

## Association for Information Systems AIS Electronic Library (AISeL)

---

SAIS 2011 Proceedings

Southern (SAIS)

---

2011

# Investigating Barriers to Knowledge Management Implementation In the U.S. Military: A Focus on Managerial Influences

Summer E. Bartczak

*University of Central Arkansas, sbartczak@uca.edu*

William R. Boulton

*Auburn University, boulton@business.auburn.edu*

R. Kelly Rainer

*Auburn University, rainer@business.auburn.edu*

Sharon L. Oswald

*Auburn University, oswalsl@auburn.edu*

Follow this and additional works at: <http://aisel.aisnet.org/sais2011>

---

### Recommended Citation

Bartczak, Summer E.; Boulton, William R.; Rainer, R. Kelly; and Oswald, Sharon L., "Investigating Barriers to Knowledge Management Implementation In the U.S. Military: A Focus on Managerial Influences" (2011). *SAIS 2011 Proceedings*. 23.  
<http://aisel.aisnet.org/sais2011/23>

This material is brought to you by the Southern (SAIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in SAIS 2011 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# INVESTIGATING BARRIERS TO KNOWLEDGE MANAGEMENT IMPLEMENTATION IN THE U.S. MILITARY: A FOCUS ON MANAGERIAL INFLUENCES

**Summer E. Bartczak**

University of Central Arkansas  
sbartczak@uca.edu

**William R. Boulton**

Auburn University  
boulton@business.auburn.edu

**R. Kelly Rainer**

Auburn University  
rainer@business.auburn.edu

**Sharon L. Oswald**

Auburn University  
oswalstl@auburn.edu

**Kevin O'Malley**

Space and Naval Warfare Systems Center, Pacific  
omalleyk@spawar.navy.mil

## ABSTRACT

The knowledge management literature identifies a variety of factors that may influence KM implementation in organizations. Over the past ten years, each of the U. S. military services has implemented KM programs to varying degrees. Although knowledge management research continues to grow, little has focused exclusively on efforts in the military context. Using Holsapple and Joshi's KM "influences" framework (2000)--which addresses managerial, resource, and environmental factors--as guiding theory, this multiple-case study reports on the "managerial" factors that have influenced KM implementation across the U. S. military services. The results indicate a number of negative managerial influence factors (i.e. barriers) have thwarted progress, the most significant being lack of leadership commitment & lack of evidence/measurement that reveal a return on investment. Identification of these influence factors not only reinforces existing theory, but also offers a practical guide for specific interventions that focus on leadership & user KM education, KM proponent leadership/organizations, and service-wide policy, guidance, and governance.

## Keywords

knowledge management, knowledge management barriers, knowledge management influences, U. S. military services, Department of Defense, multiple-case study

## INTRODUCTION

"Drowning in information, but starved for knowledge" (Naisbitt, 1984, p. 17) remains the plight of many of today's public and private sector organizations. Being a very large (Nissen, 2001) public sector organization, the Department of Defense (DoD) is no exception. The recognition of the critical importance of the knowledge resource by the DoD can be seen in newer policy/guidance documents such as the National Defense Strategy (2008b), the Capstone Concept for Joint Operations (2009), and the Quadrennial Defense Review (2006) which all highlight a shifting focus to knowledge in operations. As such, each of the services has implemented knowledge management (KM) programs with varying degrees of success. With regard to KM programs, research has shown that a wide range of factors can affect the success or failure of KM implementation. This research used the Holsapple and Joshi "influences" framework (Holsapple and Joshi, 2000), to investigate the factors that act as negative influences (or barriers) to KM implementation in a unique military context. The framework groups the factors into three broad categories: *managerial*, *resource*, and *environmental* influences. Although the larger research effort focused influences in all three categories, only the results for *managerial* influences are presented in this paper. The guiding question for the research reported here was: "How do managerial factors impact KM implementation in the U.S. military services?" The specific investigative questions included: 1) How do leadership commitment and KM reinforcing behaviors from managers at various levels impact KM efforts? 2) What coordination issues impact KM efforts? 3) What technical, social, and legal control issues impact KM efforts? 4) What measuring or valuing issues impact KM efforts?

## LITERATURE REVIEW

### Factors that Influence KM

A great deal of research has investigated the factors that influence KM implementation and success (Davenport, DeLong & Beers, 1998; Jennex, 2006; Choi, 2000; Holsapple & Joshi, 2000 & 2002 et al.)The guiding theory for this research,

Holsapple and Joshi's influences framework (2000), is based the results of a Delphi study that attempted to synthesize a broad range of factors, identified in the literature. The factors and their sources in the literature have been identified as: "culture (Leonard-Barton, 1995; Arthur Andersen and APQC, 1996; Szulanski, 1996; van der Spek and Spijkervet, 1997), leadership (Arthur Andersen and APQC, 1996), technology (Arthur Andersen and APQC, 1996; van der Spek and Spijkervet, 1997), organizational adjustments (Szulanski, 1996; van der Spek and Spijkervet, 1997), evaluation of KM activities and/or knowledge resources (Wiig, 1993; Andersen and APQC, 1996; van der Spek and Spijkervet, 1997), governing/administering knowledge activities and/or knowledge resources (Wiig, 1993; Leonard-Barton, 1995; Szulanski, 1996; van der Spek and Spijkervet, 1997), employee motivation (Szulanski, 1996, van der Spek and Sijkervet, 1997), and external factors (van der Spek and Spijkervet, 1997)" (Holsapple and Joshi, 2000, p. 239). With this research in mind, the three broad categories of influences identified by Holsapple and Joshi (2000) include *managerial, resource, and environmental*. The *managerial* influences category and its sub-elements are described in brief below:

**Managerial Influences** emanate from individuals responsible for administering the management of knowledge in organizations. Holsapple and Joshi's framework (2000) partitions these influences into four main factors: exhibiting leadership in the management of knowledge, coordinating the management of knowledge, controlling the management of knowledge, and measuring the management of knowledge.

**Leadership.** Of the four managerial influences, leadership is primary. Much of the KM literature identifies leadership as a critical element to success (Davenport and Prusak, 1998; Grover and Davenport, 2001; Heibeler, 1996, et al.). According to Holsapple and Joshi,

[The] distinguishing characteristic of leadership is that of being a catalyst through such traits as inspiring, mentoring, setting examples, engendering trust and respect, instilling a cohesive and creative culture, listening, learning, teaching..., and knowledge sharing....The KM leader creates conditions that allow participants to readily exercise and cultivate their knowledge manipulation skills, to contribute their own individual knowledge resources to the organization's pool of knowledge, and have easy access to relevant knowledge resources. (2000, p. 241)

**Coordination.** According to Malone and Crowston, "coordination is managing dependencies between activities" (1994, p. 90). Further defined, coordination is an activity that attempts to interrelate and harmonize activities in an organization (Holsapple and Whinston, 1996). The process of using knowledge to propel organization innovation can be planned and structured or unplanned and unstructured. In the context of KM, a "planned approach requires coordination within and across KM episodes, involving the determination of what knowledge activities to perform in what sequence, which participants will perform them, and what knowledge resources will be operated on by each" (Holsapple and Joshi, 2000, p. 239).

**Control.** "Control is concerned with ensuring that needed knowledge resources and processors are available in sufficient quality and quantity, subject to required security" (Holsapple and Joshi, 2000, p.240). The two critical control issues are the protection of and quality of knowledge resources.

**Measurement.** It is widely accepted that measurement is the least developed area in the KM discipline (Heibeler, 1996; Sveiby, 1997; et al.); however, it is possible to measure knowledge resources/activities and link them to financial results (Stewart, 1997; Sveiby, 1997). According to Holsapple and Joshi, "measurement involves the valuation of knowledge resources and processors....It is also a basis for evaluation of leadership, coordination, and control; for identifying and recognizing value-adding activities and resources; for assessing and comparing the execution of knowledge activities; and for evaluating the impacts of an organization's KM on bottom-line performance" (2000, p. 240).

### **KM in the DoD**

The DoD has been working to leverage KM principles to improve information-sharing and support decision-making for warfighters for over ten years. The National Defense Strategy (DoD, 2008b), the Quadrennial Defense Review (DoD, 2006), the Capstone Concept for Joint Operations (DoD, 2009), and the DoD Information Enterprise Strategic Plan (DoD, 2010) are key military guidance documents that reflect both the growing importance of the "knowledge" resource as well as considerations that must be made to better exploit it. Although no "centralized" DoD KM effort exists, the DoD Information Management/Information Technology Strategic Plan 2010 articulates the role of KM in enabling "effective and agile decision-making" and calls for the creation of a better "knowledge-sharing environment and application of knowledge-sharing concepts during the planning of joint experiments, operational concept development, combat operations and other missions" (DoD, 2008a, pg. 6). In light of the DoD-level KM objectives, DoD KM leaders continue to convene regularly to discuss KM efforts and and establish future goals and objectives (Bordeaux, 2009).

### **Military KM Research**

Although there are many military KM success stories, existing research raises the need to examine the unique barriers to KM in the military services (Plant, 2000; Bower, 2001; Johns et al., 2000). Plant (2000), in investigating KM in the Australian Defence Force, recognized that the military is a "complex" organization/environment for KM implementation. Bower (2001)

also identified that cultural, technical, and structural aspects of the military organization require special consideration in making decisions regarding implementing KM projects. Finally, Cho et al. (2000) identified cultural, technical, and process barriers to sharing knowledge in their investigation of KM in the DoD acquisition community.

## METHODOLOGY

For the purposes of this research, a multiple-case study design was chosen. Yin states that each case in a multiple-case study “must be carefully selected so that it either (a) predicts similar results (a *literal replication*) or (b) produces contrasting results for predictable reasons (a *theoretical replication*)” (1994, p. 46). Eisenhardt (1989) also adds that while cases may be chosen at random, that random selection is neither necessary nor even preferable due to the fact that the goal of theoretical sampling is to choose cases which are likely to replicate or extend emergent theory. For this research, a total of six case studies was selected. For the purposes of literal replication, each of the cases selected were military organizations identified as having an active KM program. As for theoretical replication, or contrasting results for predictable reasons, the cases selected were equally distributed among the services (Air Force, Army, and Navy/Marine Corps) with each case representing an organization with a unique organization mission (e.g. medical, test and evaluation, tactical warfighter support, and material and systems acquisition). The specific organizations used as case study sites included:

1. Air Force Material Command, Directorate of Requirements—Wright-Patterson AFB, Dayton, Ohio
2. Air Force Operational Test and Evaluation Center—Kirtland AFB, Albuquerque, New Mexico
3. Center for Army Lessons Learned--Ft. Leavenworth, Leavenworth, Kansas
4. Army Medical Department Center and School—Ft. Sam Houston, San Antonio, Texas
5. Marine Corps Systems Command—Quantico Marine Corps Base, Quantico, Virginia
6. Naval Facilities Engineering Command, Washington Navy Ship Yard, Washington, D.C.

The specific unit of analysis was the sub-units of these organizations which directly managed or oversaw KM projects/programs and/or systems. Semi-structured interviews with KM program key staff and leaders from these organization “sub-units” were conducted using the research questions as a guide. This data was augmented with additional material gathered from organization archives, websites, policy papers, etc. so that a complete picture of the organization KM effort could be provided. All data collected was entered into a case study database to support analysis. Pattern matching was used as the analysis method. Design quality issues, to include construct validity, external validity, and reliability all were addressed in accordance with Yin (1994).

## RESULTS

The managerial influence category was investigated in detail. An abbreviated (due to space constraints) verbal description of the findings is provided below while a visual summary can be seen in Table 1. The “dots” in Table 1 identify the negative influences (barriers) found to exist in each of the organizations with regard to implementing KM.

### Leadership

*Lack of leadership commitment.* The lack of leadership commitment at critical levels was found to be the most critical barrier to the implementation of KM in military organizations. The findings were consistent across all the case studies. Without leadership support, the proper enabling atmosphere, especially in terms of resources, could not develop. The lack of higher level support appeared to stem from a combined lack knowledge about KM and/or fear that it was just another faddish management trend.

*Lack of reinforcing behaviors.* Lack of reinforcing behaviors which included the absence of reward systems, initiatives to promote culture change, and leaders “talking the talk, but not walking the walk” was also identified. Although some organizations, like MARCORSYSCOM, had made efforts to put reward mechanisms in place, they found it hard to re-model existing reward structures for new purposes. Only CALL’s lessons learned mission was tied to the assessment of execution-type training activities. Respondents also identified that the short-term mentality of military leadership, driven in many cases by their relatively quick rotation between jobs, did not encourage due consideration of long-term objectives such as KM.

*Difficulty in “selling” KM.* Respondents from every case who were spearheading the KM efforts reported the difficulty in “selling” the idea of KM to leadership and users. Their difficulties stemmed from two major issues. The first issue involved preconceived ideas about KM. Some thought KM was a trendy management fad while others thought it was just another IT project. Trying to address these misconceptions caused the second major issue: the lack of proper language to describe KM concepts. Without exception, every respondent, whether on the KM staff or not, noted the difficulty in communicating with uninformed individuals about KM. KM concepts, and the multi-dimensional aspects of knowledge sharing, knowledge transfer, and the learning organization, were hard to describe in terms that individuals understood. Although extensive efforts to educate leaders and users were carried out, a common, descriptive KM was lacking and, therefore, concepts were well communicated or understood.

*Difficulty in “leading” KM.* In addition to difficulties in “selling” KM initiatives, respondents indicated difficulties in “leading” KM efforts. KM efforts were recognized as tough tasks because there were no established paths to follow, and no

Managerial Influences		AFMC	AMEDD	AFOTEC	MC SYSCOM	NAVFAC	CALL
Leadership	Lack of leadership commitment	•	•	•	•	•	•
	Lack of reinforcing behaviors	•	•		•	•	•
	Difficult to “sell” KM	•	•	•	•	•	•
	Difficult to “lead” KM	•	•		•	•	•
Coordination	Conflict w/IT organization	•	•		•	•	•
	Exec. Steering Committee needed	•	•	•	•	•	•
	Difficult to coord between info/knowledge owners			•		•	•
	Lack of crossfeed				•	•	•
Control	Restrictive impact of external control policies	•	•	•	•	•	•
	Lack of internal controls	•	•	•	•	•	•
	Difficulty controlling contractors	•	•				
	Negative impact of social control		•		•		
Measurement	Measures/ROI needed to gain/keep leadership support	•	•		•	•	•
	Lack of adequate measures	•	•	•	•	•	•
	Measurements detrimental to culture change		•		•		

**Table 1. Summary of Managerial Influence Findings**

canned solution for any problem. A majority of the respondents were avid researchers of both the literature and industry efforts so they did their best to benchmark on successful efforts and apply what they could to their organizations.

#### **Coordination**

*Conflict with IT organization.* Although coordination issues acted as barriers to KM implementation, one standout problem had to do with coordinating with IT organizations, particularly when the KM “home” was not part of an IT organization. In the sample studied, AFMC and AMEDD were not IT organizations and had not “conscientiously” decided to work with and adhere to the comparable IT organization direction and standards. Coordination problems included difficulties in bringing together disparate KM initiatives, difficulties in gaining approval for or implementation of non-standard hardware/software/technical infrastructure, and difficulties in overcoming a very IT-centric view of KM and IT’s policy role over KM technology

*Executive steering committee needed.* Another important coordination issue cited by respondents was the need for executive committees to steer/negotiate KM effort. The necessity for such governing bodies was driven primarily by the intra-organizational nature of most KM efforts. The lack of such committees made coordinating the realm of issues that crossed established organization boundaries extremely difficult, if not impossible.

*Difficulty in coordinating between information/knowledge owners.* For those organizations that had built KM systems, most reported difficulties in coordinating and receiving participation from various knowledge owners. This was especially difficult in the absence of any steering bodies. The old adage “knowledge is power” seemed to apply in many cases, and organizations/individuals were hesitant to give up information.

*Lack of crossfeed.* The last significant issue of coordination identified was the general lack of crossfeed between organizations/individuals involved in KM efforts. Although only mentioned specifically by two organizations as a barrier to KM implementation, many instances where the lack of crossfeed (between organizations/individuals involved in KM, between like organizations, and even between similar organizations across the services) was observed.

#### **Control**

*Restrictive impact of external control policies.* The first major category of control issues involved the restrictive impact of a variety of external policies. In general these policies, directly or indirectly impacted the KM staffs’ ability to develop and deploy KM systems and/or other non-technical KM initiatives. Generally the restrictive policies involved: technical infrastructure standards, software standards/policies for procurement and use, format standards, service-level IT plans/initiatives, and legal issues. Technical infrastructure standards were reported to have impacted KM efforts more in years past than recently. Most of the cases reported struggles early on regarding server ownership, connectivity solutions, and maintenance issues, but most of those issues had been resolved. Also, despite the fact that all the cases recognized the basic necessity for IT organization-driven software standards and procurement policies, they found that such policies were often unnecessarily restrictive and/or insufficient to cover the KM phenomena. In some cases where they did find appropriate software for their purposes and had the funds to purchase, they were not allowed to proceed it because it was not on the accepted standards list. Such restrictions limited the ability to experiment with new technologies that might facilitate

KM developments. Another restrictive control policy identified at NAVFAC was the mandatory compliance with the CIO's office standard format for web page development. Although the need for a standard "look and feel" was recognized, it had not given the KM staff much flexibility to be creative or develop non-standard applications. A variety of legal controls were also mentioned as being barriers to KM. These legal controls included Federal laws that govern the Privacy Act, the Freedom of Information Act (FOIA), Section 508 compliance, and records management and service laws that govern For Official Use Only (FOUO) information.

*Lack of internal controls.* As each of the case study KM efforts and systems began to evolve, there was a realization that the lack of internal controls or policies hampered future growth. Respondents recognized the need for policies that addressed sub-site management, content and quality management, taxonomies, and steps to culture evolution. Because many of the KM systems acted as portals to other sources of information/knowledge, policies that established the responsibilities and requirements of sub-site managers and the content and format of sub-site information became increasingly necessary. The exponential growth of information contained within (and made available through) the KM systems also made the issues of content and quality management of serious concern.

*Difficulty controlling "outside" contractors.* Two cases revealed impediments to KM that had resulted from difficulties in controlling "outside" contractors. Although every case studied made use of contractors in some respect, most of them worked "in-house" alongside the KM team/staff. Reported difficulties involved experiences with contractors who were not part of daily operations. The impression in both cases was that these contractors had possibly taken advantage of the KM staff's initial lack of knowledge about KM. In so doing, they "charged them lots of money for little return".

*Negative impact of social control.* The instances of social control were in most cases a positive influence on the KM efforts. Many KM leaders had taken positive steps to ensure the staff composition included the desired knowledge and skill. The grade and qualification restrictions associated with civilian and military positions were, however, unintended negative consequences of social control which, in some cases, restricted the hiring of individuals who were properly qualified for KM-related positions. Negative social control in the form of forced culture changes (i.e. making individuals use the KM systems or basing performance judgements on the level of KM system usage) was also identified.

### **Measurement**

*Measurements/value needed to gain/keep leadership support.* Except for AFOTEC, all of the cases reported that "measurements" or "proof of value" was needed to gain (or keep) leadership support. Although there was no instance of leadership demanding proof of value, respondents feared that if they could not provide good news that leadership support would decline. In fact, some respondents reported that if they had not been able to show proof of concept initially, that they would have never been able to convince leadership of KM's potential value.

*Lack of adequate measures.* A major barrier to providing leadership with tangible results regarding the impact of KM and KM systems was the lack of adequate measures. Recognized as a serious problem in every case studied, the lack of metrics was a continuous concern. Although many of the cases used KM system (or website) usage statistics to demonstrate activity, both customers and leaders stated that such statistics were suspect. As a result, organizations had relied on qualitative stories of success until they had a better idea of how to quantitatively prove KM's value.

*Measurements detrimental to culture change.* Instances were cited where the use of metrics, specifically tracking KM website/utility usage, were considered damaging to the culture change toward KM. First, individuals and leaders were often suspect of website use statistics—they did not think they captured the true picture of the how's and why's of usage. Secondly, the use of metrics to track users' contributions to KM systems was not seen as a positive influence in promoting participation in KM programs.

### **IMPLICATIONS FOR PRACTICE AND THEORY**

With regard to theory, the findings in this research, although focused on a unique military context, align well with existing research. The idea that leadership is the most influential factor is not surprising. Also, the lack of measurements (metrics) that can help to reflect the benefits and return on investment is not uncommon. The unique aspect of this research is that it offers "rich" & detailed insights across the spectrum of managerial influences from identifying specific difficulties with "selling" KM to the complications of coordinating with IT organizations to the unintended consequences/restrictive nature of external policies such as privacy, FOIA, and IT standards & procurement, etc. Interestingly, this research also allowed for 1) the development of a negative influences process model which will be detailed in a future paper and 2) will serve as the basis for future comparison work in the same "barriers" vein. As for the practical implications of the research, it also offers a guide for specific interventions that military organizations may choose to take to improve KM implementation. A focus on the education of key leaders with regard to KM seems to a primary action that could be taken. Line workers and/or KM system users could benefit from education as well. The development of KM proponent leadership and organizations would also served to address many issues especially with regard to coordination and control. Finally, the establishment of service-wide policy, guidance, and governance who help to streamline efforts and make them more cohesive & beneficial for the services as a whole.

## REFERENCES

- Arthur Andersen and The American Productivity and Quality Center. (1996). *The Knowledge Management Assessment Tool: External Benchmarking*.
- Bordeaux, J. (2009). The Day DoD KM Died. Retrieved August 4, 2010, from <http://jbordeaux.com/the-day-dod-km-died/>
- Bower, W. (2001). *Development of a Decision Framework for Knowledge Management Projects*. Unpublished Masters Thesis, Air Force Institute of Technology, Wright-Patterson AFB Dayton, OH.
- Cho, G., Jerrell, H., & Landay, W. (2000). *Program Management 2000: Know the Way How Knowledge Management Can Improve DoD Acquisition*. Fort Belvoir: Defense Systems Management College.
- Choi, Y. S. (2000). *An Empirical Study of Factors Affecting Successful Implementation of Knowledge Management*. Unpublished Doctoral Dissertation, University of Nebraska, Lincoln.
- Davenport, T. H., DeLong, D. W., & Beers, M. C. (1998). Successful Knowledge Management Projects. *Sloan Management Review*, 39(2), 43-57.
- Davenport, T. H., & Prusak, L. (1998). *Working Knowledge*. Boston: Harvard Business School Press.
- Department of Defense (2008a). *Information Management/ Information Technology (IM/IT) Strategic Plan 2008-2009*. Chief Information Officer, Washington, D. C.. Retrieved August 3, 2010 from [http://cio-nii.defense.gov/docs/DoDCIO\\_Strat\\_Plan.pdf](http://cio-nii.defense.gov/docs/DoDCIO_Strat_Plan.pdf)
- Department of Defense (2006). *Quadrennial Defense Review Report*, Secretary of Defense, Washington, D.C.. Retrieved August 3, 2010 from <http://www.defense.gov/qdr/report/Report20060203.pdf>
- Department of Defense (2008b). *National Defense Strategy*, Joint Chiefs of Staff, Washington, D. C.. Retrieved August 3, 2010 from <http://www.defense.gov/news/2008%20national%20defense%20strategy.pdf>
- Department of Defense (2009). *Capstone Concept for Joint Operations*, Joint Chiefs of Staff, Washington, D. C.. Retrieved August 3, 2010 from <http://tinyurl.com/http-capstoneconcept2009>
- Department of Defense (2010). *Information Enterprise Strategic Plan 2010-2012*. Assistant Secretary of Defense (Networks and Information Integration)/DoD CIO, Washington, D. C.. Retrieved August 3, 2010 from <http://cio-nii.defense.gov/docs/DodIESP-r16.pdf>
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Grover, V., & Davenport, T. H. (2001). General Perspectives on Knowledge Management: Fostering a Research Agenda. *Journal of Management Information Systems*, 18(1), 5-21.
- Heibler, R. (1996). Benchmarking knowledge management. *Strategy and Leadership*, 24(2).
- Holsapple, C., & Joshi, K. D. (2000). An Investigation of Factors that Influence the Management of Knowledge in Organizations. *Journal of Strategic Information Systems*, 9, 235-261.
- Holsapple, C., & Joshi, K. D. (2002). Knowledge management: a three-fold framework. *The Information Society*, 18, 47-64.
- Holsapple, C., & Whinston, A. B. (1996). *Decision support systems: a knowledge-based approach*. St. Paul: West Publishing
- Jennex, M. E. (2006). Knowledge Management System Success Factors. In D. Schwartz (Ed.), *Encyclopedia of Knowledge Management* (pp. 429-435). Hershey, PA: Idea Group Reference.
- Leonard-Barton, D. (1995). *Wellsprings of Knowledge*. Boston: Harvard Business School Press.
- Malone, T., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys*, 26(1), 87-119.
- Naisbitt, J. (1984). *Megatrends*. New York: Warner Books, Inc.
- Nissen, M. (2001). *Toward a Program of Research on Knowledge Flow in the Very-Large Enterprise*. (Navy Printing Service-GSBPP-01-003). Office of Naval Research. Arlington, VA.
- Plant, T. (2000). *Introducing Knowledge Management into Complex Organizations*. Australian Defense Force Academy, School of Computer Science, University College, University of New South Wales. (Unpublished manuscript).
- Stewart, T. A. (1997). *Intellectual capital: the new wealth of organizations* (1st ed.). New York: Doubleday/Currency.
- Sveiby, K. E. (1997). *The new organizational wealth: managing and measuring knowledge-based assets* (1st ed.). San Francisco: Berrett-Koehler Publishers, Inc.
- Szulanski, G. (1996). Exploring Internal Stickiness: Impediments to the Transfer of BestPractice Within the Firm. *Strategic Management Journal*, 17 (Winter Special Issue), 27-43.
- van der Spek, R., & Spijkervet, A. (1997). Knowledge management: dealing intelligently with knowledge. In J. Liebowitz & L. C. Wilcox (Eds.), *Knowledge Management and its Integrative Elements*. New York: CRC Press.
- Wiig, K. M. (1993). *Knowledge management foundations-- thinking about thinking-- how people and organizations create, represent, and use knowledge*. Arlington: Schema Press.
- Yin, R. K. (1994). *Case Study Research: Design and Methods* (2nd ed. Vol. 5). Thousand Oaks: Sage Publications.