prepare for year-end compensation and next year's strategy and operationalize it. Conceptually it was always the same. First to second quarter you did evaluations of your people so you actually rated your people throughout. The second and third quarter you had reviews with the CEO...so the top 40 execs of the bank...the ones who ran the base businesses, basically the CIO...head of legal...you know, those kinds of people met with him and reviewed...90% of the meeting was all about people. Succession plan...a personal succession plan...if you get hit by a bus, if you leave, if you're close to retirement, then what does your replacement chart to look like? Where's your top 20? What's the probability that they're going to leave? Where are they going? What's your development plan for your newly rising people? And you know, we would go three, four, sometimes five deep into the organization. Then, on the third and fourth quarter you'd start thinking of formulating your year-end comp. And it's all based on talent. It's all based on performance and potential."

The interviewee only begins talking in strategic terms when he discusses his own organization – his "organization of identity" – where he has decision-making ability, influence, a degree of autonomy and discretion. Specifically, he and his organization were committed to the idea of using technology that they possessed to mechanize a process that they had to manually handle each year.

"What we were trying to do was...that's the process, every year...we do that every year...What we were trying to do was use the knowledge base to make that more effective. You know, it's a tactical thing. You had to do it. But [our goal was] to get us out of the tactical and more into the strategic - in driving the business.

What the interviewee describes is a strategy-making behavior for his organization that moves his organization more toward the strategic core of the parent organization. This is obviously driven by a clear delineation, though, between the HR organization and the parent organization, with loyalty, it appears, to the parent organization secondary or subsidiary to commitment to the HR organization. Through the use of technology, this organization was trying to offload responsibilities hoisted on them by the parent organization to bring them closer not just to the parent's strategic core, but to permit them more time to pursue their own strategy.

"This is what we were trying to do. We were trying to do...through the knowledge base (I know it's hard to link)...minimize this time spent doing tactical stuff - (i.e., replicating). Freeing up time [meant we were] getting in front of the client, talking about who we were going to develop, who's on the replacement chart...thinking strategically about how the talent today lines up with where we want to take the business tomorrow. So… instead of being a support person, you became a consultant… We honestly believed that by streamlining our processes, we were going to move from being a support function to an actual consulting function and by doing that

we were going to drive business. We were going to support the strategy, which was going to get the right people, in the right place, in the right jobs."

My last example, before summarizing this study's emergent findings, involves the creation of organization through strategy, as was the case with the data management consultants (I-7). First, the interviewee describes his own place in the organization in terms of actual role versus legal structure, supporting other observations that both organization and strategy are often based upon how the individual comes to "know" them from an epistemological sense. That is, the reality of each manager's and organizations condition influence the focus they adopt, the subsidiary clues to which they attend, the patterns they develop, the sensemaking that occurs and, ultimately, the explicit sense that is produced. As this consultant explains:

"I don't have a formal ownership stake in this corporation. [However,] my role is largely one as if I did. It's a small organization. The man who owns it and I are very close and we have basically and understanding that allows me to participate in shaping the strategic direction of the organization. So the example that I'm going to focus on today is based on the company that I'm subcontracting for, Advantage Consulting Group." (I-7)

This interviewee then describes strategy for this organization very much in what appear to be operational terms:

"So our organization strategy, in growing the business focused on data conversions and similar type projects, is to enhance our ability to develop tools and methodologies and a core group of consultants that can assist companies in managing transitions from one software package to another-or one software platform to another. So there's three basic areas where we do this. One, is developing the tools to use that we bring to the engagement. Two, developing the methodologies that we use that we find successful to help ensure that the project's successful.

Three, enhancing the skills of the individuals that we work with and involve on these various projects." (I-7)

He then, however, contextualizes their approach by comparing their business to the two dominant strategies adopted by the majority of firms in the industry.

"Our goal is not to become a software company, to develop tools and sell them. You know, to sell shrink-wrapped solutions. And it's not just a place consultants... you know, to be a matchmaker and place consultants in contract positions. You know, it's more targeted than that. So that is one way that we would differentiate our organization from others that might be seen as similar." (I-7)

Even deeper into my interview with this manager - in Incident #9, analytic strategy - it became clearer that backing this strategy was a philosophy that was apparently shared by every consultant composing this unique organization. Epistemologically speaking, the software-based groups were, according to the interviewee, operating under a model where they focused on developing a generic software solution that they could then sell in bulk to insurance and health care companies. He referred to this as the "dream of becoming the next Bill Gates," an approach which, he said, took the companies in search of easy answers and moved them further and further away from the companies they supposedly served. The other big group of competitors the interviewee mentioned included the big consulting companies that he called the "IBM's, the KPMGs, and Cap Gemini's who employed a large number of very generic programmers – again, without respect for the needs of particular clients."

Driving this, says the manager/consultant, is a base attitude:

"The reason that more companies aren't doing [what we do] is that I think people have seen this, for a long time, as less prestigious work that was ultimately going to go away. That

data conversion work is not the most glamorous type of IT work to do. And somehow people thought that, at some point, there wouldn't be any more data conversions to be done." (I-7)

The manager from Incident #7 portrayed his organization as one premised upon a series of very simple (at least on the surface) philosophies portrayed more clearly in Incident #9, which dealt specifically with what they call their methodology strategy. First, while they are all trained in and experienced with technology, they are careful not to depend too much on technology to solve their problems. The manager explains the basic philosophy that separates them from the competition:

"The ideas that we have are fairly simple. I think the thing that keeps other people from doing [what we do] is our ability not to be seduced by technology, not to be seduced by technological solutions to this problem. Many of the people that are trying to sell products in this area are trying to solve the problem with technology. And what we've recognized is that it's not a problem that can just be solved with technology. There are other critical aspects of the problem that you have to address. You have to address them with, you know, detail oriented people that have a broad, that have deep industry knowledge. You have to address them with a methodology that keeps you on track and keeps you focused on the things that will yield value in the project. I don't think any of those factors are things that couldn't be duplicated. It just doesn't seem to be an attractive enough proposition to have attracted enough competitors to do the same thing." (I-9)

Their technology philosophy, then, is built on three basic tenets: One, a technology cure-all does not exist. Two, we depend upon detail-oriented people who look closely at the data; they are essential. Three, we depend upon a team of people with broad, deep industry knowledge. Their philosophy – and, indeed, philosophy when applied to organizations in this manner - is synonymous with knowledge-based strategy. The preceding portions of the strategy section,

therefore, all represent in one form or another, the presence or influence of a knowledge-based strategy. That is, some philosophical frame consisting of a conception of reality supported by stances, attitudes, beliefs, emotions that produce coherent patterns and acts of sensemaking, reflected in explicit knowledge in the form of strategic statements, codes, or activities. Many organizations within this sample even expressly mentioned a philosophical system or mindset in describing their strategies. For example, the training center for trainers (I-1) openly subscribed to a "constructivist philosophy," the management development organization (I-4) was strictly based upon a popular business program used in its field, and the talent promotion organization (I-21) operated almost exclusively to bring modern-day business philosophy to individual performers and groups in the music industry. An elaboration of incident #21's philosophy, in fact, is the basis for the knowledge-based competition described in Incident #22.

Another important and unexpected pattern that appears present in the data involves the conception of strategy, in a very explicit sense, itself. There is some evidence to suggest that the use of the strategy concept and the value placed in that concept is not uniform across managers and their organizations. Some view strategic thinking as very important while others view it almost as fantasy. Some think the use of the word strategy is overused and not defined cleanly enough to be worthwhile. Some managers see strategy as so all-encompassing that nothing organizational, to them, qualifies as not being strategic. Therefore, the very conception of strategy will undoubtedly affect how managers strategize and what they will or will not classify as organizationally relevant.

In one organization, the CEO essentially forbade the use of the word:

“The CEO flatout came out, when we were building the leadership model he flatout said to us that he didn't want strategy...he didn't want the word strategy in there. To him, strategy was, "think about things...think about things." The man was a doer.” (I-4)

It may be that the CEO just cited was afraid that all his employees were going to immerse themselves in meditation to the detriment of all else. Whatever the reasoning, the long-term thinking and planning philosophy of “strategy” did not sit well with this manager. Indeed, his philosophy seemed quite at odds with that taught in most capstone courses.

Another top manager within the largest, most long-standing, and financially successful firm in this study’s sample called the word “strategy” overused and trite (I-8). However, when I asked her why she felt that way, she explained that the fiber of her business’s philosophy driving the organization’s strategy made every act at the company strategic in nature.

What is also interesting is that strategy, for many, seemed to be encapsulated in a very simple sentiment, each having deep implications. For example, one interviewee said his organization’s strategy was “just surviving,” (I-11), one said “being number one” was their company’s strategy (I-8), one repeatedly went back to two words “quality and consistency” (I-13), and yet another went back again and again to “constant innovation” (I-24). It was often unclear until later on in our discussions whether or not the identified strategy was simply a knee-jerk response in order to have something with which to respond or, indeed, if that very explicit utterance was backed up by a philosophical system of some sort. It appeared, in looking at this set of data, that strategy as defined by managers and used in organizations was something considerably removed from our clear understanding of that concept in the academic world.

Explanatory Findings

Again, explanatory findings focus upon the comparison of low- versus high-performing firms from a knowledge-based viewpoint for each hypothesis. Selection into low and high performance groupings has used two criteria. First, interviewees or respondents classified their incidents as either successful or not successful and qualified those classifications within their interviews. Second, the researcher ranked firms by knowledge-based and financial performance relative their respective contexts (see Tables 3.1 and 3.2). Low and high performance are then used to define the sustainability condition, that is, the existence of a superior state of performance is used to indicate conditions that have allowed above-average returns, the impairment of returns to normal profit, etc (Jacobson, 1988). The sustainability condition, once identified, provides the context within which those indicators of sustained competitive advantage (value, rareness, inimitability, and nonsubstitutability) are examined. This structure allows us to make, without the statistical evidence which is provided later on, explanatory statements because we are specifically examining those characteristics which differ between low and high performing incidents, depending most heavily upon low (I-2, I-4, I-11, I-12, and I-18) and high performing (I-6, I-7, I-8, I-9, I-14, I-24) exemplars to maximize analytical variance.

This explanatory stance is, however, focused upon theory-building and is still very much exploratory in nature even though it is built on an explanatory foundation.

This section of the study will be similar to the exploratory findings section in that it will focus upon its findings assuming knowledge and knowing to be critically important currencies. Also, findings will be assessed using epistemological conventions identical to those used in the exploratory findings section. Again, one of the main contributions of this study is the incorporation of important epistemological dimension to organizational and strategic knowledge.

Each hypothesis, therefore, will be discussed in a manner congruent with the exploratory section above. That is, terminology and logic from the Tacit and Personal Knowing frameworks already introduced in this study and in this dissertation's Chapter 2 will be applied within this section.

Structure of the Analysis

The hypotheses all benefit from a look at specific portions of the transcribed interviews. These were set up in a hierarchical fashion designed to facilitate their segmentation for analytical purposes and prevent more in-depth portions of the interviews (i.e., the VRIN portions) from "contaminating" more macro-level questions about organizational strategy and knowledge-based competition. Hypothesis 1, however, requires the agglomeration of analysis across levels, and so will make greater sense if it is addressed after all other hypotheses have been examined.

The following analysis of qualitative findings will proceed, therefore, from Hypothesis 2 concerning analysis at the most macro level. "Sustained competitive advantage indicator" hypotheses 3 through 6, and Hypothesis 1 will then utilize a quantitative content analysis to examine sustained competitive advantage. Additionally, the first identification of knowledge-based strategy from high performing organizations (Incident #6) goes into some detail on knowledge currencies and epistemology. However, because of the detail already provided in the exploratory section of this study, most observations will simply be listed, accompanied by some text, but lacking that detailed commentary on currency or epistemology. Finally, the strategy and knowledge-based competition section, because of their topical importance and due to the amount of data provided by interviewees, will be considerably longer and richer in detail.

Knowledge-based View

H2 (Knowledge-based View): Knowledge resource strategies will be both prevalent and predominant among strategies identified by managers.

To test the knowledge-based view hypothesis in a qualitative sense, we have assumed that successful ventures and their driving strategies within knowledge-based organizations will result in richer, more detailed narrative concerning knowledge-based strategies even when they are asked about their organizational strategies in a general sense. This means that restricting analysis within the first question (Level 1 in Appendix B), "What would you say your organizational strategies are?" superior performing firms will describe knowledge-based strategies more frequently and with greater emphasis. This condition will similarly occur when this analysis is extended to the second critical incident question (Level 2 in Appendix B), "Please think about a situation when you felt that you and your company used knowledge effectively to compete against other rival businesses. Imagine you are back in that situation and tell me what you can remember about it." It is expected that superior performing firms will, in general, provide superior information about their strategies and their knowledge-based competition. It is also expected that the detailed interview data provided by knowledge managers within low and high performing knowledge-based contexts will provide different types of information. Each critical interview, for instance, should contain both shortcomings and successes of knowledge-based strategies. However, it is expected that low performing or failed knowledge-based strategies will provide very different evidence – greater detachment, for example, between knowledge sets and struggles with communication – than that provided by high performing or superior knowledge-based strategies.

Strategic *knowledge* management, again, is primarily concerned with those activities that help an organization conceive of and implement an organization's goals and objectives focused specifically on the use, maintenance and growth of organizational knowledge. Examples of an

organizational knowledge focus include knowledge identification and acquisition, knowledge development, sharing and distribution, preservation and measurement and the use of knowledge-based resources, including technology. In terms of explicit and tacit knowledge, this may include that which is typically considered "explicit knowledge" like computers, manuals and algorithms.

High performer strategy & knowledge-based competition

Incident #6 was provided by the technical manager dealing with an organization-wide roll-out of WebCT's Vista System. She mentioned a few knowledge-based strategies. First, she described her strategies largely in terms of personal experience and knowledge from the field of instructional design (which is a cross-roads discipline between computer science and psychology). One core strategy included the active management of the technology introduction process that required her to immerse herself in the online technology (both hardware and software) and the pedagogy it had to support. This was then contextualized through daily interactions with those unfamiliar with the technology. It was, she said, "quite an educational process" whereby she personally experienced failures and successes in the practice of introducing and implementing technology.

The process she created included an informal introduction of the online technology to her target professional group. This included providing adequate training just to lend them access to the technology. Then, she let them explore, explaining, "You just let them go and let them run free." Once they become familiar with the technology she begins identifying bounds that exist within the technology as well as acceptable practices, "to bring some organization into the whole thing." She said that she learned from experience that the highly educated professionals she works with "don't like you to go out and just tell them, this is the way you have to do it." Instead, she prefers to let them find it out on their own, provide examples of how the technology is used

by other people in other organizations, share more scientific or research-based information to lend credibility to the information, and give them a range of alternative techniques that have been "pre-tested" in the tone of, "Wouldn't it be nice if you could do A, B, C?" If she does her job correctly, she says, then they think that they came up with those ideas by themselves, "which is a whole lot easier to work with than forcing it down their throats."

"But the big thing is trying to get the point across that there does have to be some kind of organization to the classes. The other big thing is trying to get them to release the lectern. Because they are so used to... they're brought up, you know, the teacher talks, I listen, I learn. But in the online arena the teacher becomes a facilitator and the students teach each other and it becomes a whole other ball of wax. So when I do workshops, I try to teach in the classroom the way they should be teaching online, so I become a facilitator rather than a lecturer. And so they see how that works and a lot of them carry that over into their classes. Technology is just teaching them what it is." (I-6)

There are many knowledge-based currencies identifiable in this incident. On an individual level, the technology manager possesses information about technology, skill at its implementation, awareness of how that technology fits within the institution's overall structure and strategy, and training in professional discipline that focuses on the practical use of traditional computer science and psychology bodies of knowledge. Of course, these personal and professional knowledge currencies represent just the tip of the iceberg, but their mention should suffice in bringing other examples to mind. At a group level, you have bodies of knowledge created, put into use, and maintained by the "instructional design profession" and its multiple organizations. Different approaches to instructional design exist, in large part because groups subscribe to those approaches, creating different styles or schools of thought. The professionals

with whom the technology manager works possess other philosophies, goals, and objectives for which that group serves as a vessel. The professional recipients of the technology also form group of people impacted by the technology. They are expected to adopt the technology. However, its delivery, the requirements placed upon them, and conflicts with pre-existing philosophies, goals, objectives, group norms, and experiences could thwart such an adoption. On a more macro, organizational level, the technology must "fit" with structures (including other technologies, departments, competing coalitions, unions and other professional groups). Individuals, professionals, professional groups, bodies of knowledge, academic disciplines, and organizational structures – including technologies and philosophies – all reciprocally influence one-another.

The most important knowledge-based currencies in this situation, as discussed by the technology manager, seem to exist between herself and a professional (along with her professional group) and the group of recipients of the technology. From an epistemological standpoint, the existence of these currencies seem to place special emphasis, in this incident, on the introduction of new knowledge (with its benefits and challenges) first into the organization's technology management center and then out into groups of professionals including instructors, professors, researchers, and students. The technology manager's main strategic focus seems to involve changing attitudes, mindsets, beliefs, emotions, and other epistemological factors such that the introduction of the technology is preceded by an acceptance, on a very deep, personal level, of that technology.

Taking that one step further, this seems to arise from awareness, on the technical manager's part, of how difficult it may be emotionally and psychologically, when new technology is adopted. She therefore lets them experiment in a low risk environment before

introducing constraints. She suggests possible solutions rather than prescribes. So stepping beyond just developing an understanding of the technology and moving the machinery in to the organization, she has an appreciation for "the human factor."

The technical manager from Incident #6 also mentioned various other activities designed to enhance her competitiveness:

"I go online and look at other schools, if they have WebCT... what are they doing? How do they support it? What kind of tutorials are they using? Are there any special workshops they've started? And we trade information back and forth." (I-6)

She also makes specific mention of the value of experience which, she says, leads to "having a more vivid imagination of how to use the tools that are available and how to get more out of them. A lot of it is ideas... how to think outside the box. How to do things more than, you know, click here, click here, click there," in order to make the learning experience more meaningful. (I-6)

In terms of the technology, "you've got to know what is possible online. I actually go out and I learn new programs. Right now I'm trying to learn Flash. And I've found that there's a lot you can do that and a lot that even the guys I've got developing for me don't do yet. I'm thinking, well, if we can do this, this, and this, which would make a better project?" (I-6)

Then, for professional development, the technical manager mentioned she takes classes, goes to conferences, networks, participates on several listserves, and does a lot of reading. That way, she says, she is able to keep up on the latest trends and theories and keep herself competitive. She also strongly suggests finding a mentor.

While a number of strategies can be identified in the text of her interview, these can be grouped and summarized, providing an overview of her strategies in levels one and two of the interview that deal with organizational strategy and competition. These included:

1. The intentional and actively humanistic management of the technology introduction process which included perception and emotion management and "unlearning."
2. The delayed implementation of rule-based structure and more formalized technological conventions.
3. The application of learning theory as central to her practice.
4. An active use of competitive intelligence gathering and benchmarking.
5. Open sharing with competitors and other parallel institutional users of the technology.
6. An appreciation for experienced personnel that translates into her hiring decisions.
7. The use of imagination.
8. Developing an understanding for the limitations and capabilities of online technology.
9. Personal professional development, including networking and the use of professional mentors.

In this instance, strategic thinking and knowledge-based competition provide some insight into the linkages between explicit and tacit knowledge in organizations. The technology manager, for example, could easily have begun to introduce the WebCT product by providing its future users with manuals and tutorials. Had this been her starting point, every potential user would have to come to those explicit materials, each from their own level of proficiency or comfort with technology. The burden of knowledge transfer would have been placed squarely upon technical writers who would have to write the material in simple enough terms to communicate to a large audience. An additional and heavier burden would be placed upon each user as they then made their way through the explicit materials. They would undoubtedly find themselves searching through that mass of information, picking through the irrelevant to discover what may or may not pertain to them. The task of slowly moving their way through that information would also require individuals to be strongly motivated by a blind need to understand how this new technology would benefit them.

One benefit to introducing technology to the individual on a less formal basis is that when the rules, restrictions, and regulations that govern the technology are revealed, there is, at least, some experience with the technology. This "primes" those explicit directions with unspoken logic and a stance toward the technology that is less explicit. That is, when more formal training does take place, a psychological grounding to which that training can "stick" will be present. Additionally, users will have more of that unspoken knowledge and experience that will motivate them and bridge the gap between the explicit training they understand and that which they do not. They will also arrive at training better armed with questions and an ability to relate to the material – which means they have already generated explicit knowledge from their interactions with the technology.

Incident #7 involved the promotion and development of a small group of programmers involved mostly in data conversion in the insurance and health care industries. One of the top programmers and strategic decision makers described the firm's strategies as:

1. Growing the business focused on the niche data conversion market to assist companies in managing transitions from one software package to another, or one software platform to another.
2. Enhancing the company's ability to develop tools (software programming) that we then bring to the engagement.
3. Producing methodologies (routines to guide analysis) that we use and find successful to help ensure project success.
4. Enhancing the skills of the individuals that they work with and involve on these various projects.

The programmer also described two additional "what we are not" strategies to support their effort at differentiation which included:

1. Not becoming a software company that develops generic software tools and sells shrink-wrapped solutions.
2. Not becoming a matchmaker, with the goal of just placing consultants.

Looking at these strategies from a knowledge-based perspective initially, I would group the niche and differentiation strategies (#'s 1, 5 and 6) together as both falling under one strategy – that of establishing their organizational identity. First, they identify their core competency and strictly adhere to that chosen area of expertise (this is what we are and this is what we do). Second, they develop the ability to describe how they are different (this is what makes us special). This was elaborated upon when he identified his company's most critical incident:

"When we're in the process of winning business from potential clients, the presence that we make and the conversations that we have in those settings are probably the best example of how we compete using knowledge." (I-7)

He describes the types of knowledge-based assets, products of the knowledge-based strategies erected to generate and amass those assets, including an in-depth knowledge of various software packages, a cadre of *experienced* programmers whose knowledge spans both the breadth of the life and health insurance industries and the administrative solutions that are out there.

"We work with quite a few experienced consultants... in fact they are all experienced consultants... but their experience essentially spans the range of the solutions that are out there. There's not one that one might be converting from or to that we can't demonstrate some expertise in. We focus in a specific target system that's the most successful one in the market now. So we have in-depth experience and knowledge about the workings of that system and most of our data conversion business is involved in assisting conversions to that particular target system." (I-7)

From an epistemological perspective, the data conversion company looks for people that not only possess non-explicit expertise in a range of administrative systems, but also individuals that can express enough of that knowledge in an explicit sense to make their value proposition.

This is another instance where explicit and tacit knowledge are obviously inextricably linked – and where neither may create value without that tie to the other. The interviewee states, for example:

"We're very familiar with the data needs of that administrative system we can easily demonstrate our ability to provide value in that setting and we can easily provide reports and evidence to the client that we know much of what they need to discover about how to populate the tables in an environment." (I-7)

This points out the importance of "easily demonstrating" their own expertise and ability to understand their potential clients' needs that requires personal knowing on the part of each consultant. It further requires a tacit knowing system that permits ease (an efficiency argument) in successfully demonstrating (an effectiveness argument) their knowledge as a business value argument.

The extension of tacit understanding and the ability to generate useful explicit knowledge is also demonstrated in their chosen strategic focus on software development tools. According to the interviewee, the software they create is designed to "accumulate knowledge in the form of data mappings" and "details about how the data needs to be loaded in order for this complex administrative tool to work successfully." The tools they create retain details that the consultants use to produce reports that are also used to communicate value to potential clients. This requires that the firm possess an ability to create new knowledge in the form of software "tools", select out bad tools from good, and constantly apply those tools in a way that is meaningful to their clients. The critical incident details provided by the client, then, supply us with insight into additional features – actually knowledge-based strategies in their own right – including the identification, selection and retention of talent; knowledge creation, innovation, assessment, and

application; and a knowledge bridging strategy whereby they constantly seek to empathize with and understand their potential clients in order to learn, produce, and apply that knowledge in explicit ways.

Incident #8 was provided by a top manager in a company that possessed a pioneering presence in the online travel industry. She mentioned just one strategy for her company which was, "ensure that we are the leader in travel technology for the industry" with travel technology referring to the provision of information to anybody (e.g., travel agencies, consumers) seeking information on travel. Of course, dealing with information gathering, interpretation, and dissemination is clearly knowledge-based in nature - as is the identification, definition, capture, and maintenance of a leadership position. She, much like the data conversion people from Incident #7, identified strategy and competition as a very fine-grained organizational factor in the sense that they both identified strategic thinking and the philosophies of their companies as critical, daily incidents that extended to every organizational action:

"I would say minimal decisions are made, no significant decisions are made without an analytical connection. That is whether you're building a product, whether you're looking at pricing, whether you're looking at competitive action, everything has a package [formal presentation backed by analytics] for it." (I-8)

When the information manager was asked about her critical knowledge competitive incident, she responded:

"We compete every day against rivals. Big Z competes against Enzone and Lilliput. We compete against A-Company, B-Company, and C-Company - which are competing systems - so every one of our business units has strong competitors…and we are probably the strongest competitor based on our analytical talent and information." (I-8)

This was, she said, attributed to the strategy and structure of the company from which her company was spun off – a path dependency argument (Arthur, 1984) – that was and still is known for their analytical talent.

"So everything we do is based upon business plan, packages [formal presentations], data...strategically we don't make a move unless we understand the impact from a financial standpoint, a growth standpoint, and understand exactly where were going. It enables us to make a fast decision." (I-8)

A number of things are worth noting from the previous statement. First, the information manager mentioned a number of knowledge assets that would traditionally be considered explicit in nature and, therefore, simple and easy to duplicate (e.g., business plans, formal presentation, and data). However, she describes her reality, as we will see shortly, in the use of these assets to be quite different because they are tied to tacit knowing structures like attitudes, stances, shared values, beliefs, perceptions and a conception of reality. Second, she mentions the use of very structural and codified business plans used to interpret data and transfer those interpretations throughout the company. While these might be considered very tactical and operational in nature, this manager believes them to be strategic activities, the integrity of which possess strategic importance. Finally, the perceived outcomes of the above focus – those things that provide the firm with its leadership position – include a closer relationship with "reality." This is reflected in the absolute "we don't make a move unless we understand the impact…understand *exactly*." The implication is that the company is coming close to approximating perfect information (Alchian & Demsetz, 1972) which enables them to make accurate decisions more rapidly than competitors.

"We believe it is based in as close as we can get to fact because of analytics. So our conclusion should be very close to what we expect… so if you have enough historical data that view your competitors and complementary industries or the businesses you try to go in then you can project within a certain amount of probability your success and failure." (I-8)

Interestingly enough, when asked to provide a specific information gathering and analytics situation, the strategic sharing and exchange of information came up (much as it has throughout these knowledge-based interviews). This is, of course, contrary to the emphasis on the protection of information advocated in much of the intellectual property literature (Liebeskind, 1996). Her critical knowledge-sharing incident involved entry into a new market:

"We need to look at the information we have on hand because we share information with our competitors and they share information with us. We see if we're going to be successful… what will it take to get there and how quickly we can get there." (I-8)

When she was asked about the reasons for and logic behind sharing information in an information-intensive industry and the danger that posed from the competition, she replied:

"We have a bilateral agreement that we share our penetration of our core business numbers. We believe... we're not concerned about doing that because we believe that...and the industry believes that...we're the strongest in understanding the numbers. So we're not threatened to share our information because when we get the information back we're going to be better at crunching the data." (I-8)

What this says is that from a traditional strategic standpoint, simply sharing information, even strategically sensitive information, does not suffice to provide a firm with sustained competitive advantage. In fact, successful knowledge-based strategizers appear to rely upon the open sharing of "strategically sensitive" information because they believe that sharing will

provide them with greater raw materials in the form of data and information. With those additional materials, even when they are evenly distributed amongst the industry players, they can outperform their rivals in their interpretation of reality.

What stands out the most, then, in terms of theory-building in the realm of knowledge-based strategizing and competition from Incident #8 is first, knowledge-based strategy appears to extend beyond macro levels in the organization to the molecular level. That is, from this manager's perspective, the structure of their particular organization has been so constructed as to permit and require strategic decision making at all levels in the organization. Additionally, the use of data, business plans, information, the development of information-sharing "packages" all integrate into an analytic structure that very much represents an organizational "knowing" through coherent pattern emergence, sensemaking, and a closer approximation to an apparently assumed objective reality. This is very much supported and informed by epistemology. Second, not only is information hoarding not advocated but, quite the opposite, information sharing is considered competitively desirable. Third, the use of very tacit knowing, interpretation and approximations to reality are highly dependent upon what are traditionally very explicit knowledge assets that are assumed away as strategically unimportant. The fact is that the explicit is tied very tightly, in some instances, to the fiber that defines the company's structure and supports the successful continuance of its strategy.

Incident #9 is set within the same data conversion business but focuses upon the methodology strategy that was defined by the programmer as being the most critical strategy for the business and personally the most interesting. Discussing the strategy itself lends greater insight into the philosophies underlying an important knowledge-based strategy. Describing this philosophy, the managing programmer says:

“This whole idea is built, in my view, on fairly simple ideas. And that’s one of the reasons why it’s successful. I guess the foundation idea is that a successful data conversion will be built on clean data. That if you understand all the possible values that data field, on the source side, on the front side of the conversion, if you understand all the values in a given field and what those mean without making assumptions, by analyzing every bit and every byte of data in every file that you are going to convert and understanding what all that data means... if you are willing to go through that process, then you’re going to be much more successful.” (I-9)

The interviewee describes the success of this particular strategic philosophy as resting on its simplicity which makes it easy to understand, easy to follow and mentally attend to. Essentially, this strategy is a defining “focus” for the organization that has apparently sprung up from firm members’ emergence in the data conversion process wherein they have tacitly identified certain patterns.

“What tends to happen is companies tend to assume they know what's in their files and a lot of times the systems that we're converting have been in place for not just two or three years, but maybe 20 years or 30 years. Or they may... the system that we may be converting from may be only five or ten years old but it may hold data that's been converted two or three times over the life of the company. It tends to accumulate errors. And the assumptions of one era of programmers are poorly understood by the next, and the more conversions are done without this total housecleaning or total examination of all the data in all its intricate detail, the less well understood that data of the organization becomes. Our willingness to look very closely at all that data and make sure we understand it all, and make the client face up to all the data that's been swept under the rug for years and years and years, or that's been poorly understood, I think is at the foundation of why we can be successful. We don't sweep anything under the carpet.” (I-9)

These are patterns that have, over time, made their way, through the sensemaking process, formed the explicit statement of methodology strategy above provided. That explicit strategy then serves as a focus mechanism around which subsequent subsidiary clues may be interpreted or, perhaps, a context wherein other sets of subsidiary clues are sensed. New patterns are then recognized, sense is made, and organizational strategy is either supported or contradicted. In the case of the clean data methodology, the company uses its programming tools that perform different types of analysis. Files targeted for conversion are identified. Meaningful data segments (e.g., those that fit within a range of values) are retained while those judged to no longer possess value (e.g., nulls, out-of-range code, and invalid text) are eliminated. The definitions of what data is and is not meaningful are agreed upon by the programmers and their clients. That is, explicit rules are created that drive the interpretation and conversion of data. From those rules, the programmers, using the tools they created, produce stacks of reports about all of the data fields in all of the files, and they go over those reports with the client. According to the interviewee:

"It can be a mind numbing process. You can imagine, we're working with huge systems that have hundreds of files. But, if you are willing to do that, so that you make conscious decisions on all this data instead of just assuming based on what someone "thinks" is in the files, then when you reach the point where you are trying to test the new system, you don't have surprises. Otherwise, you end up converting a lot of values that you really don't know what they mean, and the testing process on the implementation of the new software tends to get elongated." (I-9)

The result is the programmers' ability to clearly demonstrate cost savings to the client by eliminating surprises and unknowns in the raw material – the data. In that way, says the

programmer, they can be more accurate in their time estimates to the client, because errors that normally confound processes later on, in the testing of the software, are eliminated. The interviewee mentioned that some companies think it's going to take six months to test and it takes them a year and a half.

"Because they start testing with bad data and then they can't figure out whether it's the data that's at fault, or that they didn't configure the new package correctly, or that the modifications that made to the new package aren't correct, or that they just don't clearly understand how it's working. So, to the extent that we can eliminate errors in testing that come from data, we can save a lot of time in the total implementation process." (I-9)

This demonstrates an interesting case where one of the most "traditionally explicit" pieces of knowledge – the raw data – is very much a part of a strong tacit knowing structure. First, even one bit of data can have its origins in the interpretation of that data during different configurations of the organization, under different rules for understanding that data, that have been buried under multiple other past data conversions. The explicit data therefore had its origins in a different time and place that undoubtedly provided a different knowing context. To convert that data, an organization must understand past tacit frames much like an archeologist would rely upon cultural anthropology and surrounding artifacts from a dig. Then, that same organization would have to place that data in a current context within which others could then properly interpret that data.

Among the most competitively important epistemological details provided by the interviewee with respect to his firm's strategic philosophy, were those that involved their mental stances, attitudes, beliefs and emotion toward data conversion and its place within the industry:

"Our methodology and our willingness to do that detailed dirty work, in the trenches, making sure we have clean data, making sure we understand what all the data means is the biggest way that we ensure our success." (I-9)

First, the firm has adopted the mental stance and attitude that data, apparently the "orphan" of the computer programming profession, is indeed important and valued work. This provides important motivation and justification for putting any energy into something that has long been discounted by various groups and avoided by individual programmers. Second, this group of programmers acknowledges that they are indeed focused upon "dirty work" and they appear to take particular pride in taking on that difficult task. This is an emotional differentiator that sets them apart, makes them feel special, and energizes them in what is, in the programmer's own words, "mind-numbing work." Finally, they are, as a group, committed to the idea that this attention to detail and willingness to work hard is one of the key drivers of their success.

This incident especially highlights a few important points in the development of an epistemological understanding of strategy-making and competition. First, businesses may accrue important benefits when they strategically provide and support that focus through which business decisions and operations are viewed. This "focus" knowledge-based strategy is therefore instrumental in the recognition of coherent patterns and sensemaking that drive the organization. Second, the focus upon the explicit is nothing less important than putting the explicit within context – which is no easy task. One of the true values come from engaging in knowledge-based business where that context is identified and clarified with the explicit then transferred successfully into a different knowledge context. This is the only way that businesses may retain knowledge created in one moment for its continued use throughout the life of the organization. Finally, this incident points to the importance of personal knowing in that the human emotional

and attitudinal side of knowing support and enable what may otherwise appear to be a strategic endeavor void of interest and value.

Incident #14's strategy and critical incident were provided by the director of an incubator focused upon the promotion of businesses within the biotechnology industry. This is, just to provide a reminder, one of the main examples within this study's sample, that highlit the difficulties that even the uppermost organizational members may have in defining organization in knowledge-based enterprises, precisely because she was heavily engaged in boundary-spanning (Thompson, 1967). Her viewpoint on organization becomes a large part of her knowledge context which then permeates her strategy creation. These strategies include:

1. Identifying research with pragmatic applications.
2. Creating, maintaining and promoting the interface between very early stage research and startup companies.
3. Assist early stage enterprises in stabilizing themselves (i.e., secure financing, help them position themselves to quickly take advantage of market opportunities, recruit their management teams, and define milestones).

"So in terms of our strategies, everything we do is to accomplish those goals. And at that point when we have stabilized a new enterprise the idea is that company graduates and goes out into the real world and is in the private sector." (I-14) So essentially, the incubator is in the "startup" business.

Specific to the above strategies are various knowledge-based activities associated with "engagements" with the local university, at as many levels as is feasible. These engagements include things like obtaining an intellectual property license or finding a faculty co-founder who will sponsor related ongoing research with the startup. They work to find new or pre-existing laboratory and other workspace. They encourage companies to build relationships with the

student population by recruiting student assistants, creating student internships, and developing class projects. So other knowledge-based strategies might also include:

1. Building a community focused upon the exchange of knowledge and knowledge-based resources.
2. Building relationships that focus upon mutually beneficial cooperation.

This, says the director, "ramps up their learning curve and ramps up their ability to stabilize and work with them - rather than if they were just in the private sector doing this on their own in their garage."

The director also hopes that benefits will occur by defining the knowledge landscape and operating as a matchmaker between university intellectuals and new business as loyalty develops between the partners. That loyalty is then supposed to provide financing, mentorship, and business knowledge presence in future ventures. The director mentioned the benefits of intellectual property licensing and revenue returns on royalties were distant competitors to the interest she personally took in creating that cooperative organizational context, which she referred to generally as "The Research Enterprise."

When asked specifically about knowledge-based competition, she mentioned that they first defined their competitive niche though "the considerable investment that's been put into [the University] in the past. This provides one rationale for the path dependency viewpoint on knowledge-based assets that takes place through the creation of new organizing mechanisms, including new businesses. Additionally, prior investments in specific areas of research also help to define niche areas given that areas of excellence have already been defined by their longevity.

"We have some niches where we produce some really good [emphasis] research… knowledge base. And so if I was to say bio business... no doubt, plant and animal genomics, proteomics... we are first-class in those areas." (I-14)

The interviewee also pointed to the university's national reputation in that areas of knowledge were also built upon decades upon decades of public support that, while not directly translatable into new research areas, did lead to the production of knowledge pathways that suggested several alternatives. More important than the actual pathways, however, is that they have brought "frontier science" into those arenas and have created some areas of excellence and some expertise which helps define their niche.

Second, she says her organization identified and took advantage of a trend in commercialization that, they say, arose within the last five years.

"So, in my world what happens is that translates to companies... startup companies... that are predicated on some very unique areas that are because of the tradition that I've just described. But they will end up having human application. So you have this intersection of plant genetics, animal genetics, combining into a commercialization player that eventually will have a human application." (I-14)

While the director does mention the advantages related to knowledge assets specific to the projects over which she has direct control, one of the most interesting arguments she makes, that is actually supportive of recent interest in technology agglomeration research, is her identification with other local universities and research institutions.

"The interesting thing, though, is in... I think, probably unusual... well certainly not the status quo for the rest of the universities is in... a public/private partnership with a group called the Georgia Research Alliance, which was developed 10 years ago to really address the research competitiveness within the Georgia institutions. The GRA was really set up as a catalyst to shore up the research enterprise and the research infrastructure at the various member institutions to

foster collaboration because this kind of science only gets done through collaboration and interdisciplinary processes and sharing a ***lot*** of resources." (I-14)

The regional research alliance, she says, has been a very successful catalyst for setting up inter-institutional collaboration which only strengthens the performance of all member institutions. While by supporting the structure and goals of the regional alliance, members receive additional funding for research, access to eminent scholars, and so on, the real motivation is the "change in culture." Members, including most of the state's major research institutions, find ways to become more and more competitive by enhancing their distinctive competencies without thinking of themselves as competitive with member institutions. Of course, while the director does mention the lack of head-to-head competition, each institution does want to outperform the others in ways that do not threaten the alliance. The director explains that such behavior is possible because of the clarity with which members define themselves and their research foci and pick their collaborations carefully.

Finally, the director mentioned a state-level economic development strategy which she appeared to subscribe to and take advantage of:

"When you focus development in niche areas like biotech or new media or software, it creates a buzz elsewhere and then people are interested in coming because they recognized there's great research going on. You know, there's a buzz going on in that place that we want to be a part of.." (I-14)

Again, with respect to her member in the alliance:

"I don't think we view ourselves as really that competitive each other. I think what we're more concerned about his creating a body of knowledge and expertise that gives us a competitive advantage to other states on a national basis." (I-14)

These provide additional dimensions within which the director of the biotech incubator must develop her strategy. In fact, it speaks to a condition whereby a strategic decision-maker can and does serve to balance the needs of multiple organizations, operating simultaneously within many knowledge contexts. Supporting the incubator's knowledge-based strategies they also actively pursue cooperation strategies like:

1. Supporting their alliances' strategies.
2. Leveraging their own knowledge through collaboration with alliance members.
3. Developing and supporting the state's research reputation on a national level.
4. Engaging with other technology transfer organizations (especially those around the state).

"So I guess I would say that our organizational strategies and our mission, and everything that we accomplish, we want to leverage strategic advantage for the entire state because we view our competition as other states." (I-14)

Incident #24 is provided by the owner and programmer of a Canadian electronic communications services company focusing upon his innovation strategy. One of the interesting drivers of this strategy involves the influence of this individual's personal knowing upon his firm's strategy. Specifically, he refers to the protection end of his strategy as being linked particularly strongly to his paranoia. He blacked out the windows in the space where he ran his machinery. He kept a couple of German Shepherds which, he says, were around just because he loved dogs, but they still gave him a sense of security. Of course, like many entrepreneurs, he strongly identified with his business and his product. However, he also had a strong and persistent feeling that somebody was going to rob him of both. This caused him to adopt his protective strategy which, in part, drove and justified constant innovation. Epistemologically speaking, his emotional and intellectual knowing collided to produce something that worked for him.

Of course, not everything the entrepreneur did was entirely unique. He adopted a number of very standard techniques for protecting software code that could be protected under copyright law.

"[As] more powerful software applications became available, some shells were available to facilitate communication so you didn't have to write the drivers for how to communicate with the modem from scratch. And a few people... generally university kids... had written simulators, things that looked something like our software but were less robust. These people generally did it because they enjoyed doing it. They wanted to show what great programmers they were. So we were pretty aggressive in firing off letters of intent from our lawyers whenever somebody came up with an imitation. They would usually proudly boast, hey, I've got a simulator for the Telebyte system. Well, fine. So we'd go deliver notice." (I-24)

The main and preferred method of protection, however, was innovation itself.

"We kind of tried to enforce legal protection where possible. But more often than not... and this was not only the key to keeping competition away, but also to keeping the users interested... we had to constantly innovate." (I-24)

Innovations included a discussion system that grew out of the series of bulletin boards that they provided and managed. With the bulletin boards, the programmers themselves had to set up the boards "manually" and add the users. After setting specific bulletin boards up for various users, the owner decided that the users might like to post things themselves and manage their own discussion.

"One summer we rewrote that application from the ground up to let users create their own discussion groups so that they could be moderators of instead of letting the owners of the computers (us) be the moderators and, you know, decide what gets created. That was quite

popular. So people could then set up the discussion group on whatever topic they wanted to hand, you know, and run it themselves and set up their own rules. So that was popular." (I-24)

Specific to his discussion group innovation – which included understanding the programming technology, of course – was imagining what specific products would be pleasing to his users based upon his focus upon them in the act of innovating. The entrepreneur remained a user himself (both a gamer and avid PC user) because it was entertaining and mentally stimulating on a personal level. But he also had a great desire to provide his users with something they would find useful, interesting, and unique. This too was driven by his immersion in his user's world and culture.

The interviewee also offered a popular online version of a Dungeons and Dragons gaming system and community. He identified it as one of his most profitable products. Below, he talks about one innovation concerning commonly held conceptions about that game's virtual space:

"In the gaming world, most of the online games assumed that everybody... once you stepped into a room or into a space... you were in the same space as everybody else. So we then conceptualized the possibility of interacting across spaces... of not being in the same space. So people in adjacent spaces could hear you. Or if you had a bow and arrow you could shoot at something in an adjacent space. That was kind of an innovation that allowed them to do things differently than they had done before." (I-24)

The interviewee also describes spending a lot of time observing the behavior of his users. In this way, what he describes is his personal adoption of their focus and an attempt to absorb those subsidiary clues, from a tacit knowing perspective, in order to "know" what they knew.

His Dungeons and Dragons experience follows:

“Because these people would actually get together to fight monsters... they would actually gang up on... a big part of the game was fighting monsters. You know, you sorta found these things that were roaming the countryside. You attack them. You killed him. You take the treasure. So these guys would gang up. They would figure out... they would try to deduce what the algorithms were for how the monsters moved and how these monsters behaved and they would figure out an optimal strategy for how to deal with these monsters. So what combination of character types... how many fighters do we need? How many magic users do we need? How many clerics do we need to take on this type of monster?” (I-24)

He describes, incidentally, his own perception that users developed a non-explicit understanding of the algorithms, not that they figured them out and wrote them down. Then he talks about how the change he introduced in his online environment altered that understanding:

“Well, once we introduced distance combat, that introduced a whole change in their mindset. Now, instead of all conceptually standing in the same room, they could actually create a sorta military strategy where they would literally have a front line of hand combat with this monster. Some people in the back would shoot arrows. The people casting the spells would stand off to one side safely hidden so they wouldn't get hit by these monsters. They actually developed tactics, you know.” (I-24)

The interviewee then tells how as a response he wrote program that allowed the monsters to travel in groups. They began to carry missile weapons as well and “get more intelligent” by more intelligently picking their targets. Then the gamers would evolve their tactics as a response and innovation driven by the interaction would occur again.

“So instead of simply picking the target that was closest, which happened to be the first algorithms that I worked on, they then began to pick the targets that were causing the most

damage to them. So if somebody stood in the back and shot a monster and did a lot of damage to the monster, that monster might then pick on the person at the back to go after. You know, and even if it didn't have the right weapons to reach that distance, it might charge through the ranks and go after that person. So we had the monsters evolve their tactics... and this constant kind of, almost escalation, of... and it wasn't a power based escalation because you could easily program a monster that was to powerful for a user. Everyone recognized that was unfair. So it was an escalation of tactics which was, you know, can I get the monster to outsmart you? Can you outsmart it? They would come up with some pretty good strategies." (I-24)

In summary, the personal knowing of the entrepreneur in his self-proclaimed "paranoia" and a type of competition with the customer provided great emotional and intellectual fuel for innovation. This took the form of fairly typical intellectual property protections and, more importantly to the interviewee, the constant need to innovate – a need based very much in the attitudes and stances that influenced the way he came to "know" his competitive landscape. Additionally, the innovation itself provided some evidence of an intense engagement in both his observations of customer behavior as well as attempts at more tacit knowing immergence in their experiences. The observation and immergence together, in a tacit knowing sense, provided the major focal-point through which subsidiary clues were perceived and, eventually, sense of his customers was made.

This brings us to low performers' strategies and accounts of knowledge-based competition through their critical incidents of choice. One of the things that immediately sets the low performers apart from high performers is their focus upon things that were – and, in many cases, still are – going wrong for them. While their incidents include knowledge based strategies and evidence that they have or are doing some things well in a knowledge-based sense. They

also provide much more evidence of problems within the management of their knowledge-based assets. These, most apparently, set them apart from the group just presented. The following section will, therefore, briefly summarize those characteristics detailed above, but special focus will be given to their differences with the above group – especially to those things, that they reported, failed within their knowledge-based systems. Specifically, we are looking to answer the question, "What is it that produces failure in knowledge-based strategizing and competition?"

Low performer strategy & knowledge-based competition

Incident #2 involves the production of a key web-based deliverable of a multimillion dollar curriculum development project. The strategy and critical knowledge competition incident comes from the perspective of the technology project manager responsible for managing the production of the web site. The web site was to serve as a searchable repository showcasing the life-cycle of the curriculum project, lessons learned, identifying knowledge created, and assessing its performance. While the summary product for the technology project manager was the web site, the executive committee in charge relied upon the fact that the information it provided would attract some more millions from those who initially funded the overall curriculum project. The critical incident, then, is the creation of the web site product within the greater context of the curriculum project.

One of the big problems for the web site project was that it was not backed up by strategic thinking and only very minimally, in a knowledge-based manner, in that it was agreed by all that a web site would be a good thing. Knowledge-based strategies for the big project included amassing broad academic knowledge and expertise, building a general framework for a curriculum based upon one particular theory in their field, and hoping they could process deliverables that would attract continued funding. So the more macro level strategies for the

project as a whole were vague as well. That nothing really existed for the key deliverable is not surprising.

Critical failures mentioned by the technology project manager included a personal lack of technology project management experience, a lack of management talent throughout the organization, and a lack of engagement by the executive committee. Key elements of failure existed specifically because key knowledge either did not exist or was not used. The failure to manage knowledge within both the larger curriculum project and in the technology project was especially devastating.

The project manager mentioned a number of personal failings including a lack of know-how and experience in project and technology management. For example, her ability to analyze what content was and was not necessary within web-based technology was lacking. She also did not know how to manage the technology with regard to its interconnectedness to others on the project.

"One, I was on this project, being asked to create this website, and really not, in hindsight really not knowing how to go about it on a variety of levels from analyzing what needed to really be in there from knowing how to get any input that I needed. I mean the whole process…I just didn't know how to do anything systematically." (I-2)

The project manager mentioned other organizational difficulties. First, the executive committee didn't recognize any of its knowledge resources from the most micro individual level to the most macro group level. At the individual level, this appeared to include their lacking a sense of self and idea of where they fit within the whole process. While they possessed both authority and credentials, they really had no management skill, and essentially did not manage.

The project manager mentions the commencement of the project, where the framework was being considered, as a six-month long "simmering" of ideas:

"There was a lot of reading what was out there (in theory) that related to the idea of contextualized teaching and learning. So the faculty members did a lot of reading, and talking and meeting in groups and kind of just hashing out, well what does this mean? They were supposed to be thinking about what kind of strategies would be employed to affect that kind of learning environment and then how would the knowledge be used? Then they created a framework and using that framework…there was a core group of professors that were assigned to change their syllabus or syllabi to integrate those teaching strategies. People went over it and over it… the framework was reworked… But they always just wanted to massage it all the time. The idea too, was that all this was going to be "infused" into the curriculum. It was all kind of nebulous." (I-2)

The project manager also recounts how lacking in structure the project was, changing little from the time of its conception:

"The project was never well-organized I think. They purposefully tried to keep it very minimal in the layers of authority, if you will. Anyway, [the person I reported directly to] was more the administrative budgetary person. [The other two members of the executive committee] were more the "big idea, showcase, PR" people behind the project. My function was ill-defined. I made my job what it was. It didn't start out anything web design related." (I-2)

In addition, the project manager said that the project meant different things for different people, pointing to a mismanagement of perceptions about the project and its importance, expectations, and clear divisions of labor. "The web site was my product but the professors had

their own products that they had to do." (I-2) These included various stakeholders. The project manager describes two major stakeholder groups:

"The stakeholders would be both the executive committee and all the professors that were on the project. I consider them stakeholders, but that's another failing in the project, I don't think *they* really saw themselves as such, the majority of them. The majority of the professors… 29 or 30 professors… and of those probably 25 of them simply saw themselves as being required to produce some little written thing in exchange for their 6% or whatever they were getting. But they were not part of this project as a greater whole. Not at all." (I-2)

The project manager also mentioned that she had specific requirements that had to be met to produce a good web site. The website had to look good. It had to contain all the necessary data, including papers, journal entries, assessments, and descriptions of project activities. This was a major part of her particular expertise that the executive committee would not or simply did not take advantage of – perhaps because, as described earlier, they never defined themselves in active management and leadership roles. It almost appears as if a nonspecific "somebody" was always expected to deliver at some point.

"The web site had to look good in more than just design sense. It had to look like real work had been done. It had to look like there had been real outcomes that were useful." (I-2)

The project manager summarized her problem experience with the project as being an isolating experience lacking support:

"The project had continued funding. Everything dragged on. I was not getting the support at my level. I had no resources to pull that web site together. If I knew how to do it at the time, I probably could have asked for them. Nobody had any clue as to what it took to do that." (I-2)

"The woman I worked for didn't have the foggiest understanding. I caught her asking the secretary (who was quite capable) but still not any...no knowledge on using anything with the web, in terms of production. She was asking [the secretary] if she was the one who uploaded files to the web and did certain things with Acrobat or something. I was dumbfounded that she thought [the secretary] was off doing that stuff. Of course this was a woman who didn't know how to make a folder on her desktop and where her files all went." (I-2)

The project manager mentions a number of knowledge-based difficulties within the web site project. First, the web site in concept is very much an intangible for people - something they neither understand nor have but superficial familiarity with. It appears as though they see text on the Web. It looks a lot like text would on paper with some fancy stuff attached. But it does not look complex. The incident above almost suggests that one administrator thought that making copies was somehow linked to the running of the Acrobat software. So one intangible characteristic of this web site is that its functioning is nowhere near transparent - i.e., nobody knows anything about what happens "behind the screen". Second, ignorance for the workings of technology in a general sense also appears to exist such that management dealing with technology uses the next-best available technology. In this above case, that substitute was the Xeroxed page exchanged for an Adobe Acrobat document and the substitution of a less-than-metaphorical conception of physical files in place of the metaphorical files used on Windows and Apple PCs.

What the project manager describes is very much an explicit to tacit connection whereby the delivery of explicit materials (e.g., files, articles, journal entries) is not an explicit task but rather a number of very tacit tasks that are designed to produce explicit materials – and these are

tasks that grow in their need for tacit knowledge as the quantity of explicit materials increases. For example:

"What we're talking about is that… the website needed to look professional. It needed to be complete. Complete meant that documentation of everything the project said they were doing was somewhere in that website, whether the document consisted of a report on the activities that month, or professional staff development for the faculty, or maybe it consisted of a theoretical piece written by one of the faculty members on the project. So it had to look professional and be complete. On a less specific level, what really had to look good is that work that was done by the professors was that the new syllabi that were developed, the commentaries from…the reflections from the various faculty members, it had to demonstrate… if someone were to read it closely, it needed to demonstrate that change had been made. There had to be some sign of positive movement in students' scores because of that change. This was a curriculum change that was supposed to be designed and developed to change teacher education. That's the ultimate goal. The federal measurement of that were improved scores in the K-12 kids. Well, I mean, to think that you're going see that in three years is really silly. The federal government has set up something that's not even feasible." (I-2)

Of course, nothing mentioned above, by itself, would constitute something terribly "tacit" in the traditional typological use of the word. Indeed, the project heavily relied upon a number of very simple and tangible explicit knowledge resources in the production and delivery of other simple and tangible explicit resources. But managing the use of and production of those resources is very "tacit" even in a typological sense. Who gets assigned to complete those tasks? Where do they get delivered? Who makes sure they get delivered? When and how does assessment take place? Do we have enough resources to complete everything we set out to

deliver? Have we assigned the right people for the task? These are all questions that management should have asked at the right time and of the right people. So management is very much a tacit knowing experience. I would also argue, very much against the typological norm, that the production of any number of their explicit materials also required tacit knowing. Management failed to do this appropriately in the above case. A final example of this breakdown in the management of knowledge is provided below:

"The lack of support. Being left high and dry for a long time. I was given this project in the late spring and I couldn't start it because I didn't have materials. One real big hindrance in this project…Uh God! This bugs me! Eight months before this, there was a meeting with the faculty, the executive committee said this is what we're going to be doing, we're going to have this web site, and I had said to them prior to that, I would like to have the opportunity to make some specific requests about the format that they turn their material in…all of that kind of stuff. Because if they turn in their files on paper, that's going to do me no good! I wanted to be able to say, you must turn in your documents in a word processing program such as Word and it needs to be in "X" size, and all of that. I wanted specifications so that I could assure myself that I could quickly and fairly easily transfer the content for this web project properly. We were about to receive 7 to 14 very big notebooks of *stuff*... everything from syllabi, to copies of students' work, to academic papers that were written, and in theory that all should have all been made accessible somehow on the website. The website was to have been a repository of this kind of information so that somebody else could come in and search the site and say, I want to see how people do contextualized science curriculum for their future science teachers, because remember this is for teacher ed students. At any rate, the executive committee said, "No, No, No…we can't make them do this. We can't ask them to do all this stuff." The most I was permitted was that (I think)

it be in a certain font. I don't even remember! I said that I needed the files on disk. What I got from everybody was a freekin' mess! And at that point I should have categorically gone back to the executive committee immediately and said, this is not useable, this is not useable and this is not useable. You take care of it. *Get* what I need! Instead, I didn't do that. I tried to make the best of it. But I did tell one of the executive committee members and again, she said, I can't make them go back and redo this. It was a big fat nothing! So by the time it really got down the wire, one of the professors was off to Singapore for a year. Files that should have been easy to get a hold of were made…I mean that was absurdly difficult. And then, one department thought they were helping by scanning every single page and making a bitmap file of *every single*… hundreds and hundreds of pages, separate files. Again…a big fat mess of uselessness!" (I-2)

This arrival of diverse materials from every corner of the project essentially marked its end. This is when the executive committee intervened by introducing new knowledge, in the form of outsourcing, which brought to the project a dysfunctional sense of competition. Errors in knowledge mismanagement, much like that had been throughout the project, were of much greater concern. While the executive committee could have used this outside group to gain perspective on the web-based technology and assess the functioning of the technology project, the same knowledge and technological myopia existed. The interviewee recalls one orientation meeting where the outsourcers praised the web-page work and pointed out specific areas where they could lend a hand:

"So I needed to work with them because I understood the content and the flow and [one of the outsourcers] did say over and over, we can't do this without [the project manager], because the executive committee was trying to get them to take over the whole thing. And both [outsource group members] had to say multiple times, we need [the project manager] because

she has been with the project for three years, she understands what this stuff is about and how it should fit together. There's just no way that we can jump in at this point and have any understanding of what goes with what, and what would make sense, and why it should be here." (I-2)

The outsourcing group did possess many superior skills, experience with the organization's servers and web programming systems, and better accesses to support resources, which were all good reasons for bringing them on to the job. However, they did not possess other critical experience central to the project, including personal experience with the project. They were, in fact, unfamiliar with the project's theoretical content, its organizational structure, and its historical and working context. In essence, their knowledge did not extend beyond who the executive committee was and what, restricted by the severely limited ability of the committee to express their technological needs, they wanted from their web-based project. They just wanted it done. The outsourcers (precisely like the project manager had been treated) were expected to be "up to speed" instantly, their advice was not taken, their questions were not understood and in general, when they spoke they were not listened to.

The curriculum project was not a success in achieving any of its goals except that they did receive additional funding in the millions of dollars. They still do not possess a coherent and cohesive body of explicit (paper-based or otherwise) materials possessing – and they still do not have a web page that lends access to a complete body of work such that the user may truly assess what really went on in the project.

Incident #4 involves a knowledge-base project within a bank's human resource division. That is, the primary reason this organization existed was to manage the bank's top management

development efforts. The main strategy described by the project manager involved the management of redundancies in the execution of these management development processes.

The knowledge-base (KB) was one of the bank's Lotus Notes-based databases. Basically it was a repository for documents, possessing categories upon categories and subcategories upon subcategories that supported leadership development. A project would start, a Notes page for that project would be created, and then that page would become the source for embedding and tracking documents.

"The theory was, well, what we'll do is...this was an HR function...we do the same things over, and over, and over. We were obsessed with templates. Part of the problem was that in my job...not in my job but in my clients' jobs was...there was a very dangerous balance between creativity and efficiency and so no one wanted to use anybody else's template. They all wanted to create their own baby. And so what would end up happening is that you had people who were using this knowledge-base, but there were two things at work. It just got way unwieldy. It was difficult to maneuver. It was difficult to find and all that stuff. And as it got bigger and bigger and bigger people just stopped going to it." (I-4)

The tool, according to the interviewee, just stopped working. It took too long to get the information and a premium was placed upon the creation of new knowledge. So a very expensive piece of machinery, that was a major knowledge-based asset for any company, was not being used. Information was also being created faster than it was being managed while structures were in place that promoted the continuance of that information glut.

The solution (a proven one) was to convert the Notes-based KB to a web-based database that the bank had adopted many years before. The big problem they encountered at that stage (a

common one) was that HR could not get any buy-in from their clients slated to use the KB. The interviewee described the situation:

"We had ten lines of business - major lines of business - and within those, sub-businesses. Within each of those, you had a leadership development or HR person rolling out core functions like talent planning, or succession planning or on-boarding or some other HR thing. Well there would be ten thousand docs in there...all these different versions of it and what we would try to do is pare it down to some core, core templates and there would be non-negotiables that you would always have to do and in your time you could add your 20% of splice to your line of business. And this would be our knowledge-base. It would be sleek. It would be scalable." (I-4)

The interviewee described that a main motivator for them was a widespread complaint that processes were inefficient and employees, having to make up the slack, had to work longer and longer hours. Burnout was commonplace and high employee turnover was the result. HR recognized the need for a knowledge base that would create better processes, make it more efficient and, through the use of templates, cut development workload 20-30% minimum. That was supposed to fix the problem. "I can't tell you," said the interviewee, "how we replicated stuff… it was terrible! We wasted a lot of time."

The interviewee mentioned that the KB would deal with those redundancies in process allowing the executive and management development people to do the real business of attracting top talent and trading out the bottom 20%. This was congruent with the goals and philosophies set forth by the talent management program they had adopted which, says the interviewee, is basically a clone of a popular General Electric program. The interviewee describes the benefits of the knowledge-base from the HR perspective:

"What we were trying to do was use the knowledge base to make that more effective. You know, it's a tactical thing. You had to do it. But our goal was to get us out of the tactical and more into the strategic end driving the business (e.g., focus on top managements' ability to motivate the people they worked with, attract top talent). We were trying to minimize this time spent doing tactical stuff. Freed up time allowed us to get in front of the client, talking about who we were going to develop, who's on the replacement chart...thinking strategically about how the talent today lines up with where we want to take the business tomorrow. We honestly believed that by streamlining our processes, we were going to move from being a support function to an actual consulting function and by doing that we were going to drive business. We were going to support the strategy, which was going to get the right people, in the right place, in the right jobs." (I-4)

The knowledge-base for executive and leadership development supported their lines of business around the bank's people doing forced-ranking, performance and potential. That was one of their core businesses.

"It's GE basically," said the interviewee, explaining their philosophy. "Our theory was, you attract and retain the best talent...you win. Because if you have an A player, then an A player is better than a B or C player. That's Brad Smart's philosophy. So you top trade and get A players in every key position. So, how do you do that? You come up with routines and processes that create a talent discipline in your business. And what we were trying to do with the KB is streamline the process and make it more strategic and impactful versus tactical. You know, eliminate the wasted time around the tactics to do the processes. You know, the communication...the templates."

A few knowledge-based errors occurred. First, the knowledge-base, despite great arguments in its favor, never worked. Therefore one major knowledge-based asset - a system that cost the company extreme amounts of money - fell into obsolescence and abandonment and got "parked" in storage. The information gathered by the system and its operators was either improperly used or not used at all even when the system was still running. In essence, then, that very expensive knowledge storage and generating mechanism also absorbed great amounts of intellectual energy, racking up equally enormous intellectual opportunity costs.

Second, the management development end of the organization still operates very much within the confines of its adopted philosophy, but has not been able to support that philosophy's main goals – the attraction and retention of top talent and elimination of the bottom 20%. In fact, the current inefficiencies that result in the overworking of management, the underutilization of existing processes, the invention of redundant or counterproductive processes, work very much against that core philosophy. Ironically, these organizational problems have been clearly identified and so they are very much a part of the day-to-day consciousness of the organization's employees. Furthermore, it is a problem that, quite obvious to employees, works counter to that philosophy to which they purportedly subscribe. For example, a culture might exist that supports, with explicit language, a type of illusion that could impede the pattern recognition that would support needed organizational change. Evidence currently suggests that a strong competition exists between the main HR philosophy and those organizational actions that would accomplish that philosophy's proposed ends. One of the interviewee's observations supports this theory. The main reason for the knowledge-base project's demise, he said, was "ownership":

"Flat out. That is the name of the game in project management. You know, the guy...my top guy...he was getting the ball rolling, but he was not going to stay engaged. He didn't want to

stay engaged. He shouldn't have stayed engaged. He needed to delegate to somebody… to one of his direct reports. They came onboard and they would take ownership. They wouldn't commit money. They were uncomfortable with the technology. They didn't think people would buy-in, not with just to the technology, but with to the actual process. Because the KB within this department had way over-promised...way under-delivered." (I-4)

Of course the word "ownership" can be extended in many different ways within a personal knowing perspective. But in this case it nicely demonstrates how that personal knowing ties to tacit knowing. In the above paragraph, you have a top manager with ultimate discretion refusing "ownership" of the project. In personal knowing terminology, his stance toward the technology, his beliefs about its unlikely success, his lack of motivation in assigning it to one of his direct reports all support his "knowing the project would be a failure," although this sentiment did not appear in an explicit statement. That personal knowing, right or wrong, is based upon tacitly knowing the atmosphere within the organization in a very complex and mostly non-explicit sense. That personal understanding is undoubtedly shared by many in the organization, thus supporting that tacit knowing. Now, this is not to say that "knowing the project would fail" is an absolute assessment of reality. It may simply represent a tacit shared calculus of the obstacles blocking the way of that project's success. Either way, one answer to the problems presented in this incident is to develop a better understanding of those links that bind personal and tacit knowing.

Incidents #11 and #12 involve the most blatant example of firm failure from both financial and knowledge criteria. The incidents are provided by the same individual, a senior manager and long-term technical support specialist, but the incidents are from two very different perspectives. While it does make some sense to break the two incidents apart, a side-by-side

comparison is much more illustrative. Incident #11 involves this interviewee's narrative from the physical and web-based catalogue context (i.e., that of the organization's traditional business) and Incident #12's narrative focuses upon the cabling business that has recently become the firm's new emphasis.

Descriptions of both strategies are short perhaps because the firm is in a desperate state and explicit language is for the manager to find. The tone of the interviewee made him seem pained, depressed, and sometimes detached. His mood seemed to switch from nostalgic, to confused, to angry… The interviewee seemed to be in a somewhat desperate state himself, which may not properly convey in the text.

The strategies of the catalogue company included "staying alive" which involves first persisting, then making a "comeback" in terms of both restoration to and surpassing past catalogue company glory. Of course, this strategy is explained in terms of the cabling end of the company's strategy, but the interviewee does not know of a current strategy.

"The organization focuses on cable... bought a lot of local cable companies... it's basically the only cable company in the area. And they also have the traditional catalog business which had been shrunk to make room for the cable companies. They laid off more than 2000 helpdesk employees which were the bulk of employees supporting the catalog. So we shrunk our main business to move into cable because the owner/president thought that would be more lucrative and made a bad gamble." (I-11)

When the interviewee moves back to the catalogue company, however, he is able to speak in more detail about the strategy:

"So now we're stuck trying to get our company... our catalog company, back and come out currently with a new catalog. The ways that we're trying to make the new catalog company

work, given that we had massive layoffs, is to use faster servers that are able to take orders more rapidly and process information more rapidly so that customers know whether or not something is or is not on hand. They can place an order and make sure the order is complete. We have new hires. We are trying to train them to make them good customer service people." (I-11)

The recent events had obviously been traumatic. The interviewee spoke sadly about friends and loyal co-workers that had been lost when the company tried changing its course. In terms of just explicit knowledge, the interviewee had a very difficult time talking about the company and took long pauses. He appeared to require more processing time. He kept returning to some very bad memories of obviously fresh and upsetting events. From a knowledge-based perspective, the employee appeared easily capable of describing the old catalogue company and the recent downturn in the business's performance. Explicit descriptions seemed quite difficult for the new cabling end of the business which follows:

"I'd say the big strategy would be to buy up as many cable companies as we could in our area... our local area... and sink all our money in to cable. That is, what we were doing was to move away from our traditional catalog company and move into the cabling business." (I-12)

The interviewee did not have a current strategy for the cabling company, although he did mention that cabling was beginning to make money, which was being used to revitalize the catalogue.

One possibility for the sharp differences the language for strategies is that coherent, readily available explicit examples take time to formulate through experience and that experience. That is, time to identify coherent patterns on a personal level and for sensemaking between other employees, needed for the production of organizational language, was available for the traditional business and for highly visible traumatic events. Enough time may not have

existed for explicit language describing the cabling business to come out or, alternatively, the impact the cabling strategy had on the rest of the company may have been too chaotic and difficult to make sense of (except that the economy went sour or the owner made a bad choice).

From a knowledge-based perspective, the catalogue let go 2000 of its core employees – a knowledge resource that had been recognized for their ability to provide superior technical services. This seems counterintuitive from the "world's largest technical services company." The loss of these core employees' experience in building the company and supporting that core business for which the company is still currently known, though it does not set the catalogue company's knowledge-based assets to zero, does severely impact the company. The catalogue company lost the knowledge that the community composed of those individuals helped to create and maintain. The company undoubtedly lost many, if not all, cultural assets. Then, in addition to the above losses, knowledge of company misdeeds like the damaging layoffs, the insider trading charges against some of top management, the loss of reputation has rushed in to fill the void left when other knowledge structures were uprooted. The old knowledge that survived now mixes with new knowledge to create some sort of hybrid. Who knows what knowledge assets the company possesses at this point?

It is especially interesting to observe that a large body of knowledge still appears to exist for the catalogue company while the cabling company it was essentially sold for, though they have the technical knowledge you would expect, appears to have little in the way of the macro relational, community-based, or cultural knowledge. It appears that the whole company still benefits from even that which remains of the catalogue company's old knowledge in some very specific ways. This is revealed when the interviewee discusses the catalogue's future. With

respect to customer service, it almost seems like the interviewee believes that its previous high-standard can be rebuilt:

"One of the uncommon things about the catalogue company is that people have been able to get good quality customer service... or they have been in the past. Another strategy is that we got new databases. We are reconstructing the data... making sure the data looks good. We also have cable companies now which, although they were in retrospect a bad decision, the cable companies are beginning to make more money and that money is going back into the catalogue catalog company." (I-11)

That faith in the ability to rebuild the catalogue is also reflected below, with greater focus on a technological solution. The interviewee explains:

"The technology is going to allow us to fill an order because we will have that stock. It will be available for customers and you will be able to get something that's a little more reliable. You do have the pride of the company. You have hard-working people. Even the survivors are working hard. The pride that Black Box has... that creates superior performance, commitment... that's one of the few things when everything else has been sliced away, that keeps Black Box alive and is expected to keep us moving forward in the future… our catalog has been the biggest, the most successful and we can grow that again, I believe." (I-11)

The interviewee talks as if he possesses hope for the future of the catalogue business specifically through the use of past knowledge-based assets like those enabling the world class customer service and the company sense of pride through the efforts of the "hard working survivors," and the fact that they had been the biggest and most successful in the past. This may speak to some very valuable knowledge indeed or it may indicate a rich source of cognitive

dissonance. Additional interviews within this company specific to these critical incidents would give some clues as to which is occurring.

A few things are intriguing about these two incidents. First, the catalog and cabling business within the same company appear to be "known" quite differently by the interviewee. This brings up questions such as, are these differences in knowing indicative of the need for greater separation – even different corporate structures? Does the cognitive difference between the two "conceptions of company" indicate inefficiencies, missed opportunities, or is it just the product of the interviewees coping mechanisms? Second, there appear to be some durable knowledge-based resources that survive organizational trauma. Do these knowledge-based resources keep the firm from shutting its doors? For example, does the company pride described by the interviewee – a pride based upon an overarching knowledge about and experience with the organization – provide the motivation to persist? The interviewee mentioned the catalog company's past performance when it did not appear that the company could really leverage that past performance. However, from that epistemological perspective, is that past vision of the company still valuable? Can that vision be used to pull all the broken pieces of the company back together again? It seems unlikely that, as the interviewee states, investment in physical technology, like the faster servers mentioned, would provide the catalog with any advantage. But there may be knowledge residuals present that are not indicated in these interviews that, mixed with that superior technology, could provide a faster recovery, a superior new path for the catalog, and a rapid return to the first place position in technology support services they had once known. These incidents do suggest that some value exists in organizational memory even when present circumstances are quite different from those in the past.

Incident # 18 involves the personal knowledge management strategies of the Director for Technical Training and Operations Management within an environmental services firm. This incident was chosen as a low performer because of two specific reasons. First, like many of the low performers, this company does not appear to have put much energy into strategic thinking. Strategizing is an intentional, intellectual activity that is a provider of knowledge-based assets for the organization and, at the same time, a key knowledge-based asset itself. Second, they have highly strategic and valuable thinkers, such as the knowledge manager here interviewed, but they do not appear to possess any awareness of them. Had this interviewee and her knowledge-based strategies been tied to the organization within whose context she was strategizing, then this incident may very well have ended up among the high performers. As the firm currently operates, strategy appears isolated within each individual manager, and so while the firm may benefit from their strategies, they really can not be credited for those strategies and the success they bring.

With regard to strategy, this company relies heavily upon the collection of knowledge in formulating their bid for any given environmental services contract and, once they have won a bid, they also use knowledge management to formulate, assess, or revise standard operating procedures (SOPs). The interviewee describes that process:

“We basically have to seek the knowledge. I have some of the knowledge which is documentation knowledge - artifacts. So, I just gather artifacts... organizational artifacts. That's one way that I collect the knowledge. The second aspect would be through interviews... conversation. And that's where we come into knowledge-based competition because that worker really doesn't want to give me that information. Because nobody's ever tapped them for their

resources and now, all of a sudden, we say, Hey! We want to capture the knowledge you know and make it formal through a standard operating procedure." (I-18)

While the interviewee can clearly say what it is she does with respect to knowledge management, however, she also makes it clear that the organization, with respect to their critical knowledge management function, has no strategy whatsoever. The interviewee explains:

"Oh, yeah! The company didn't give me any guidance. This was just my experience. They basically just send me in and say, why don't you go out and get some stuff. So this was my own technique. The company didn't have a built-in mechanism, a built-in strategy for capturing knowledge of this sort. The only strategy the company really had was to win the contract. You know, we had to get the knowledge to make sure we were getting the right bid in. In addition to that, they still had a desire to capture the knowledge. They just didn't know how to do it. They didn't have a strategy for doing it. So I guess, I was the key turning point in setting the strategy in place, to get it done." (I-18)

The interviewee explains her own strategy for capturing knowledge, demonstrating some very good lesson for successful knowledge management, but the company does not know what is happening. This is a clear mismanagement of a key knowledge asset (the manager) and epistemologically an almost total lack of knowing. It is unclear what the organization does that allows it to go on existing, save that they operate in an environment that does not demand much from it, and benefits accrue from those within the organization who are thinking. The interviewee talks a little bit about her knowledge strategy. Instead of going in to a knowledge gathering target company and saying "this is a knowledge stickup" – which is what she calls it, she takes a different approach:

"For me, just being experienced in the industry for 14 years, I know the frontline workers are the ones who really know some of the things about how the plant really operates. So, my strategy is to go in and go in through a whole other aspect besides just getting the knowledge. I go in through building a relationship. So I may go in on the team and I really don't go in with the business coat on. So I get in with the team... with the shift, and because I'm experienced in what they do, then I may just sit around and hold informal conversations with them. We may be talking about what ever... just whatever they may be talking about that day. I kind of informed them that this process will be taking place and we'll be needing you to contribute and that type of thing." (I-18)

The interviewee mentions that the last job she worked on produced two 650-page manuals when the SOPs were finally finished. But she took six months in just purely relationship-building activities.

"To get the process done it took me six months to go into the, what we call in adult learning side - the team building, building trust, building a relationship. So, because they weren't giving up the information… I mean, I really had a couple of people, employees, just literally cuss me out. Not curse me out, but cuss me out! They were really, you know, adamant about me coming to get the information. So, the relationship, I would say, took anywhere from 6 to 9 months before I even really got in to say, let's do the standard operating procedure gathering up the knowledge." (I-18)

Once the relationships had been built, she would then begin to engage in the more formal side of knowledge management.

"I did nothing that formally represented my duties. It was like I was in this laid-back mode. I began to slowly discuss process control. You know, like if a problem happened I would

ask them, you know, how did you do this? What did you-all do here? That type of thing. Then, by the time I rolled out the project and we formally announced it, I made the operators participate. How I included them... I included them on the team. I had them, you know, write down what they do about certain processes...assign certain segments to them. We just did it in a team basis. Like I said, that's just some of the things that I did. In my situation, because the knowledge was being withheld, I actually had to go in and put my tasks over to the side and, they kind of knew why I was there for but we didn't throw it on them. I mean, I really just kind of hung around operations for like six months. 6 to 9 months just to get the information done." (I-18)

Of course, to many 6 to 9 months sounds like too big an investment to place on just getting to know the workers, developing a sense of trust, and creating buy-in to the knowledge sharing process. For this type of knowledge sharing to happen successfully, however, all those things needed to be in place. Again, from a personal knowing perspective, there is no possible motive for sharing what you know with the knowledge manager. There may, in fact, be negative consequences from the employee's perspective. For example, what good is the employee to the company if their knowledge is no longer theirs to give but, rather, is possessed by the company? From a survival stance, no employee in their right mind will openly opt for something they believe will make them obsolete. The interviewee describes past efforts from the company:

"Now when I thought about it, they had been trying to get these manuals done for about six years. They just wouldn't release the knowledge. It was just that tightly controlled! Because you can't make a person, a human, tell you what they know when they are staying within the companies range. That's one of the things you have when you're trying to collect knowledge... capture knowledge... is that as long as the employee's within the guidelines of them keeping their

job, the may continue to work. You could order them to give the knowledge and if you did, would you really get what you are looking for?" (I-18)

One of the most valuable things about this manager and her knowledge management strategy is that she apparently holds an appreciation for the personal knowing that takes place with the plant's operators. She in fact comes to the whole knowledge collection venture from a personal knowing perspective. This is something from which the company, if it were interested or aware, could potentially benefit. But they are not aware, as the interviewee points out, and this has resulted in a condition wherein a culture of knowledge hoarding has developed:

"They've never had an avenue for keeping organizational knowledge. No one's ever asked them. I guess at some point, they wanted to be asked… you know, inclusion. So all these years... they've been working there twenty years... I mean, this is like 30 years no one has had a manual on duty. So now all of a sudden, you come in and say, tell me what you know." (I-18)

Another interesting point that the interviewee makes is the absence of knowledge management in anything other than process control. Her insight appears to suggest that knowledge management, as a practice, is very much aimed at a particular group of people even though the philosophy is sound enough to apply to much broader areas. In particular, she mentions the lack of knowledge management of the knowledge managers.

"You know, this is an untapped group, because nobody cares until that water is bad. The firm doesn't really have a mechanism, a set strategy for managing their knowledge. You know, every company... it's not a secret that every company needs to keep some type of information within themselves. But one of the biggest problems within this whole knowledge management avenue is how do you go about in getting it? And how do you deal with the obstacles when you ran into them? That's not written. There's no written documentation. There's no manual that says,

this is the strategy so you can capture knowledge? The knowledge itself, the knowledge I have, is being held from the company. So that's a gap there. Do you know what I'm saying? You know, no one came to me to ask, how did you go about in getting it? Maybe this is something we can use in our strategy. I guess what I'm saying is, when you have key people who are responsible for capturing knowledge, unless that position is there, then who are these people that are keeping this knowledge? If the company is tapping into that resource, then who are the people who are capturing the knowledge for that firm? Because there's no explicit avenue... this is the first thing you do, this is the second thing you do... what they're telling me to do is, get those SOP manuals. We need those SOP manuals done. But there's a gap in that strategy because nobody debriefed me. Nobody said, you did a wonderful job... so how did you get this much information gathered?" (I-18)

This incident points to two specific lessons for knowledge-based strategy. First, firm success does not necessarily depend upon successful action by a firm. Resources, even mismanaged or unmanaged human talent, can provide a firm with revenue. However, if human or other knowledge-based resources are not intentionally managed and backed up by a formalized strategizing structure, then good performance can not attributed to that firm. Second, an extension to that, is that evidence of strategy's existence within a firm does not necessarily mean that the firm has a strategy. In this incident, for example, high-performing knowledge management occurred because of the strategies of one person. However, if the knowledge manager of this incident left the firm or switched positions, that knowledge management knowledge would not be transferred within the firm. It would remain parked, like much knowledge, within the individual. A firm and its sustainability – not simply the continuance of some competitive advantage – depend highly upon the intentional act of strategizing which

constitutes a very important type of knowing within organizations. This knowing is very much related to Penrose's emphasis on the managerial resource.

Finally, personal and tacit knowing are very intimately related to strategic and managerial action in that these directly influence and are sometimes integral to how an organization situation is perceived. Personal knowing is central to whether or not threats or opportunities are identified, what strategic options are conceived of and selected amongst during organizational decision-making, and what beliefs, emotions, and attitudes inform or cloud managerial thinking. Tacit knowing is also central to understanding how "organizational artifacts" such as those collected by this incident's manager are contextualized. An understanding of tacit knowing in strategic thinking, therefore, helps tie often mundane explicit data or information to a greater organizational context. This understanding is important and provides advantages to managers who possess it. Additionally, a dual understanding of personal and tacit knowing helps tie individuals to other groups within the organization as well as to organizational processes while also connecting organization structures to the organizational members that produce them.

Quantitative Content Analysis

Data collection included the audio taping of the interview during which time the investigator wrote parenthetical interpretive comments to improve the validity of the data collected. For example, critical incidents and organizational strategies were listed and repeated back to the interviewee for validation. Careful attention was given to whether or not the interviewee had indeed addressed the question. Areas suggestive of needing additional probing on the part of the investigator were identified and attended to through the use of follow-up questions. The constant search for clarification in content and feedback concerning the accuracy of the investigator's observations led to a high standard of quality in the collection of data. As

Kirk and Miller (1986, p.21) state "in the case of qualitative observations, the issue of validity is… a question of whether the researcher sees what he or she thinks he or she sees." The use of personal observation and follow-up questions allowed an on-going member check Creswell (1984) for the purposes of ensuring validity during the collection of the interview data. Although the audio recordings were quite complete, investigator observation also took place during their transcription. Notes included were taken pertaining to the stance an interviewee was taking, how they perceived the company's performance, spoke about the company's practices, or emphasized certain passages, just to name a few examples. The use of Dragon Naturally Speaking's voice recognition software, once the software was calibrated and trained, allowed for a more rapid transcription of the interviews and permitted the investigator to make additional notes.

Additionally, the transcribed interviews were also segmented using the NVivo qualitative data management tool to maintain the integrity of the categories. Coding (the counting) took place within that environment for the purposes of hypothesis testing and has focused upon strategy, knowledge-based competitive acts, and VRIN indicators. Other patterns were not this segment of the paper's primary focus and so the findings will be discussed with special attention to this paper's hypotheses. Other patterns that were identified during the coding process can be found in this study's final discussion.

Units of Analysis

The quantitative analysis of textual data in this paper focuses upon the sampling unit of the critical knowledge competition incidents. According to Pool (1959) these units are considered independent in that the inclusion or exclusion of any one sampling unit as a datum has neither logical nor empirical implications for choices among other units (p.203). This is an especially important point for this study because we really do not know enough to capably

include or exclude an interviewee a priori. We neither know what composes critical knowledge competition incidents, nor what each interviewee may bring to the body of data. This has offered tangible insights into these incidents which can be found in the discussion.

Another important unit of analysis is the recording unit, which Holsti (1969: 116) defines as "the specific segment of content that is characterized by placing it in a given category." This study's recording units were designed specifically to help answer those questions behind the hypotheses. These units are provided by questions within the protocol which deal with firm strategy, knowledge based competition, value, rareness, inimitability and, finally, nonsubstitutability. These recording units help to refine the context of the incident, however, and deal with aspects of knowledge-based competition that are thought to be theoretically important. They provide their own insights. Recording units, according to Krippendorf (1980) retain dependencies that might exist in the sampling unit (i.e., the critical knowledge competition incident) within that recording unit's individual description.

Finally, this brings us to the context unit, which will be an obvious focal point of the quantitative analysis that follows. Content units delineate that symbolic material that needs to be examined in order to describe or make sense of a recording unit. This is based upon the observation that symbols (i.e., questions of value and rareness) codetermine their interpretation. Within the value recording unit, for example, something may be said concerning the rareness of a particular business strategy. In Incident # 3, for example, the web designer mentions within the value recording frame that finding somebody with good design skills and a visual aesthetic was difficult to find. However, that "hard to find" rareness occurs within the value context and is therefore coded as such. Both "good design skills" and the "visual aesthetic" would be counted among the sources of organizational value because they are part of the value proposition. That is,

because they come to mind within the value recording frame, they can not be disassociated with that value and must be counted. Specifically, contextual units within value, rareness and other recording units of interest are counted if they in any way represent an aspect of the value, rareness, or whatever the recording unit may be. These are described in greater detail below as strategy, knowledge competition, value, rareness, inimitability, and rareness counts are explained since these are central measures to this study. They are the points of comparison between low and high performing firms, also described below, used to test this study's hypotheses.

Content Analysis Schemes, Validity and Reliability

The central purpose of the content analysis schemes provided below is to guide the conversion of qualitative data into quantified variables used in hypothesis evaluation (Larsson, 1993). Appendix E's contains a detail coding scheme that outlines coding used within this study as well as other basic codes that arose through the various iterations of the document analysis. Appendix F moves beyond those more common universal codes contained within Appendix E to identify coding that may be of interest to future studies or to deeper examination of this set of data. While this is beyond the scope of this dissertation – such an examination should be undertaken in future studies at a later date. This study focuses primarily upon those counts most central to testing the study's hypotheses while the study's use of qualitative observation allows the investigator access to the socially complex world of the interviewees (Adler & Adler, 1994). This is, in part, the origin of the discovery of many of those aforementioned categories contained in this study's final appendix. Again, both predetermined and basic emergent categories are found in the Quantitative Content Analysis Code Book (Appendix E).

The validity of this study's content analysis scheme depends upon its ability to categorize verbal behaviors within each interview that adhere to recording and content units described

above. The recording units correspond to hypothesis content categories strategy, knowledge-based competition, value, rareness, inimitability, and nonsubstitutability. While it was stated above, it bears repeating here, that the recording units' ability to contain content pertinent to each variable of interest enforces the important mutual exclusivity requirement for content validity. Again, any interviewee utterance that supported strategic value within the value recording unit was counted under the value category. Any utterance within the rareness, inimitability, or nonsubstitutability recording frame were likewise counted and coded. The following section describes those different dimensions followed by a discussion of inter-rater agreement and reliability.

Performance

Performance was measured based upon the subjective coding of organizational performance with knowledge-based performance measures (see Table 3.1) and more traditional firm performance measures (see Table 3.2) taking their apparent placement within their peer groupings into account. The use of subjective observation for coding was useful in this study for a number of reasons: First, it provided a measure of performance whose validity would not be threatened by single source bias as would have been the case had performance measures relied upon analysis of interview content, just as an example. Second, the study of knowledge-based competition using the critical incident technique – as was stated in the exploratory section of the qualitative findings – exposes a radically different view of strategy, organization, competition, and other constructs from the perspective of the interviewee. The subjective coding by investigator observation permits the assessment of traditional performance and knowledge-based performance taking that radical perspective into account. This demonstrates additional

advantages of this approach. The separation of low and high performing firms is used to define the sustained competitive advantage position used in the testing of Hypotheses 1 and 2.

Value, rareness, inimitability, and nonsubstitutability

These categories were quantified by counting any verbal utterance within the twenty four transcripts that supported their respective qualities. For example, Incident #7's inimitability section is provided below, showing my coding for constraints on imitation. Any aspect of the text that supports some detail of inimitability has been coded with a "[11a]." Everything so coded is counted.

J.: That's interesting. Let me ask you a question about that. You also think it's uncommon for companies to have that perspective... to not want to be the Microsoft or the big consulting company?

O.: Yeah. I do. I think a lot of times people get really caught up in the idea [11a] that they can develop a tool [11a] and sell, you know, thousands in thousands of copies [11a] of it and make a zillion dollars [11a] or that they can hire consultants for $30 [11a] an hour and place them for $100 an hour [11a] and get rich off the spread [11a]. We're not trying to do either [11a] of those and I do think that's a difference [11a] in how our organization works. Both of those are a trap [11a], by the way, because hardly anybody is successful [11a] on either of those ends [11a], in my view.

Walking though the logic of this coding, the first "[11a]" that "people… get caught up in the idea" refers to a competitor's mindset or philosophy that impedes imitation. Therefore, it gets counted. Note that "getting caught up in the idea" could also be coded under firm strategy because it refers to the strategic vision of an organization. However, in this section, the recording frame provides a very clear inimitability context and so, for purposes of coding and then

comparing organizational inimitability, coding for strategy would not be appropriate. Also found in the coding above are various details of that mindset that would impede imitation, like focus upon the development of a specific software tool, its mass production, and the "get rich" mentality that drive software-based competitors. All such details support a mindset that very much impedes imitability of the interviewee's organizational strategy because those details accumulate to complicate the competitor's transition from their current software-based strategy to the alternative strategy adopted by the interviewee's firm.

Sections based upon recording units value, rareness, inimitability, and nonsubstitutability all followed the above coding convention reinforcing and providing greater validity for their coding. That is, the coding process itself did not change – only the focal point of each analysis was subject to error from differences between each category.

The end result was that the coding schema above defined maintain four critical assumptions of content analysis (Cohen, 1960). First, the content and recording units maintain independence of judgments – as does the critical incident sampling unit. Second, content and recording units also maintain mutual exclusivity and a detail within the content units that also make it an exhaustive coding. A third criterion is that raters must be equal in their intellectual capacity to make coding judgments. The rater for this study was selected based upon that criterion. Fourth, coders were free to assign coding judgments over any categories and, an additional measure that all content assumptions were met, coding took place within the text. This provided additional evidence of the placement of coding within context and allowed raters to discuss any apparent discrepancies, when they arose.

Interrater reliability

Currall, Hammer, Baggett and Doniger (1999) provide arguments supporting three different assessments for interrater reliability – proportion of agreement, Cohen's (1960) κ, and Scott's (1955) π.

The simplest measure of interrater reliability in interrater agreement, which is the number of times raters agree on a code divided by the total number of coding judgments. For the performance measures, no measure of performance (traditional or knowledge-based) was accepted until agreement was reached through rater discussion. Interrater agreement was, therefore, 1.00 for both performance sets and .83 for other coding categories. This simple measure of interrater reliability is highly appropriate for this study because it is easy to calculate, is easy to interpret, and works best with a small number of categories (as was the case with this study). Some criticize interrater agreement because in studies with a higher number of categories agreement can occur by chance. However, this would not be likely in a study with as few categories as this study possesses and, given discussions to normalize agreement between the ratings, virtually impossible.

While Cohen's Kappa is quite frequently used in the social sciences, its greatest benefit is that it corrects for chance agreement. This is unnecessary in our current study. Furthermore, Cohen's κ corrects for chance agreement by calculating "fixed" marginal probabilities along the diagonal of a matrix of coding data based upon preexisting information on coding categories. No such matrix exists – nor would it be helpful - for the eight categories upon which this study focuses, and no preexisting information exists. Scott's π is unaffected by coding categories, which is not a problem area within this study, and offers advantages over κ because it does not rely on the fixed marginal proportions that κ does and it uses all coded data – versus only the

diagonal for κ. Interrater reliabilities using Scott's π, however, depend upon the frequency with which raters used each of multiple content analysis categories. Again, this study was not set up such that multiple categories within each sampling unit were analyzed. These simply were not necessary to analyze the hypotheses. Therefore, Scott's π is also inappropriate for this study.

Interrater reliabilities for subjective assessments of both knowledge-based and traditional performance-based rankings was 1.00 due to the assignment of ranking based upon consensus. When rankings between raters did not differ this was unimportant. When rankings between raters did differ, discussion was undertaken until agreement on both performance measures was reached.

Hypothesis Tests

Most of the hypotheses concern testing the differences between the two independent groups identified as low and high performers (i.e., non-sustained versus sustained competitive advantage). That is, these hypotheses are concerned with whether or not the low performing group and the high performing group have been drawn from the same population. According to Siegel and Castellan (1988: 102-103), the *t* test which is often used to make such comparisons, is inapplicable when its assumptions (e.g., normal distribution, equal variances, and interval data) are unrealistic for the data. Such is the case here where a normal distribution and equal variance is not assumed and interval data is not available. Descriptive statistics can be found in Table 3.4. This study has achieved ordinal measurement and may therefore take advantage of the Wilcoxon-Mann-Whitney test – one of the most powerful of the nonparametric tests and the proposed alternative to the parametric *t* test. The null hypothesis H_0 is that low and high performers have the same distribution with the alternative hypothesis H_1 that the high performer group is stochastically larger than the low performer group. Because the alternate hypotheses

predict the direction of difference, these tests are one-tailed. H_1, stated differently, predicts values for the stochastic superiority of the high performer group that are so extreme that the associated probability under the null hypothesis H_0 is $\alpha = .05$.

Hypothesis 1 stated that organizational knowledge (explicit and tacit) would be the main source of sustained competitive advantage – placing special emphasis on explicit and tacit knowledge. This study assumes that explicit and tacit measures are subsumed under general measures of knowledge for a number of reasons: First, Chapter 2 lends theoretical support to such an argument. It develops a couple of frameworks offering suggestions on how non-explicit knowledge works to bring about the production of spoken and written forms of knowledge. Second, the qualitative content analysis section of this study also provided evidence suggesting how explicit and tacit knowledge interrelate, how the production of explicit takes place, and how the explicit may set up a context (still supported by tacit knowing) whereby meaning is made. Finally, Gerard (2003) recently tested the both continuous and dichotomous views of explicit and tacit knowledge. Comparing thirty-six sources of knowledge commonly conceived as explicit (e.g., newspapers, books) and tacit (e.g., experience, thinking), he found evidence supporting the connected but separate view of explicit and tacit knowledge stated above. Evidence also suggested that a straight categorization of knowledge into explicit or tacit groups is misleading. Therefore, this test of Hypothesis 1 relies upon more general knowledge indicators.

We can make this assessment using various results from the Wilcoxon-Mann-Whitney analysis. First, we expected lower performing firms to measure significantly lower in a stochastic sense when compared to higher performing firms on similar measures. Table 3.5 contains the sum of ranks for low and high performing groups in that order. Values that are similar (i.e., whose differences are small) indicate no significant difference between low and high performing

groups for that variable. Compared for gender, just as an example, low performers sum of ranks equaled 61.50 and high performers equaled 58.50. This is not a large difference and suggests that both groups do not differ stochastically when gender is used as a comparison. Additionally, the low performing firm's sum of ranks is higher than that of the high performing firms, which is not directionally what we would expect for performance-related variables. No tests are being run for gender so the directionality is not important beyond serving as an example. When knowledge-based and sustained competitive advantage variables are used for comparison, however, we hope that the difference between the sum of ranks scores are significantly different and provide evidence that the lower performing group indeed ranks lower for each variable in question. Table 3.6 contains scores for the Mann-Whitney U, the Wilcoxon W, the Z score, and the calculated level of significance as well. Specifically, evidence that low and high performing firms differ in the predicted direction is supported by 1-tailed significance scores where $p < .05$.

Hypothesis 1 concerns the comparison of performance and sustained competitive advantage-related variables for low and high performing organizations. Variables such as strategy section size or knowledge ratio density could be considered proxies for verbosity, ability to communicate, or the importance of knowledge in each organization but this discussion is restricted to more direct indicators of firm performance. The first of these is performance which, you will remember, is a subjective ranking of traditional organizational performance within their peer groups. Observation included investigator participation in the interview, research notes, the reading (sometimes) of publicly available archival materials, and less formal discussions with interviewees. Low and high sums of ranks for performance were 25.50 and 94.50 respectively ($p = .003$**) and, therefore, statistically significant. Low and high sums of ranks for strategy counts were 49.00 and 71.00 ($p = .478$) and not statistically significant. Low and high sums of ranks for

knowledge counts were 42.50 and 77.50 (p = .256) and not statistically significant. Low and high sums of ranks for value counts were 30.50 and 89.50 (p = .018*) and statistically significant. Low and high sums of ranks for rareness counts were 23.00 and 97.00 (p = .001***) and statistically significant. Low and high sums of ranks for inimitability counts were 24.50 and 95.50 (p = .002**) and statistically significant. Low and high sums of ranks for nonsubstitutability counts were 24.50 and 95.50 (p = .002**) and statistically significant. Low and high sums of ranks for VR (combined value and rareness) counts were 26.00 and 94.00 (p = .004**) and statistically significant. Low and high sums of ranks for IN (combined inimitability and nonsubstitutability) counts were 25.00 and 99.00 (p = .003**) and statistically significant. Low and high sums of ranks for sustained competitive advantage were 21.00 and 99.00 (p < .000***) and statistically significant. Summary statistics for all hypotheses are presented in Table 3.7.

Because of the hierarchical nature of the data collection and the restriction of recording frame, details (from performance to value counts and on to the summed VR, IN, and sustained competitive advantage variables) are increasingly more finely-tuned, which is probably why the probabilities supporting the rejection of the null hypothesis tend to increase. Evidence very strongly supports Hypothesis 1.

Hypothesis 2 stated that knowledge resource strategies will be both prevalent and predominant among strategies identified by managers. This is essentially a test of the main assumption of the knowledge-based view and a critical assumption of the resource-based view as well. The first step of this test included the computation of two ratios. The first ratio, called knowledge volume, is a simple comparison of characters in the knowledge section to those in the strategy section. This ratio gives a sense of the amount of space devoted to knowledge in the

interview relative space given to strategy. A score higher than 1.0 indicates a greater relative emphasis on knowledge (13 out of the 21 incidents scored above 1.0 in this test, only 5 scored below 0.5). The second ratio, called the knowledge density, compares the knowledge count (i.e., the raw count of knowledge coded in the first two sections of each interview) to the strategy count (i.e., the raw count of strategy coded in the first two sections of each interview). This gives the amount of knowledge content relative strategy content (16 out of 21 incidents scored above 1.0 in this test, none scored below 0.5). Both measures give a readily understandable and standardized comparison between interviews with respect to knowledge and, therefore, a measure of the knowledge-based stance of the organization. This provides strong support for Hypothesis 2.

Hypothesis 3 stated that higher knowledge-based performance will lead to greater evidence of attention to competitive value-seeking activities than will lower knowledge-based performance. Of course, these statistics were already mentioned since Hypothesis 3 can be seen as a sub-hypothesis to the overall topic of sustained competitive advantage. Low and high sums of ranks for value counts were 30.50 and 89.50 ($p = .018$*) and statistically significant. This suggests that greater evidence existed supporting the value proposition of the organization's strategy in higher than in lower performing organizations. This provides strong support for Hypothesis 3.

Hypothesis 4 stated that superior knowledge-based competitive performance will produce greater evidence of attention to competitive rarity than will lesser knowledge-based performance. Low and high sums of ranks for rareness counts were 23.00 and 97.00 ($p = .001$***) and statistically significant. This suggests that greater evidence exists within the interview text

supporting the inimitability proposition of the organization's strategy in higher than in lower performing organizations. This provides strong support for Hypothesis 4.

Hypothesis 5 states that superior knowledge-based performance will produce greater evidence of attention to competitive imitation than will lesser knowledge-based performance. Low and high sums of ranks for inimitability counts were 24.50 and 95.50 (p = .002**) and statistically significant. This suggests that greater evidence exists within the interview text supporting the inimitability proposition of the organization's strategy in higher than in lower performing organizations. This provides strong support for Hypothesis 5.

Hypothesis 6 stated that superior knowledge-based performance will produce greater evidence of attention to competitive substitutability than will lesser knowledge-based performance. Low and high sums of ranks for nonsubstitutability counts were 24.50 and 95.50 (p = .002**) and statistically significant. This suggests that greater evidence exists within the interview text supporting the nonsubstitutability proposition of the organization's strategy in higher than in lower performing organizations. This provides strong support for Hypothesis 6.

Quantitative Content Conclusions

Of course, summarizing the above tests of hypotheses, strong support was found for all performance-relevant elements with the strongest support provided by variables like VR, IN, and the final summative sustained competitive advantage variable. Again, given the nature of this study's qualitative and quantitative design and its segmentation into units of increasingly fine detail, this is not surprising. The nature of the findings (e.g., support for a major KBV/RBV assumption H_2, sustained competitive advantage H_1, and its indicators H_3 through H_6) demonstrate, above all, how powerful and useful mixed methodology can be in design, data collection, and data analysis. Hitt, Gimeno and Hoskisson (1998) advocated the use of multi-case

methodology to better study the resource-based view in particular. Based upon my own observation, I would not only agree with those authors, but would strongly recommend Flannigan's critical incident technique (1953) and more advanced content analysis as providing avenues for rich, in-depth exploration and explanation within the RBV topic in particular. This is true too within other more general topics that would benefit from that phenomenological access to organizational actors along with the added insight provided by quantitative analysis. This study, for example, while it was rigorously designed – especially with respect to its hierarchical construction - used very rudimentary content units as "contact points" that were coded and counted. Still, while this information was simply coded, much detail remains beyond that simple coding which could offer insight to future studies. Such an examination, while possible, was beyond the scope of this study but that in-depth examination is precisely where future studies should focus.

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CHAPTER 4

DISCUSSION

The empirical portion of this dissertation was built upon theory from two different fields. One was the philosophy-based field of epistemology or theory of knowledge where the tacit knowing theory and personal knowing theory were introduced and elaborated. Chapter 2, in fact, focused upon the work of tacit knowledge's Michael Polanyi and related that to the second field of interest, strategic management. Work from the strategic management field depended upon two related theories – the resource-based and knowledge-based views – that focus upon knowledge as a resource. The convergence of these two different bodies of theory provided the base upon which Chapters 3 and 4 were constructed. The second major portion of the dissertation followed a call by a number of researchers - among them Jay Barney, Katherine Eisenhardt, Udo Zander and Bruce Kogut – for more multi-case based and theory-building research which includes the use of grounded theory. This trend is summarized nicely by Hitt, Gimeno & Hoskisson (1998). The dissertation takes a grounded theory, multi-case, and mixed methodology approach beginning in Chapter 3 to better understand the use of knowledge in competition within and between organizations. With the end of better understanding those phenomena, twenty-four interviews were transcribed and that qualitative content was both qualitatively and quantitatively analyzed. This sectioned the dissertation's findings into three different parts: The first two involved qualitative analysis in an investigation from an exploratory stance, where emergent patterns were identified and described; and an explanatory stance where differences in performance and knowledge competition were examined for the lowest and highest performing

organizations. The third part of the essay was a quantitative content analysis that provided a test of the six hypotheses.

The exploratory qualitative analysis examined aspects of strategizing and knowledge-based competition within low and high performing organizations. This examination took an exploratory approach that is especially evident in the introduction of its grounding in philosophies of knowledge and knowledge-based currencies. This was a critical aspect of grounding findings in extant theory (Glazer & Strauss, 1967; Eisenhardt, 1989). One of the first things to arise from that introduction was the realization that the knowledge-based view supported by that grounding required a change in perspective on important organizational constructs like resources, competition, performance, organization, and strategy. That established a basis upon which tacit and personal knowing theory was then applied to those important organizational activities that facilitate or hamper the sustained competitive advantage condition. This portion of the analysis used the rich qualitative data pulled from the interview transcripts to identify patterns that justify and extend knowledge- and resource-based views. Strategy and knowledge-based questions (Levels 1 & 2 from Appendix B) were the exclusive focus of this section.

The explanatory qualitative analysis, which was the second major section of Chapter 3, stepped down one level in the hierarchy established in Appendix B to focus upon the knowledge-based assertion that knowledge resource strategies will be both prevalent and predominant among strategies identified by managers. To do this, low versus high knowledge-based performers were contrasted for the purposes of identifying critical failure and success factors. Again, this was restricted within the context of philosophies of knowledge and knowledge-based currency arguments as well as deeper application of tacit and personal knowing theories in

support of those arguments. Qualitative data was again used to provide a richer context grounded in both theory and practical management for discussion.

The quantitative content analysis used coding techniques that took advantage of the hierarchical structure of the study to better examine those critical indicators of sustained competitive advantage (Level 3, Appendix B). While the design itself introduced tight control - in the collection of data during the interviews, for example - the coding itself employed a straightforward unidimensional scheme that permits coders to focus upon the context identified by the research questions. This includes open-ended questions pertaining to value, rareness, inimitability, and nonsubstitutability – and while each of the sections contains many references to other themes that could be coded in other ways – these were essentially controlled. The use of even simple content analysis in this section exhibited incredible power when statistically comparing, through the Wilcoxon-Mann-Whitney nonparametric test, low versus high performers. This provided additional validity and support for the qualitative analysis that preceded the quantitative coding and analysis. It also allowed the testing of hypotheses that confirmed differences between low and high performing groups. Essentially, the results of the statistical test suggested that these groups did not come from similar populations, which potentially indicates deeper differences between knowledge-based strategizers and their failing counterparts. In addition to providing a surprisingly strong test of the knowledge- and resource-based hypotheses, this section of the essay represents the first direct test, to my knowledge, of the knowledge-based assumption driving both theories. Furthermore, it appears unusual in its direct test of sustained competitive advantage using Barney's value, rareness, inimitability, and nonsubstitutability indicators.

Recommendations for Research and Practice

There are a few recommendations that come directly from the above summaries, including personal observations concerning research itself, opportunities for future research, and implications for practice.

Personal Observations

First, the dual grounding of research in theory and practice provides great opportunities to relate the intense intellectual work taking place in organization, strategy, and management research to the experiences of people in organizations. In this paper, specific focus was brought to bear upon the experience of thinking strategically in a knowledge-based and sustained competitive advantage perspective. The use of the theoretical framework to guide the investigation permitted greater identification of variables of interest while maintaining flexibility enough to capture personal experience. Of course, not everything fit easily or naturally within the framework, which led to new insights and, perhaps, theory-building. One of my biggest surprises came from consistently experiencing difficulty with descriptions of resources, competition, performance, organization, and strategy for interviewees. Our interactions, in turn, provided additional insight which were explained within the context of the research using a deeper application of knowledge- and resource-based views. The clash of research and organizational member contexts was highly rewarding and informative but also very time-consuming. Greater incidents of such conflict are definitely needed – supporting increased calls for grounded theory, multi-case studies, and mixed methodologies.

My second recommendation concerns the mixing of methodologies like the mixture of qualitative, from an exploratory and explanatory perspective, and quantitative content analysis. The mixture of methodologies was important in increasing internal and external validity. Plus,

mixing methods allow strengths and weaknesses of each method to be compensated for by companion methods. However, of equal importance is the internal conflict this contrast creates within the investigator. These methods provided me with symbiotic insights because the bouncing between qualitative to quantitative methodologies required different thinking. While both methods enjoy solid traditions based in scientific thought and procedure, their mixed use provided synergies that took each methodology to another level. For example, my introduction to survey methodology and hierarchical regression greatly (if not entirely) influenced my decision to create and utilize the hierarchical structure within Appendix B's interview protocol. While such techniques do commonly occur within interviews, my need for simplicity and control in the protocol design was almost paradoxical in my obsession with the application of ideas that came directly from survey work. In particular, problems due to my lack of experience or discomfort with survey or interview methodology would often be answered by my contact with both. Still, my understanding was that survey methods would not capture enough details, in a flexible enough manner, to provide for the discovery of unexpected patterns. But the qualitative interview, I thought, would lack the acceptance and scientific cache possessed by survey methodology.

Extensions to This Work

Of course, this study attempted to advance knowledge- and resource-based theory and measurement, through the use of mixed methodologies and a focus upon theories of knowledge. The use of Polanyi's epistemology to inform this work seemed particularly well-matched to research focused upon knowledge assets and knowledge-based competition.

From a theory-building perspective, the utility of personal and tacit knowing frameworks to investigate organizational activity, strategy-making, and competition has been illustrated in

situations involving the sharing of strategic information across competitors, and creating and maintaining organizational knowledge. These two frameworks also place special emphasis on attention to attitudes, beliefs, and emotions within context that helps to connect personal with group experience. They also emphasize building connections including how such connections may be made and maintained. Of course, underlying each of the above topics are assumptions that come from Polanyi's epistemology. That specific theory's use in this paper has provided possible explanations for the functioning of explicit through tacit knowing. For example, the assessment of competition and, indeed, whether or not competition even existed appeared throughout the interviews. Likewise, the concept of organization was negotiated and contextualized by each interviewee in part through their descriptions of strategy and their use of firm knowledge. The explicit language itself, in the sharing of personal experiences and beliefs, provides that context, but it is always firmly rooted to a body of underlying tacit knowledge. This study provides many suggestions within the text as to how the understanding of explicit and tacit (e.g., through the tacit and personal knowing frameworks) may be advanced theoretically, with the hope that these will be operationalized for research. Literature on organizational decline, for example, recognizes that people within an organization lose their ability to articulate organizationally relevant information following significant drops in performance (Edwards, McKinley & Moon, 2002; Rosenblatt & Sheaffer, 2001). A similar situation was observed to exist here between low and high performers that may actually, through content analysis, afford researchers the ability to predict upward and downward turns in performance based upon the analysis of organizational dialogues. Beyond the frameworks used in this study, however, exist many other epistemologies that would undoubtedly offer alternative and possibly competing explanations for how and why things happen in organizations.

For knowledge- and resource-based views this study has taken first steps at operationalizing value, rareness, inimitability, nonsubstitutability, and sustained competitive advantage which should further future attempts to measure such concepts. Of course, this study's limitations in that operationalization and measurement provide many opportunities for future empirical work. Remember, this paper used the most basic and unidimensional coding schemes within each of its recording units - those different levels and sublevels identified in Appendix B's interview protocol. That content analysis should be expanded to take a more detailed look at three things specifically. First, how do value, rareness, inimitability, and nonsubstitutability interact to bring about and maintain sustained competitive advantage? For example, within each of the third-level recording frames of the interviews, only aspects of textual content that supported the recording unit's question were coded. That is, within the value recording frame, only value-based content were coded, leaving references to organizational strategy, knowledge-based competition, and all the other indicators of sustained competitive advantage uncoded. Each missed coding opportunity is a forgone chance to study these interactions in greater detail.

Second, more detailed and multidimensional coding should take place within each concept itself. An example of such coding is detailed in the quantitative content code book in Appendix E where value is coded not just according to its count, but segmented according to its combined occurrence with content that suggests positive and negative emotion, lack of value, value source variety (or value breadth), and positive and negative emphasis, just to name a few. Appendix E also contains a coding scheme that, beyond digging deeper into the content of sustained competitive advantage indicators, are suggestive of other areas that emerged during the coding process and analysis of the interviews such as success and failure and explicitness and tacitness. All of the above are temporarily forgone opportunities to better understand the topics

addressed in this paper including things like strategizing and knowledge-based competition and extending beyond that, digging deeper into other concepts like value, performance, or emotion, just to name a few examples.

Finally, while the suggestion to code things like emotion or emphasis with greater attention to detail was briefly mentioned above, these are tied to another need within resource- and knowledge-based views. The emergence of coding for emotion and emphasis both surfaced because of this study's use of the personal knowing framework in the hopes of one day more closely examining the structure that framework suggests. It is clear that much may be done to better our understanding of knowing in organizations through the use of centuries old philosophies of knowledge and knowing. This is especially true for studies that expressly focus upon knowledge as its prime driving force. Yet most present day works reference the importance of knowledge superficially without trying to better understand how knowing itself takes place and influences individuals and their organizations. One final suggestion, then, is to build a bigger and better bridge between epistemology and knowledge-based studies. This may be accomplished by taking advantage of work directly with the field of epistemology or areas within other fields that have used epistemologically relevant constructs. For example, one limitation of this study is that it did not take advantage of psychological measures like locus of control or self-efficacy. In future studies, controlling for these and other relevant psychological variables may provide insights into why managers place value on some knowledge-based activities and not on others, or why some knowledge-based resources are considered inimitable while others are not.

Implications for Practice

Of course, many implications for practice were explicitly identified in the preceding analyses and discussions of findings, but one last observation of the practical importance of

perception or philosophy is worth noting: With regard to the explicit/tacit connection, the very explicit definitions practitioners use to contextualize their situation can serve as supports that provide strategic focus or they can serve as blinders. For example, many interviewees had trouble – in a very visceral way - with the concept of competition. It was either taboo to use the word competition within certain industries, professions, or situations; or the idea grated on the interviewees personal sensibilities. Those that embraced the idea of competition, however, seemed to use their perceptual abilities differently than those who expressed difficulties with the concept. It appeared as if those individuals who were more at ease with the concept of competition were more in tune with their environments. They looked outward – in an organizational sense – to see "who was out there." What were other organizations doing? How were they doing it? Was it working? Then they would look inward to see how they could do things like other organizations were doing or how they could perform better. Competition-averse individuals were still aware that competition existed. They identified at least some of it quite easily. But they shied away from turning their perceptual abilities in its direction. Its examination seemed somehow painful or maybe too intrusive or voyeuristic. Whatever the source of their aversion, the result was a narrowing of vision both internal to and external to their own organizations. Internally, overlaps or inefficiencies because of organizational redundancies or conflicting philosophies were avoided so as not to be confrontational. These same sources of apparent conflict, however, seemed to be viewed as opportunities for improvement by "competition friendly" organizational members. Externally too, opportunities were missed because they refused to view an obvious competitor - for financial resource, attention, or recognition – as a potential threat, or source of information, or cooperative partner. The competition averse individual's world literally shrank. Of course, conceptions of competition can

work the other way. However, the above illustration suffices without expanding upon competitive alternatives.

How an individual or professional group or industry approaches the competitive concept is just one example of how an explicit word – tied, of course, to all of its related philosophies - can greatly change the context within which organizational activity takes place. Competition was just one example of this. Conceptions of industries, organizations, strategies, and others all serve as potential enablers of organizational growth or impediments to recognizing and taking advantage of opportunity. The practitioner should be aware when the explicit language within their industries or professions is helping or hindering their ability to recognize, assess, and respond to their environments. One way to do this is to question how, exactly, that explicit language connects to those underlying philosophies and whether or not that explicit language holds a critical position within those philosophies. The explicit often does not accurately represent the underlying tacit knowing that we possess but sometimes ignore or dismiss.

TABLES

TABLE 3.1
KNOWLEDGE-BASED PERFORMANCE RANKINGS FOR CRITICAL INCIDENTS

	Organization	High-Tech Focus	Knowledge Performance Rating 1 = Very Poor, 5 = Very Good				
			1	2	3	4	5
I-1	**Trainer Training Center**	Distance Tech, Community, Philosophy				X	
I-2	**Curriculum**	Web-based Repository, Control w/ Distance	X				
I-3	**Web Designer**	Organizational Identity, Project Management			X		
I-4	**Management Development**	Knowledge-base, Tech Leverage, Process Ctl	X				
I-5	**Technology Management**	Large-scale Rollout, Change Management				X	
I-6	**Tech Professional**	Client Support, Professional Devt., Identity Management					X
I-7	**Data Conversion Consultancy**	Data Conversion, Programming, Quality Control, Process Management					X
I-8	**Sensemaking & Interpretation Services**	Information Processes, Process Management, Analytics, Leadership					X
I-9	**Analytic Strategy**	Data Collection & Interpretation, Information Management					X
I-10	**Retail Image**	Image & Identity Management, Industry Savvy, Afficionado				X	
I-11	**Web-based Catalogue**	Survival, Web-based Services, Technical Support, Reclamation	X				
I-12	**Cable Guy**	Telecommunications, Rapid Growth, Monopoly	X				
I-13	**Technical Support**	Communications, Programming, Quality & Consistency			X		
I-14	**Biotech Incubator**	Technology Transfer & Commercialization, Niche Creation					X
I-15	**Environmental Process Management**	Software Development, Info Management, Regulatory Compliance				X	
I-16	**Property Information Management**	Datawarehouse & Information Mgt, Cost Control		X			
I-17	**Environmental Production**	Information and Knowledge Gathering, Bidding, Cost Control			X		
I-18	**Process Management**	Knowledge Capture & Management	X				

TABLE 3.1 (CONTINUED)

I-19	**On-line Services**	E- & Telecomm Services				X	
I-20	**Technology Trainer**	Technology & Training Management	X				
I-21	**Talent Promotion**	Talent Identification, Support & Promotion, Business Philosophy			X		
I-22	**Music & Business Interpreter**	Knowledge Bridge, Bring Business Technique to Niche Music Industry			X		
I-23	**New Media Incubator**	Technology Support, New Business Devt, Community Building, Public Relations				X	
I-24	**On-line Gaming**	Innovation, Intellectual Property Defense, Technology Adopting & Creation					X

TABLE 3.2
TRADITIONAL PEFORMANCE RANKINGS FOR CRITICAL INCIDENTS

	Organization	High-Tech Focus	Traditional Performance Rating 1 = Very Poor, 5 = Very Good				
			1	2	3	4	5
I-1	**Trainer Training Center**	Distance Tech, Community, Philosophy				X	
I-2	**Curriculum**	Web-based Repository, Control w/ Distance					X
I-3	**Web Designer**	Organizational Identity, Project Management		X			
I-4	**Management Development**	Knowledge-base, Tech Leverage, Process Ctl					X
I-5	**Technology Management**	Large-scale Rollout, Change Management					X
I-6	**Tech Professional**	Client Support, Professional Devt., Identity Mgt			X		
I-7	**Data Conversion Consultancy**	Data Conversion, Programming, Quality Control, Process Management			X		
I-8	**Sensemaking & Interpretation Services**	Information Processes, Process Management, Analytics, Leadership					X
I-9	**Analytic Strategy**	Data Collection & Interpretation, Information Management			X		
I-10	**Retail Image**	Image & Identity Management, Industry Savvy, Afficionado	X				
I-11	**Web-based Catalogue**	Survival, Web-based Services, Technical Support, Reclamation	X				
I-12	**Cable Guy**	Telecommunications, Rapid Growth, Monopoly	X				
I-13	**Technical Support**	Communications, Programming, Quality & Consistency				X	
I-14	**Biotech Incubator**	Technology Transfer & Commercialization, Niche Creation			X		
I-15	**Environmental Process Management**	Software Development, Info Management, Regulatory Compliance				X	
I-16	**Property Information Management**	Datawarehouse & Information Mgt, Cost Control					X
I-17	**Environmental Production**	Information and Knowledge Gathering, Bidding, Cost Control			X		
I-18	**Process Management**	Knowledge Capture & Management			X		

TABLE 3.2 (CONTINUED)

I-19	**On-line Services**	E- & Telecomm Services				X	
I-20	**Technology Trainer**	Technology & Training Management	X				
I-21	**Talent Promotion**	Talent Identification, Support & Promotion, Business Philosophy			X		
I-22	**Music & Business Interpreter**	Knowledge Bridge, Bring Business Technique to Niche Music Industry			X		
I-23	**New Media Incubator**	Technology Support, New Business Devt, Community Building, Public Relations		X			
I-24	**On-line Gaming**	Innovation, Intellectual Property Defense, Technology Adopting & Creation					X

TABLE 3.3
CRITICAL KNOWLEDGE-BASED COMPETITION INCIDENT PROFILES

Incident	Organization	Page Count	Word Count	Critical Strategic Context
I-1	**Trainer Training Center**	13	5848	1. Combine technology & theory 2. Increase customer base 3. Differentiate 4. Create studio environment – alter current environment 5. Build sense of community 6. Adopt overarching philosophy
I-2	**Curriculum**	13	5340	1. Maintain tight managerial control 2. Develop knowledge-based product 3. Receive continued funding 4. Utilize Web technology
I-3	**Web Designer**	11	5541	1. Manage client expectations 2. Define business identity 3. Discovering client identity 4. Use technology for better learning 5. Use project management & learning theories as guiding philosophies 6. Formalize strategy - planning, implementation, control, and evaluation
I-4	**Management Development**	13	6596	1. Efficiently use existing technology 2. Better use of org knowledge 3. Design process "templates" 4. Identify & replicate core processes 5. Free management for strategy-making
I-5	**Technology Management**	9	4280	1. Plan system retirement & change 2. Assess organizational impact 3. Plan future system access & mgt 4. Develop support for new system 5. Develop & coordinate departmental bridging mechanisms

TABLE 3.3 (CONTINUED)

I-6	**Tech Professional**	5	1989	1. Focus on user training 2. Utilize defined training philosophy 3. Engage in competitive intelligence 4. Enhance professional status 5. Engage professional community 6. Create interorganizational boundary-spanning structure 7. Establish a dominant departmental presence within parent organization 8. Define & establish departmental identity within the parent organization.
I-7	**Data Conversion Consultancy**	8	3499	1. Develop proprietary software tools 2. Identify & utilize successful methodologies 3. Identify, attract, retain core people 4. Communicate in-depth knowledge to clients 5. Deliver unusual fixed pricing
I-8	**Sensemaking & Interpretation Services**	7	2618	1. Industry leadership 2. Leverage information & talent 3. Base everything on analytics 4. Provide the most accurate forecasts 5. Make fast decisions 6. Better understand reality. 7. Freely share core information 8. Outperceive & interpret competition
I-9	**Analytic Strategy**	6	2903	1. Obtain high quality data 2. Develop rigorous processes 3. Heavy client involvement 4. Focus on quality communication 5. Work through analysis with client
I-10	**Retail Image**	13	7497	1. Developing the store's identity 2. Build up specialized stock 3. Enhance proprietary brand presence 4. Develop complementary assets & resources
I-11	**Web-based Catalogue**	4	1655	1. Survival 2. Grow back lost resources 3. Reestablish credibility 4. Restructure employee/mgt structure
I-12	**Cabling Technology**	2	498	1. Downsize traditional business 2. Rapidly grow networking business 3. Establish local monopoly

TABLE 3.3 (CONTINUED)

I-13	**Scientific Technical Support**	7	3567	1. Provide technical support for high-tech calculations 2. Maintain good connectivity w/ outside systems 3. Maintain business critical software 4. Attract increased funding 5. Maintain high quality service for diverse clientele
I-14	**Biotech Incubator**	12	5830	1. Identify commercializable research 2. Rank project potential 3. Support new ventures 4. Help raise capital & mgt talent 5. Build & encourage academic relationships 6. Set goals & define success 7. "Graduate" firms from incubator 8. Maintain mentor/support community
I-15	**Web Process Management**	11	5481	1. Focus on academic customer niche 2. Target through federal violations 3. Gather industry knowledge 4. Expertise differentiation 5. Customize technological solutions 6. Build reputation
I-16	**Property Information Management**	9	4356	1. Use database to increase efficiency 2. Create understandable information about existing resources 3. Better understand & use least costly resources 4. Use existing information
I-17	**Environmental Production**	4	1753	1. Privatization acquisition assessment 2. Competitive bidding 3. Operating cost management 4. Optimizing treatment 5. Maintain government compliance
I-18	**Knowledge Capture**	13	6587	1. Developing & refurbishing standard operating procedures 2. Collecting knowledge from existing sources
I-19	**On-line Services**	13	6015	1. Focus service on PC early adopters 2. Providing low cost service 3. Use knowledge to tap unmet demand 4. Constant focus on innovation 5. Provide increasing interactivity

TABLE 3.3 (CONTINUED)

I-20	**Technology Trainer**	6	2128	1. Overcoming resistance to new technology 2. Establish calming environment 3. Provide basic understanding
I-21	**Talent Promotion**	10	4788	1. Identification & selection of talent 2. Talent promotion 3. Business knowledge consulting 4. Utilize volunteer resources
I-22	**Music & Business Interpreter**	10	4788	1. Combine business & art philosophies 2. Utilize comparative talents 3. Creating & promoting structure
I-23	**New Media Incubator**	13	6028	1. New venture support 2. Economic community-building 3. Utilizing student talent 4. Develop community presence through public relations 5. Create coalition of local tech companies 6. Secure financing 7. Create supports for proven ventures
I-24	**On-line Gaming**	7	3662	1. Seek opportunity from new tech 2. Technological intellectual property protection 3. Legal intellectual property defense 4. Avoid imitation through innovation 5. Customer intelligence 6. Tracking innovation/change impact 7. Attention to culture 8. Industry exit

TABLE 3.4
MEANS, STANDARD DEVIATIONS, AND RANGE

	N	Mean	Std. Deviation	Minimum	Maximum
Gender	21	.62	.50	0	1
Management Level	21	4.33	.97	1	5
Interview Length	21	2401.00	1102.50	307	4776
Word Count	21	4338.57	1916.56	498	7497
Strategy Section Size	21	5642.71	4501.31	819	16825
Knowledge Section Size	21	7209.33	4865.03	268	17319
Knowledge Ratio #1 Volume	21	2.4859	3.5537	.04	16.28
Knowledge Ratio #2 Density	21	5.2589	14.7669	.70	69.50
Performance	21	3.38	1.50	1	5
Firm Size	21	3.05	1.60	1	5
Firm Age	20	3.05	1.57	1	5
Strategy Count	21	83.05	70.67	2	249
Knowledge Count	21	157.62	112.12	14	395
Value Count	21	32.52	22.25	2	86
Rareness Count	21	30.57	16.42	4	63
Inimitability Count	21	33.67	27.58	2	107
Nonsubstitutability Count	21	26.57	27.03	0	99
VR (Value & Rareness)	21	63.10	33.33	8	130
IS (Inimitability & Nonsubstitutability	21	60.24	50.91	3	162
Sustained Competitive Advantage	21	123.33	65.95	14	239
HiLo Knowledge	21	2.14	.85	1	3

TABLE 3.5
RANKED COMPARISONS BETWEEN LOW AND HIGH PERFORMING GROUPS

	HiLo Knowledge	N	Mean Rank	Sum of Ranks
Gender	Low	6	10.25	61.50
	High	9	6.50	58.50
Management Level	Low	6	4.75	28.50
	High	9	10.17	91.50
Interview Length	Low	6	7.00	42.00
	High	9	8.67	78.00
Word Count	Low	6	5.83	35.00
	High	9	9.44	85.00
Strategy Section Size	Low	6	8.50	51.00
	High	9	7.67	69.00
Knowledge Section Size	Low	6	6.17	37.00
	High	9	9.22	83.00
Knowledge Ratio #1 Volume	Low	6	6.00	36.00
	High	9	9.33	84.00
Knowledge Ratio #2 Density	Low	6	6.00	36.00
	High	9	9.33	84.00
Performance	Low	6	4.25	25.50
	High	9	10.50	94.50
Firm Size	Low	6	11.00	66.00
	High	9	6.00	54.00
Firm Age	Low	6	10.00	60.00
	High	8	5.63	45.00
Strategy Count	Low	6	8.17	49.00
	High	9	7.89	71.00
Knowledge Count	Low	6	7.08	42.50
	High	9	8.61	77.50
Value Count	Low	6	5.08	30.50
	High	9	9.94	89.50
Rareness Count	Low	6	3.83	23.00
	High	9	10.78	97.00
Inimitability Count	Low	6	4.08	24.50
	High	9	10.61	95.50
Nonsubstitutability Count	Low	6	4.08	24.50
	High	9	10.61	95.50
VR (Value & Rareness)	Low	6	4.33	26.00
	High	9	10.44	94.00
IS (Inimitability & Nonsubstitutability)	Low	6	4.17	25.00
	High	9	10.56	95.00
Sustained Competitive Advantage	Low	6	3.50	21.00
	High	9	11.00	99.00

TABLE 3.6
RESULTS FOR THE WILCOXON-MANN-WHITNEY TEST

	Gender	Mgt Level	Length	Word Count	Strategy Section Size	Knowledge Section Size	Knowledge Ratio #1 Volume	Knowledge Ratio #2 Density	Perf	Firm Size	Firm Age
Mann-Whitney U	13.500	7.500	21.000	14.000	24.000	16.000	15.000	15.000	4.500	9.000	9.000
Wilcoxon W	58.500	28.500	42.000	35.000	69.000	37.000	36.000	36.000	25.500	54.000	45.000
Z	-1.837	-2.590	-.707	-1.532	-.354	-1.298	-1.414	-1.414	-2.770	-2.210	-2.030
Sig. (2-tailed)	.066	.010	.480	.126	.724	.194	.157	.157	.006	.027	.042
1-tailed Sig.	.057	.001***	.265	.073	.388	.112	.095	.095	.003**	.018*	.030*

	Strategy Count	Knowledge Count	Value Count	Rareness Count	Inimit Count	Non-Subst Count	VR	IN	Sustained Comp Adv (VRIN)
Mann-Whitney U	26.000	21.500	9.500	2.000	3.500	3.500	5.000	4.000	.000
Wilcoxon W	71.000	42.500	30.500	23.000	24.500	24.500	26.000	25.000	21.000
Z	-.118	-.649	-2.064	-2.960	-2.774	-2.774	-2.597	-2.713	-3.182
Sig. (2-tailed)	.906	.516	.039	.003	.006	.006	.009	.007	.001
1-tailed Sig.	.478	.265	.018*	.001***	.002**	.002**	.004**	.003**	.000***

TABLE 3.7
TESTS OF THE HYPOTHESES

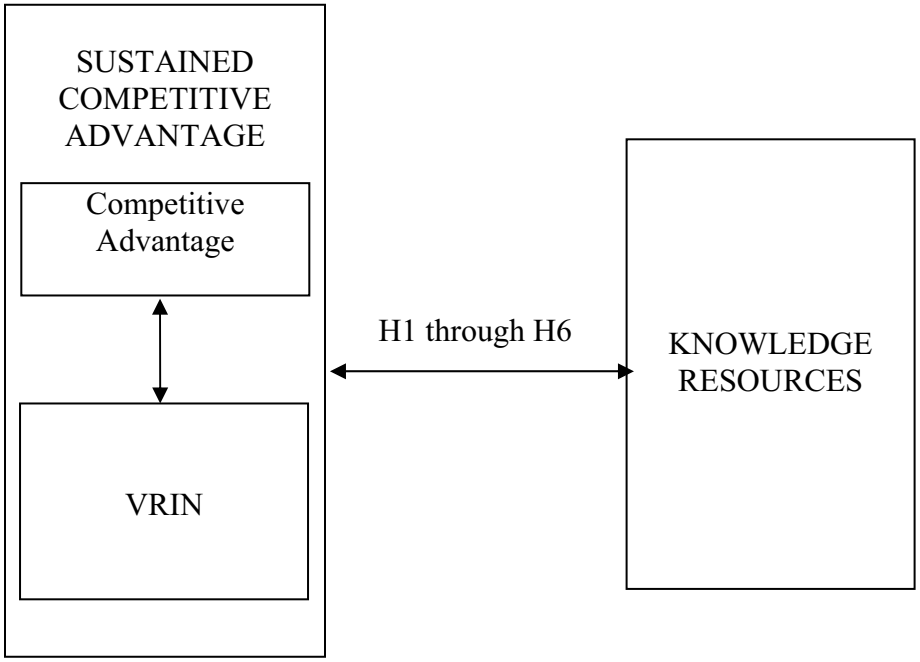
Hypotheses **Variables**	**Sum of Ranks**		**Significance**
Hypothesis 1: Performance & SCA	Low	High	
Performance	25.50	94.50	.003**
Strategy	49.00	71.00	.478
Knowledge	42.50	77.50	.256
Value	30.50	89.50	.018*
Rareness	23.00	97.00	.001***
Inimitability	24.50	95.50	.002**
Nonsubstitutability	24.50	95.50	.002**
Value & Rareness (VR)	26.00	94.00	.004**
Inimitability & Nonsubstitutability (IN)	25.00	99.00	.003**
Sustained Competitive Advantage (VRIN)	21.00	99.00	.000***

	Relative Emphasis		
	Knowledge (above 1.0)	Strategy (below 0.5)	
Hypothesis 2: Knowledge-based & Resource-based views (KBV & RBV)			
Knowledge Volume	13 of 21	5 of 21	Support
Knowledge Density	16 of 21	0 of 21	Support

	Sum of Ranks		**Significance**
	Low	High	
Hypothesis 3: Value	30.50	89.50	.018*
Hypothesis 4: Rareness	23.00	97.00	.001***
Hypothesis 5: Inimitability	24.50	95.50	.002**
Hypothesis 6: Nonsubstitutability	24.50	95.50	.002**

Secondary data and third-party content analysis using news sources & industry journals

Exploratory grounded theory logic following Glaser & Strauss (1967) and multiple-case "replication" logic of Yin (1994) used by similar studies (Brown & Eisenhardt, 1997; King & Zeithaml, 2001; Ranft, 1997).



TECH-BASED VENTURES

Possibly "pure" dot-coms (no bricks, no mortar) involved in on-line retailing (SIC 5961). On-line content (7389) another possibility. For hypothesis testing, compare three high- & three low-performers at a minimum.

CONTROLS

High versus Low Performers

FIGURE 3.1
COMPETITIVE ADVANTAGE THROUGH ORGANIZATIONAL KNOWLEDGE

APPENDICES

APPENDIX A
KEY ATTRIBUTES OF CASE AND CRITICAL INCIDENT TECHNIQUES

	Case Study	Characteristics Applied to this Study
1.	Bounded by time and space	6 month data collection (time); the critical competitive knowledge incident (phenomena)
2.	Extensive, multiple sources of information	In-depth narratives; industry journals; expert panel; reflexive review
3.	Time spent describing context and detailing events	Dot-com on-line retail sector; knowledge resources; knowledge workers; management

	Critical Incident	Characteristics Applied to this Study
1.	Quick and vivid recollection of past experience	Looking at narrative delivery of critical competitive knowledge situation; observant of managerial time constraint
2.	Maintains focus	Keeps discussion on behaviors and thoughts related to incidental competitive knowledge strategizing
3.	Enhances credibility of data	Encourages reflection; emphasis on effective and ineffective behavior; Focus on contributing and exemplary incidents

APPENDIX B
CRITICAL INCIDENT INTERVIEW GUIDE

LEVEL 1

What would you say your organizational strategies are?

LEVEL 2

Please think about a situation when you felt that you and your company used knowledge effectively to compete against other rival businesses. Imagine you are back in that situation and tell me what you can remember about…

- Who was involved in the situation?
- How did it get started? What was going on? What was the competitive knowledge that was being discussed and/or developed (or what competitive advantage did you and your company hope to gain)?
- What was your company trying to accomplish? What had to happen in order for the company to use knowledge to compete in the way it wanted?
- What was getting in the way?
- What did you (your company) do in the situation?
- What did the competition or other firms do?
- If there was a point when it seemed that it was almost impossible to move forward, what did you do?
- How did it turn out?
- What was achieved?
- What evidence can you think of that competitive advantage was attained?
- Does this make you think of another incident when knowledge was used to gain competitive advantage?

LEVEL 3

Can you describe briefly how your organization or its strategy is uncommon?

Can you describe briefly how your organization's strategy creates value (profit, superior performance) or minimizes costs?

Can you describe briefly how your organization's or its strategy keeps from being copied by competitors?

Can you describe briefly how your organization's or its strategy avoids substitution by competitors? That is, what keeps current or potential competitors from somehow meeting your customers' needs in other ways?

APPENDIX C
INFORMED CONSENT FORM FOR COMPETITIVE KNOWLEDGE-BASED FIELD INTERVIEW

By engaging in this interview, you agree to take part in a research study titled "Competing with knowledge-based resources in the dot-com industry."

The reason for this study is to interview managers to better understand how knowledge may be used to compete in business. This should improve our understanding of how spoken (explicit) and unspoken (tacit) knowledge is used in organizations.

Your responses during the interview are confidential to the extent provided for by the law. Your participation is voluntary, and you may withdraw at any time without any negative consequences. The tape recording is used for the purposes of accuracy of content so that I may concentrate on other aspects of the interview process. While you will be identified by the researcher while the study is in progress and you continue to grant your participation, once the study is completed, any personal or company identifiers will be removed from all records. A summary report specific to your company will be provided to you if you wish. A summary report for other general and industry-specific findings will also be provided. No report will identify individual contributors. All reports of data not specific to your company will be by group averages only. If you have any questions about this material, please feel free to call me (Joseph G. Gerard) at my office in Terry College's management department, phone number (706)-425-2960, or contact my faculty advisor, Dr. Ann K. Buchholtz, management department, phone number (706) 542-9465.

Participation in this study includes an introduction by phone or introductory letter. An in-person or phone interview will follow, which will take at least 15 minutes but may take longer (perhaps up to two hours) depending upon the depth of analysis you desire for your specific company. No firm-specific information will be provided to anybody other than the interviewee (CEO or top manager) and the identity of the firm and the research participant will be kept confidential.

For questions or problems about your rights please call or write: Chris A. Joseph, Ph.D., Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

APPENDIX D
CRITICAL INCIDENT INTERVIEW GUIDE & PHONE SCRIPT

Introduction and Overview of Project

Thank you for speaking with us today. I would like to begin by describing a little bit about our project. We are interested in understanding the relationship between managers' understanding of competition using knowledge and firm performance. To do this, we need to have a clear understanding of your beliefs about the type of knowledge that contributes to organizational success in the dot-com industry.

This interview consists of a set of open-ended questions. The purpose of these questions is to identify and gain deeper insight into the knowledge and skills that XXXX XXXXX has that allows it to outperform competitors. In addition, if time allows, if you have ideas that you wish to share about knowledge and skills used by other firms in the dot-com industry to compete, we would be very interested in discussing those thoughts with you.
Over the next two months, we are having similar conversations with other CEO's and top managements of dot-com firms. Based on learning gained from these discussions, we are developing a questionnaire that will be administered to you, other top managers, and key middle managers to measure the perceptions of knowledge competition by managers throughout the organization. All answers will be kept strictly confidential. Each CEO will receive a customized analysis of the results for his company at the end of the project.
In the initial letter that we sent you last week, we briefly described knowledge competition and explicit and tacit knowledge. I would be happy to review any information that was unclear in the materials that we sent. Do you have any questions about knowledge competition, tacitness or explicitness, or what we are interested in measuring?

BACKUP----(if they have not read the materials or seem confused-- read information on intro, i.e., letter of consent, to them).

Do you have any other questions before we start?
If agreeable with you, we would like to tape record the interview. The transcript of the tape will be completely confidential; we just like to tape the conversation so we can focus more on the interview and less on transcribing it. However, we do not wish to tape it if you have any reservations. Do you have any objections to taping this?

Knowledge Competition Content

We would like to spend the first part of this interview asking you to identify several critical competencies in XXXX XXXXX. Can you think of an(other) example of XXXX organization's knowledge-based sources of competitive advantage? In other words, what areas are you strong in vis-à-vis your competitors and what gives you an edge over the competition?

Please think about one of these situations when you felt that you and your company used knowledge effectively to compete against other rival businesses. Imagine you are back in that situation and tell me what you can remember about…

- Who was involved in the situation?

- How did it get started? What was going on? What was the competitive knowledge that was being discussed and/or developed?
- What competitive advantage did you and your company hope to gain (what was your company trying to accomplish)? What had to happen in order for the company to use knowledge to compete in the way it wanted?
- What was getting in the way?
- What did you (your company) do in the situation?
- What did the competition or other firms do?
- If there was a point when it seemed that it was almost impossible to move forward, what did you do?
- How did it turn out?
- What was achieved?
- What evidence can you think of that competitive advantage was attained?
- Does this make you think of another incident when knowledge was used to gain competitive advantage?

Follow-up questions to clarify individual sustained knowledge-based competencies (member check).

- Can you think of an(other) example of XXXX XXXXX's knowledge-based sources of competitive advantage? In other words, what areas are you strong in vis-à-vis your competitors and what gives you an edge over the competition?
- Help us understand what it is about this competency that leads you to the conclusion that it is a source of competitive advantage for the firm.
- Is it a source of value?
- Is this an unusual knowledge-based source of competition?
- Can you 'know' it better than your competitors?
- Will it continue to be a potential source of value?
- Can this knowledge-based advantage be imitated? That is, can competitors copy this knowledge-based advantage?
- Are there substitutes for this knowledge? Can competitors use something other than the knowledge we've been discussing to achieve similar ends?
- How do you strengthen or support this type of knowledge-based competition?
- How do you share this type of knowledge-based competition with others inside the organization?
- How do you share this type of knowledge-based competition with allies or partners?

Summary/ Confirmation (if follow-up desired by manager)

- May I state the competency using a phrase or a sentence or two and see if you agree that it is capturing what you are describing as a core knowledge-based competency of a firm?
- From this conversation, it is our understanding that you would list the following as 5 (or 4 or 6...) as key competencies at XXXX XXXXX. (Come up with 1 sentence summary of each to make sure we are on the same track). Get agreement or make modifications.

Appendix D (Continued)

- Rankings of importance
- We are interested in how important you think these competencies are. Which one do you think is most important to the current success of XXXX XXXXX?
- Which do you think is the next most important for the current success of the firm?
- Which do you think is the next most important?
- Can you rank the remaining 2 or 3?
- Would this ranking vary (repeat them to the manager) if you considered these competencies regarding the near term (2-5 year time horizon) of XXXX XXXXX?
- How would you rank them regarding the long term (5-10 year time horizon) of XXXX XXXXX?

Date and Time of Interview: XXXXday, November XXth at XX am

Time Start: _____ Time End: _____

Interviewer: Joseph G. Gerard

APPENDIX E
QUANTITATIVE CONTENT CODE BOOK

This is the basis for the coding form.

Controls

1. Personal
    a. gender (female=0; male=1).
    b. management level (1 though 5) 1 being lower level line management, 3 being mid-management, and 5 being ownership or top management.
2. Performance – This is a judgement made by the primary investigator and covers a few levels.
    a. Firm-level by industry or competitive group as described at the time of the incident.
    b. Counts of low, normal and high performance throughout the interview.
3. Firm Size – This is an observation made by the principle investigator (1 through 5) with 1 being small and 5 being large.
4. Firm Age – This is an observation made by the principle investigator (1 though 5) with 1 being a new or start-up company and 5 being a well-established, older company.

Knowledge-based Competition

5. Strategy
    a. Strategy Count (StratC) – which is just a straight count of the different strateges mentioned.
    b. Knowledge Strategy Count (KstratC) – the number of knowledge-based strategies within the total strategy count.
    c. Strategy Success/Failure (StratS/F) – coding the strategy either a success (0) or failure (1); alternative – ranking scale from highly successful (1) to highly unsuccessful (5).
    d. Strategy Rationale – shows justification, rationale, or legitimation of strategy.
    e. Knowledge Strategy Rationale – shows justification, rationale, or legitimation of strategy.
6. Competition – (abandonment of "competitive advantage" in favor of an explicit statement of a firm's competitive position, including the type of advantage expected and how that advantage should be measured BARNEY, 2001.)
    a. Competition Count – a count of the mention of competition.
    b. No Competition Count – a count of the mention of absence of competition.
    c. Competition Strength (1 to 5) 1 being low and 5 being high.
    d. Cooperation Count – a count of the mention of cooperation.
    e. No Cooperation Count – a count of the mention of no cooperation.
    f. Cooperation Strength – (1 to 5) 1 being low and 5 being high.

Ties to exploratory type of advantage expected and how it is achieved.

Appendix E (Continued)

Hierarchical Success and Failure Codes

7. Success
    a. Success Count (SuccCount) - a count of the number of times successes were mentioned.
    b. Success Range (SuccRange) - the number of different types of success mentioned.
8. Failure
    a. Failure Count (FailCount) - a count of the number of times failures were mentioned.
    b. Failure Range (FailRange) - the number of different types of failure mentioned.

Hierarchical VRIN in Knowledge-based Competition

9. Value:
    a. Value Count (ValCount) is the total count of references to value.
    b. Value Count Emote (ValCountEmote) is the total count of value references tied to emotion.
    c. Reverse Value Count (RevValCount) is the total count of references to an value eroding position/condition.
    d. Reverse Value Count Emote (RevValCountEmote) is the total count of value references tied to emotion.
    e. Value Breadth (ValBreadth) - is the variety of value within the value count.
    f. Reverse Value Breadth (RValBreadth) - is the variety of value within the reverse value count.
    g. Value Emphasis (ValEmph) is the total count of references justifying, rationalizing, or legitimating value.
    h. Reverse Value Emphasis (RevValEmph) is the total count of references justifying, rationalizing, or legitimating negative value.
10. Rareness:
    a. Rareness Count is the total count of references to rareness.
    b. Rareness Count Emote is the total count of rareness references tied to emotion.
    c. Reverse Rareness Count is the total count of references to a common position/condition.
    d. everse Rareness Emote Count is the total count of common references tied to emotion.
    e. Rareness Breadth is variety with the total rareness count.
    f. Reverse Rareness Breadth - Is the variety commonness utterances within the total count of reverse rareness utterances.
    g. Rareness Emphasis - Is the total count of references justifying, rationalizing, or legitimating rareness.
    h. Reverse Rareness Emphasis - Is the total count of utterances that justify, rationalize, or legitimate commonness.
11. Inimitability:
    a. Inimitability Count - Is the total count of utterance that refer to an inimitability position/condition.

b. Inimitability Emote Count - Is the total count of inimitability utterances tied to emotion.
c. Reverse Inimitability Count - Is the total count of utterances that refer to a common position/condition.
d. Rev Inimitability Emote Count - Is the total count of utterances referring to commonness that are tied to emotion.
e. Inimitability Breadth - Is the variety within the total inimitability count.
f. Rev Imitability Breadth - Is the variety within the total count of imitability utterances.
g. Inimitability Emphasis - Is the total count of references justifying, rationalizing, or legitimating inimitability utterances.
h. Rev Inimitability Emphasis - Is the total count of utterances that justify, rationalize, or legitimate commonness utterances.

12. Replicability - This refers to the ability to copy knowledge within an organization.
    a. Replicability Count - Is the total count of utterance that refer to a replicability position/condition.
    b. Replicability Emote Count - Is the total count of replicability utterances tied to emotion.
    c. Rev Replicability Count - Is the total count of utterances that refer to an unreplicable position/condition.
    d. Rev Replicability Emote Count - Is the total count of utterances referring to unreplicable positions/conditions tied to emotion.
    e. Replicability Breadth - Is the variety within the total replicability count.
    f. Rev Replicability Breadth - Is the variety within the total count of unreplicability utterances.
    g. Replicability Emphasis - Is the total count of references justifying, rationalizing, or legitimating replicability utterances.
    h. Rev Replicability Emphasis - Is the total count of utterances that justify, rationalize, or legitimate unreplicability utterances.
13. Non-Substitutability:
    a. Non-Substitutability Count - Number of times non-substitutability is mentioned.
    b. Non-Substitutability Emote Count - Is the total count of non-substitutability utterances tied to emotion.
    c. Rev Non-substitutability Count - Is the total count of utterances that refer to a substitutability position/condition.
    d. Rev Non-Subst Emote Count - Is the total count of non-substitutability utterances that tie to emotion.
    e. Non-Substitutability Breadth - Is the variety within the total count of non-substitutability utterances.
    f. Rev Non-Subst Breadth - Is the variety within the total count of substitutability utterances.
    g. Non-Subst Emphasis - Is the total count of references justifying, rationalizing, or legitimating non-substitutability.

h. Rev Non-Subst Emphasis - Is the total count of references justifying, rationalizing, or legitimating substitutability.

Hierarchical Explicit and Tacit Knowledge in Knowledge-based Competition

14. Explicitness and Tacitness - For explicit and tacit knowledge ratings, use the explicit and tacit knowledge scale if possible! This is not necessary for the explanatory part of the study.

a. Tacitness Ranking (1-5) 1 being low and 5 being high.
b. Explicitness Ranking (1-5) 1 being low and 5 being high.

APPENDIX F
EXTENDED CODE BOOK OF EMERGENT PATTERNS

1 #005 Strategies
2 #006 Competition
3 #007 Success
4 #008 Failure
5 #009 Value
6 #010 Rareness
7 #011 Inimitability
8 #012 Replicability
9 #013 Nonsubstitutability
10 #014 Knowledge
11 Belief
12 Clientele
13 Community
14 Competition
15 Competitive Advantage
16 Competitors
17 Cooperation
18 Emotion
19 Emphasis
20 Experience
21 Explicitness
22 Feeling
23 Identity
24 Inimitability Emphasis
25 Innovation
26 Insight
27 Introduction
28 Knowing
29 Knowledge Centrality
30 Knowledge Resource
31 Knowledge Strategy
32 Knowledge Synonyms
33 Knowledge Type
34 Luck
35 Mindset
36 Misunderstood
37 Nonsubstitutability Emphasis
38 Objects of Competition
39 Organization
40 Organization Knowledge
41 Pattern Recognition
42 Performance
43 Personal Knowledge

Appendix F (Continued)

44 Philosophy
45 Proximity
46 Rareness Emphasis
47 Reality
48 Replicable Emphasis
49 Resource Providers
50 Resources
51 RQ1
52 RQ2
53 RQ3
54 RQ4
55 RQ5
56 RQ6
57 RQ7
58 Rules
59 Self-Monitoring
60 Sensemaking
61 Stakeholders
62 Strategic Knowledge Action
63 Strategic Philosophy
64 Strategy
65 Strategy Emphasis
66 Nonsubstitutability
67 Nonsubstitutability Emphasis
68 Substitutes
69 Sustained Competitive Advantage
70 Sustained Comp Advantage Emphasis
71 Tacitness
72 The Competitor
73 The Knower
74 The Member
75 The Practitioner
76 Thinking
77 Unknown
78 Value Emphasis

APPENDIX G
ORGANIZATIONAL STRATEGIES AND KNOWLEDGE-BASED PERFORMANCE

Incident #1: Distance Technology and Community-Building

Organization #1 focuses on the training of trainers by coaching them in a unique blend of technology and organization learning philosophy in a community-focused environment. Organization #1 most closely resembles a relatively permanent fixture that arose to meet the demand for more sophisticated trainers brought about by, especially, the emergence of the corporate training and managerial consulting industries.

Organization #1's strategies included: (1) Training trainers (i.e., consultants, project managers, intellectual product designers, researchers, and corporate developers) in the use of technology and learning theory. (2) Carving out, in terms of growth and reputation, a niche defined as the intersection of Computer Science and Psychology. (3) Providing all of their product offerings in an on-line format within five years to take advantage of distance learning technologies. (4) Providing greater hands-on, studio-type, and case study experiences for their clients. (5) Building a sense of community within the organization. (6) Making a constructivist philosophy the foundation of their organization and continually fortifying that base.

Overall, my observation of this organization was that they hoped to move the organization into two directions that, while not necessarily counter-productive or mutually exclusive, could provide unique challenges for the organization. Namely, across strategies, the organization, as evidenced in the transcripts of critical incidents, strongly emphasized both community-building and "distance-technologies." On the one hand, community-building stressed studio or laboratory style course-work, the formation of special-interest groups, and the hands-on application of their training through work on practical – or "real life" – projects. The move toward their use of distance-technologies, on the other hand, included web-based meetings, on-

line discussions, synchronous and asynchronous communication, and an emphasis on telecommuting and videoconferencing such that face-to-face meeting was no longer essential. The different nature and requirements of the face-to-face versus distance could, perhaps, move face-to-face meeting to a position inferior to distance-style meeting. Such differences could, for example, motivate individuals to abandon activities that enhance the organization's sense of community in favor of activities that support distance learning and separation.

This organization is considered a success in its emerging field. However, its management of knowledge is mixed and the inconsistency of its strategy makes it a solidly ranked but tenuous success.

Incident #2: Organizational Unconsciousness

Organization #2 was involved in the creation of a strategically important web-based product that was to serve as the sole information repository evidencing the success of a three-year, multimillion dollar project. The project secured continued funding in a very competitive environment and would be labeled a "success" based upon purely financial criteria. However, using the organization's strategies and an application of the knowledge-based view as a basis for judging the project suggests otherwise.

Organization #2's strategies included: (1) Establishing a flat hierarchy and maintaining strict control within that hierarchy. (2) Developing a knowledge-based product (a more effective curriculum) that was unique within its theoretical and philosophical niche. (3) To gain continued funding. (4) To make the Web the mechanism for arguing the project's value and success.

With regard to the first strategy, the top three managers did work to maintain their authority, but they appeared to be uninvolved in the daily happenings of the project. This resulted in their deep lack of knowledge about what was being done to construct the end-product.

How things would actually get done and who would be responsible for getting things done was never clearly defined. On the other hand, the top executives were highly occupied in defending their own managerial territories. When problems did arise, they were reactive in the sense that they saw these as somehow unrelated to themselves and "solved" these difficulties by making things unpleasant for all involved until the problems disappeared. Similarly, they focused on a theory and philosophy-based product without clearly managing the various developers of that product and chose to showcase the project through Web-based technology without clearly understanding what the management of that technology entailed. The curriculum and its showcasing were knowledge-based products that depended upon the management of numerous knowledge resources – none of which were managed.

Incident #3: Organizational Awakening & Identity

Organization #3 can best be described as a very new, emergent venture in sole proprietor/consultant form. The business is based upon the use of web-related technologies, including web authorship tools (i.e., FrontPage, Dreamweaver), new media programming (i.e., Flash, Java) mixed with project management and consultancy knowledge for delivering more focused and effective web-based tools through learning theory.

Organization #3's strategies included: (1) Managing expectations and improving organization/client communication (2) Defining business identity (3) Creating or discovering client identity. (4) Using technology to deliver better access to learning. (5) Integrating well-accepted project management and instructional design techniques. (6) Formalizing organizational planning, implementation, control, and evaluation. (7) Improving "soft-," or people skills.

My own observation is that this organization is at a heavy learning stage given its infancy. It appears to be experimenting with planning, implementation, and control techniques to

better run the company. The entrepreneur also appeared to be formulating the philosophies and solidifying her vision in order to more clearly define the organization's identity. Evaluating the performance of a new venture is tricky, at best. Financially, this organization does not even officially exist and is, therefore, clearly a failure. However, from a knowledge-based perspective, this organization does create marketable value in a unique product for its customers. Its imitability or substitutability are untested and currently unknown. In this sense, it may be more accurate to measure a new business's potential (as is often the case in more speculative situations) by knowledge-based criteria that lend greater structure to such assessments. Based upon this, I would judge this fledgling venture to be a low to moderate success.

Incident #4: The HR Knowledge Base

Organization #4 can best be described as a top-end human resource organization. That is, it focuses its efforts on the development of the very highest managers within a large U.S. bank. This organization takes a more traditional look at knowledge in that it treats it more like a fixed asset. Like many organizations, Organization #4 has adopted data warehousing and the "knowledge base" as a tool and resource for strategic advancement.

Organization #4's strategies included: (1) Making better use of an existing technology resource. (2) Focusing database use to eliminate redundancy and make pre-existing organizational knowledge more accessible. (3) Designing templates to support human resource functions like talent planning, succession planning, or on-boarding. (4) Identifying and replicating core processes. (5) Freeing up management for work on more strategic activity.

While the organization itself was successful in stock market performance terms, the use of knowledge in this situation was mediocre to failing. The interviewee describes much time and

energy spent developing one knowledge base only to have that project dropped toward the very end and replaced by what was more or less a "duct tape" solution.

Incident #5: Strategic Technology Rollout

Organization #5 is a technology management and support department at a large state institution in the southeast. Currently, this organization is involved in the rollout of a large software and hardware system that involves some familiar but radically different technology. The project is strategic in the sense that its adoption impacts the entire organization at virtually every level and is designed to better position the organization with respect to its competitors.

Organization #5's strategies include: (1) Planning for system retirement, bridging, and new system rollout. (2) Providing assessments of organizational impact. (3) Planning for future system access and management. (4) Developing and supplying training, education, and advertising for the new system. (5) Coordinating both informal and formal (departmental) bridging without the advantage of pre-established coordinating mechanisms.

Organization #5 has been seen as a success for the past five years and is viewed as being in the forefront in managing the types of technology for which it is responsible. Not only is it one of the largest users of the technology, then, it is also seen as a model user of that technology. The project is not yet fully implemented, with fully half or so of the project yet to be finalized. However, the project is currently viewed as successful – but tentative.

Incident #6: Tech Design Professional

This incident was more focused upon the professional aspect of this person's job as somebody who worked in the field of instructional design. While the content of the interview would still be valid from the perspective of the profession group as an organization (Organization #6), the interviewee herself became exhausted and also got interrupted half way

through the interview. This critical incident therefore stops in the middle of the value-added questioning group. The strategy and knowledge-based competition, though, still exist and permit analysis at the more macro level. It is impossible, however, to comment on the sections that focus upon value, rareness, inimitability, and nonsubstitutability. Also, much of the interview focused upon the technology design professional and was, therefore, very individualistic and phrased in terms of the archetypical technology and learning design professional.

Organization #6's strategies include: (1) Focusing on user education. (2) Following a specific education process (e.g., let them play, describe certain boundaries and bring in organization, help apply more technical learning theory, assist and lead rather than direct, help them to unlearn, bring it all together in what you call technology). (3) Engaging in competitive intelligence with other users of the same technology (i.e., what they do, how they do it, what their tutorials and workshops look like, how they trade and exchange information). (4) Continually enhancing professional status (i.e., get more experience, use imagination, survey tools & see what can be done, learn some tools or technology, apply it to possible projects). (5) Engaging in professionally socializing and networking (i.e., go to conferences, stay on listservs), read, keep up on latest trends (i.e., maintain a professional library). This interviewee also mentioned outside of the strategy section of the interview that she worked hard strategically, (6) Establishing a dominant or influential presence within the parent organization. (7) Creating interorganizational boundary-spanning mechanisms – and (8) Defining and clearly establishing an identity within the parent organization. These final three strategies firmly root the profession into the organizations in which she works to effectively, it seems, bind the professional to the organization.

Critical incident #6 is based upon the insights and experiences of a leading member of the profession, but the focus provided by the interviewee makes it very difficult to compare with other incidents here collected. Incident #6 lends itself nicely to a future study and it may also be used to compare strategy and knowledge-based competition.

Incident #7: Dirty Detail Work

Incident #7 focuses on an organization that works primarily in data conversion projects within the Health and Insurance industries. According to the organization, they operate between two extreme competitive types that include software solution design firms and general IT consulting firms. A principle component of their strategy comes from not identifying with either extreme.

This company's strategies therefore emphasize: (1) Developing software tools that assist in their doing data conversions. (2) Developing methodologies that, in their data conversions, lead to successful projects. (3) Identifying and keeping a core group of people whose experiences span the range of systems in the target industries. (4) Developing and communicating (via reports and other evidence) in-depth knowledge about the data conversion process to prospective clients. (5) Delivering an unusual fixed bid price for work contracted – a differentiating strategy.

This organization appeared to be very successful within its own niche. However, this organization also appeared to measure success quite differently than many would, for instance, in the industrial/organization economics field. It is, in fact, very difficult to fit this company into the typical industry view – as is the case with many "new economy" companies. Interestingly, this company appears to be highly successful precisely because it defies compression within software design or computer programming, consulting, or insurance, health care, or accounting industries.

Incident #8: Competitive Sensemaking

Incident #8 focuses on leading company seen as successful in both stock market performance and in its presence as an industry leader in innovation. It was, in fact, one of the first companies to utilize a business model based upon almost 100% web-based applications. The company is very much described by the strategy it has adopted.

Organization #8's strategy includes: (1) Striving to be THE leader in online travel – in competition with other travel systems and networks. (2) Maintaining its reputation as the strongest in analytical talent and information, thus leveraging their organizational "upbringing" or "inheritance." (3) Basing everything upon analytical behavior. That is, everything they do must be based upon business plan, packages, data...so strategically, no move should be made without understanding the financial, growth, etc. impact. (4) Always understanding where they are going. (5) Making fast decisions (i.e., focusing on speed). (6) Basing every action on fact and comprehension of reality. Possessing the best understanding of reality. (7) Continued free sharing of information with competitors. (8) Excelling in the perception of and interpretation of information.

Organization #8 was probably the highest performer in the sample – in both a stock market and knowledge-based sense.

Incident #9: Quality Ingredients

Incident #9 is based upon another incident provided by the same interviewee that provided information for Incident #7. The company is, to reiterate briefly, a programming group that focuses on data conversions specific to accounting software in the insurance and health care industries. I will refer to this company here as Organization #9 in order to clearly match

organization with incident. Also, the strategy described below will focus specifically upon an incident conforming to the organization's analytics strategy that is critical to this company.

Organization #9's analytics strategy focuses upon: (1) Getting quality data. (2) Relying upon, establishing, and adjusting processes that are detailed and rigorous. (3) Working through the conversion as close as possible with the client to accurately identify units of interest (e.g., files, target fields of interest, variables), assign meaning to units of interest in collaboration with the client, and construct explicit rules. (4) Assuring quality communication with client to produce quality outcomes. (5) Working through the analysis with the client.

If we focus upon the analytic performance of this company, then Organization #9 would be considered a high success. Being privately held, like many organizations within this sample, there are no stock market indicators that provide objective measures of this firm's success.

Incident #10: Bricks and Spackle

While Organization #10 was brought to my attention because of the founder's focus upon web-based design and new media advertising, the founder, when I provided him a list of the questions, selected his retail business as most critical in his use of knowledge-based strategy. Organization #10 is a start-up company that is in its infancy. However, much of what has gone into the construction of this entrepreneurial venture has been born from other ventures in which the owner does or has engaged.

For the retail venture, Organization #10's strategy includes focus upon: (1) Building retail space and the store's "concept." (2) Building up specialized stock within the store space. (3) Enhancing their proprietary brand. (4) Complementarily grow retail, on-line, and proprietary "Spackle" brand.

Success for this company could be measured in a number of different ways. Economically, because the firm is an entrepreneurial effort and currently only "barely holds its head above water," it would be a flop. Entrepreneurs, however, base much of what they do upon their own valuation of a situation, including feedback they get from those familiar with the business, including customers. A knowledge-based perspective, which takes this into account, would deem this venture a success. That success, however, takes the infancy of this venture into account making any definitive judgment of performance iffy at best. The owner did appear to have superior knowledge of his chosen niche including information about fashion, the business environment in Athens, pop culture in the Athens area (e.g., the music, fashion, club & downtown "scenes"), and fashion branding. This entrepreneur also had an enormous local network as well as an emerging set of contacts in New York City.

Incident #11: Knowledge Decapitation

Incident #11 focused upon the failing of a traditionally very successful and old web-based catalogue business. While this part of the organization could be considered one of the oldest portions of the business, much of what made it successful had been abandoned in favor of the expansion of a new strategy – which is the subject of critical incident #12.

Strategies of Organization #11 focus on: (1) Staying alive, which includes remaining stock market viable and staving off litigation. (2) Growing back its catalogue business. (3) Reestablishing its credibility. (4) Building a different employee/management relationship.

Essentially, this company had the worst condition of all the companies studied. As was mentioned above, Organizational #11 was in survival mode, had shrunk, made other parallel investments, got caught up in dot-com and telecom enthusiasm, and was hit by post-911 economic conditions. This company, though it still possesses some knowledge- and finance-

based assets, can in most ways be classified a huge failure. The interviewee sounded desperate, depressed and devastated.

Incident #12: Org Disorientation – Second Childhood

Of course, Incident #12 focuses on a different strategy and critical incident, but the organization is the same as that described in Incident #11. Again, for consistency and clarity, the organization associated with this incident will correspond to its number. Therefore, we will talk here about Organization #12. Of course, because this incident focuses on a different business and the context does not remain exactly the same, it has to be discussed separately as well. For instance, this incident focuses on the cabling business, which is very different from the on-line catalogue and service business of Incident #11. The strategy is different and so must be our assessments of success and failure.

Organization #12's strategies included: (1) Downsizing the organization's traditional web-based catalogue business. (2) Rapidly growing the organization's cable business. (3) Establishing market dominance or monopoly through acquisitions or mergers – mostly mergers.

Largely, the company has been successful in all those areas listed as strategies above. They have downsized the traditional physical and web-based catalogues which they had supported for almost thirty years. They also grew their local cable presence quite rapidly, establishing a local monopoly in their target geographic area. According to the interviewee, in fact, they are now the only cabler in the area. However, it seems (again, to the interviewee) that they paid too much for the cable businesses they bought (mostly through "merger), especially when those acquisitions came at the cost of the catalogue business. Stockholders, employees, the SEC, the local community, and even management are very dissatisfied with organizational

actions of the past two and a half years, though, making actualization of these strategies a marked failure.

Incident #13: Tech Support

Incident #13 involves the management of information at a large science-based research organization that focuses primarily in the areas of computer-based applications in chemistry and molecular biology. It is also critical that Organization #14 also effectively manage technology that supports and enables its operation.

Organization #13's strategies all focus on creating and maintaining consistency and reliability when: (1) Providing computer and other technical support for complex calculations. (2) Maintaining good communication and interconnectivity between internal and external computer systems (e.g., e-mail, proprietary web site, software). (3) Developing, maintaining, and supporting software - when necessary or critical - that supports the plurality of interests in the organization. Additionally, the organization (4) engages in activity that attracts money from various stakeholders, including their host university, other universities around the world, and the National Institutes for Health in the United States and (5) Tailors their activities to deliver high quality service on all their strategies for a diverse plurality especially within but also external to their organization.

This organization seemed highly successful in terms of its performance with its university and institutional stakeholders. Organization #13 also appeared highly successful in providing innovative solutions to support the operations of the larger organizations to which it was connected. One observation, though, was that little awareness seemed to exist of a world outside the organization and its close associates. This probably supports the strengths the organization exhibited but causes it to appear very egocentric.

Incident #14: Coalition and Knowledge

Organization #14 is a new but highly successful organization that focuses on supporting the commercialization and/or formation of biotechnology and new media businesses.

In support of such efforts, Organization #14 focuses on: (1) Identifying early stage research that may be commercialized. (2) Ranking projects according to their potential for success. (3) Supporting new companies selected for organizational backing. (4) Helping these new companies "stabilize" by helping them secure financing, take advantage of market opportunities, and recruit their management teams. (5) Encouraging relationships for new companies with the university through student assistantships, student internships, class projects, and other ties to the university. (6) Helping new companies define and accomplish milestones (in the case of biotech firms) or generate revenue through product or service sales. (7) "Graduating new firms fully into the real world/private sector. (8) Building loyalty such that graduated companies support the program – by mentoring, advising, providing financial support - once they establish themselves.

Organization #14 is judged to be highly successful for a number of reasons. First, they and their peers judge them to be successful based upon incubator occupancy and new firm survival, patents applied for and issued, revenues generated and jobs created, just to name a few. Organization #14 also appears to have a very detailed knowledge-based strategy based upon the building of alliances, partnerships, and coalitions. While this did not initially appear as one of their stated strategies, it did arise when we began to talk about knowledge-based competition.

Incident #15: Web Process Management

Organization #15 grew out of a single project contracted for by a software services firm from Canada that evolved into a separate environmental technology and service firm highly

grounded in web-enablement. While the parent company did have considerable experience, significant aspects of this new project, including its form, its autonomy, and its innovative nature suggest that Organization #15 should be considered a fairly new venture.

While the owner/CEO of Organization #15 emotionally feels like attending to a variety of markets, he and his top management team have decided to remain focused on a very narrow environmental consumer. This is reflected in the firm's strategies which include: (1) Focusing on product placement in universities and other academic settings. (2) Following EPA fine and notice of violation recipients and requests for proposals (RFPs) as the sole targets of their marketing. (3) Leveraging their knowledge of industry power structure to initiate and define contacts and identify key decision-makers. (4) Disseminating information about the unique nature of their expertise. (5) Deliver a customized software development project, versus a standardized solution, for their clients. (6) Build a solid reputation.

While this organization is in its early stages, it has had some initial indicators of success, including an apparent ability to repeatedly win bids over their competitors during the request for proposal (RFP) process. It is also identified by its investors as among the most promising in their venture portfolios. While I would not label this company as highly successful, I would unconditionally label it a success.

Incident #16: The Graphical Information Warehouse

Organization #16 is a property management firm engaged in the strategic gathering, use, and interpretation of information in data warehouse form to advance their strategy in a very particular way:

Their strategic use of information included: (1) Using database technology to streamline existing business. (2) Using information to better support clients with existing property, space,

location, and technology resources. (3) More effectively using least costly properties. (4) Using existing information – that is, leveraging information already paid for - to inform business decisions.

The organization was highly successful when judged by typical performance measures. However, from a knowledge-based or technology management perspective, they were miserable failures. Like many companies, they did not properly manage information, technology, and human resources that were very costly to acquire. The result was the "parking" and "mothballing" of this very expensive organizational asset.

Incident #17: Knowledge-based Acquisition

Organization #17 was an organization within the fairly recent emergence of privatization-type firms. The sole purpose of this firm was to bid for the management of formerly state-run or government-managed organizations. In order to bid for such services, the organization received "canned" information from the privatization target, which had to be supplemented (or offset, depending upon the situation) by their own information gathering.

Organization #17's strategies included: (1) Assessing the privatization target's situation. (2) Developing and delivering a competitive bid to provide services. (3) Lowering operating costs. (4) Optimizing treatment/production. (5) Maintaining regulatory compliance.

While the organization's performance appears good enough to provide for its immediate continuance, it is unclear whether anything other than the mediocre performance of all industry players explains its persistence. No real strategy appeared to exist. The stated strategy translated more into an operational procedure. Furthermore, it is unclear whether or not this firm cogitates at all on its future, making it a dismal failure in a knowledge-based sense. Once again, however, the environment has put off the selecting out of an inferior species.

Incident #18: Knowledge Capture

Organization #18 is a knowledge-management segment of the privatization firm in Incident #17. In essence, Organization #18 is that body responsible for capturing knowledge. Sometimes this happens before a bid is placed, but it more often occurs after a contract has been secured. Organization #18 is responsible for seeking out standard operating procedures, if they exist, and correcting or augmenting them. More frequently, however, this group must develop standard operating procedures using the existing knowledge of employees, teams of engineers, and their own wiles.

Organization #18's strategies include: (1) Revamping or developing standard operating procedures (SOPs). (2) Colleting knowledge from pre-existing documentation, interview, conversation, and observation.

Again, this may be endemic to the parent privatization company described in Incident #17, but strategy, other than basic activities, basically did not exist. However, this particular group, because of its management, possessed its own strategy to accomplish the goals of the company even though the company did not (formally or otherwise) seem cognizant of the job in which it was engaged. The strategies specific to the management team within this group are described in the qualitative portion of this essay.

Incident #19: Combining Knowledge

Beginning in the early '80s, organization #19 offered several web-based services, including e-mail, bulletin-board systems, online gaming, and shopping, just to name a few. For this incident, it is the combination of technical expertise and knowledge of a gaming culture that provide focus.

Organization #19's strategies focused on: (1) Meeting the needs of early adopters of personal computers – especially the more technically savvy users. (2) Providing lower-cost services than those then available. (3) Meeting their perceptions of unmet demand identified through technological know-how and popular culture. (4) Constantly innovating – to differentiate and experiment. (5) Provide a more interesting, interactive online gaming environment.

Organization #19 was successful in both a typical business-performance sense and a lifestyle sense, according to the interviewee. There were a number of things in the interview to suggest that this entrepreneur was also successful from a knowledge-based viewpoint. This high level of success is explained in detail in the qualitative analysis.

Incident #20: Training Professional

Incident #20 is somewhat unusual when compared with the other incidents because the interviewee began to speak in terms of his overall status as a professional technical and instructional designer. This is actually quite interesting because the person is by no means a leading member of his professional organization. This strong identification as a "professional" also does not correspond as closely, however, with other conceptions of organization within this study that focused upon specific ventures. One exception includes certain aspects of Incident #6 – the Tech Design Professional. However, because the professional group and the professional himself are the organizations, conceptions of performance and competition will be quite different. Performance, for instance, is more closely related to the development of the individual trainer (in this case, the interviewee) and how that individual fits hierarchically within that group of professionals. Performance is also defined by a variety of values, norms, traditions, and standards set up and maintained by the professional group and its membership.

Likewise, success is determined, in large part, by the simultaneous status or reputation of the individual within that group and the ability of that individual or group of individuals to forward the mission and goals of that professional group. Failure is indicated both by a lack of advancement or recognition within the profession and an inability of the professional organization to accomplish its mission and goals.

This trainer and low-ranking member of a professional association's strategies included: (1) Overcoming resistance to the new technology. (2) Establishing a calm and secure atmosphere during the training experience. (3) Providing a basic understanding for his clients and patrons.

While the interviewee held a position of authority and responsibility within his parent organization, managing big projects, running various labs and expensive technology critical to his parent organization, he did not think strategically or even organizationally. In many ways, he appeared only to notice what was directly within his view – in developmental psychological terms, very much like Piaget's concrete, operational way of thinking. While he described a number of sources of competition within his organization, he either did not see that which he described or (as was the case with Incident #14) operated in a culture where talking about competition or thinking in competitive terms was taboo. Organization #20's timid and myopic adoption of his world and surroundings make his performance, in a knowledge-based sense, a huge failure. Once again, however, in performance terms the organization exists and, while it does not thrive or excel in a typically performance sense, it does suffice without attracting scrutiny. Incident #6 provides an excellent contrast to this organization's poor performance because it is an exemplar of a strong bond between professional and organizational strategy.

Incident #21: Talent Promotion

Organization #21 is a small artist management firm for musical talent from musical groups and bands, solo acts, and ensembles. The organization represented a select number of musicians chosen by the owner, who booked engagement mostly in the South and along the East Coast.

Organization #21 had very focused differentiation strategies that included: (1) Carefully selecting talent for representation. (2) Growing each of his clients to point where they could secure record/performance contracts. (3) Providing a foundation for their future businesses with themselves as the product. (4) Maintaining very few employees and recruiting volunteers.

Once again, this organization was very much an entrepreneurial and lifestyle driven business. Using typical performance indicators, this organization would probably rank as a moderate success being neither strongly successful nor indicative of failure. The company did persist for just over five years in the cut-throat music industry, which is also a financial indicator of success, given the treacherous environment. From a knowledge-based perspective, this organization would be a solid success because of the thoughtful and intentional energy placed into strategies that built upon knowledge-based resources. It can be reasonably argued that the knowledge-based strategizing was also responsible for the business's success in such a turbulent industry during chaotic times.

Incident #22: Knowledge Bridging

Incident #22's organization is the same talent management firm described in Incident #21. This different incident focuses upon one knowledge-based strategy in particular which I will call the knowledge bridge strategy, which is similar in conception to the boundary spanning function described as central to top management work (Thompson, 1967). The difference is that

this activity has, for this organization, been canonized into firm knowledge-based strategy, making it an organizational versus managerial mechanism.

Sub-strategies for the bridging mechanisms/approach include: (1) Finding that "marriage" between business and art. (2) Representing clients possessing artistic integrity who lacked the desire to involve themselves in the more formal organizational type tasks. (3) Finding the bridges between the art and the organization as well as the organization and good business practice to promote clientele.

Again, because of the malevolent environment, the fierce competition, and difficulties inherent to the music industry, this organization could be viewed as successful and, perhaps, strongly successful given its longevity. However, the call is difficult to make and we rank this as moderately successful to be conservative. Again, however, our ranking for the knowledge-based performance is strongly successful for many of the same reasons discussed in Incident #21.

Incident #23: A Knowledge Organization

Organization #23 is closely related to Organization #14 in that both organizations work within a similar community and/or umbrella of organizational associations and both are engaged in incubator-type operations. Organization #23 focuses entirely on the identification and support of exclusively new media businesses. They are still different organizations with different strategies, competing under different enablers and constraints, and competing with different sets of knowledge.

Organization #23 focuses on: (1) Growing small businesses so that they can become successful employers in our community. (2) Retaining those businesses in our community after graduation. (3) Providing "real-world" internship, job, or educational credit opportunities for local students. (4) Establishing an organizational and technological presence in a variety of

communities through public relations efforts. (5) Creating a coalition of local technology-based companies to provide needed support for entrepreneurs, potential employers and employees who focus on technology or biotechnology in their geographic area that did not previously exist. (6) Helping these new companies secure financing, take advantage of market opportunities, and recruit their management teams. (7) Creating a "graduation space" for incubator companies.

Organization #24 is very successful in both the tradition performance and knowledge-based senses. They judge themselves as successful. Their peers in the leading association of incubators judge them to be among the top three incubators nationally. Additionally, they possess a high occupancy rate, create many high tech jobs, have a few successful graduates, and have developed a strong local presence in their downtown area as well as in the local technology community. Organization #24 appears very focused and successful in knowledge-building and knowledge-resource combination strategies. They have a very strong set of alliances, partnerships, and coalitions and actually hold a founding and leadership position among other local influential organizations.

Incident #24: Innovation Strategy

Incident #24 deals with the same web services organization that was discussed in incident #19. However, because the issue of innovation was central to their overarching organizational focus, it was important to address the innovation strategy in greater detail.

Organization #24's innovation strategies focus on: (1) Taking advantage of new technologies. (2) Developing mechanisms to prevent other people from using those technologies in a similar way. (3) Aggressively defending legally defensible property. (4) Avoiding imitation by constantly innovating and changing. (5) Constantly monitoring customers and customer behavior for opportunities. (6) Tracking innovative change for its impact on their product and on

their customers. (7) Paying careful attention to established norms within their customer culture. (8) Identifying an industry exit when technology changed enough to make continuing undesirable.

Again, just focusing on Organization #24's innovation strategy, this company was very successful not because they were "wildly profitable" as the interviewee states, but because, from a knowledge-based stance, the company actively and intentionally identified and managed that knowledge-based innovation asset. While the company was profitable, provided its members with a satisfactory lifestyle, and took advantage of a previously unfilled market need – its main claim to success, I would argue, was in managing the innovation intangible that drove everything the business and its persistence. As will become evident later in this essay, it was the intangible innovation resource that created value for the organization's customers, made Organization #24 uncommon among competitors, and thwarted both imitation attempts by the competition and erosion by substitutes.