From Data to Love: Teaching Management of Knowledge Assets In the Christian Business Classroom

Richard J. Martinez
Cedarville University
rmartinez@cedarville.edu

ABSTRACT: *This paper provides a roadmap of how discussion related to the nature of knowledge, the uses of knowledge, and the management of knowledge assets could be done in a Christian business classroom. I offer some of the insights I have incorporated regarding integration of our Christian faith and scripture in this discussion. What is most important for this paper is that we can envision a unique role for Christian business educators, who will have much to add to the story of knowledge management, and who will teach these processes in unique ways to students who will often use knowledge for unique purposes.*

INTRODUCTION

Since Ikujiro Nonaka published his seminal piece about knowledge creation (1994), organizational scholars have begun to examine more closely the nature of knowledge and its critical role in organizational processes. At the same time, in the marketplace and in the business education classroom, we are increasingly confronted with the role of knowledge in modern society. We have heard that "knowledge is power," and indeed it seems that organizations that manage knowledge assets will have some important advantages. Many firms are creating positions for "knowledge specialists." Textbooks dedicated to the subject of knowledge management are just now emerging.[1] Even still, it is not entirely clear how to present these ideas to our students. It is not always clear how knowledge is different than information, and it is not clear how this translates into occupational capital. Most educational institutions do not (yet) have courses dedicated to understanding the management of knowledge assets (making the few existing textbooks almost irrelevant), and thus such ideas may show up in a number of other courses, often in disjointed fashion. It is also not entirely clear how this subject ought to be approached from an intentionally Christian perspective. While I have no penultimate panacea for such curricular problems, I do share in this paper the pedagogical approach I have developed for introducing business students to the critical role that knowledge and its management plays in modern business practice.

It should be noted that I personally have taught this material in courses on strategic management and organization theory (or organization design). The material, as I am presenting it here, can be covered in as little as two (jam packed) weeks of class meetings, or it can be stretched over several weeks, depending on the level of interaction between instructor and students, and additional materials brought into the discussion. It is possible that future iterations of knowledge management sections could be the subject of an entire semester course, but more materials will need to be developed for this to be the case. At this stage in the development of knowledge management studies, the materials can be covered as part of an existing management (or information systems) course.

My approach to teaching management of knowledge assets is undergirded by the Christian humility that arises from two specific passages of scripture — 1 Cor. 1:18-31[2] and Jeremiah 9:23-24.[3] As we explore the nature of knowledge and its role in business practice, students are reminded through these passages that it is God who defines knowledge and truth, and while He provides these for our use, we are cautioned to remain humble in their application.

The sessions on Management of Knowledge Assets — and the sections of this paper — proceed according to three basic "chapters." First, we explore and discuss "what is knowledge." The definition that emerges comes from a larger discussion of truth and reality, but it is also aimed at a *practical application in a business context.* That is, I do not attempt a deep philosophical or theological treatment in this paper, as the discussion centers on management of knowledge assets, not on the concept of knowledge itself. This simple working definition is then contrasted with similar concepts, and an evolutionary model emerges in which knowledge is placed in the context of data, information, knowledge, intelligence, wisdom, and (ultimately) love. Each of these elements is also considered according to its ability to provide a firm with a competitive advantage, as will be discussed below. Having developed an understanding of what knowledge is (and its role in developing competitive advantage — hence the impetus for managing knowledge assets), we turn secondly to exploring "knowledge about what?" or the factors about which firms must be knowledgeable. I have narrowed these down to three categories, discussed below. Finally, once we know what knowledge is, and we know what we want to know, we discuss several steps for managing knowledge assets. These steps are also discussed below. We begin however, with a brief overview of the recent literature regarding knowledge in organizations.

MANAGEMENT OF KNOWLEDGE IN ORGANIZATIONS[4]

Nonaka's work on knowledge creation (1994) is widely credited with jump-starting the recent examination of knowledge in modern organizations. As Nonaka observed, "the society we live in has been gradually turning into a 'knowledge society'…[and t]he ever-increasing importance of knowledge in contemporary society calls for a shift in our thinking concerning innovation in large business organizations" (1994:14). The focus on knowledge has emerged in the intersection of learning theory (e.g. Argyris & Schon, 1978; Bandura, 1974), information management (e.g. Powell & Dent-Micallef, 1997), and the resource-based view of the firm (e.g. Barney, 1991; Dierickx & Cool, 1989; Wernerfelt, 1984). That is, organizational scholars have metaphorically modeled firms as learning organisms, where information feeds the quest to create learning organizations engaged in evolutionary innovation (Morgan, 2006; Nelson & Winter, 1982). More recently, Barney (1991, 1995) and others have explained well the critical role of organizational assets in creating and sustaining competitive advantage, outlining the "resource-based view" of the firm. Assets that are least imitable provide the greatest advantage, and tacit knowledge[5] has emerged as perhaps the asset most difficult to imitate (e.g. Kogut & Zander, 1992, 1993). As a result, scholars and practitioners alike have begun to place greater emphasis on understanding knowledge in organizations and how it might best be managed.

Work in this area is emergent and very interesting. Knowledge has been studied recently in terms of its relationship with organizational control systems (Turner & Makhija, 2006), its ability to be protected in large scale or inter-organizational operations (Coff, Coff, & Eastvold, 2006; Schulz, 2001; Subramani & Venkatraman, 2003), its impact on firm boundaries (Coff, 2003), its group characteristics (Okhuysen & Eisenhardt, 2002), its relationship to Foucauldian power (Gordon & Grant, 2004), and its viability as a theory of the firm (Nickerson & Zenger, 2004). Numerous scholars have begun to look at the ramifications of knowledge management in the international business arena (Bhagat, Kedia, Harveston, & Trandis, 2002; Carlile, 2004; Tallman, Jenkins, Henry, & Pinch, 2004), as well as in networks (Dyer & Hatch, 2006; Hansen, 2002; Hansen, Mors, & Lovas, 2005; McFadyen & Cannella, 2004; Tallman et al., 2004). And yet, as these new studies emerge, we seem still to struggle with making concrete claims about knowledge and its role in organizations. Hence, the challenge for teaching about knowledge in business programs remains stiff. Anne Huff, in her 1999 Presidential Address to the Academy of Management, notes, "the explosion of knowledge production within business and other organizations poses a critical challenge to current modes of teaching and research within our business schools" (2000: 288). Turner and Makhija further observe that:

> The literature provides us with only a rudimentary understanding of such organizational processes associated with the treatment of knowledge. A primary impediment to developing a more comprehensive understanding arises from the fact that knowledge is inherently unobservable. (2006: 197)

Nonetheless, we would be remiss if we did not begin to wrestle with the implications of living in a "knowledge society" where business organizations are very much the knowledge centers upon which this society depends (see, for example, Hayek, 1945, 1948). In this spirit, we turn next to the simple, yet effective, system I have used to introduce the topic in the Christian classroom.

DEFINING THE CURRENT KNOWLEDGE AGE – SUBJECTIVE, OBJECTIVE AND SOCIALLY CONSTRUCTED REALITIES

Perhaps the greatest issue surrounding the study of knowledge in organizations is developing a definition that moves the conversation forward. I typically begin the discussion by asking students what they know to be True, with a capital "T." Such a question is sure to bring about a number of interesting responses, some predictable, some not. This process allows us to explore the nature of truth as understood in a Christian worldview and contrast that with post-modern portrayals of truth. Given the challenges of post-modern relativism, it is somewhat comforting to bring into the conversation Arthur Holmes' famous observation that "all truth is God's truth" (1977), but even still some will be uncomfortable with this idea. The critical task of the instructor at this point is to bring students to a point where they are thinking about how we might know what is real and what is not real. This point becomes critical for understanding knowledge, organizational decision-making, and sense-making.

Reality. In order to conceive of knowledge and understanding, students must first consider the subjective nature of "reality" as perceived by humans in social settings, including organizations. On the path to constructing reality (Berger & Luckman, 1966) we make sense of the world around us in order to make decisions and enact our environment (Weick, 1979). This is one of the most critical things managers can do (Pfeffer, 1980). Ultimately, it seems to make sense to students that organizations whose *subjective* rendering of reality is closest to *objective* reality will have an advantage, and can make better decisions.[6] That is, firms whose managers and workers construct a model of their environment that is closest (relative to their rivals) to the real state of the environment (in terms of customers' desires, production possibilities, demographic trends, etc.) will be in the best position to take actions that best take advantage of opportunities that others might not even perceive. Such firms would, presumably, have a competitive advantage where such advantages are most critical. This point, when made emphatically, resonates well with students as it brings the previously abstract discussion (regarding truth and reality) squarely back into the world of "relevance" and real-life business.

One tool I have found useful in helping students to understand this distinction (subjective vs. objective reality) and its importance is a very simple "knowledge box" (or K-box).[7] As indicated in Figure 1a, the K-box is a simple rectangle with square grids. The box in its entirety represents knowledge about a given subject or issue, while each grid square represents information leading up to that knowledge. As explained below in more detail, *knowledge* is defined in terms of understanding about a subject, and it derives from various sources of information. Thus, to the extent that the K-box is completely filled in, this would represent perfect, objective knowledge, or objective reality (see Figure 1b).

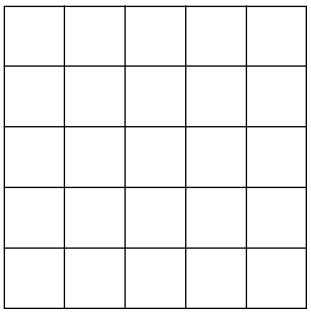

Figure 1a
Basic Knowledge Box

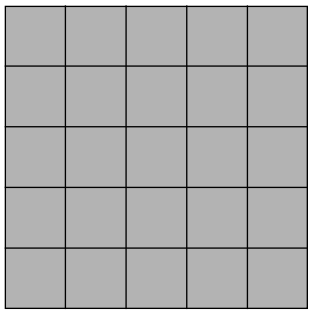

Figure 1b
Objective Knowledge Box

To the extent that only some boxes are filled in, and some more filled in than others (representing the fact that we always have incomplete and imperfect information), this represents subjective knowledge, or subjective reality (see Figure 1c). When organizational actors are able to make decisions on the basis of knowledge that is closer to objective reality than are their competitors — that is, their K-boxes are more completely and accurately filled with information — these organizations will have a distinct advantage.

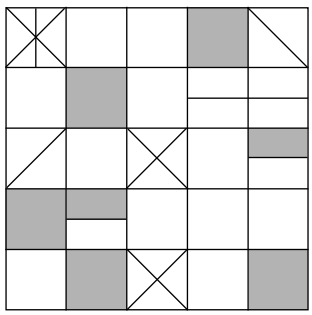

Figure 1c
Subjective Knowledge Box

With that in mind, we can then turn to a discussion of how knowledge represents this level of understanding and how firms with greater knowledge have a competitive advantage.

ELEMENTS OF KNOWLEDGE

In essence, we can talk about the interaction between several similar concepts in order to create a meaningful pattern of knowledge development. Concepts that we often use interchangeably or in an overlapping sense have important distinctions that impact their role in organizational decision-making. I have identified six elements of "understanding" that are interrelated and seem to represent an evolutionary pattern in business history and future thinking. Data, information, knowledge, intelligence, wisdom, and love (yes, love) are relevant to organizational decision-making and success, now, in the past, and in the future. Other authors and thinkers have arranged these elements in different ways (see Bierly, Kessler, and Christensen (2000), for example), but the elements tend to be consistent, with the exception of adding love to the equation. For example, Richard Chewning (2003) focuses on *wisdom* as the ultimate stage of these factors. In his examination of wisdom as it relates to God's nature, Chewning combines information and knowledge into one construct, while he separates out understanding from knowledge. As can be seen below, I have separated out information from knowledge and have defined knowledge in terms of understanding (see Table 1 right). Nonetheless, there are many possible ways of conceiving the relationship between all of these elements. In my courses, the elements are discussed according to the pattern that follows.

Data. Data are facts and figures that initially lack context or meaning. In the early to mid-20th century, data and data processing technologies had the capacity to provide competitive advantage, as in the rise of IBM. Large firms that relied on data (banks, insurance, etc.) could purchase the expensive machines and thus were able to store and retrieve such data in ways that smaller firms could not.[8] Eventually, as the technology disseminated, most firms had access to data processing capabilities and, thus, data could no longer be a source of sustained competitive advantage. Data, then, becomes the source of information.

Information. Information results from "data made meaningful through some operation (aggregation, average, mathematical function, analysis, etc.) or context." Informational elements become the basis for decision processes. For much of the mid- to late-20th century, information had the potential to provide firms with a competitive advantage, as some firms had access to more and better information than did others. This was a result of the "information revolution," and reflected some firms' superior information technologies and IT human resource assets. At some point (probably with the advent of personal computers and the internet), information technologies ceased to be largely proprietary, and information is in the process of becoming a commodity. As a result, little sustainable competitive advantage arises strictly from information or information technologies in the 21st century. This is not to say that information plays no role in the competitive environment. Products such as geographic information systems, internet mapping (e.g. Google and MapQuest) and other innovative approaches to using infor-

Table 1: Elements of Knowledge and Competitive Advantage

	Definition	Competitive Advantage
Data	Raw facts that initially lack meaning and context	Almost none
Information	Data made meaningful through operation or context	Still some temporary advantage through discovery
Knowledge	Combination of information sources to create understanding of environment or context	Most current advantages are knowledge-based
Intelligence	Information and knowledge that reaches a state of perpetuation or self-learning	Some advantage is based in dynamic processes and learning
Wisdom	An understanding of how and when to use knowledge	Perhaps much future advantage yet unknown
Love	The ultimate state in which the application of knowledge is guided by what is best for others, rather than what is best for self	Likely that competitive advantage may be meaningless when business is based in love

mation sources continue to generate temporary advantages for a small number of firms. These advantages are not likely to be sustained, however, as information diffusion is more rapid.[9] In the quest for sustainable and significant advantages, information, however, becomes the source of knowledge (Nonaka, 1994).

Knowledge. Knowledge results from information sources combined to create understanding, as in the knowledge boxes discussed earlier (Figures 1a-1c). Information from various sources in the environment can be combined to create an understanding of aspects of that environment, thus leading to "knowledge" about that aspect. This, in the business context, may be related to the firm's customer demand function, competitor intentions and capabilities, likelihood of success of various strategic actions, environmental changes that require firm responses, paths to valuable innovation, etc. *It is knowledge that is currently the source of much of competitive advantage in the modern marketplace,* especially for the firm that has people who are able to filter through the plethora of information available and determine what information actually applies to their organization and its issues — unfortunately rare.[10] Firms that manage knowledge assets well will be able to make decisions that best exploit competitive opportunities and avoid competitive threats.

Nonaka (1994: 15) suggested that his work "follows a traditional epistemology and adopts a definition of knowledge as 'justified true belief,'" although he severely downplayed the "truth" aspect of that perspective and focused on personal beliefs and the justification of knowledge. While his original assertion ("justified true belief") is more consistent with a Christian epistemology that seeks objective knowledge through God's general and special revelation, his dismissal of truth renders Nonaka's work an interesting combination of post-modernism and positivism. Nonaka also noted that, "there is a clear distinction between knowledge and information," such that "information is a flow of messages, while knowledge is created and organized by the very flow of information, anchored on the commitment and beliefs of its holder" (1994: 15).

While we must acknowledge the important role of knowledge in business, we must also remind our students that there are even more important factors for the Christian business actor. Futurist Alvin Toffler wrote in his 1990 book *Power Shift* that the source of power throughout human history has shifted/evolved from strength (force/violence) to wealth to knowledge. Presumably, strength overwhelms rivals or competitors, wealth can buy strength, and knowledge creates wealth. Hence the phrase, "knowledge is power." Students will be comfortable with this idea, so it is at this point that we may introduce Jeremiah 9:23-24, which indicates that Toffler's wonderful epiphany was acknowledged and humbled by God thousands of years ago.

> This is what the LORD says: "Let not the wise man boast of his wisdom or the strong man boast of his strength or the rich man boast of his riches, but let him who boasts boast about this: that he understands and knows me, that I am the LORD, who exercises kindness, justice and righteousness on earth, for in these I delight," declares the LORD. (Jer. 9:23-24, NIV)

We see that, while Toffler identified strength, wealth (riches), and knowledge (wisdom) as the sources of power in modern society, the Lord indicates that we ought not boast of (or be overly impressed by) such things, as knowing God is better, and that He delights more in kindness, justice, and righteousness, which He models for us. This is also consistent with Proverbs 1:7a, "The fear of the Lord is the beginning of knowledge" (NIV), and it echoes the wonderful words of Micah 6:8:

> He has showed you, O man, what is good.
> And what does the LORD require of you?
> To act justly and to love mercy
> and to walk humbly with your God

That is, while human power may indeed be related to strength/might, wealth/riches, and knowledge/wisdom, the author of all these things — the omnipotent Creator — has indicated that he delights in such things as love, kindness, justice, righteousness, mercy, and humility, and these are the things he requires of us — not power, not profits, not other definitions of human "success." This is, of course, not to suggest that our God does not want us to have knowledge, or that our pursuit of knowledge is somehow at odds with our pursuit of God and his will. Indeed, as we see in Proverbs, "The fear of the Lord is the beginning of knowledge, but fools despise wisdom and discipline (Pr. 1:7) and "The fear of the Lord is the beginning of wisdom, and knowledge of the Holy One is understanding" (Pr. 9:10). It is knowledge for the sake of godly purposes and knowledge of God that is of most value for the believer, not knowledge for the sake of power.

Having made this important point, we note that, as business and academia continue to develop sophisticated (and cheaper) knowledge systems, we can anticipate that knowledge will over time become more disseminated and less unique as a source of competitive advantage. When and how this will occur is speculative. However, when such knowledge parity occurs, competitive advantage will most

likely come from intelligence.

Intelligence. While intelligence is often understood in terms of a state or level of knowledge, we can conceive of a more dynamic element to intelligence, in the sense that it represents information and knowledge that reaches a point of perpetuation or self-learning. It is possible — perhaps likely — that we will in the future rely on "intelligence systems" in organizations. This is consistent with creating the "learning organization" as discussed by scholars and thinkers like Peter Senge (The Fifth Discipline) and others. It is also likely that an understanding of how artificial intelligence systems work will enter the discussion, as will allusions to other intelligence systems, such as human intelligence (HumInt), signals intelligence (SigInt), and electronic intelligence (Elint) currently utilized by "intelligence agencies," such as the CIA. I have specifically referred to Senge's work in this discussion with students, especially as it represents a good example of the dynamic nature of organizational capabilities, a subject closely related to knowledge management. Artificial intelligence is a well-developed field of study, and its implications for business systems of the future could make for a deep and worthwhile discussion as well.

It is possible at this point to also consider what implications the current debate between Darwinists and Intelligent Design Theorists has for business people. Class discussion could center on the nature of Darwinian business processes[11] versus the processes as seen through the lens of an intelligent design framework (Behe, 1996; Dembski, 1998, 1999). That is, if human beings are indeed made in the image of a God who is an "intelligent Designer," then what implications, if any, might that have for humans as creative designers of organizations, products, services, etc.? An understanding of competitive advantage may indeed be placed squarely in the realm of "survival of the fittest" vs. "intelligent design" that makes humans agents of change.

Meyer and Davis (2003) point to the coming age of the molecular economy, in which work in areas such as bio-technologies and nano-technologies represents intelligent production components, where systems learn on their own as they are engaged in the processes of production. There are numerous ethical considerations inherent in these trajectories, and students will be well served to consider the moral implications of bio-genetic engineering and other elements of the molecular economy (e.g. stem cell research, genetic manipulation, etc.). Such issues will become material for business decisions in the future, and potential sources of competitive advantage. Exactly what competitive advantage looks like in this realm is speculative, as the age of dynamic intelligence systems lies in the future. Meyer and Davis refer to the potential evolution of intelligence related to biotechnological advances as "the adjacent possible," and they agree that it is at best speculative to guess the details of this future state, although they make more general predictions. At some point, however, the acquisition and use of intelligence — including the dynamic, learning aspects of intelligence — will be less differentiated as intelligence gathering and interpretation processes are disseminated across firms through evolving technology and systems. This will clear the path for wisdom to be paramount.

Wisdom. It is generally believed that wisdom is superior to knowledge, being in essence an understanding of how and when to best use the knowledge we have. As Bierly, et al. put it:

> [S]uccess does not necessarily go to the firms that know the most, but to the firms that make the best use of what they know and know what is strategically most important to the firm and to the society at large. (2000: 596)

This definition, of course, assumes a standard for judging what is "best," and each discipline will have its own understanding in this sense. For example, some people are politically wise, in that they know best how and when to use knowledge for political gain. We could simply refer in the present context to the "best use" of knowledge for valued organizational outcomes, and that would be appropriate (necessary, but not sufficient) for the discussion in the Christian business classroom. At the same time, however, we will certainly want to consider with students how wisdom is inevitably tied to the outcomes one defines as salient, and explore the critical differences between worldly wisdom and God's wisdom (I refer often to Colossians 2:8[12] at this point). Wisdom in business is an understanding of the consequences of organizational actions, and it comes with experience, learning, prayer, and meditation (and as a gift of God — see James 1:5[13]). Chewning says of this relationship:

> Knowledge is the foundation for both wrong thinking and right thinking. Understanding and wisdom both rest on knowledge, but knowledge without understanding and wisdom could be likened to a torpedo without its guidance system — lots of latent power but with little chance of reaching its objective. (2003: 37)

At some point, we may envision "wisdom systems" being a main source of competitive advantage. While a Christian perspective may define wisdom in terms of God's

will, it is possible that a secular marketplace will define wisdom quite differently, and act accordingly. For example, wisdom (when and how to employ knowledge assets) may be defined as that employment of knowledge assets which most creates financial wealth and weakens or destroys competitors. On the other hand, since a market in which wisdom is the main source of competitive advantage is still speculative, we might envision wisdom as pertaining to ethics, sustainability, and social responsibility. As we study, and think about, and learn more about wisdom, we will begin to see how wisdom is based on, and undergirded by, love. A Christian understanding of when and how to use knowledge is guided by what most demonstrates love to our fellow humans. Thus, in the future, we can hope for a new society in which God's wisdom has led us to love.

Love. Although I make no attempt to trivialize the concept of love by including it in the same discussion as sources of competitive advantage, I do sense that beyond wisdom is a society and a marketplace in which decisions are made on the basis of love — at least in theory. There is no question that knowledge and love are closely linked (e.g. Phil 1:9-11[14]). If knowledge may lead to wisdom, whereby one understands when and how to use the knowledge one has, can we not understand love to be the ultimate state in which the application of knowledge is guided by what is best for others, rather than what is best for self? Is it not true that what separates God's wisdom from our wisdom is that His thoughts and actions are guided by love in a way that often stands out in contrast with our self-interested rationality? God's wisdom led Him to use what He knew about human nature, human events, and justice to construct a plan of salvation that involved self-sacrifice, as opposed to self-interest, and this because he "so loved the world that he gave his one and only Son, that whoever believes in him shall not perish, but have eternal life" (John 3:16, NIV). Jesus gives an example of decision-making under love when he states that, "Greater love has no one than this, that he lay down his life for his friends" (John 15:13, NIV). The important point here is that it seems to be logical, and consistent with Christian theology, that decisions made out of wisdom and love combined are superior to decisions made simply through worldly wisdom. Examples could be coaxed from students, or the instructor may present several scenarios and ask how outcomes would be different if decisions were made without love as an input.

An example here might refer to the recent trend in American business toward offshore sourcing (moving jobs overseas). Managers and corporate decision-makers analyze information from many sources and may come to the conclusion (gain knowledge) that their publicly traded firm's competitiveness is at risk if they cannot lower labor costs, as rivals are doing. Having this knowledge evokes a decision scenario that will either be guided by wisdom or devoid of such. In this case, wisdom may pertain to how such a move should take place, when to announce plant closings, when to make the move, where new operations should be structured and located, and whom to retain from the existing employee base. Such decisions made in the light of wisdom AND love may further consider whether such a move is necessary at all. The love-based decision scenario certainly considers the plight of potential new employees in new locations, but also may involve a self-sacrificial redefinition of "success" or "performance," such that sacrificing short-term profitability in order to save local jobs demonstrates love for those under their care. It may require managers to take the firm private, such that some market pressures are removed from the equation. Obviously, we are not there yet, and such a discussion might seem abstract to students, but the exercise illustrates how far we have to go before the business realm moves from knowledge to intelligence to wisdom to love.

It is also possible to couch discussions of corporate social responsibility (CSR) in this framework. For example, the modern movement toward creating socially responsible firms seems to indicate a move toward wisdom, recognizing that corporations have great power (arising from knowledge and wealth) and ought to be more wise in how and when they use that power (e.g. Davis & Schoorman, 1997; Freeman, 1984; cf. Friedman, 1970). However, most studies suggest that CSR strategies are guided by market-based wisdom, aiming for public relations points, market position, and increased profitability (Margolis & Walsh, 2003). Wisdom based in love would lead to CSR that acted out of love for God's creation, love for the plight of workers, and love for "the least of these," the poor and powerless.

What does competitive advantage mean in this context, or has it become irrelevant in this future context? If marketplace activities and decisions have been (or will be) guided alternatively by the variable (across firms) availability of data, information, knowledge, intelligence, and wisdom, then we can understand in each phase what guides managers. In some future state, is it possible that managerial decisions will be based on which actions best demonstrate love toward organizational constituents? Is love a realistic basis for organizational action and decisions? Perhaps love leads managers to pursue the common good, or social justice, or some rendering of social gain, a scenario in which stakeholder and corporate citizenship perspectives take on greater — but certainly not exhaustive —

meaning. To say that an answer to these questions involves much speculation would be an understatement. Moving on, however, we next consider what are the critical elements about which firms must be knowledgeable.

KNOWLEDGE OF WHAT?

Because we are firmly within the knowledge age, we focus again on management of knowledge assets. In this section, I will explain how the class discussion turns to consideration of the factors about which firms must be knowledgeable. If the current market environment rewards knowledge, and decisions based on superior knowledge assets are most likely to convey competitive advantage, then we must consider what knowledge is important. Three categories are explored in this paper (and in the class discussions), although it is possible to state them differently. These include environmental factors, processes, and cause and effect relationships.

Environmental factors. Firms (i.e. managers, employees, decision-makers) must have knowledge about — and understanding of — the environment in which they operate. All aspects of the environment are important. The general environment requires knowledge about economic conditions, demographic factors, legal and regulatory trends, socio-cultural trends, and technological boundaries/opportunities. In the firm's more specific environment, knowledge about organizational culture, employee morale, strategic strengths and weaknesses, supplier relationships, customer preferences, etc. becomes a source of advantage. Firms must also be aware of conditions, factors, and trends in their industry and among their competitors. Knowledge of rivals' intentions and weaknesses can certainly be advantageous. At the same time, organizations must have self-knowledge — that is, they must have insights about their own strengths and weaknesses, such as is common in the typical SWOT analysis with which business professors will be familiar.

Processes. In order to have an advantage in the marketplace, firms must have knowledge about the processes relevant to their operations. These processes include, but are not limited to, manufacturing processes (possibilities), management processes, marketing and sales techniques, motivation, innovation, creativity, regulatory compliance, financing, accounting, public relations, etc. Essentially, managers must have knowledge about the management of each type of resource utilized by the firm. Human resources must be hired, trained, motivated, and managed. Financial resources must be acquired, allocated, and accounted for according to established legal and systemic principles. Physical plant and equipment must be integrated, maintained, coordinated, and controlled. Processes exist for each of these elements of economic life, and firms must have knowledge of these processes to be successful. Further, processes for relationships with external entities must be known and mastered. Regulatory processes, promotional processes, negotiation processes, and others require knowledgeable managers.

Much of the recent literature in the knowledge management arena deals with the process of knowledge transfer, suggesting that firms must not only have knowledge of processes, but also knowledge about processes involving knowledge (e.g. Bhagat, et al., 2002; Dyer & Hatch, 2006). Where the learning literature in the past spoke of "double-loop learning," whereby firms gain the capacity to learn how to learn (Levitt & March, 1988), we may likewise conceive of the process of "double-loop knowing," whereby firms either learn how to know, or know how to know.

Cause and effect relationships. Beyond simply knowing how to accomplish various things, as in "processes," firms must also have knowledge about why things happen the way they do. Senge (1991) notes that organizations that understand systems (i.e. engage in systems thinking) move in the direction of becoming learning organizations. This involves understanding numerous relevant cause-and-effect relationships (Turner & Makhija, 2006: 198). For every desired organizational outcome, firms must understand (have knowledge about) how to get from point A to point B. What is the *cause* of the outcome *(effect)* desired? And for every organizational action considered (cause), what are possible effects that may not normally be anticipated? For example, if a firm has a problem with employee turnover, knowledge of what *causes* turnover will be necessary before the problem can be solved. Not all firms have such knowledge in equal proportion. If a firm wishes to be more successful at innovation, knowledge about what *causes* innovation will be required. At the same time, firms considering shifting jobs to foreign facilities must have knowledge about the multiple *effects* such a move will have. Organizational change actions also bring about a complex multitude of effects that firms should seek to understand as much as possible in order to anticipate problems in the process.

Having considered these categories of factors about which firms must be knowledgeable, we would move next to a consideration of steps in the process of managing knowledge assets.

MANAGEMENT OF KNOWLEDGE ASSETS

If knowledge is the most prevalent source of competitive advantage in modern markets, then firms must consid-

er what steps are necessary to manage knowledge assets. Recently, Turner and Makhija talk about four "stages" of the knowledge management process, which they call:

> "(1) knowledge creation and acquisition, (2) the transfer of knowledge to other individuals or organizational units, (3) the interpretation of this knowledge in a manner conducive to the objectives of the organization, and, finally, (4) the application of the knowledge toward organizational goals" (2006: 201).

In my courses, I have typically worked with six stages that are consistent with those discussed by Turner & Makhija and go into more depth where necessary. The process could be expanded and made even more complex (as appropriate), depending on how much time the instructor is devoting to the subject.

(1) Determine what specific information and knowledge is critical. For our firm, what specific knowledge is critical to our success, given our mission, and our industry and our position and our strategy. What must we know to succeed? And what informational elements are necessary to create this knowledge? This process may require representatives from all parts and levels of the organization coming together for the specific purpose of its consideration. Strangely enough, this is not a typical point of discussion in organizational meetings, and thus its inclusion in the knowledge management process is critical.

Use of the knowledge boxes shown in Figures 1a-1c again is helpful here. Organizational actors must labor at this point in the process to actually name the boxes, or determine what knowledge is being constructed by a given box. At the same time, what information goes into each box? What makes up the little squares in a given knowledge box? Naturally, this is not a perfect science, but the exercise itself tends to be very useful. Instructors could create exercises around this process, allowing students to create knowledge boxes for various business scenarios. Outside of the classroom, simply engaging in the process of considering what knowledge is critical will be valuable for any organization.

(2) Determine sources of information and knowledge. Having agreed in general on the things that we must endeavor to have knowledge about, we must then consider the sources for this information and knowledge. As human assets represent a firm's greatest knowledge assets, much of our knowledge is found in existing employees (Kogut & Zander, 1992). Some knowledge we must acquire may be found through the hiring of employees with the knowledge we need. We must also consider informational sources necessary to create knowledge. Various media are critical here, including information systems; online news sources; trade and industry publications; training, development, and education; etc. At the same time, firms acquire knowledge through trade, espionage, transfers (Carlile, 2004; Schulz, 2003; Tung, 1994), opportunism (Parkhe, 1991, 1993) and spillovers (Eden et al., 1997), although some of these processes are more desirable than are others. What is most critical is that firms determine how they will fill in the squares of their knowledge boxes, or how they will "acquire" knowledge boxes, such as in the case of hiring valuable employees.

(3) Disseminate information and knowledge. We next must determine how to disseminate knowledge throughout the organization. Intact knowledge, and the information necessary to create knowledge, must be disseminated to the right person (people) at the right time, given the time-sensitive nature of information. For example, executive information systems represent efforts to ensure specific people have access to specific knowledge and information resources at specific times. Schulz (2001; 2003) has found that the flow of knowledge throughout organizations is complex and subject to dynamic forces that must be understood in order to best take advantage of organizational knowledge assets. He also found that the relevance of new information and knowledge must be ascertained through vertical knowledge "flowpaths" (2001), emphasizing the criticality of knowledge dissemination for developing knowledge boxes.

Hansen (2002) found that innovation is facilitated by intra-organizational (interunit) network paths that shortened knowledge flow time and ensured that product development teams shared knowledge on an ongoing basis. At the same time, firms must consider whether boundaries ought to be placed on dissemination of information and knowledge in order to ensure the next step in the process.

(4) Store and protect information and knowledge. Firms must develop systems and procedures to ensure that information and knowledge are stored for speedy retrieval when necessary, and that these assets are protected from destruction, theft, or over-dissemination. With modern network technologies, data theft is not unusual. Further, the more firms utilize their knowledge-based advantages, or share knowledge assets across business units, the more likely it is that competitors will have an opportunity to learn their secrets (Coff, 2003; Coff et al., 2006). There is also the consideration of what to do with information or knowledge that seems to be of little present value, but which might have great value in the future. Firms that have the ability to store and retrieve information in order to turn previously useless information into valuable knowledge at

some future point are said to have "transformative capacity" (Garud & Nayyar, 1994), a potential source of competitive advantage.

For example, information regarding a rival's competitive capabilities may be acquired in the course of gathering information about other factors. Such a piece of information may not make sense in the present context, but if it is stored, catalogued, and retrievable, the information may become a critical piece of information in the knowledge creation process at a later time when it becomes evident that this competitor is preparing for strategic moves. In this sense, storage and protection of knowledge assets can become systematic. Lewis et al. (2005) describe a "transactive memory system," (TMS) as a "collective memory system for encoding, retrieving, and communicating group knowledge" (581). They further suggest that, "knowledge embedded with a transactive memory system (TMS) helps groups apply prior learning to new tasks and develop an abstract understanding of a problem domain, leading to sustained performance" (581). These ideas point out that transformative capacity and transactive memory systems are examples of processes by which firms can move beyond the simple protection of data (in terms of security) to storage and retrieval systems that make learning more dynamic.

(5) Use knowledge. Having developed, disseminated, stored, and protected the firm's information and knowledge, we must discuss the use of knowledge. Just as in physics we speak of potential energy and kinetic energy, we can understand knowledge as having both potential and kinetic value. In general, however, as an organizational asset, knowledge must be used in order to bring about the greatest advantage in fulfilling the organization's mission. As Coff et al. note, "once valuable tacit knowledge is identified, firms must transfer and replicate it to increase the scale and meet the demand for the scarce resource" (2006: 452).

Organizational actors must be able to recognize where knowledge assets are best employed. What decision scenarios require which knowledge assets? This is where wisdom begins to make a difference in organizational action. Employing knowledge assets in organizational processes sets in motion the forces that lead to competitive advantage, yet wisdom about when and how to best use these assets may bring sustained advantage. As with any other asset, however, rents cannot be earned on knowledge that is not utilized in pursuit of organizational objectives.

Knowledge turnover. As noted earlier, knowledge and information are time sensitive. Firms must manage knowledge assets to ensure proper turnover. Knowledge — or the understanding of how the world (or markets or other processes, etc.) works — is derived from informational elements, and information can become outdated quickly. To the extent that knowledge is based on information that represents "the state of things," it will soon be obsolete as the state of things changes. Organizational decisions made on the basis of consumer surveys collected in 1972 are likely flawed as a basis for current decision-making. The discussion of knowledge management, thus, ends with the subject of ensuring the freshness of information and knowledge.

Much of the emerging research on knowledge management involves processes that ensure knowledge turnover. For example, knowledge transfers and spillovers expand the pool of firms that have access to the latest technologies, ideas and discoveries (Eden, et. al., 1997). Knowledge networks place numerous firms in a position to continually update their understanding of opportunities, threats, and conditions in their industries (Hansen, 2002). Knowledge creation processes are aimed at exploring new possibilities in light of existing realities (Meyer & Davis, 2003; Nonaka, 1994). These and other efforts are aimed at ensuring firms are constantly engaged in meaningful knowledge turnover.

CONCLUSION

As one might imagine, the discussion of management of knowledge assets can be quite complex. I offer in this paper a roadmap of how it might be done, and I offer some of the insights I have incorporated regarding integration of our Christian faith and scripture in this discussion. And yet there is still much room to articulate a Christian view of knowledge and knowledge management. Chewning goes a long way toward explicating knowledge and wisdom and God's nature (2003), however his analysis is not specifically oriented to business or management.

Further studies will look into the ways we might teach innovation processes from our unique worldview. That is, we understand that God has created all things, and we simply discover his creation. However, the process of discovery may be taught from a biblical perspective, with consideration given to path dependence (e.g. Arthur, 1989; David, 1985), mindful deviation, and intelligent design. Innovation is a critical part of the modern business world, and it is closely related to knowledge. We ought not wait long to articulate a Christian understanding of innovation.

Anne Huff (2000) has identified a unique challenge for business educators in the 21st century. While business schools and programs have operated from a specifically academic paradigm in the past 100 years, there has been much pressure to focus more of our efforts in the future on applied business education. Huff sees this as a pendulum

effect that will eventually swing back toward academics and scholarship. In the meantime, however, she urges business educators to adopt a middle ground in which we continue in our core, distinctive competence, which is knowledge production. As a result, business educators will emphasize education over training, and they will work as allies with business in understanding the nature of knowledge, the uses of knowledge, and the management of knowledge assets. Each realm (business and academia) has unique capabilities in this quest. What is most important for this paper is that we can envision a unique role for Christian business educators, who will have much to add to the story of knowledge management, and who will teach these processes in unique ways to students who will often use knowledge for unique purposes.

I welcome and look forward to insights from other teachers and scholars on how this subject might proceed and take shape in the Christian business classroom.

ENDNOTES

[1]E.g. Madanmohan Rao, *Knowledge Management Tools and Techniques: Practitioners and Experts Evaluate KM Solutions,* Elsevier Publishing, 2004; Helen Rothberg & G. Scott Erickson, *From Knowledge to Intelligence: Creating Competitive Advantage in the Next Economy,* Elsevier Books, 2004.

[2] [18]For the message of the cross is foolishness to those who are perishing, but to us who are being saved it is the power of God. [19]For it is written: "I will destroy the wisdom of the wise; the intelligence of the intelligent I will frustrate." [20]Where is the wise man? Where is the scholar? Where is the philosopher of this age? Has not God made foolish the wisdom of the world? [21]For since in the wisdom of God the world through its wisdom did not know him, God was pleased through the foolishness of what was preached to save those who believe. [22]Jews demand miraculous signs and Greeks look for wisdom, [23]but we preach Christ crucified: a stumbling block to Jews and foolishness to Gentiles, [24]but to those whom God has called, both Jews and Greeks, Christ the power of God and the wisdom of God. [25]For the foolishness of God is wiser than man's wisdom, and the weakness of God is stronger than man's strength. [26]Brothers, think of what you were when you were called. Not many of you were wise by human standards; not many were influential; not many were of noble birth. [27]But God chose the foolish things of the world to shame the wise; God chose the weak things of the world to shame the strong. [28]He chose the lowly things of this world and the despised things — and the things that are not — to nullify the things that are, [29]so that no one may boast before him. [30]It is because of him that you are in Christ Jesus, who has become for us wisdom from God — that is, our righteousness, holiness and redemption. [31]Therefore, as it is written: "Let him who boasts boast in the Lord."

[3] [23] This is what the LORD says: "Let not the wise man boast of his wisdom, or the strong man boast of his strength or the rich man boast of his riches, [24] but let him who boasts boast about this: that he understands and knows me, that I am the LORD, who exercises kindness, justice and righteousness on earth, for in these I delight," declares the LORD.

[4] In this paper, I make no attempt to develop a treatise on the concept of knowledge, or even on a Christian epistemology. Such a treatment is beyond the scope of the current effort. Rather, I am more interested in the teaching of the management of knowledge assets, and how our unique perspective might inform the task in the classroom. For readers interested specifically in a Christian treatment of knowledge and epistemology, see Chewning (2003), Moreland & Craig (2003, esp. Chs. 3, 6, &7), and MacDonald (1993 — interesting discussion of Aquinas' theory of knowledge).

[5] Basing his discussion on Polanyi's (1966) classic work, Nonaka describes tacit knowledge as having "a personal quality, which makes it hard to formalize and communicate. Tacit knowledge is deeply rooted in action, commitment, and involvement in a specific context. In Polanyi's words, it 'indwells' in a comprehensive cognizance of the human mind and body" (1994: 16).

[6] The space shuttle *Challenger* disaster serves as a tragic but effective example of this point. The administrators and managers who forced the decision to launch the ill-fated shuttle worked hard to construct a subjective rendering of reality that allowed them to "rationally" launch the shuttle, while objective reality (i.e. physical laws and properties) was quite distant from their construction, and ultimately worked against them.

[7] See also Turner & Makhija, 2006, p. 199, footnote #3 for a similar example.

[8] One could show or make reference to the entertaining movie, *The Desk Set,* starring Katherine Hepburn and Spencer Tracy here. The story revolves around the attempts of an "efficiency engineer" (Tracy) trying to convince a large corporation that the new International Business Machines data computer is more efficient in finding answers to the firm's questions than the existing "information department" under the leadership of Hepburn.

[9] I am indebted to the insights of an anonymous *CBAR* reviewer for his point.

[10] I am grateful to an anonymous *CBAR* reviewer for reminding me of the point that discernment is critical and valuable.

[11] For example, random environmental variations, such as typified in the organizational ecology literature (Hannan & Freeman, 1989); or deterministic group behaviors, such as typified in the evolutionary psychology literature (e.g. Nicholson, 2000).

[12] "See to it that no one takes you captive through hollow and deceptive philosophy, which depends on human tradition and the basic principles of this world rather than on Christ"

[13] "If any of you lacks wisdom, he should ask God, who gives generously to all without finding fault, and it will be given to him."

[14] [9]And this is my prayer: that your love may abound more and more in knowledge and depth of insight, [10]so that you may be able to discern what is best and may be pure and blameless until the day of Christ, [11]filled with the fruit of righteousness that comes through Jesus Christ — to the glory and praise of God.

REFERENCES

Argyris, C., & Schon, D.A. (1978). *Organizational Learning.* Reading, MA:Addison-Wesley.

Arthur, W.B. (1989). Competing technologies, increasing returns, and lock-in by historical events. *The Economic Journal,* 99: 116-131.

Bandura, A. (1977). *Social Learning Theory.* Englewood Cliffs, NJ: Prentice-Hall.

Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management,* 17: 99-120.

Barney, J.B. (1995). Looking inside for competitive advantage. *Academy of Management Executive,* 9: 49-61.

Behe, M. J. (1996). *Darwin's Black Box: the biochemical challenge to evolution.* New York: Free Press.

Berger, P.L. & Luckmann, T. (1966). *The social construction of reality : A treatise in the sociology of knowledge,* Garden City, N.Y.: Doubleday.

Bhagat, R.S., Kedia, B.L., Harveston, P.D., & Triandis, H.C. (2002). Cultural variations in the cross-border transfer of organizational knowledge: An integrative framework. *Academy of Management Review,* 27: 204-221.

Bierly, P.E. III, Kessler, E.H., & Christensen, E.W. (2000). Organizational learning, knowledge and wisdom. *Journal of Organizational Change Management,* 13: 595-618.

Carlile, P.R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science,* 15: 555-568.

Chewning, R. (2003). God is infinitely WISE: We have access to His wisdom. *Journal of Biblical Integration in Business,* p. 35-53.

Coff, R.W. (2003). Bidding wars over R&D-intensive firms: Knowledge, opportunism, and the market for corporate control. *Academy of Management Journal,* 46: 74-85.

Coff, R.W., Coff, D.C., & Eastvold, R. (2006). The knowledge-leveraging paradox: How to achieve scale without making knowledge imitable. *Academy of Management Review,* 31: 452-465.

David, P.A. (1985). Clio and the economics of QWERTY. *American Economic Review Proceedings,* 75: 332-337.

Davis, J.H., & Schoorman, F.D. (1997). Toward a stewardship theory of management. *Academy of Management Review,* 22: 20-47.

Dembski, W. (1998). *The Design Inference.* Cambridge: Cambridge University Press.

Dembski, W. (1999). *Intelligent Design: The Bridge Between Science and Theology.* InterVarsity Press.

Dierickx, I. & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science,* 35: 1504-1511.

Dyer, J.H. & Hatch, N.W. (2006). Relationship-specific capabilities and barriers to knowledge transfers: Creating advantages through network relationships. *Strategic Management Journal,* 27: 701-719

Eden, L., Levitas, E. & Martinez, R.J. (1997). The production, transfer, and spillover of technology: Comparing large and small multinationals as technology producers. *Small Business Economics,* 9: 53-66.

Friedman, M. (1970). The social responsibility of business is to increase its profits. *New York Times Magazine,* 13 Sept, 1970, 33: 122-126.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach.* Boston: Pitman.

Garud, R. & Nayyar, P.R. (1994). Transformative capacity: Continual structuring by intertemporal technology transfer. *Strategic Management Journal,* 15: 365-385.

Gordon, R. & Grant, D. (2004). Knowledge management or management of knowledge? Why people interested in knowledge management need to consider Foucault and the construct of power. *Journal of Critical Postmodern Organization Science,* 3: 27-38.

Hannan, M.T. & Freeman, J. (1989). *Organizational Ecology,* Cambridge, MA: Harvard University Press.

Hansen, M.T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science,* 13: 232-248.

Hansen, M.T., Mors, M.L., & Lovas, B. (2005). Knowledge sharing in organizations: Multiple networks, multiple phases. *Academy of Management Journal,* 48: 776-793.

Hayek, F.A. (1945). The use of knowledge in society. *American Economic Review,* 35: 519-530.

Hayek, F.A. (1948). *Individualism and Economic Order,* Chicago: University of Chicago Press.

Holmes, A.F. (1977). *All Truth is God's Truth.* Grand Rapids: Wm B. Eerdman's.

Huff, A.S. (2000). Changes in organizational knowledge production. *Academy of Management Review,* 25: 288-293.

Kogut, B. & Zander, U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science,* 3: 383-397.

Kogut, B. & Zander, U. 1993. Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies,* 24: 625-645.

Levitt, B. & March, J.B. (1988). Organizational Learning, *Annual Review of Sociology,* 14: 319-340.

Lewis, K., Lange, D., & Gillis, L. (2005). Transactive memory systems, learning, and learning transfer. *Organization Science,* 16: 581-598.

MacDonald, S. (1993). Theory of Knowledge. In Norman Kretzmann and Eleonore Stump (Eds.) *The Cambridge Companion to Aquinas,* Cambridge, UK: Cambridge University Press, p. 160-195.

Margolis, J. D., and Walsh, J. P. (2003). Misery loves companies: Rethinking social initiatives by business." *Administrative Science Quarterly* 48, 268-305.

McFadyen, M.A. & Cannella, A.A. (2004). Social capital and knowledge creation: Diminishing returns of the number and strength of exchange relationships. *Academy of Management Journal,* 47: 735-746.

Meyer, C., & Davis, S, (2003). *It's Alive: The Coming Convergence of Information, Biology, and Business,* Boston: Crown Business.

Morgan, G. (2006). *Images of Organization.* London: Sage.

Moreland, J.P. & Craig, W.L. (2003). *Philosophical Foundations for a Christian Worldview.* Downers Grove, Illinois: InterVarsity Press.

Nelson, R.R. & Winter, S.G. (1982). *An Evolutionary Theory of Economic Change,* Cambridge, MA: Harvard University Press.

Nicholson, N. (2000). *Executive Instinct: Managing the Human Animal in the Information Age.* New York: Crown.

Nickerson, J.A. & Zenger, T.R. (2004). A knowledge-based theory of the firm – the problem-solving perspective. *Organization Science,* 15: 617-632.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science,* 5(1): 14-37.

Okhuysen, G.A. & Eisenhardt, K.M. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science,* 13: 370-386.

Parkhe, A. (1991). Interfirm diversity, organizational learning, and longevity in global strategic alliances. *Journal of International Business Studies,* 22: 579-601.

Parkhe, A. (1993). Strategic alliance structuring: A game theoretic and transaction cost examination of interfirm cooperation. *Academy of Management Journal,* 36: 794-829.

Pfeffer, J. (1980). Management as symbolic action: The creation and maintenance of organizational paradigms. In L.L. Cummings and B.M. Staw (Eds.), *Research in Organizational Behavior,* 3: 5-52, JAI Press: Greenwich, CT.

Polanyi, M. (1966). *The Tacit Dimension.* London: Routledge & Kegan Paul.

Powell, T.C., & Dent-Micallef, A. (1997). Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal,* 18: 375-405

Senge, P.M. (1991). *The Fifth Discipline,* Doubleday.

Schulz, M. (2001). The uncertain relevance of newness: Organizational learning and knowledge flows. *Academy of Management Journal,* 44: 661-681.

Schulz, M. (2003). Pathways of relevance: Exploring inflows of knowledge into subunits of multinational corporations. *Organization Science,* 14: 440-459.

Subramani, M.R. & Venkatraman, N. (2003). Safeguarding investments in asymmetric interorganizational relationships: Theory and evidence. *Academy of Management Journal,* 46: 46-62.

Tallman, S., Jenkins, M., Henry, N., & Pinch, S. (2004). Knowledge, clusters, and competitive advantage. *Academy of Management Review,* 29: 258-271.

Toffler, A. (1990). *Powershift: Knowledge, wealth, and Power at the Edge of the 21st Century.* Bantam Books: New York.

Tung, R. (1994). Human resource issues and technology transfer. *International Journal of Human Resource Management,* 5: 808-825.

Turner, K.L., & Makhija, M.V. (2006). The role of organizational controls in managing knowledge. *Academy of Management Review,* 31: 197-217.

Weick, K.E. 1979. *The Social Psychology of Organizing,* (2nd ed.), New York: McGraw-Hill.

Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal,* 5: 171-180.