O UNIVERSITY OF OREGON
APPLIED INFORMATION MANAGEMENT

Technology-Based Market Capabilities: Options that Support Competitive Advantage

CAPSTONE REPORT

Dana L. Hogan
Director, Applications Development
and Support
Information Services
Providence Health Plans

University of Oregon
Applied Information
Management
Program

June 2006

722 SW Second Avenue
Suite 230
Portland, OR 97204
(800) 824-2714

Approved by

_____

Dr. Linda F. Ettinger

Academic Director, AIM Program

Abstract

for

Technology-Based Market Capabilities:

Options that Support Competitive Advantage

Barney et al. (1995) explain that technologies can increase a firm's economic value by reducing costs or differentiating products and services. Literature published 1995-2006 is analyzed to identify types of technology-based market capabilities useful in pursuit of competitive advantage. Eight types are identified: Business Intelligence, Customer Relationship Management, Data Warehouse, Electronic Data Interchange, Email, Information Technology, Knowledge Management and Web & Internet Technologies. The outcome provides a set of references for managers of information systems.

.

Table of Contents

Chapter I. Purpose of Study

Brief Purpose

The purpose of this study is to develop a set of technology-based market capabilities designed for use by managers of information systems in the pursuit of competitive advantage. Saloner, Shepard, and Podolny (2001) state, "Competitive advantage is the 'how' of strategy. . . . It defines *how* the firm intends to achieve its long-term goals within its chosen scope" (p. 39). Brache (2002) defines strategy as "the framework of choices that determine the nature and direction of an organization" (p. 7). Two examples of a technology-based market capability are knowledge management that according to Rumizen (2002) is—"the systematic process by which knowledge needed for an organization to succeed is created, captured, shared and leveraged" (p. 9)—and information systems defined by Brache (2002)as—"a vehicle for capturing, storing, correlating, disseminating, and/or accessing information about the external environment, internal operations, or the connection between them" (p. 33).

This study is designed as a literature review, described by Leedy and Ormrod (2001) as, ". . . to 'look again' (re + view) at what others have done in areas that are similar, though not necessarily identical, to one's own area of investigation" (p. 70). Included in the review are periodicals retrieved from online university library databases, texts from University of Oregon Applied Information Management coursework and online resources from the World Wide Web. Literature published from 1995 to 2006 is collected and analyzed using conceptual content analysis as described by Palmquist (2006). To identify the technology-based market capabilities (Saloner et al., 2001), key search terminology and phrases are selected to guide the analysis (Palmquist, 2006).

The results of the conceptual analysis process are presented in the form of a

table, listing technology-based market capabilities that have been shown to create value

and improve competitive advantage. Then, results are analyzed again and presented as

a set of referenced options designed for the needs of information services managers

when planning to develop or invest in technology-based market capabilities.

Full Purpose

To better understand the concept of technology-based market capabilities in pursuit of competitive advantage, it's useful to further define terms. In a recent study, Cegielski, Reithel, and Rebman (2005) provide insight into how a survey audience defined competitive advantage: "Interestingly, most of the participants expressed competitive advantage not in terms of a single application of technology that produces a benefit for a finite amount of time, but rather as a continuous effort to manage the integration of technologies as they develop" (p. 115). From this perspective, the assumption can be made that the challenge to the information manager is heightened to select and provide a number of information technologies that add value and capabilities on an integrated basis. The term "information technology" is defined in this study as, ". . . all matters concerned with the furtherance of computer science and technology and with the design, development, installation, and implementation of information systems and applications" (Interoperability Clearinghouse Glossary of Terms, 2006). In this case, "technology" refers to the creation of information technologies (Interoperability, 2006) that according to Barney, Fuerst, and Mata (1995) ". . . increase economic value to a firm by either reducing the firm's costs or differentiating its products or services" (p. 487). Examples of technology-based market capabilities that add value by reducing cost are purchasing/inventory/ordering systems or automated telephonic support centers (Barney et al., 1995). An example of technology-based market capabilities for product differentiation is customer centric innovation, which uses customer research (through data collection and analysis) to identify needs, and which uses results to develop and purchase capabilities, including technology, needed to differentiate products and desired services (Selden and MacMillan, 2006).

Strategic Planning

Technology-based market capabilities can be considered part of competitive advantage in strategic planning. Saloner et al. (2001) state that during strategic planning, ". . . each unit (business) is asked to develop a plan for itself, and those plans get reviewed, revised, and aggregated by more senior managers as the plan 'moves up' the organization" (p. 9). As part of this planning, information managers must devise an information technology strategy that aligns and supports the business strategy (Cegielski et al., 2005) of their business counterparts. Rumizen (2002) states that, "Even though CIOs [Chief Information Officers] must be experts in information technology, their primary role is to help the organization succeed" (p. 120). Cegielski et al. (2005) reveal that information managers (including CIOs) must be an integral part of the strategic planning process in selecting and providing technology to meet business strategic needs.

Value Creation and Competitive Advantage

Saloner et al. (2001) also describe the challenge of creating competitive advantage in support of business strategy:

> A firm achieves superior performance only if it can provide products or services that customers will pay more for than it costs the firm to provide them. That is, the firm must be able to create value. Value creation is at the heart of any successful strategy (p. 39).

Thus, this researcher takes the position that information managers must stay informed and skilled in use of technology-based market capabilities that create value leading to the competitive advantage of the organization.

Method

This method of this study is a literature review. Leedy and Ormrod (2001) posit, "The review [literature] describes theoretical perspectives and previous research findings related to the problem at hand" (p. 70). The process involves a review of existing literature related or identical to the problem and is intended to consider previous findings and reveal new ones (Leedy and Ormrod, 2001). Research findings presented in the form of books, full-text journal articles obtained from academic databases, and online articles from the World Wide Web make up the body of resources collected and analyzed in this study. Ample materials are identified to create the data pool for analysis, with a focus on scholarly and peer-reviewed materials.

Twenty-five resources, published between 1995 and 2006, have been selected to form the data pool for this analysis. Literature collection focuses on the following content areas:

• Technology-based market capabilities, as they pertain to information management systems (technology): Barney et al. (1995) explain that technologies can "increase economic value to a firm by either reducing the firm's costs or differentiating its products and services" (p. 487).

• Value creation, as it pertains to technology-based market capabilities: Value is defined as a service or product that customer is willing to pay more for than it costs a company or firm to produce (in this case, with the use of technology) (Saloner et al., 2001).

• Competitive advantage, as it pertains to technology-based market capabilities: According to Saloner et al. (2001), ". . . to have a competitive advantage, an organization must have market position and capabilities" (p. 41).

Chapter III – Method fully describes the set of collection criteria. All resources are selected according to their relevance against two criteria:

- technology-based market capabilities

- competitive advantage

Literature that does not match one of these criteria is excluded from the study.

While not inclusive of all of the data available on this topic, a preliminary review of the literature reveals that the technology-based, value-creation market capabilities most often identified are information management tools for knowledge management (KM) and business intelligence (BI). Alavi, Kayworth, and Leidner (2005/2006) define KM as "the generation, representation, storage, transfer, transformation, application, embedding and protection of organizational knowledge, where knowledge can be defined as information possessed in the minds of individuals" (p. 192). BI appears to be equally important, as Gessner and Volonino (2005) posit, "Customer profitability can be increased and customer attrition decreased when BI technology enables business management to identify when up-sell and cross-sell opportunities exist and interventions are needed" (p. 74). Emphasis is placed on these two capabilities at the outset.

The selected literature is analyzed using conceptual content analysis (Palmquist, 2006). "In conceptual analysis, a concept is chosen for examination, and the analysis involves quantifying and tallying its presence" (para. 2). The eight steps to the conceptual content analysis process (Palmquist, 2006) are detailed in Chapter III – Method. In summary, conceptual content analysis is used to identify from the larger body of resources the resources most pertinent to this study, based on the existence and frequency of concepts, terms, or phrases within an item of literature. Then the tallying process of the data is used to judge the relevance of each research piece in

analyzing the findings and the data pool as a whole.

Results of the conceptual analysis process are presented in a table as a set of factors that describe technology-based market capabilities. The initial data is organized to indicate the source (created via information technology as software or hardware) of each technology-based market capability. Results are then re-analyzed and re-framed into the final outcome of the study as a set of three tables that present referenced options developed in terms of the needs of information services managers, as a way to understand how technology-based market capabilities are useful sources in the pursuit of competitive advantage (as defined by Barney et al., 1995; Rumizen, 2002; Saloner et al., 2001).

Brache (2002) states, "A competitor can meet the needs of the market with similar or substitute products and services" (p. 7). To have a competitive advantage, an organization must have market position and capabilities (Saloner et al., 2001). And while this paper does not focus on market position, Saloner et al. (2001) refer to the concept as, ". . . a firm's positional advantage within its competitive environment" (p. 41). This paper does address market capabilities defined by Saloner et al. (2001) as: ". . . the capabilities that enable [a company] to perform certain functions better than its rivals" (p. 41).

The assumption underlying this study is that technology-based market capabilities have the potential to create value in an organization and are thus key to competitive advantage. The outcome of this study is a research-based set of tables that present referenced options in this pursuit. Tables outline the technology-based market capabilities identified in the literature as relevant sources of information technology used in the pursuit of competitive advantage and the options are referenced (see Tables 10,

11 and 12). These relevant sources identify the types of technology-based market capabilities (information technology-based) that create value and competitive advantage, as these concepts are defined above. Tables are designed for information management and business professionals to use as part of strategic planning and business development activities. Information systems managers, especially Chief Information Officers (CIO), need to provide knowledge and skill in building technology-based market capabilities (Rumizen, 2002; Saloner et al., 2001). Rumizen (2002) states, "A good CIO's job is to make information technology service the needs of the business. . . . To do that successfully, a CIO must understand the business, build internal relationships, and plan for the future" (p. 127). A CIO must be effective at selecting systems that add the most value and for less than it costs to provide them (competitive advantage) (Rumizen, 2002).

Significance of the Study

Information systems managers and CIOs have a stake and responsibility in providing information technology to help their organization succeed in achieving competitive advantage. According to Pastore (1995), the CIO (and information systems manager) has a crucial role in creating technology-based market capabilities: "CIOs understand the enabling technologies to allow distinctive positions to be created, so the CIO has an important role to play" (para. 11). Galliers, Leidner, and Baker (2001) support the importance of technology-based market capabilities: "Information systems are moving out of the backroom, low-level support position, to emerge as the nerve centres of organizations and competitive weapons at the front end of businesses" (p. 19). PRTM and InterUnity Group's 2003 study further reinforces the point: "Companies that are leaders in their markets and industries are better at using IT to enable business

strategy" (para. 1).

On the other hand, Gessner and Volonino (2005) posit that a contradictory perspective exists in the field: "Over the past decade, companies have invested heavily in IT infrastructure to capture, store, analyze and communicate data. However, these data infrastructure investments were often approved based on projections of profitability from customer relationship management (CRM) or BI, which were not achieved" (p. 74). Regarding turning strategic plans into reality, Peppard and Ward (2005) say that ". . . [senior leaders] tend to focus on keeping costs and resource usage to a minimum, while having limited understanding of the practical barriers to translating their high-level strategic change plans into reality" (para. 25).

Based on these two conflicting positions, the goal of this study is to analyze the available literature to support leadership activities in successfully developing and investing in technology-based market capabilities that meet competitive advantage. This study is designed to create an aggregate view of current technology-based market capabilities. The outcome of this study is import to industries heavily dependent on technology in meeting the needs of their customers (e.g. manufacturing).

Limitations

Time frame

Literature published from 1995-2006 is reviewed in researching the problem. These dates are chosen to provide a ten-year perspective on the role of information technology capabilities in today's business world, as presented in the literature. Most of the findings identified are more recently published.

Selected literature

Texts, scholarly peer-reviewed literature from academic databases, online

university libraries, and Internet Web sites are used to identify literature pertaining to technology-based market capabilities in the pursuit of competitive advantage. Literature was identified using key search terms and phrases fully described in Chapter III – Methods of this paper.

- Competitive Advantage: The concept of competitive advantage is widely written about from a business perspective of strategy and organizational capabilities. This paper focuses on the information systems used in creating competitive advantage and includes the review of resources written in the past decade.

- Technology-Based Market Capabilities: According to Saloner et al. (2001), ". . . there are two common 'categories' of competitive advantage[:] . . . position and advantages based on the firm's capabilities" (p. 41). The scope of this paper includes an assessment of technology-based market capabilities that create value, relative to competitive advantage.

Literature review

The process of literature review involves review of existing literature related or identical to the problem area (Leedy & Ormrod, 2001). It is a systematic way of building upon an existing body of research retrieved from valid and reliable resources, such as books, indexes, abstracts, and other general references, relevant to the research problem. The literature is read, evaluated, organized, and synthesized to provide supporting evidence for the research problem (Leedy & Ormrod, 2001). Literature pertaining to competitive advantage and technology-based market capabilities is readily available in literature from the analysis and, therefore, suitable for literature review.

Conceptual content analysis

The selected literature resources are analyzed using conceptual content

analysis. The relevancy of each piece is identified by studying the content to identify word and concepts related to technology-based market capabilities and competitive advantage. Conceptual content analysis can be thought of as establishing the existence and frequency of concepts—most often represented by words or phrases—in a text" (Palmquist, 2006). Coding of resources and analysis identifies technology-based market capabilities related to competitive advantage. The final outcome of the content analysis is presented as a table of recommendations for the audience of this paper, information management professionals.

Exclusions

Data pertinent to technology-based capabilities (hardware and software tools) are identified during conceptual analysis. Literature regarding information management knowledge expectations and skills regarding technology-based market capabilities are included. All other data are excluded. For example, organizational structure, management skills, and leadership are not included as part of this analysis.

Definitions

"Business Intelligence (BI)," according to Webopedia (2006), "represents the tools and systems that play a key role in the strategic planning process of the corporation . . . " "These systems allow a company to gather, store, access, and analyze corporate data to aid in decision-making" (para. 1). BI is used across various industries; for example, Gessner and Volonino (2005) indicate that BI can assist in "identifying revenue-generating and revenue-retaining opportunities" (p. 66).

"Competitive Advantage" *i*s the "how" of strategy. It defines how the firm intends to achieve its long-term goals within its chosen scope (Saloner et al., 2001). The elements of competitive advantage are explained by Rumelt (2003): "Thus, competitive

advantage means having low costs, differentiation advantage, or a successful focus strategy" (p. 1). Rumelt (2003) further defines competitive advantage by quoting Porter: "Competitive advantage grows fundamentally out of value a firm is able to create for its buyers that exceeds the firm's cost of creating it" (p. 2).

"Conceptual Content Analysis" follows the methodology of content analysis as described below. According to Palmquist (2006), "A concept is chosen for examination, and the analysis involves quantifying and tallying its presence" (para. 2).

"Content Analysis" as described by Palmquist (2006), ". . . is a research tool used to determine the presence of certain words or concepts within texts or sets of texts" (para. 2). The process consists of defining the data collection strategy, and then creating an analysis and presentation plan.

"Customer Relationship Management (CRM)" involves the use of technology to capture, store, and leverage customer information. According to Selden and MacMillan (2006), customer information is used to "identify core customer segments" and in developing services, tools, and products that exceed customers' expectations.

A "data Warehouse" is a centralized database used to aggregate all organizational data. The data warehouse is preceded by an operational data store, which is used as a staging area to prepare data to be loaded to the data warehouse (Messner, 2004; Webopedia, 2006).

Brache (2002) reviews the benefits of "Electronic Data Interchange (EDI)": "Electronic links with your customers can simplify and accelerate their ordering of your products and services, your billing, and their payment" (p. 152).

According to Rumizen (2002), "Electronic Mail" is an electronic version of written mail. "Electronic messages are sent via an electronic network" (p. 141).

"Information Managers/Technologists" are people who manage staff that maintain, support, implement, develop, and handle other aspects of information technology (Hughes, 2003).

"Information Systems" are software and/or hardware applications. According to Brache (2002), "An information system is a vehicle for capturing, storing, correlating, disseminating, and/or accessing information about the external environment, internal operations, or the connection between them" (p. 144).

"Information Technology (IT)" is the application of knowledge in creating information systems. IT includes all matters concerned with the furtherance of computer science, technology, and with the design, development, installation, and implementation of information systems and applications" (Interoperability Clearinghouse, 2006).

"Knowledge Management (KM)" is the systematic process by which knowledge needed for an organization to succeed is created, captured, shared, and leveraged (Rumizen, 2002). Brache further notes that, "Much of KM is getting what is in the heads of a small number of people ('tacit knowledge') available to all who can use it ('explicit knowledge')" (p. 144).

"Literature Review" is a process that involves review of existing literature related or identical to the problem area of a research-based study. The literature is read, evaluated, organized, and synthesized to provide supporting evidence for the research problem (Leedy and Ormrod, 2001).

"Market Capability" is the ability of an organization to efficiently provide customer-desired services. These are the capabilities that enable a firm to perform certain functions better than its rivals (Saloner et al., 2001). Rumelt (2003) cites Kay, who posits, "A distinctive capability becomes a competitive advantage when it is applied in

an industry and brought to market" (p. 2).

"Market Position" is one component of an organization's competitive advantage. The other is its capability. Saloner et al. (2001) state there are three types of positional (market) advantage:

- "Industry structure [few competitors],"

- "Heterogeneity in the industry [dominator in a fragmented industry]," and a

- "Network of relationships [favorable relationships lead to better market position]" (p. 44).

According to Brache (2002), "Processes" "are the vehicles through which work gets done" (p. 8). Process examples include business development, product development, order fulfillment, strategic planning, etc.

"Business strategy" defines an organization's goals and the direction it will take to achieve them (Saloner et al., 2001). For example, if an organization wants to reduce administrative costs, it might choose to implement KM, that according to Brache (2002) assists in: "getting the right information to the right people at the right time" (p. 144).

"Technology-based market capabilities" are the enabling information technologies that allow distinctive market positions leading to competitive advantage (Pastore, 1995). These technologies include software and/or hardware, e.g. BI (Gessner & Volonino, 2005; Thornthwaite & Mundy, 2006) and KM (Santos, 2002; Rumizen, 2001).

"Web or Internet technology" is defined by a variety of words and phrases identified in this study. According to Webopedia (2006), the Internet is "a global network connecting millions of computers in over one hundred countries," (and the Web is "a system of Internet servers that make information available worldwide."

"Value creation" is related to competitive advantage (Saloner et al., 2001). There are two components required to achieve competitive advantage: production at a lower cost than competitors and customer preference. Rumelt cites Saloner et al. (2001): "Most forms of competitive advantage mean that either a firm can produce some service or product that its customers value more than those produced by competitors or that it can produce its service or product at a lower cost than its competitors" (p. 41).

A "vendor" is an organization or firm that sells software, hardware, or related services to the general public (PC Magazine, 2006).

Problem Area

The research goal of the study is to identify solutions to help information systems managers to be effective business partners by providing technology-based market capabilities in the pursuit of competitive advantage. The IT industry is very active in providing solutions for technology-based market capability. This situation is widely written about, as revealed by the research. According to PRTM and The InterUnity Group (2003), "The link between corporate performance and effective information technology (IT) management is clearly emerging" (para. 1). Worthen (2004) states, "On the one hand they (CIO's) need to keep costs low to please the COO (chief operating officer) and CFO (chief financial officer); on the other, they must continue investing in IT projects to give the company a competitive advantage to satisfy the CEO" (para. 5).

The literature review and content analysis of this study identify many types of technology-based market capabilities. With the high expense of information technology investments, information managers need to know which technology-based market capabilities (software and hardware) are most successful in the pursuit of competitive advantage. Not only are companies and information systems managers challenged with

proving technology-based market capabilities, they may also face the challenge of providing and integrating numerous systems. Pastore (1995) says, "Companies with sustainable competitive advantage integrate lots of activities within the business: their marketing, service, designs, customer support" (para. 10). Pastore (1995) adds, "All of those things are consistent, interconnected, and mutually reinforcing" (para. 10).

The pressure to differentiate from other organizations is fierce. Oliveira and Roth (2005) state, "In the virtual space, the competition is only a few clicks away, and if customers are dissatisfied with the portal's ease of use, they can easily go elsewhere" (para. 20). Further defining the problem, Hughes (2004) quotes Carr: ". . . the ubiquity of IT systems has largely neutralized the competitive advantage that innovative businesses have gained from IT. . . . IT systems have become commoditized" (p. 39). Carr's comments resonate with the previous statements from Pastore regarding integration of activities: companies cannot rely on a single system to provide their competitive advantage. Provision of many systems, and perhaps integrating them, is now the source of providing technology-based market capabilities in the pursuit of competitive advantage.

Making appropriate decisions based on the numerous types of technology-based market capabilities poses high risk in expense and resource allocation for information systems managers. Selecting the right technology-based market capabilities to address their specific market needs is critical to success. Friscia (2003) states, "The best companies don't sit idle—they take advantage of the slowdown to strengthen their organizations and find ways to gain competitive advantage" (para. 2). This study provides a research-based review and analysis of the literature that addresses types of technology-based market capabilities in the pursuit of competitive advantage. While not

a complete assessment of all the types of technology and their applications, the outcome of this study provides information service managers a reference to quickly reveal likely sources of technology-based market capabilities. In addition, the literature review and conceptual content analysis findings reveal potential resources for further consideration.

Chapter II. Review of References

The following review of references provides insight on key literature used in this paper. Each reference is reviewed for the following three aspects: (1) applicability to the study, (2) how the reference is used in the study to support the various sections of the paper, such as the purpose, method, or analysis, and (3) how the selection criteria of this study are used to select the particular reference, including factors such as detail about the author(s), use in other studies, and authority of the source. Each resource is listed alphabetically and introduced with a bibliographic citation.

Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource based analysis. *MIS Quarterly, 1*(4), 487-505. Retrieved April 16, 2006, from EBSCO (Business Source Premier).

This work associates the importance of technology-based market capabilities to competitive advantage and frames the way in which information technology creates value in an organization. The authors describe the use of several types of technology-based market capabilities, the application of the technology, and the impact on competitive advantage.

Citations from this journal article are key in framing the Purpose of this paper. Barney, Fuerst, and Mata's work qualifies against the criteria for literature selection and is selected for use in the data analysis process.

In addition to the works of other researchers, Barney, Fuerst, and Mata are cited in other literature selected for this study. Barney is a professor at Ohio State University. Fuerst and Mata are professors at Texas A & M University. The authors are published and cited in numerous texts and in journal and industry articles.

Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise

health. New York, NY: John Wiley & Sons, Inc.

Brache's book is written for the business professional, offering advice on how to

achieve operational performance and excellence. This book focuses on organizational

culture, processes, and strategy.

Brache's work is referenced in the Methods chapter in defining market position,

and citations from the text are used in the Definitions section of this paper. Chapter 9 of

the text is selected as one entry in the data set, for use in the data analysis. Brache's

work is used to provide definitions for the concepts of strategy, information systems,

and knowledge management.

Brache is the Executive Director of Business Solutions with the consulting and

training firm Kepner Tregoe. According to Kepner Tregoe's Web site (citation), Brache is

the author of twenty-six articles published in business magazines and is a graduate of

Wesleyan University. In addition to nearly 30 years of experience in the field of

consulting, Brache is also the co-author of two texts (including this cited one) on

operational and process excellence.

Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies:

Developing a timely IT. *Communications of the ACM*, *48*(8), 113-117. Retrieved

March 26, 2006, from EBSCO (Business Source Premier).

This work reviews a survey of IT professionals regarding success in business

strategies and IT solutions. A key finding in this article is that businesses are more

successful with a combination of solutions rather than relying on only one technology-

based market capability.

The authors' work is used to frame the Purpose of this paper to tie technology-

based market capabilities to competitive advantage. This article is also selected for use in the data analysis process. The authors of this work are academic researchers. Cegielski is an associate professor of management information systems at Auburn University. Reithel is a professor at University of Mississippi. Rebman holds an assistance professorship at the University of San Diego. The article follows standard research publication protocols required by the *Communications of the ACM* and is supported by scholarly journals and industry articles in citation.

Galliers, R., Leidner, D., & Baker B. (2001). *Strategic information management:*

Challenges and strategies in managing information systems (2nd ed). Oxford,

MA: Butterworth-Heinemann.

Galliers, Leidner, and Baker provide an overview of the role of information management in managing business needs. This text covers many aspects of information management strategy. The authors illustrate the role of information managers in various business processes and settings and provide case studies to further clarify. The text examines ways in which information technology supports business strategy and the realization of strategic goals. The reference qualifies against the literature selection criteria for both technology-based market capability and competitive advantage.

This text is selected as a source in framing the Purpose of this paper. However, because the application of technology-based market capability to competitive advantage is addressed throughout this lengthy text, it is not selected as a resource for data analysis due to time limitations of this research study.

While this book is a collegiate text, it is written in a format for use by information management professionals in the workplace. This is important to the study because the

purpose of the final outcome is to provide recommendations applicable in a "real world" setting. Galliers is a renowned professor and published and cited author, as is Leidner. Baker holds a doctorate from Warwick Business School. All of the authors have areas of interest in strategic information systems and knowledge management. This text is widely cited in other academic studies.

Gessner, G., & Volonino, L. (2005). Quick response improves returns on business

intelligence. *Information Systems Management*, *22*(3), 66-74. Retrieved March

26, 2006, from EBSCO (Business Source Premier).

Gessner and Volonino's article discusses the importance of customer

relationship data and tools for managing information—in particular, timely response to customer needs and other value-added services (services customers are willing to pay more for). Business intelligence (BI) is a technology-based market capability reviewed in this study. The competitive advantage of timely customer response is reviewed in detail in this article.

Content from this article concerning BI is used to frame the Purpose and Method of this paper. This study meets the qualifying criteria for literature review and is selected for use in the data analysis process.

This article is published in a professional peer-reviewed journal. Professor Gessner teaches marketing and Professor Volonino teaches information systems, both at the Wehle School of Business at Canisius College in Buffalo, New York.

Palmquist, M. (2006). *Overview: Content analysis*. Retrieved March 19, 2006, from

Colorado State University Writing Lab Web site: http://writing.colostate.edu/

guides/research/content

The Colorado State University Writing Lab Web site provides an overview and

systematic method for content analysis. The author is quoted throughout the paper in reference to conceptual content analysis.

The site was used in depth in developing the Method chapter of this study and in creating the eight-step data analysis plan. A definition of conceptual concept analysis is also cited in the definitions section of the purpose of this study.

Palmquist's content analysis work is recommended as a guide by the University of Oregon Applied Information Management as part of thesis preparation. The author is a Professor of English and a University Distinguished Teaching Scholar at Colorado State University.

Peppard, J., & Ward, J. (2005). Unlocking sustained business value from IT

investments. *California Management Review*, *48*(1), 52-70. Retrieved March 26,

2006, from EBSCO (Business Source Premier).

This study reviews the importance of customer relationship management using a bank as context. The article illustrates the importance of the role that managers and users take in realizing the potential from information technology investments.

Content is used in framing the strategy in the Significance section of the Purpose of this paper in describing strategic planning and its importance in competitive advantage. The study is selected for use in the data analysis process.

Both authors have published numerous books and journal articles on business management, strategy, and information technology. Professor Peppard teaches Information Systems and Professor Ward teaches Strategic Information Systems, both at the School of Management at Cranfield University, London, England.

Rumelt, R. (2003). What in the world is competitive advantage? Retrieved May 7, 2006,

from The Anderson School at UCLA Web site: http://www.anderson.ucla.edu/

documents/areas/fac/policy/WhatisCA_03.pdf

This article pulls together the works of numerous expert authors on the topic of competitive advantage. Rumelt provides an important reference in explaining competitive advantage and value-creation.

Rumelt's work supports several areas of the Purpose of this study. Citations are used to define the first construct of competitive advantage. Three definitions in this study—competitive advantage, market capability, and strategic planning—are supported by Rumelt's work. This work qualifies against only one of the criteria constructs for the study; therefore, it is not selected for use in the data analysis process.

Rumelt has been the author of several texts and numerous scholarly journal articles on the topic of competitive advantage and strategy since the 1970s. The author is a professor at the Anderson School of Business at University of California Los Angeles.

Rumizen, M. (2002). *The complete idiot's guide to knowledge management*. Madison,

WI: CWL Publishing Enterprises.

Rumizen's informative text on knowledge management is written as a primer and focuses on how business knowledge can be used organizationally in strategy and through teamwork and structure. It also reviews the common applications of knowledge with information technology and the role of information management professionals in meeting these business requirements.

Part 3 of Rumizen's text focuses on the role of information management and technology in servicing the needs of business strategy and operational performance. Rumizen is cited throughout this study in all sections of the paper to frame the importance of the problem and its relationship to knowledge and information technology.

Part 3 of the text qualifies against the literature review criteria of this study and is selected for use in the data analysis.

Rumizen has worked professionally as a knowledge strategist at Buckman Labs since 1997. Rumizen is a well-cited author in both scholarly and business literature in the area of knowledge management.

Saloner, G., Shepard, A., & Podolny, J. (2001). *Strategic management.* New York, NY: John Wiley & Sons.

This text covers the spectrum of the strategic planning and outcomes process and was selected because of its detailed overview of competitive advantage and technology-based market capabilities illustrated by case studies. These case studies provide real-life examples of the application of technology-based market capability.

The text includes chapters that cover competitive advantage, strategy, and value-creation, which are important in building the context of the Purpose and Problem of this study. Technology-based market capabilities are discussed throughout the selected chapters. The authors are cited throughout this study as a key reference in the Purpose, Problem, Definitions, and Method of this paper. Chapters 2, 3, and 10 qualify against the criteria for data analysis for this study and are selected as part of the data set for coding.

Saloner, Shepard, and Podolny are widely cited in academic and professional literature. This text is used at the college level, as well as by business professionals. The authors have written numerous books and scholarly articles. All three are professors at Stanford University, Berkeley, California. Saloner, Shepard, and Podolny are quoted in Rumelt's work on competitive advantage, also referenced in this study.

Chapter III. Method

The primary research method of this study is literature review. The process involves review of existing literature related or identical to the problem area. The literature is read, evaluated, organized, and synthesized to provide supporting evidence for the research problem. The focus of this study is on technology-based market capabilities pertaining to competitive advantage. Pastore (1995) states that "Rarely does sustainable advantage grow out of a single activity in a business" (para. 8), and that "Sustainable advantage comes from systems of activities that are complementary" (para. 9). Thus, there are many forms of technology-based market capabilities written about in the literature. This makes the literature review process well suited to identifying literature related to the problem area of the study.

The study is done using the qualitative approach to literature review. Leedy and Ormrod (2001) state that "qualitative approaches have two things in common . . . . They focus on phenomena that occur in natural settings 'the real world,' and ". . . they involve studying the phenomena in their complexity" (p. 147). The qualitative analysis approach identifies literature that reveals the nature of this author's focus on competitive advantage and complex phenomena (technology-based market capabilities).

Literature Collection

In order to determine the capabilities that create value and competitive advantage, a body of literature relevant to the purpose of this study is identified, presented in a variety of kinds of materials, including, books, journals, and online resources. Materials collected for the study address the theoretical framework of technology-based market capabilities in the pursuit of competitive advantage. Value, market position, and strategy pertaining to competitive advantage are important terms in

the process of identifying the literature pertinent for this study of technology-based market capabilities (Saloner et. al, 2001). Twenty-five sources form the data pool for analysis; all have been published over the last decade. This timeframe is selected to produce an analysis of today's business and information technology environment.

During the literature collection process, relevant sources are selected based on a test for relevance against one criterion: technology-based market capabilities that add competitive advantage. Literature that doesn't meet one of these criteria is disqualified from the study. Literature is collected from a variety of published sources, including the following:

• Books – Books from the University of Oregon's graduate program in Applied Information Management (AIM) (see Appendix A, Table 1) are referenced and analyzed in the study as key resources.

• Academic Database – Business Source Premier, accessed through the University of Oregon Libraries, is the primary academic database used to identify literature related to the research problem. Lexis-Nexis Academic results often proved to be repetitive of those found in Business Source Premier. Search terms and strings used to identify the literature using Boolean operators:

"CIO" + "competitive" + "advantage"

"CIO" + "market" + "capabilities"

"Competitive" + "advantage"

"information" + "management" + "capabilities"

"information" + "technology" + "capabilities"

"information" + "technology" + "value"

"technology-based" + "market" + "capabilities"

"technology-based" + "business" + "solutions"

Productive search strings include the terms, "CIO competitive advantage", and "information technology capabilities." A pool of journal articles and online resources has been identified from this research. Literature identified describing a particular capability (software or hardware) is described in the study as a technology-based market capability. Examples include business intelligence (BI) (Gessner & Volonino, 2005; Thornthwaite & Mundy, 2006) and (KM) (Santos, 2002; Rumizen, 2001).

- Internet Search Engines and Web sites – To identify online journal articles and resources from the World Wide Web, two search engines are used: Google (http://www.google.com) and Google Scholar (http://scholar.google.com). The literature search terms and process indicated above identify industry articles, online magazines, and technology and business industry Web sites. In addition, previous University of Oregon Capstone papers and academic research support sites such as the Colorado State University Writing Lab are assessed for potential resources. The Web sites indicated in Table 2 (see Appendix A) identify the most pertinent resources.

Data Analysis

A final set of references for use as the data analysis set has been obtained, consisting of twenty-five sources. Sources in the data set are listed in Appendix B. The approach selected for data analysis is conceptual content analysis as defined by Palmquist (2006). Conceptual content analysis is used to "identify the intentions, focus or communication trends of an individual, group or institution" (Palmquist, 2006). The eight-step process for conceptual content analysis outlined by Palmquist (2006) is followed in this study. Each step, as applied, is described below.

Step 1: Level of analysis

The content analysis process is applied to literature that identifies types of technology-based market capabilities in the pursuit of competitive advantage. This includes data that identifies a technology source that increases competitive advantage by reducing cost and improving efficiency or by increasing value (where the customer is willing to pay more than the cost to produce it) (Saloner et al., 2001). Analysis proceeds at the concept level, guided by five larger constructs, defined next.

Step 2: Number of concepts for coding

Two larger constructs are used to guide the reading of the literature: 1) competitive advantage and 2) a technology-based market capability such as software or hardware. The actual coding is directed by close reading in relation to a definition for each construct. They include:

• *Construct 1*: *Competitive advantage*. Competitive Advantage is the "how" of strategy. It defines how the firm intends to achieve its long-term goals within its chosen scope (Saloner et al., 2001). The elements of competitive advantage are explained by Rumelt (2003): "low costs, differentiation advantage, or a successful focus strategy" (p. 1). Rumelt (2003) further defines competitive advantage by quoting Porter: "Competitive advantage grows fundamentally out of value a firm is able to create for its buyers that exceeds the firm's cost of creating it" (p. 2).

• *Construct 2: Technology-based market capabilities.* Factors described as technology-based market capabilities (technology tools) are the enabling technologies that allow distinctive market positions (Pastore, 1995). A beginning emphasis in this study is on capabilities that fall within two larger types: knowledge management and business intelligence. Other types are identified as they emerge through the data

analysis process.

Step 3: Coding for existence or frequency

Within each piece of literature, the existence of concepts related to the two constructs outlined above is noted and recorded.

Step 4: Distinguishing among concepts

Terms and phrases appearing in the literature related to these constructs, whether hardware, software, communications, or other technology-based services, are generalized as "technology-based market capabilities" and then by one of two previously described types (or others as they are defined in the analysis), including BI (Gessner & Volonino, 2001) or KM (Alavi et al., 2005/2006).

Step 5: Rules for coding texts

Texts are first analyzed for the existence of the concept of technology-based market capability as described under Construct 1 above. If the text also qualifies for the existence of Construct 2, described above, the source is coded and tabulated as such.

Step 6: Irrelevant information

Information is relevant if identified in the previous step regarding content coding rules. Irrelevant information, identified through interpretive comparison to the coding concepts and rules, is ignored in this study. Words such as "and" and "the" are not considered irrelevant if they do not affect the outcome of the coding.

Step 7: Coding

Coding of resources is done manually, reviewing each piece of literature for the existence of the targeted concepts and construct definitions listed in Step 2 above. In the case of textbooks, the relevant chapters are reviewed rather than the entire text. All articles and online sources are reviewed and coded in their entirety.

Several coding steps are conducted. The first phase identifies the literature pool for content analysis. Coding of the literature pool addresses the previous criteria constructs as a way to determine whether to include the literature source in the content analysis. In other words, an occurrence of each of the constructs is noted only if the identified technology-based market capability can also be related in the text to the construct of competitive advantage (value, market position, or strategy). The features of competitive advantage:

Value – A customer's willingness to pay more for a good or service than it cost the firm to create them (Saloner et al., 2001).

Market Position – according to Saloner et al., is the "how" of strategy . . . . It defines *how* the firm intends to achieve its long-term goals within its chosen scope" (p. 39). Brache (2002) posits, "Strategy is the framework of choices that determine the nature and direction of an organization" (p. 7).

Strategy – Relates to technology of **strategic** importance, defined as having elements that clearly support and define the firm's goals and the direction it will take to achieve them (Saloner et al., 2001).

Data is tracked and analyzed in an Excel spreadsheet. Table 3 (see Appendix A) describes the literature pool evaluation template for content analysis, with an example indicated. Literature that does not meet both criteria for the study is disqualified from the pool for content analysis.

Phase two of the content analysis identifies the existence of one or more technology-based market capabilities in the literature. During the content analysis, a coding cross-reference table of related words, terms, and phrases is tracked. When associated with the broader categories of technology-based market capability types, the

existence of the related word, term, or phrase is coded as an occurrence of the broader

category of a technology-based market capability type. A beginning emphasis in this

study is on two types: customer relationship management and knowledge management.

Other types are noted as they emerge during the analysis process. This data is tracked

in an Excel spreadsheet and displayed as noted in a coding template (see Table 4,

Appendix A). Each broad category of technology-based market capability type (as

indicated in the literature pool and revealed through content analysis) is derived from

the related words, terms, and phrases. In addition to deriving the term for broader

categories of technology-based market capabilities, the existence of a technology-

based market capability is identified. As these related words, terms, and phrases are

identified through the content analysis, they are coded as "existing" in the literature

source per the cross-reference represented in Table 4 (see Appendix A).

The coding in this phase reveals the distribution of technology-based market

capability types by literature source and professional area. The coding template for this

analysis is represented in Table 5 (See Appendix A). The professional area of

application is an important coding step in gathering information for presentation of the

data to the audience (IS managers), which is described in the next step of the analysis.

The table columns are labeled with the derived technology-based capability types

identified in the previous coding step and represented in Table 6 (see Appendix A).

Step 8: Data presentation

The raw data are analyzed a second time in order to focus on how each reported

technology-based market capability is applied in pursuit of competitive advantage. The

results are presented as a set of recommendations in the form of three tables (see

Tables 10-12, Appendix A). Table 10 (See Appendix A) reports the types of technology-

based market capabilities identified in the pursuit of competitive advantage, with the

relevant literature sources for each indicated. McAdams' (2006) work on BI is indicated

as an example of the presented analysis. Table 11 (see Appendix A) presents the

relevant literature sources by technology-based market capability type. Table 12 (see

Appendix A) presents the relevant literature sources by professional area of application.

Chapter IV. Analysis of Data

There are three phases of data analysis. A description of each phase of the analysis is reviewed in this chapter. The results of the analysis are presented as a series of tables, presented in Appendix A (see Tables 10-12). The final outcome of the study (see Table 10) documents the types of technology-based market capabilities indicated as being successful in the pursuit of competitive advantage is presented in Chapter V. Conclusions.

The first data analysis phase concerns selection of the data set for content analysis. The search criteria for the study identify documents relating to technology-based market capability and competitive advantage. The larger pool of literature sources is then analyzed for qualification against the selection criteria for inclusion in the analysis. Resources are selected based on the existence within the literature of terms and phrases identifying both technology-based market capability and competitive advantage. When an instance of a type of technology-based market capability is identified, the second criterion, competitive advantage, is applied. In this step, each source of an identified technology-based market capability type (such as KM or CRM) is again reviewed in relation to if and how it creates competitive advantage, either through value, market position, or strategy. A source may be coded if associated with any or all these features. These features of competitive advantage are defined below:

Value is defined as a customer's willingness to pay more for a good or service than it cost the firm to create them (Saloner et al., 2001).

Market Position, defined as "… the "how" of strategy . . . It defines *how* the firm intends to achieve its long-term goals within its chosen scope" (Saloner

et al., 2001, p. 39). Brache (2002) posits, "Strategy is the framework of choices that determine the nature and direction of an organization" (p. 7).

Strategy relates to technology of **strategic** importance, defined as having elements that clearly support and define the firm's goals and the direction it will take to achieve them (Saloner et al., 2001).

A pool of 25 references is selected to form the data set for content analysis. References selected for use during content analysis are presented in Table 9 (see Appendix A). The analysis of the literature pool has disqualified five literature sources that did not meet both the constructs of technology-based market capability and competitive advantage. A resource indicating that this construct is not met, coded as "N", is eliminated from further analysis. The result of the analysis is a reduction from the literature pool for conceptual content analysis to a total of 21.

The second phase begins actual coding of the literature to identify instances of the existence of the first criterion, defined at the concept level as technology-based market capability. Numerous types of technology-based market capabilities are identified as derived from the cross-reference table of words, terms, and phrases represented in Table 9 (See Appendix A).

Table 10 (see Appendix A) documents how the various types are located within the literature pool. Literature sources not related to a professional area are indicated as not applicable and coded as "n/a". Most literature sources indicated more than one technology-based market capability, as indicated in Table 11 (see Appendix A). A third table identifies the relevant sources of technology-based market capability by professional area.

A second analysis of the findings is done to present the literature sources related to each professional area related to the literature pool. A key finding revealed in the analysis in Table 11 (see Appendix A) is that many of the technology-based market capabilities are discussed as various sets of solutions to competitive advantage. From the analysis, these appear to be tailored to the industry or particular business. For example, Brache (2002), describing technology-based market capabilities used in the professional area of banking, writes about the application of CRM, IT, KM, and the Web in the pursuit of competitive advantage. Pacewic (2004), writing in the professional area of health insurance, writes solely about KM as a competitive advantage, while others in the literature pool address KM along with other technology-based market capabilities, applied in various professional areas.

Chapter V. Conclusions

The final outcomes of the study, Tables 10, 11 and 12 (see Appendix A), are designed to present referenced options to managers of information systems when selecting effective technology-based market capabilities useful in the pursuit of competitive advantage. Table 10 shows the distribution of discussion of technology-based market capabilities, across the selected literature analyzed in this study. Table 11 lists types of technology-based market capabilities, across the selected literature analyzed in this study that have been shown to create value and improve competitive advantage. Table 12 identifies the professional area(s) of application addressed in each reference.

Tables 10-12 (see Appendix A) provide referenced options for selecting the most effective technology-based market capability in pursuit of competitive advantage. The tables enable:

- quick identification of technology-based market capabilities useful in the pursuit of competitive advantage;

- identification of literature sources that pertain to competitive advantage and review of specific types of technology-based market capability; and

- identification of literature sources that pertain to professional areas of application, related to competitive advantage and technology-based market capabilities.

This study reveals the importance of the correct and prudent selection of technology-based market capabilities in the pursuit of competitive advantage. Previously cited in the Purpose of this study, Cegielski et al. (2005) write about the importance of technology-based market capabilities and their survey audience: "Interestingly, most of the participants expressed competitive advantage not in terms of

a single application of technology that produces a benefit for a finite amount of time, but rather as a continuous effort to manage the integration of technologies as they develop" (p. 115). Indeed, the first outcome of the study, presented in Table 10 (see Appendix A), indicates that literature sources include the occurrence of numerous technology-based market capabilities. However, this ambiguity of multiple sources in creating technology-based market capability provides a challenge in revealing the best approach in the pursuit of competitive advantage. This presents a very difficult challenge to the IS manager looking to satisfy strategic plans where technology-based market capability is the expected solution and the potential is great for costly mistakes. Gessner and Volonino elaborate:

> Over the past decade, companies have invested heavily in IT infrastructure to capture, store, analyze, and communicate data. However, these data infrastructure investments were often approved based on projections of profitability from customer relationship management (CRM) or BI, which were not achieved. (p. 74)

Thus, errors in selecting a technology-based market capability for meeting competitive advantage are a risk for IS managers. The wrong selection can result in expense, thus reducing the ability to achieve competitive advantage. As stated in the Purpose of this study, not only do IS managers face the problem of what technology-based market capability will most closely satisfy competitive advantage goals, but the expense of a potential mistake in selection is looming. Peppard and Ward (2005), regarding turning strategic plans into reality, say that ". . . [senior leaders] tend to focus on keeping costs and resource usage to a minimum, while having limited understanding of the practical barriers to translating their high-level strategic change plans into reality"

(para. 25). Thus the focus on high risk in selecting the best technology-based market

capability for the competitive advantage need, in addition to the high-cost of the solution

to the business, compounds the problem for the IS manager.

Appendix A. Tables

Table 1.

University of Oregon Applied Information Management References

Text	AIM Course	Relevance
How Organizations Work	Managing Organizations	This book covers strategic planning and information management capabilities, value, and competitive advantage.
Knowledge Management for Dummies	Knowledge Management	This book reviews knowledge management as a capability, as well as the role of CIO and information managers.
Strategic Information Management: Challenges and Strategies in Managing Information Systems	Information Systems and Management	This book covers strategic management, value, market capabilities, and competitive advantage and focuses on information systems.
Strategic Management	Information Systems and Management	This book covers strategic management, value, market capabilities, and competitive advantage.

Table 2.
Web sites Searched for Literature Collection

Web site	Description	Relevance
http://aim.uoregon.edu/	University of Oregon Applied Information Management Research Abstracts Archive	Several previous Capstone papers are identified as potential data for the study.
http://writing.colostate.edu/guides/research/content/	Professor Michael Palmquist (2006) provides an overview of content analysis published on the Colorado State University Writing Lab Web site.	The Content Analysis process is used to assess the literature of this study.
http://www.cio.com	The Web site for *CIO Magazine*	This Website presents content regarding the role of the CIO and IS managers in providing value to their business.
http://www.ichnet.org	The Web site for Interoperability Clearinghouse, a non-profit resource with a purpose to provide information to the public about successful information technology solutions.	Provides information management definition and is a resource for technology-based capabilities.
http://www.pcmag.com	The Web site for *PC* Magazine online.	This Web site presents a technology encyclopedia, news, and industry literature.

Table 3 Template.

Literature Pool Evaluation Template, Data Set for Content Analysis

Literature Source	First Criterion: Technology-based Market Capability?	Second Criterion: Competitive Advantage?
Example: Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices, pp. 191-224.	Y	Y
Source author, publication date, title, page number(s).	Y/N	Y/N
Sources	n=x	n=x

Note. Column one of the coding template indicates the author, publication year, title, and page numbers of literature source reviewed. The second column identifies that a technology-based market capability (such as BI or KM) is indicated in the literature source. Column three indicates the existence of the construct of "competitive advantage" criterion (value, market position, or strategy).

Table 4.

Coding Cross-Reference: Words, Terms, and Phrases

Technology-based Market Capability Type	Related words, terms, and phrases
customer relationship management	Customer-centric innovation, CRM, customer database
knowledge management	KM, collaboration tools, online training program, workflow tools

Table 5 Template.

Distribution of Technology-based Market Capability Types within the Literature

Literature Source	Professional Area of Application	Type 1 [e.g., Business Intelligence]	Type 2 [e.g., Knowledge Management]
Example: Alavi, M., Kayworth, T., & Leidner, D. (2005/2006), pp. 191-224.	Technology	X	

Note: Literature source details are recorded in column one; the professional area(s) of the technology-based market capabilities are recorded in column two. Columns three, four, etc., indicate the types of technology-based market capability identified in the literature.

Table 6 Template.

Report of Technology-based Market Capabilities

Technology-based Market Capability Types	Relevant Literature Sources
Business Intelligence	McAdams, J. (2006). What's Next: Business Intelligence, pp. 24-26.

Note: Column one shows the technology-based market capability type and column two indicates the list of relevant sources from the literature pool.

Table 7 Template.

Report of Relevant Literature Sources by Professional Area

Professional Area Applied	Relevant Literature Source(s)
Auto	Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760.

Note: The data presented in Table 2 indicates the relevant literature sources by professional area. Tables one and two are meant as resources for use by information and business planners tasked with identifying technology-based market capabilities, as well as, purchasing or managing information technology systems that support competitive advantage [value, market position and/or strategy].

Table 8.

Literature Pool Evaluation, Data Set for Content Analysis:

Literature Source: Author, Title, Page Reference	Technology-Based Market Capability?	Competitive Advantage?
Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An empirical examination of the influence of organizational culture on knowledge management practices, pp. 191-224.	Y	Y
Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis, pp. 487-505.	Y	Y
Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise health, pp. 141-165.	Y	Y
Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies: Developing a timely IT, pp. 113-117.	Y	Y
Friscia, T. (2003, January). The good, the bad and the performance-driven, online article.	N	Y
Gessner, G., & Volonino, L. (2005). Quick response improves returns on business intelligence, pp. 66-74.	Y	Y
Helfat, C., & Lieberman, B. (2002). The birth of capabilities: market entry and the importance of pre-history, pp. 725-760.	Y	Y
Hughes, N. (2003). Business value, competitive advantage, and the role of IT, online article.	N	Y
Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33.	Y	Y
Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? pp. 66-69.	Y	Y

Literature Source: Author, Title, Page Reference	Technology-Based Market Capability?	Competitive Advantage?
McAdams, J. (2006). What's next: Business intelligence, pp. 24-26.	Y	Y
Messner, W. (2004). The beauty and importance of quality customer information, pp. 279-290.	Y	Y
Oliveira, P., & Roth, A. (2005). An empirical investigation of the B2B e-service chain, pp. 1-7.	Y	Y
Pacewic, B. (2004). Knowledge as a strategic asset: Aligning knowledge management practices in support of strategic management processes and goals, pp. 1-59.	Y	Y
Pastore, R. (1995). Competing interests, online article.	Y	Y
Peppard, J., & Ward, J. (2005). Unlocking sustained business value from IT investments, pp.52-70.	Y	Y
PRTM & The InterUnity Group (2003). Optimizing business performance: Using it for competitive advantage, online article.	Y	Y
Rathnam, R., Johnsen, J.., & Wen, H. (2004/2005). Alignment of business strategy and IT strategy: A case study of a Fortune 50 financial service company, pp. 1-9.	Y	Y
Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150.	Y	Y
Saloner, G., Shepard, A.., & Podolny, J. (2001). Strategic management, pp. 19-64, 239-279.	N	Y
Santos, J. (2000). Time to knowledge, online article.	Y	Y
Selden, L., and MacMillan, I. (2006, April). Manage customer-centric innovation—systematically, pp. 108-116.	Y	Y

Literature Source: Author, Title, Page Reference	Technology-Based Market Capability?	Competitive Advantage?
Tarafdar, M.., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies, pp. 1-8.	Y	Y
Thornthwaite, W.., & Mundy, J. (2006). Standard reports: Basics for business users – how to plan, prioritize and design the primary vehicle for delivering business intelligence, pp. 44-46.	Y	Y
Worthen, B. (2004, October). Cost-cutting versus innovation: Reconcilable differences, online article.	N	Y
Sources	n=21	n=25

Table 9.

Coding Cross-Reference: Words, Terms, and Phrases by Technology-Based Market Capability Type

Technology-Based Market Capability Type	Related Words, Terms, and Phrases
Business Intelligence (BI)	Business intelligence (BI), enterprise system (ES), enterprise data management (EDM), metrics, scorecard, corporate scorecard
Customer Relationship Management (CRM)	Customer-centric innovation (CCI), CRM, customer database, customer contact center
Data Warehouse (DW)	DW, operational data store (ODS), reporting system, enterprise database, enterprise reporting system
Electronic Data Interchange (EDI)	Electronic exchange of information
Electronic Mail (EMAIL)	email, electronic mail, LISTSERV
Information Technology (IT)	Information and communications technology (ICT), information technology (IT), information systems (IS), infrastructure, information architecture, hardware, software, telecommunications, network.
Knowledge Management (KM)	KM, collaboration tools, online training program, workflow tools.
Web and Internet Technology (WEB)	Extranet, Internet, Intranet, Web browser, World Wide Web (WWW), eCommerce, portal, bulletin board (BB), chat room, search engine, Web-enabled, XML, HTML, HTTP.

Table 10.
Distribution of Technology-based Market Capability Types within the Literature

Literature Source	Professional Area	BI	CRM	DW	EDI	EMAIL	IT	KM	WEB
Alavi, M., Kayworth, T., & Leidner, D. (2005/2006).	Technology							X	X
Barney, J., Fuerst, W., & Mata, F. (1995).	Retail, Transportation				X		X		
Brache, A. (2002).	Manufacturing, Travel		X		X		X	X	X
Cegielski, C., Reithel, B., & Rebman, C. (2005).	Technology						X		X
Gessner, G., & Volonino, L. (2005).	Banking			X				X	X
Helfat, C., & Lieberman, B. (2002).	Auto, Publishing, Retail, Technology						X		X
Malhotra, Y. (2003).	Technology						X	X	X
McAdams, J. (2006).	Publishing, Real Estate	X		X					X
Messner, W. (2004).	Banking		X	X					

Literature Source	Professional Area	BI	CRM	DW	EDI	EMAIL	IT	KM	WEB
Oliveira, P., & Roth, A. (2005).	Manufacturing						X		X
Pacewic, B. (2004).	Insurance							X	
Pastore, R. (1995).	n/a							X	
Peppard, J., &Ward, J. (2005).	Banking		X	X			X		X
PRTM & The InterUnity Group (2003).	n/a		X						
Rathnam, R. Johnsen, J., & Wen, H. (2004/2005).	n/a						X		
Rumizen, M. (2002).	Education, Retail, Technology					X		X	X
Santos, J. (2000).	Education, Technology		X						
Selden, L., & MacMillan, I. (2006, April).	Banking, Retail, Technology		X						
Tarafdar, M., & Gordon, S. (2003).	Auto, Education, Manufacturing		X					X	X
Thornthwaite, W., & Mundy, J. (2006).	n/a	X		X		X			
		BI	CRM	DW	EDI	EMAIL	IT	KM	WEB
		2	6	5	2	2	7	9	10

Table 11.

Report of Technology-Based Market Capabilities

Technology-based Market Capability Types	Relevant Literature Source: Author, Title, Page Reference
Business Intelligence (BI)	McAdams, J. (2006). What's next: Business intelligence, pp. 24-26; Thornthwaite, W., & Mundy, J. (2006). Standard reports: Basics for business users – How to plan, prioritize and design the primary vehicle for delivering business intelligence, pp. 44-46.
Customer Relationship Management (CRM)	Brache, A. (2002). How organizations work. Taking a holistic approach to enterprise health, pp. 141-165. Messner, W. (2004). The beauty and importance of quality customer Information, pp. 279-290. Peppard, J., & Ward, J. (2005). Unlocking sustained business value from IT investments, pp.52-70. PRTM & The InterUnity Group (2003). Optimizing business performance: Using it for competitive advantage, online article. Santos, J. (2000). Time to knowledge, online article. Selden, L., & MacMillan, I. (2006, April). Manage customer-centric innovation—systematically, pp. 108-116. Tarafdar, M., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies, pp. 1-8.
Data Warehouse (DW)	McAdams, J. (2006). What's next: Business intelligence, pp. 24-26. Messner, W. (2004). The beauty and importance of quality customer information, pp. 279-290. Peppard, J., & Ward, J. (2005). Unlocking sustained business value from IT investments, pp.52-70. Thornthwaite, W., & Mundy, J. (2006). Standard reports: Basics for business users – How to plan, prioritize and design the primary vehicle for delivering business intelligence, pp. 44-46.
Electronic Data Interchange (EDI)	Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis, pp. 487-505. Brache, A. (2002). How organizations work. Taking a holistic approach to enterprise health, pp. 141-165.

Technology-based Market Capability Types	Relevant Literature Source: Author, Title, Page Reference
Electronic Mail (EMAIL)	Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150. Thornthwaite, W., & Mundy, J. (2006). Standard reports: Basics for business users – How to plan, prioritize and design the primary vehicle for delivering business intelligence, pp. 44-46.
Information Technology (IT)	Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis, pp. 487-505. Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise health, pp. 141-165. Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies: Developing a timely IT, pp. 113-117. Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760. Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? pp. 66-69. Oliveira, P., & Roth, A. (2005). An empirical investigation of the B2B e-service chain, pp. 1-7. Peppard, J., & Ward, J. (2005). Unlocking sustained business value from IT investments, pp.52-70. Rathnam, R. Johnsen, J., & Wen, H. (2004/2005). Alignment of business strategy and IT strategy: A case study of a Fortune 50 financial service company, pp. 1-9. Tarafdar, M., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies, pp. 1-8.
Knowledge Management (KM)	Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices, pp. 191-224. Brache, A. (2002). How Organizations Work. Taking a Holistic Approach to Enterprise Health, pp. 141-165. Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33. Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? Pp. 66-69. Pacewic, B. (2004). Knowledge as a strategic asset: Aligning knowledge management practices in support of strategic management processes and goals, pp. 1-59

Technology-based Market Capability Types	Relevant Literature Source: Author, Title, Page Reference
	Pastore, R. (1995). Competing Interests (online article). Rumizen, M. (2002). The Complete Idiot's Guide to Knowledge Management, pp. 119-150.
Web-Based Technology (WEB)	Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices, pp. 191-224. Brache, A. (2002). How Organizations Work. Taking a Holistic Approach to Enterprise Health, pp. 141-165. Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging Information Technologies: Developing a Timely IT, pp. 113-117. Gessner, G., & Volonino, L. (2005). Quick Response Improves Returns on Business Intelligence, pp. 66-74. Helfat, C., & Lieberman, B. (2002). The birth of capabilities: market entry and the importance of pre-history, pp. 725-760. Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33. Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? Pp. 66-69. McAdams, J. (2006). What's Next: Business Intelligence, pp. 24-26. Oliveira, P., & Roth, A. (2005). An Empirical Investigation of the B2B E-Service Chain, pp. 1-7. Peppard, J., & Ward, J. (2005). Unlocking Sustained Business Value from IT Investments, pp.52-70. Rumizen, M. (2002). The Complete Idiot's Guide to Knowledge Management, pp. 119-150. Tarafdar, M., & Gordon, S. (2003). How Information Technology Capabilities Influence Organizational Innovation: Exploratory Findings from Two Case Studies, pp. 1-8.

Table 12
Report of Relevant Literature Sources by Professional Area

Professional Area	Relevant Literature Source(s)
Auto	Helfat, C., & Lieberman, B. (2002). The birth of capabilities: market entry and the importance of pre-history, pp. 725-760.
Banking	Gessner, G., & Volonino, L. (2005). Quick response improves returns on business intelligence, pp. 66-74. Messner, W. (2004). The Beauty and importance of quality customer information, pp. 279-290. Selden, L., & MacMillan, I. (2006, April). Manage customer-centric innovation—systematically, pp. 108-116.
Education	Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150. Santos, J. (2000). Time to knowledge, online article. Tarafdar, M., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies, pp. 1-8.
Insurance	Pacewic, B. (2004). Knowledge as a strategic asset: Aligning knowledge management practices in support of strategic management processes and goals, pp. 1-59.
Manufacturing	Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise health, pp. 141-165. Oliveira, P., & Roth, A. (2005). An empirical investigation of the B2B e-service chain, pp. 1-7. Tarafdar, M., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies, pp. 1-8.
Publishing	Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760. McAdams, J. (2006). What's next: Business intelligence, pp. 24-26.
Real Estate	McAdams, J. (2006). What's next: Business intelligence, pp. 24-26.

Professional Area	Relevant Literature Source(s)
Retail	Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis, pp. 487-505. Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760. Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33. Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150. Santos, J. (2000). Time to knowledge, online article. Selden, L., & MacMillan, I. (2006, April). Manage customer-centric innovation—systematically, pp. 108-116.
Technology	Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An empirical examination of the influence of organizational culture on knowledge management practices, pp. 191-224. Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies: Developing a timely IT, pp. 113-117. Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760. Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33. Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? pp. 66-69. Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150. Selden, L., & MacMillan, I. (2006, April). Manage customer-centric innovation—systematically, pp. 108-116.
Transportation/ Travel	Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis, pp. 487-505. Brache, A. (2002). How organizations work. Taking a holistic approach to enterprise health, pp. 141-165. Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies: Developing a timely IT, pp. 113-117. Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the importance of pre-history, pp. 725-760. Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions, pp. 20-33. Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage? pp. 66-69. Rumizen, M. (2002). The complete idiot's guide to knowledge management, pp. 119-150.

Appendix B. Data Set for Content Analysis

Alavi, M., Kayworth, T., & Leidner, D. (2005/2006). An empirical examination of the influence of organizational culture on knowledge management practices.

Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis.

Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise health.

Certagon (2006). Increasing revenues with real-time visibility into financial market changes.

Cegielski, C., Reithel, B., & Rebman, C. (2005). Emerging information technologies: Developing a timely it.

Friscia, T. (2003, January). The good, the bad and the performance-driven.

Gessner, G., & Volonino, L. (2005). Quick response improves returns on business intelligence.

Helfat, C., & Lieberman, B. (2002). The birth of capabilities: market entry and the importance of pre-history.

Hughes, N. (2003). Business value, competitive advantage and the role of it.

Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions.

Malhotra, Y. (2003). Is knowledge the ultimate competitive advantage?

Mcadams, J. (2006). What's next: Business intelligence?

Messner, W. (2004). The beauty and importance of quality customer information.

Pacewic, B. (2004). Knowledge as a strategic asset: Aligning knowledge management practices in support of strategic management processes and goals.

Pastore, R. (1995). Competing interests.

Peppard, J., & Ward, J. (2005). Unlocking sustained business value from it investments.

PRTM & The Interunity Group (2003). Optimizing business performance: Using it for competitive advantage.

Rathnam, R., Johnsen, J., & Wen, H. (2004/2005). Alignment of business strategy and IT strategy: A case study of a Fortune 50 financial service company.

Rumizen, M. (2002). The complete idiot's guide to knowledge management.

Saloner, G., Shepard, A., & Podolny, J. (2001). Strategic management.

Santos, J. (2000). Time to knowledge.

Selden, L., & Macmillan, I. (2006, April). Manage customer-centric innovation—systematically.

Tarafdar, M., & Gordon, S. (2003). How information technology capabilities influence organizational innovation: Exploratory findings from two case studies.

Thornthwaite, W., & Mundy, J. (2006). Standard reports: basics for business users – How to plan, prioritize and design the primary vehicle for delivering business intelligence.

Worthen, B. (2004, October). Cost-cutting versus innovation: Reconcilable differences.

Bibliography

Alavi, M., Kayworth, T., & Leidner, D. (2005/2006, Winter). An empirical examination of the influence of organizational culture on knowledge management practices. *Journal of Management Information Systems*, *22*(3), 191-224. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Barney, J., Fuerst, W., & Mata, F. (1995). Information technology and sustained competitive advantage: A resource-based analysis. *MIS Quarterly, 1*(4), 487-505. Retrieved April 16, 2006, from EBSCO (Business Source Premier).

Brache, A. (2002). How organizations work: Taking a holistic approach to enterprise health. New York, NY: John Wiley & Sons, Inc.

Cegielski, C., Reithel, B., & Rebman, C. (2005, August). Emerging information technologies: Developing a timely IT. *Communications of the ACM*, *48*(8), 113-117. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Friscia, T. (2003). The good, the bad and the performance-driven*. CIO Magazine, January 29, 2003, Article report815.* Retrieved May 2, 2006, from http://www2.cio.com/analyst/report815.html.

Galliers, R., Leidner, D., & Baker B. (2001). *Strategic information management. Challenges and strategies in managing information systems* (2nd ed). Oxford, MA: Butterworth-Heinemann.

Gessner, G., & Volonino, L. (2005, Summer). Quick response improves returns on business intelligence. *Information Systems Management*, *22*(3), 66-74. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Helfat, C., & Lieberman, B. (2002). The birth of capabilities: Market entry and the

importance of pre-history. *Industrial and Corporate Change, 11*(4), pp. 725-760.
Retrieved April 24, 2006, from EBSCO (Business Source Premier).

Hughes, N. (2003). Business value, competitive advantage, & the role of IT. *CIO Magazine, June 20, 2003, Article report1486.* Retrieved May 2, 2006, from http://www2.cio.com/analyst/report1486.html.

Interoperability Clearinghouse (2006). *Glossary of terms.* Retrieved April 16, 2006, from http://www.ichnet.org/glossary.htm

Leedy, P. & Ormrod, J. (2001). *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions. *McKinsey Quarterly, 2005(4),* 20-33. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Malhotra, Y. (2003, September). Is knowledge the ultimate competitive advantage? *Business Management Asia*, *September, 2003, Article BMA.* Retrieved April 24, 2006, http://www.kmnetwork.com/BMA.html.

McAdams, J. (2006). What's next: Business intelligence? *Computerworld*, *40*(1), 24-26.

Messner, W. (2004, Fall). The beauty and importance of quality customer information. *Marketing Review*, *4*(3), 279-290. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Oliveira, P., & Roth, A. (2005). An empirical investigation of the B2B e-service chain. *Academy of Management Proceedings, 2005, pD1-D6.* Retrieved April 19, 2006, from EBSCO (Business Source Premier).

Pacewic, B. (2004, March). *Knowledge as a strategic asset: Aligning knowledge*

management practices in support of strategic management processes and goals. Retrieved March 26, 2006, from University of Oregon Applied Information Management Program Web site: http://aim.uoregon.edu/pdfs/Pacewic2004.pdf

Palmquist, M. (2006). Overview: Content analysis. Retrieved March 19, 2006, from Colorado State University Web site: http://writing.colostate.edu/guides/research/content

Pastore, R. (1995, October). Competing interests. *CIO Magazine, October 1, 1995, Article porter_100195.* Retrieved April 19, 2006, from http://www.cio.com/cio/porter_100195.html.

Peppard, J., & Ward, J. (2005, Fall). Unlocking sustained business value from it investments*. California Management Review*, *48*(1), 52-70. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

PRTM & The InterUnity Group (2003, May). Optimizing business performance: Using it for competitive advantage. *CIO Magazine, May 6, 2003, Article surveyreport.* Retrieved April 19, 2006, from http://www2.cio.com/research/surveyreport.cfm?id=55.

Rathnam, R. Johnsen, J., & Wen, H. (2004/2005 Winter). Alignment of business strategy and IT strategy: A case study of a Fortune 50 financial service company. *Journal of Computer Information Systems, 45(2),* 1-8. Retrieved April 24, 2006, from EBSCO (Business Source Premier).

Rumelt, R. (2003). *What in the world is competitive advantage?* Retrieved May 7, 2006, from The Anderson School at UCLA Web site: http://www.anderson.ucla.edu/documents/areas/fac/policy/WhatisCA_03.pdf

Rumizen, M. (2002). *The complete idiot's guide to knowledge management*, Madison, WI: CWL Publishing Enterprises.

Saloner, G., Shepard, A., & Podolny, J. (2001). *Strategic management.* New York, NY: John Wiley & Sons.

Santos, J. (2000, November). Time to knowledge. *CIO Magazine, Analysts Corner, November 6, 2000, Article report258.* Retrieved May 2, 2006, from http://www2.cio.com/analyst/report258.html.

Selden, L., & MacMillan, I. (2006, April). Manage customer-centric innovation—systematically. *Harvard Business Review*, *84*(4), 108-116. Retrieved March 26, 2006, from EBSCO (Business Source Premier).

Tarafdar, M., & Gordon, S. (2003). *How information technology capabilities influence organizational innovation: Exploratory findings from two case studies*. Retrieved April 24, 2006, from Google Scholar.

Thornthwaite, W., & Mundy, J. (2006). Standard reports: basics for business users – How to plan, prioritize and design the primary vehicle for delivering business intelligence. *Intelligent Enterprise*, *9*(2), 44-46. Retrieved March 26, 2006, from EBSCO (LexisNexis Academic).

Webopedia (2006). Online Encyclopedia. Retrieved April 19, 2006 from http://www.webopedia.com

Worthen, B. (2004, October). Cost-cutting versus innovation: Reconcilable differences. *CIO Magazine*, October 1, 2004, Article cost. Retrieved May 2, 2006, from http://www.cio.com/archive/100104/cost.html.