IDENTIFYING KEY SUCCESS FACTORS FOR THE IMPLEMENTATION OF ENTERPRISE CONTENT MANAGEMENT SYSTEMS

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Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2014

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Horne, Stephanie Burnett. Identifying Key Success Factors for the Implementation of Enterprise Content Management Systems. Doctor of Philosophy (Information Science), August 2014, 144 pp., 17 tables, 11 figures, references, 85 titles.

Enterprise content management (ECM) is an emerging research area that is beginning to find attention in academia. While the private sector has a growing industry and community for ECM, academia is starting to address this with direct links to the better-established areas of information systems and enterprise resource planning systems. ECM has been viewed as a higher-level concept of methods and strategies pertaining to content management in the context of the enterprise. Like many other organizational wide systems, ECM systems are complex, difficult to implement and risk failing to meet expected success measures. Definitions for what exactly constitutes an ECM system are still evolving. The major issues with ECM systems are that they are increasingly being implemented by organizations in an attempt to address the unmanageable amount of unstructured content over its lifecycle, compliance pressures, collaboration needs, content integrity and continuity, and controlling costs. However, the implementation problems are many and diverse, such as determining content and business processes to be included, determining technologies to fit the organizational needs, how to integrate with existing systems, and managing organizational culture and change for acceptance. There is currently little academic research in the area of ECM, and research determining the key factors that contribute to successful implementations of these systems is absent.

This research addressed the existing gap in ECM research and investigated the key success factors for the implementations of ECM systems with the objectives of identifying a set

of success factors. Guided by research in related areas and through developing a theoretical framework and the resulting research model, the study used a qualitative case study method to identify ECM implementation factors and their relationship to organizational culture and people, business processes, technology and organizational content. The results of this research were twofold, first by contributing needed research in the ECM area and second to aid organizations in the implementation of ECM systems by identifying key factors.

ACKNOWLEDGEMENTS

This dissertation culminates twelve years of education for three degrees and closes a chapter in my life. There were many figures of support throughout this journey and I would like to thank some of them here. Thanks are due to my committee, Dr. Suliman Hawamdeh, Dr. Mary C. Jones, and Dr. Oksana Zavalina who ensured that this research would become a valuable contribution to the field of ECM. Thank you to Dr. William Moen for starting me on this path as my mentor and friend. There are many friends and family who were close to me and patiently supported me through trials and success and I owe thanks to them all. In particular, I would like to thank my parents and brother, who have always been proud of me with or without a degree. Finally, my deepest gratitude is for my husband and dearest friend for his belief in my potential to succeed.

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LIST OF ABBREVIATIONS

BPR	Business process restructuring
CM	Content management
CSF	Critical success factor
ECM	Enterprise content management
ERP	Enterprise resource planning
ES	Enterprise systems
IS	Information system
IT	Information technology
SQL	Structured Query Language
XML	Extensible Markup Language

CHAPTER 1

INTRODUCTION

Organizations of all types create, use, store, disseminate, and destroy content in structured, semi-structured and unstructured formats. Although structured content is always steadily increasing, semi-structured and unstructured content is growing at an exponential rate and is estimated to be the majority of organizational content (O'Callaghan & Smits, 2005). "Information overload" and "content chaos" are terms used to describe the problem of managing the increasing unstructured content as new methods of creating, collecting, sharing and publishing increase as well. In addition to content chaos, the pressure of compliance, collaboration, records management, and other organizational content needs continue to increase. Email, blog posts, tweets, paper and digital records, documents, images and graphics, audio and video, and web content are some of the unstructured content that organizations need to manage over the lifecycle of creation, use, dissemination, versioning, storage and disposal. The field of enterprise content management (ECM), a type of information system (IS), has emerged to address these problems.

The major issues with ECM systems arise from the fact that they are increasingly being implemented by organizations in an attempt to address the unmanageable amount of unstructured content over its lifecycle, compliance pressures, collaboration needs, content integrity and continuity, and controlling costs (Alalwan & Weistroffer, 2012; Grahlmann, Helms, Hilhorst, Brinkkemper & Amerongen, 2012; Miles, 2011; O'Callaghan & Smits, 2005). These systems are complex and difficult to implement and the problems are many and diverse, such as determining content and business processes to be included, determining technologies to fit

the organizational needs, how to integrate with existing systems, and managing organizational culture and change for acceptance (Haug, 2012; Nordheim & Paivarinta, 2006; vom Brocke, Simons & Cleven, 2011). There is currently little academic research in the area of ECM and research determining the key factors that contribute to successful implementations of these systems is largely non-existent (Alalwan & Weistroffer, 2012; Grahlmann et al., 2012).

1.1 Background

Enterprise content management systems are descendents of many computer based systems, or IS, that developed in the 1950s. These systems began as solutions to computing and transaction processing and then evolved to aid organizations in decision-making processes at many different levels. Sprague (1980) defines decision making systems as "dedicated to improving the performance of knowledge workers in organizations through the application of information technology" (p. 5). These systems have very similar technological architectures and even though their purposes may differ, an understanding of them sheds light on the components of ECM system, and as ECM systems are integrated with them during an implementation. Some examples of IS are management information systems, decision support systems, executive support systems, knowledge management systems, and business intelligence.

Content is the data and information the enterprise creates, receives, processes, stores, disseminates, and disposes. There are three types of content managed by an ECM system: structured, semi-structured, and unstructured content. Structured content is numerical and is processed in database management systems or data warehouses (Sprague & Watson, 1983). Semi-structured content and unstructured content is non-numerical data such as text, graphics,

images, audio, and web pages. These types of content are becoming a majority of enterprise content and are estimated to be 80% of content managed and is exponentially growing (O'Callaghan & Smits, 2005). Boiko (2002) defined content as information plus data with format and structure; information is wrapped with metadata to provide format and structure for storage, retrieval, and display. He indicated that some of the challenges of organizing enterprise content are determining and implementing standards for format and structure, such as taxonomies and metadata hierarchies, for content across departments and the multiple technologies in use.

Benevolo and Negri (2007) conducted a survey of current products marketed as content management systems (CMS) and compared functionality competence regardless of commercial claims. This research relied heavily on Boiko's (2002) definition of a CMS and they used several definitions and concepts of content management from his *Content Management Bible* text. They defined a CMS "as a system of methods and techniques to automate the processes of content collection, management and publishing using information technologies" (p. 10). They indicate that a true CMS includes three systems in one: a collection system, a management system, and a publication system. The collection system has capabilities for content authoring, acquisition, conversion, aggregation and collection services. The management system has repository, administration, and workflow capabilities and the publication system has a template system, publication services, website support and other media support. The researchers developed a framework to indicate how sub-systems fit within the CMS capability space. They are considered sub-systems because their capabilities fall short of fulfilling collection, management, and publication functionalities.

The term ECM has grown in industry usage and there is still great confusion about the difference between CMS and ECM. Definitions are often determined by perspectives, such as those of vendors, users, authors, consultants and organizations. Although Benevolo and Negri's product evaluation defined CMS and sub-system capabilities, they admit that there are no common terms and definitions for these systems in the vendor or client sectors. Also, ECM marketed technologies are beginning to include functionality outside of their research space, such as web portals and publishing tools. These inconsistencies in industry language and marketing has increased confusion for system selection and often results in poor functional fit and system dissatisfaction.

1.2 Statement of the Problem

The purpose of this section is to state the problem in the context of the literature review, to define the problem space, scope, participants and research site.

> A good qualitative purpose statement contains information about the central phenomenon explored in the study, the participants in the study, and the research site. It also conveys an emerging design and uses research words drawn from the language of qualitative inquiry. (Creswell, 2009, p. 112)

Despite the lack of a clear understanding of ECM, the adoption of ECM systems in organizations continues to increase. IS implementations are complex, difficult, and expensive and often fail. Industry research indicates that ECM implementations may share the same fate and there is already a large amount of industry literature on ECM projects as well as workshops, conferences and a wide audience attending them (Paivarinta & Munkvold, 2005). ECM success factors have not been determined or what measure of impact they might have on ECM implementations or how they might be interrelated. Organizations need to understand the issues that determine their success or failure when approaching an ECM project. There is a gap

of knowledge in the academic literature for ECM implementation success factors research and academic interest for ECM implementations and adoptions is beginning to take place and there has been a call for research in the area of implementation and for determining critical success factors (CSFs) in particular (Alalwan & Weistroffer, 2012).

This dissertation addressed the call for research from Alalwan and Weistroffer (2012) by conducting a qualitative case study to determine key success factors for an ECM system implementation in a higher education setting. The scope of this study focused on department team leads and members responsible for implementing an ECM at a single university and a collection of their implementation documents. This university was chosen because several of its departments had completed or were in the last stages of implementing an enterprise wide ECM system within the last six years. The purpose of the new system was to replace the legacy document management system and to provide expanded content management needs, such as workflow and records management and compliance needs. The department implementations fell into two types: large core departments that had to convert data from the legacy system and smaller departments that were restructuring some of their business processes to use the new system. The departments had a wide variety of timeframes for their projects, from two to six years.

The team leads and members for departments had been tasked by upper management to implement either within their department or in collaboration with other departments. Their experiences included considering legacy systems, business processes, data conversion, functionality development, user involvement and perceptions, and others. These participants came from a wide variety of position, age, and department size and their implementations

included a variety of content management needs and system uses. These participants worked with an enterprise team, consultants from the software company, and in some cases, end users, during their projects. The purposes of this research are to address the existing gap in ECM systems research and further investigate issues related to ECM implementations with the objective of identifying key success factors.

1.3 Research Questions

Qualitative research questions start with a central question that develops into sub-questions often resulting in hypotheses (Creswell, 2009). The central question for this research was derived from the stated research problem and the literature indicating the need to address a knowledge gap for CSF research (Alalwan & Weistroffer, 2012): What are the key factors for successful ECM implementations?

The conceptual basis of this study is founded in an IS theoretical framework derived from the literature and includes the DeLone and McLean's (1992) model of success, Kwon & Zmud's (1987) unified model of success factors, and Roger's (1983) diffusion of innovation theory. This framework is used to represent the problem space by defining a successful implementation and indicating three factor categories: individual factors, task-related factors, and technological factors. The framework is then extended into a research model by using the ECM literature to include content factors and to divide individual factors into managerial factors and user factors (Tyrvainen, Paivarinta, Salminen & Iivari, 2006). The resulting research model creates five sub-questions:

- Are there managerial factors that impact ECM implementation success?
- Are there user factors that impact ECM implementation success?
- Are there task-related factors that impact ECM implementation success?
- Are there technological factors that impact ECM implementation success?

- Are there content factors that impact ECM implementation success?

1.4 Purpose and Importance of the Study

The purposes of this research were to address the existing gap in ECM systems research and further investigate issues related to ECM implementations with the objective of identifying key success factors. It was intended that the perceptions from a diverse group would provide a rich amount of data for exploring key factors. The interview schedule was designed to narrow the participants' perceptions of key factors by having them globally discuss their implementations, asking them to specifically name factors by categories, and finally having them evaluate their implementations and discussing the top factors for success. It was intended that this method would help participants remember details of their project and enable them to determine factors that aided the success of their project and factors that they had needed to be successful, but were lacking.

This research is important because it is the first to focus on identifying key success factors for ECM implementations, to the researcher's knowledge. There is also a need for factor research indicating key factors and best practices for practical applications. By conducting an exploratory case study for identifying key factors, this study begins the needed research for the ECM area as well as providing practical feedback for future implementations.

1.5 Summary

Enterprise content management is a new area in IS research and organizations are increasingly implementing ECM systems to address exponential content growth. While industry research and recommendations are plentiful, there is little academic research to date. There is a knowledge gap and a need for more research on ECM implementations and critical factors in

particular. This study addresses that call by beginning to identify key factors for implementation success with a qualitative case study.

CHAPTER 2

LITERATURE REVIEW

The first purpose of this literature review is to examine previous research, emphasize leading research studies, identify trends and establish a theoretical framework. Given the limited body of research in the area of enterprise content management (ECM), this chapter examines relevant literature in the areas of information science (IS) and enterprise resource planning (ERP). Critical success factors (CSF) research in these areas is also examined and how it could be applied to ECM research is discussed.

2.1 Enterprise Content Management Systems

Enterprise content management is an emerging concept and is undergoing the same defining process as predecessor systems such as decision support systems and enterprise systems (Benevolo & Negri, 2007; Paivarinta & Munkvold, 2005; Tyrvainen et al., 2006). ECM has roots in previous systems such as content management, document management, records management, and knowledge management. ECM has become an industry buzzword attracting vendors and customers alike and is developing into a community of interest with professional organizations, such as the Association for Image and Information Management (AIIM, www.aiim.org). AIIM defines ECM as "the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists" (www.aiim.org, Glossary Section, para. 1, 2012). The topics of strategies and methods feature prominently in the AIIM literature and indicate their importance to an ECM development. AIIM produced an *AIIM Industry Watch: State of the*

ECM Industry (Miles, 2011) report that evaluated various factors and trends impacting the ECM industry. The 2011 report highlights several key findings and concludes that ECM system implementations are driven by improved efficiency, optimal business processes, reduced costs and compliance needs and that managing content chaos is the most important trigger leading enterprises to look for an ECM solution. According to AIIM, ECM strategies combine the purposes of efficiency and effectiveness of content management needs, making ECM an extension of predecessor systems.

AIIM indicates that there are four primary areas of consideration for ECM, or the four Cs: compliance, collaboration, continuity, and cost. Legal compliance has become a major records management consideration for enterprises as well as a costly venture. Developing compliance into an ECM system can lower those costs. There is an increasing need for collaboration tools within enterprises leading to records management, knowledge management, and compliance needs for collaborative materials. AIIM indicates that the cost of implementing an ECM initiative must be weighed against the cost of inaction and cautions against over emphasis on the return on investment. Continuity refers to the ability of an enterprise to recover from disruption or disaster by the crisis-accessibility of enterprise content provided by an ECM. The AIIM industry report (Miles, 2011) surveyed community members to determine "the drivers for ECM investment, the adoption of collaborative technologies, use of outsourcing, user priorities, views of the future as regards cloud and open source, and spend intentions for the next 12 months" (p. 3). Although AIIM is non-profit association, the report was funded by industry partners: EMC^2, Kofax, OpenText, and Microsoft.

The report found that controlling content chaos is the leading reason enterprises seek ECM solutions. The most chaotic content were tweets, instant messages, and external blog posts. The top business drivers for ECM projects are improving efficiency, optimizing business processes, reducing costs, and mitigating risks. Since 2007, there has been a steady decrease in compliance and risk drivers and a sharp increase for collaboration needs. For larger enterprises, cost/efficiency has greater importance, and in smaller enterprises, compliance and risk have greater importance. Enterprise wide ECM adoption is at 29% with 19% of enterprises integrating document or records management projects enterprise wide and 22% of enterprises implementing document or records management projects at the department level.

The top deployment strategy for ECM is to selectively update, replace, and migrate existing systems at the department level as needed, followed by migrating and replacing existing systems with a new single-vendor ECM suite. Enterprises hoping for a single ECM solution have decreased, but still hold at 48%. The adoption of SharePoint as an ECM solution has rapidly increased due to its collaboration, web portal, and project management applications. However, these implementations are less than mature and SharePoint is weak in the areas of document management, compliance, and governance and many implementations integrate SharePoint with other document and record management technologies (Jones, 2012).

Overall, the ECM industry is seeing growth as enterprises seek to take control of content chaos by developing an ECM strategy, whether by implementing a single-vendor product, integrating repositories with a portal, or developing document and record management projects at the department level. The industry use of the term content management is blurred

with the use of ECM and the underlying presence of document and record management implementations often become the foundation technologies of an EMC system.

However, the industry has been criticized for commercially driven ECM language that can be misleading for enterprises looking for solutions to a variety of challenges (Andersen, 2008; Benevolo & Negri, 2007; Boiko, 2002). Roth, Wolfson, Kleewien, and Nelin (2002) from IBM attempted to clear up misconceptions of what enterprise applications are by outlining the technological architecture and components that are used for information integration within enterprises. Their concept architecture for enterprise applications begins with a foundation tier that allows for storage, search and retrieval and may include a federation approach for external data. Integration services are built upon the foundation tier and serve as a transparent bridge between the foundation databases and the application layer. They include tools for indexing, mining, workflow, content management, and other activities. An application interface using a variety of standards-based programming and query languages, such as SQL and XML, allows access to an enterprise's rich data through the integration layer. The application layer uses SQL and XQuery to extract and manipulate structured, semi-structured, and unstructured data from the integration and foundation layers.

Roth et al. (2002) describe the components and purposes of an ECM system and they refer to them as enterprise applications for information integration. The term "enterprise content management system" is absent from their framework as well as from Boiko's (2002) content management text. This term evolved more recently to ECM systems in the last ten years. Figure 1 shows the three tiers of integration architecture.

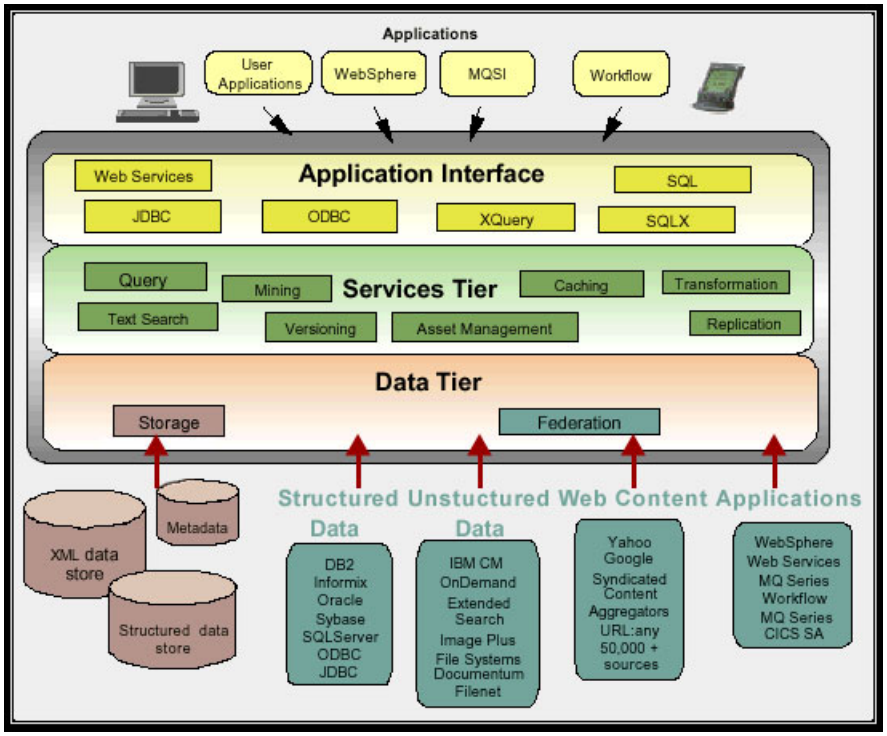

Figure 1. Three tier information integration architecture[1].

There is also a continual emphasis from industry media that there is no single ECM technology, but rather an integration of many technologies together which sometimes includes a marketed ECM technology. ECM systems combine this integration of technologies with the strategies and methodologies needed to manage enterprise content throughout its lifecycle. Regardless of the lack of a unified definition, organizations are increasingly concerned with managing their unstructured content and are willing to spend in the direction of ECM solutions.

ECM is beginning to draw academic attention and efforts to define the elements of ECM have begun. ECM research is developing topics of who implements an ECM system, why implement, what an ECM system includes, and how ECM systems are implemented. The

[1] From "Information integration: A new generation of information technology" by M. A. Roth, D. C. Wolfson, J. C. Kleewien, and C. J. Nelin, 2002, *IBM Systems Journal 41*(4), p. 570. IBM Technical Journals. Reproduced by permission.

following four sections discuss topic discovery and agreement in the small amount of research in the area of ECM implementation.

2.1.1 Case Studies

Smith and McKeen (2003), two of the first ECM researchers, conducted a focus group of knowledge managers to determine how they viewed ECM within their enterprise. The researchers began with a broad definition of ECM: "the strategies, tools, processes and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle" (p. 648). The knowledge managers identified several short term reasons to develop an ECM strategy, such as simplification of processes and improved enterprise navigation, retrieval, and versioning. They also identified three main areas where ECM was employed in their enterprises: internet portals for enterprise materials, information retrieval, and web content management. Finally, the knowledge managers agreed on eleven ECM roles and responsibilities represented in Table 1.

Table 1

Eleven Identified Roles and Responsibilities of ECM (Smith & McKeen, 2003).

Role or Responsibility	Definition
Individual content quality, accuracy and timeliness	A role of ownership that is responsible for the quality, accuracy and timeliness and is aware of compliance policies.
Individual content authorship	A role that prepares, acquires, and maintains content according to the potential uses and limitations.
Overall content quality, accuracy, and timeliness	A role that manages how content is stored, protected, backed up, and versioned.
Content stewardship	A role that assesses, repurposes, and increases enterprise content and manages the content lifecycle.

(table continues)

(continued)

Role or Responsibility	Definition
Taxonomy and metadata	A role that works with decision makers and organizational data knowledge to manage the ongoing taxonomy development.
Workflow management	A role that carefully chooses technologies to manage workflow.
Access management, security and privacy	A role that manages access to enterprise content
Technical support	A role that carefully selects technologies to support content management.
Content standards and templates, look and feel	A role that develops content standards and templates for enterprise wide use.
ECM strategy	A role or roles that develop ECM strategies.
Communication about ECM	A role that educates and trains employees on enterprise content standards and practices.

Content stewardship is at the heart of ECM strategy and includes activities focused on managing content throughout the content lifecycle (Smith & McKeen, 2003). Capturing, organizing, processing, and maintaining according to enterprise standards and policies are the primary activities. The study concluded that while ECM may not be well defined or understood, there is a sense among knowledge managers that developing an ECM vision for their enterprise will continue to be an important goal.

In order to determine why organizations implement ECM, vom Brocke, Simons, Herbst, Derungs and Novotny (2011) conducted a qualitative case study of two enterprises that were planning an ECM implementation. Using a process perspective, they discovered 21 ECM drivers related to the integration of technological and managerial issues, the integration of all types of content, and the integration of the content lifecycle. This research supports Smith and McKeen's research by agreeing that content stewardship over the lifecycle is a key element of ECM. They also indicated that the content lifecycle includes seven phases: creation, capture,

editing, reviewing, storing, retrieving, and retaining. However, their findings did not clearly define what enterprises expect to gain through their ECM implementations other than more consistent and timely information for users.

The researchers concluded that ECM is characterized by at least three broad characteristics. First, all types of information are included in the system (structured, semi-structured, and unstructured). Second, the system manages content over the content lifecycle. Third, the system includes managerial and technological perspectives. The researchers also indicated that ECM implementations are multidimensional and have interrelated issue perspectives.

O'Callaghan and Smits (2005) agreed that ECM systems include all types of content and manage them over their lifecycle with the same phases as vom Brocke et al. (2011), except from an ECM task perspective. O'Callaghan and Smits research was focused on determining what content should be included in an ECM system and developed a blueprinting framework for assessing content in a case study. The authors suggested three perspectives from which to approach ECM: the content management system, reusable content, and business processes. They applied this framework to a large technical company considering an ECM investment by conducting four activities. They conducted a content audit to determine what content needed to be included; specifying ECM needs for retrieval and workflow; a value assessment of content candidates; and a cost/effort assessment. The content audit determined organizational content based on type, availability, ownership and use, reuse, format, and existing systems that manage content. The researchers conceptualized five features of ECM functionality to determine system needs: find, distribute, re-use, track, and associate. The value assessment

requirements for content were derived directly from the five ECM functions: findable, distributable, re-usable, traceable, and the ability to associate a content object with related content. Finally, the cost/effort assessment evaluated the relationship between the value of the content and the amount of cost and effort required to include it in the system. These four activities resulted in content portfolio decisions represented by a scatter diagram that grouped content candidates into three categories of *do*, *consider*, and *don't*.

This study was relevant because it took a first step in evaluating ECM implementation needs and indicating that content selection is an important part of planning. There was also an emphasis on the importance of metadata and the need to include an evaluation of the cost and effort metadata creation incurs. It defined three perspectives to approach ECM implementations: technology, content, and process with a particular emphasis on the importance of content, and these perspectives are echoed by other ECM researchers (Nordheim & Paivarinta, 2006; Paivarinta & Munkvold, 2005; Tyrvainen et al., 2006).

vom Brocke, Simons and Cleven's (2011) research is similar to O'Callaghan and Smits' in that a blueprint framework is developed for an ECM system implementation. O'Callaghan and Smits' blueprint framework was specifically used to define content candidates for an ECM system, yet this blueprint framework went beyond content discovery for a more holistic implementation plan. vom Brocke et al. included Tyrvainen et al.'s (2006) content, enterprise, processes, and technology perspectives in their model with a particular emphasis on the enterprise perspective because it "pertains to the social, business and legal aspects" of ECM systems (p. 482). It was also asserted that ECM and business process restructuring (BPR) are closely related areas, due to ECM's extensive use of workflow processes, and developed a

process-oriented framework for ECM implementations. Their ECM-blueprinting framework integrates an ECM implementation strategy into the existing business processes of the enterprise.

The ECM-blueprinting framework consists of five phases: business process analysis, content analysis, ECM system analysis, ECM-blueprints adaptation, and BPR. The authors indicated that while building the ECM-blueprints for an enterprise, valuable insights are discovered before implementation, such as what processes need to be included and which technologies are needed. This framework proposes issues of how enterprises may or may not approach the discovery of content and processes that are candidates for an ECM implementation. For example, to what degree are current business processes analyzed prior to an ECM implementation? How is enterprise content determined for the ECM? The answers to these questions may inform how planning impacts successful ECM implementations.

Nordheim and Paivarinta (2006) responded to Smith and McKeen's (2003) call for further research on EMC implementation case studies by studying an ECM implementation in a large oil company, Statoil. These researchers also agree that ECM includes all types of content over its lifecycle, the importance of metadata and taxonomy, ECM tasks that support the lifecycle phases, and management practices and policies to support the system. They then borrow Van de Ven and Poole's (1995) model of four meta-theoretical motors of development and change from the enterprise systems (ES) literature and applied it to ECM case study research. Among other conclusions, they indicated that borrowing from the enterprise resource planning (ERP) literature was a good fit for ECM research in that ES and ECM systems are very similar with the main differences being that ECM technologies are less mature and this

impacts the early stages of implementation. They also identified seven phases of an ECM implementation: strategy, feasibility, solution scenarios, request for information, request for proposal, design specification and customization, and implementation.

Haug's (2012) research is a case study of an ECM implementation at a small to medium enterprise. Haug borrowed IS CSFs and applied strategies to support these factors by using action research in the roles of researcher and consultant (Poon & Wagner, 2001). The CSFs were committed and informed executive sponsor, operation sponsor, appropriate IS staff, appropriate technology, management of data, clear link to business objectives, management of organizational resistance, management of system evolution and spread, evolutionary development methodology, and carefully defined information and system requirements. Implementation success was defined as user acceptance. The implementation was carried out over six phases: process analysis, process redesign, software analysis, software design, software selection, and implementation.

The results indicated that all ten CSFs needed to be met for success and these results need further testing with future case studies. Other factors were mentioned outside the ten CSFs, such as user involvement, customization, and clear vision. Because success was defined as user acceptance, efforts were taken to highly customize the software to user specification and to minimize disruption of user routines and tasks. It is difficult to measure the impact of action research on the implementation and determine to what degree supporting the ten CSFs improved success. However, this research was a first attempt to address ECM success factors and does so by borrowing from the IS literature and applying them to a case study.

2.1.2 Theoretical Development

Paivarinta and Munkvold (2005) analyzed 56 case narratives of ECM implementations from AIIM to define and develop a conceptual framework of issue areas. Their framework includes five issue areas that require particular management to enable ECM within the enterprise. The authors defined these areas as the content model, the enterprise model, infrastructure, administration, and change management:

> ECM should support organizational *objectives* and the desired enterprise model. Actions based on the objectives result in more or less anticipated and desired *impacts*, interplaying with the future objectives. ECM is realized through design and implementation of the *content model*, including all information content relevant from the viewpoint of the *enterprise model*. The implementation of ECM is supported by the technological *infrastructure and administrative resources and practices* in place. *Change management* is needed to cultivate an optimized fit between the enterprise and its content model, infrastructure, and administration over time. (p. 2)

They emphasized the importance of an understanding by the enterprise of the content model as the core of any ECM system implementation. The content model includes five subareas: content structure, view, and presentation models, content life-cycles, metadata and corporate taxonomy. An understanding of the content model allows the enterprise to consider their content beyond traditional document and knowledge management practices when planning and implementing an ECM system. For example, content life-cycles from an ECM perspective not only manages life-cycles and versioning, but also manages creation and capture from internal and external sources, controlled content workflows and access, controlled storage, versioning, and revision, and compliance, retention, and archiving management.

The enterprise model refers to developing a shared vision within the enterprise for the ECM objectives and outcomes (Paivarinta & Munkvold, 2005; Senge, 1994). This includes developing planning, roles, responsibilities, objectives, desired impacts, and approaches. The

enterprise vision can vary greatly between different enterprises due to business viewpoints and objectives. Paivarinta and Munkvold indicated that the enterprise model can be process-based, team-based, project-based, and others. For example, shipping and billing would use a process-based approach and a hospital might use an imaging and workflow-based approach.

The infrastructure, administration, and change management issue areas refer to the technology, policies, and support mechanisms needed to implement an ECM system. Managing infrastructure issues include integrating applications and tools, developing user friendly interfaces, and managing information security issues. Administration issues include developing policies and standards, evolving existing roles, creating new roles, and establishing responsibilities. Change management issues identified include justification of investment, top management support, maintaining ECM expertise, and managing user opposition to change.

The authors also attempted to place ECM in context with established areas of information management. They indicated that information resource management and electronic document management are predecessor practices and ECM builds upon them by expanding the scope to include semi-structured and unstructured content and by collaboration between internal and external users and integrates new and traditional technologies across the enterprise. However, ECM is indicated to be a subarea of knowledge management because it manages information about enterprise knowledge, it manages content creation and reuse, it can combine content and processes; it manages content life-cycles, and there is an emphasis on metadata and enterprise for taxonomy development (Nordheim & Paivarinta, 2006; Paivarinta & Munkvold, 2005). While there is not a consensus of agreement in the literature that ECM is a

subarea of knowledge management, their ECM issues framework does provide a comprehensive view of the ECM problem space.

The authors provided an informal practitioner checklist of management issues to be considered when planning an ECM system implementation, such as justifying the initiative, evaluating impacts, involving key stakeholders, developing a shared vision, among others. The terms *challenges* and *critical success factors* were not used, but these checklist items are present later in the IS and ES Critical Success Factors Research section.

Tyrvainen et al. (2006) developed a conceptual framework for conducting future ECM implementation research. Their framework approached ECM implementations from four perspectives: content, enterprise, processes, and technology. The Tyrvainen et al. framework is developed from the Paivarinta and Munkvold (2005) model and similarities can be drawn. First, similar to the Paivarinta and Munkvold model, content perspective is considered the key component. Second, the enterprise perspective is included in both. Paivarinta and Munkvold model's use of the term *infrastructure* and the Tyrvainen et al. use of the term *technology* both refer to the hardware, software, and standards used in ECM system implementations. Paivarinta and Munkvold's administration and change management issues have been absorbed into the Tyrvainen et al.'s enterprise perspective and they have added the process perspective, which was discussed mostly in the Paivarinta and Munkvold enterprise section.

The authors emphasized that any ECM research should include the content perspective because content is the core for any ECM implementation. The content perspective includes three views: information view, user view, and systems view. The information view "is interested in the semantics of the content, how it is structured, represented, and made

accessible to users" (p. 629). The information view also considers issues of granularity. Early content management systems were either course (such as file storage) or fine (such as database storage). The main challenge for the information view is how to develop semantics and ontologies to meet retrieval needs for semi-structured and unstructured content. The solutions thus far have been the use of extensible markup language schemas and content tagging.

The user view of the content perspective is focused on how content is represented to the viewer and in what context. Methods of creation, storage, and dissemination have an impact on the user interpretation of complex content as to its relevance and usefulness. Tyrvainen et al. (2006) indicated that while there is research in information retrieval and social contexts, the ECM literature is lacking in research for the user view.

The systems view is focused on the users, content, and technologies that host content in combination as a system. It is related to the technology perspective, but the systems view recognizes the users and content as part of the system. Even though there is little research in this area, they speculated that the systems view of an ECM implementation is often not well planned.

The enterprise perspective focuses on the social, business, and organizational aspects of the enterprise. These aspects can include a wide range of constructs such as organizational culture and structure, change management strategies, top management support, communication, business objectives, business processes, and others. The authors indicated that research in the enterprise perspective for ECM is rare.

Two categories for the processes perspective are included: development and deployment. Development refers to the process of implementing and maintaining an ECM system. Deployment refers to the process of implementing content life-cycle activities, such as document and content management strategies. The authors indicated that the processes perspective also lacks in critical research.

Finally, the technology perspective is focused on the hardware, software and standards that are used in ECM implementations. Tyrvainen et al. indicated that there is a rich body of literature for ECM technologies, and they argued that although technologies must be included in ECM research, the main focus is on the entire system, including the enterprise and processes that are part of that system.

Many implementation activities may be categorized according to the four perspectives, but it is important to remember that these perspectives are often interdependent and ECM implementations are multidimensional processes.

2.1.3 Two ECM Academic Literature Reviews

Alalwan and Weistroffer (2011) conducted a review of the ECM literature that included 91 resources from journal articles, conference proceedings, books, book chapters, and master's theses that addressed the topic of ECM. Their purpose was to evaluate the literature and to develop a model for directing future research that includes "three structural pillars: system component dimensions, system lifecycle, and strategic managerial aspects" (p. 441). The system component dimensions include tools, strategy, people, and process. The system lifecycle components include adoption, acquisition, evolution, and evaluation phases. The strategic managerial aspects include change management and management commitment.

They concluded with several calls for research, two of which this proposal will address. The first addresses the system component of process dimension: "the ECM field lacks academic guidelines for successful implementation: empirical research that discusses ECM implementation is scarce" (p. 453). The second addresses the system lifecycle phase of evolution: "in the evolution phase, research on challenges and solutions of ECM integration is needed. Determining the critical success factors for ECM integration would be most useful" (p. 454).

The second literature review by Grahlmann et al. (2012) is limited to 32 academic articles that were organized according to Tyrvainen et al.'s (2006) framework for defining ECM: content (information view, user view, and systems view), enterprise, process, and technology. They added a seventh category, research field, to denote 12 articles that discuss ECM as an IS research field. The purpose of their review was to develop a working definition of ECM and to develop a functional ECM framework.

Grahlmann et al. review ECM definitions from the articles and determined that they fall into two issue areas: content/technology perspectives and enterprise/process perspectives. These two issue areas are combinations of Tyrvainen et al.'s (2006) four issue areas. There is also some disagreement whether structured content is included in an ECM system in the literature, but Grahlmann et al. include structured content in their ECM viewpoint because it is present in practical ECM applications. The authors propose this comprehensive, yet concise, definition:

> Enterprise Content Management comprises the strategies, processes, methods, systems, and technologies that are necessary for capturing, creating, managing, using, publishing, storing, preserving, and disposing content within and between organizations. (p. 272)

This definition includes a holistic perspective of ECM and a lifecycle perspective of content, which are supported by the practical and academic literature. The authors follow their ECM definition with a Functional ECM Framework defining four functional layers of ECM and test it with three case studies.

2.1.4 Summary of Enterprise Content Management Systems

The academic ECM research began with broad definitions of ECM, identifying roles and responsibilities of ECM, and based on general agreement that content is the integral commonality for ECM. The focus on content, content stewardship and content lifecycles appears to define the purpose of ECM apart from previous systems, such as management support systems, which are focused on supporting decision-making tasks. However, ECM implementations may include these previous systems through integration with legacy systems as well as share similar technological architectures.

There is some agreement that ECM is related to the established areas document and content management and that ECM may be a sub-area of knowledge management. There is also some agreement that ECM goes beyond document and content management by combining technologies, business processes and infrastructure to manage content lifecycles and workflow. ECM is also repeatedly referred to as a field of IS in the academic literature.

While the specific language used to describe ECM and perspective emphasis is not always consistent, there is some agreement that ECM systems include the components of content, enterprise, processes and technology and that these components include sub-components such as change management, BPR, content lifecycle, communications and others.

2.2 IS and ES Critical Success Factors Research

The interest in enterprise systems CSFs for the present proposal is four fold: these systems are used widely across industries, there is a wealth of relevant literature, there are several similarities between these systems and ECM, and previous ECM research has borrowed from the IS and ES fields. Although the purpose of enterprise systems varies, the implementation difficulties are similar. For example, ERP systems combine several technologies across enterprise departments using packaged ERP software to automate and integrate business processes for timely information access, improving transaction efficiency and effectiveness, and decision-making (Al-Mashar, Al-Mudimigh & Zairi, 2003; Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006). Business processes improved by ERP implementations include accounting, supply chain management, e-commerce processes, production planning, warehouse management, and administrative processes. ECM purposes are different from ERP, such as managing organizational content over the content lifecycle, but are similar to ERP systems in that enterprise wide technologies are integrated using packaged ECM software and ECM implementations are also closely tied to BPR, as are ERP systems.

There is a gap in the academic literature for ECM implementation success factors research. ECM success factors have not been determined or what measure of impact they might have on ECM implementations or how they might be interrelated. While ECM purposes are content driven and ERP purposes are transaction driven, implementation problems and success factors may be similar and ECM research can benefit from ERP CSF research.

There are many challenges to implementing an enterprise-wide information system and the ERP literature alludes to problems, methods, and impediments to successful implementation that has lead to academic research that attempted to define these factors. Some of the possible challenges are multi-site or global implementations; gradual versus aggressive implementations; cultural and national challenges; and *an all or nothing* attendance to CSFs (Garcia-Sanchez & Perez-Bernal, 2007; Maguire, Ojiako & Said, 2009; Markus, Tanis & Fenema, 2000; Motwani, Mirchandani, Madan & Gunasekaran, 2002; Poon & Wagner, 2001; Sethi, Sethi, Jeyaraj & Duffy, 2008). The scope of these challenges includes the innovators, adopters, processes, and factors involved in IS implementations.

One approach to understanding these elements of IS and ES implementations is Rogers (1983) theory of diffusion of innovation, which can apply to many aspects of the implementation process. Rogers' theory has been widely used across fields and industries despite some criticism (Fichman & Kemerer, 1999; Lundblad, 2003; Rogers, 1983). Rogers' theory states that there are four elements of diffusion that impact the adoption or rejection of an innovation over five stages of adoption by five groups of adaptors that result in positive and negative consequences for the individual and social group. The innovation is diffused through communication channels over time within the social system. The diffusion begins with knowledge of the innovation, followed by persuasion to adopt the innovation, the decision to implement the innovation, and finally a confirmation of the adoption or rejection of the innovation by the individual. There are also several factors that impact adoption such as innovation decision types, innovation characteristics, adopter types, issues of heterophily, and issues of opinion leadership and change. These concepts are useful for identifying how

individuals within an organization are led to adopt (successful implementation) or reject (failure of implementation) a new IS system implementation (Mustonen-Ollila & Lyytinen, 2003).

Information systems literature indicates that the success or failure of an implementation project is due to a variety of critical factors (Wixom & Watson, 2001). Defining success is a first step when discussing CSFs and the literature varies on this definition. Successful enterprise system implementation has been defined as on time and within budget, or as fulfilling expected system use. Sometimes however, a discussion of CSFs begins without defining success. DeLone and McLean (1992) outlined a history of defining IS success in their landmark study and presented a definition for the dependent variable, success. The resulting study indicated that IS success is a multifaceted concept with at least six constructs: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. The primary result from the study is not just identifying possible constructs, but recognizing that the relationships between the constructs are interdependent and can increase or decrease the effectiveness of each other. DeLone and McLean (1992) emphasize a holistic perspective when studying success constructs with particular attention to how these constructs impact each other. See Figure 2 for an illustration of the model.

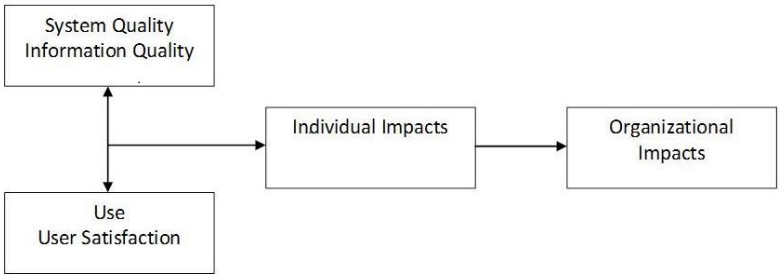

Figure 2. Delone & McLean's model for success.[2]

A group of researchers at the MIT Sloan School of Management developed the CSF approach to define important aids to solving information needs (Rockhart, 1979). Rockart was an early researcher to apply the CSFs approach to top management information needs and defined CSFs as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where 'things must go right' for the business to flourish" (p. 85). He also indicated that these areas need to receive constant management and evaluation to be effective. In his article, Rockart was referring to factors critical to meeting organizational goals. Bullen and Rockart later extended the definition of CSFs to be used for management information system planning (Bullen & Rockart, 1981). Boynton and Zmud (1984) agreed and that the CSF method has two strengths for management information systems implementations: it generates user acceptance at the senior managerial level and allows for a top-down planning process that reveals high level conceptualization of organizational issues. Kwon and Zmud (1987) identified four issues areas that impact a six phased view of IS implementations. The researchers define individual, task-related, technological, and structure factors for the initiation, adoption, adaptation,

[2] From "Information systems success: The quest for the dependent variable" by W. H. Delone and E. R. McLean, 1992, *Information Systems Research 3*(1), 60—95. Reproduced by permission.

acceptance, use, and incorporation phases of implementation. The first three factor categories, individual, task-related, and technological, are similar to Tyrvainen et al.'s (2006) categories of enterprise, process, and technology.

Since then, success factors approaches have been used extensively in the IS area for determining IS system implementation CSFs and ERP systems in particular (Holland & Light, 1999; Nah, Zuckweiler & Lau, 2003; Parr & Shanks, 2000; Somers & Nelson, 2001). Holland and Light divided 12 ERP CSFs into two categories, strategic and tactical, and concluded that there are factors specific to ERP projects beyond standard IS factors, such as ERP strategies and business process change. Parr and Shanks (2000) identified 10 ERP CSFs they considered necessary for success and applied them by using a project phase model that resulted in these recommendations: large projects should be partitioned in to smaller projects, the use of an empowered project champion, and that it may be best to implement a vanilla system. Somers and Nelson (2001) identified 22 ERP CSFs and supported previous research that the standard IS CSFs are important for ERP implementations and that there are specific ERP CSFs such as BPR. Nah et al. (2003) identified 11 ERP CSFs with 47 sub-factors with a survey of chief information officers and reported that the most critical factors were top management support, project champion, ERP teamwork and composition, project management, and a change management program. ERP CSF research culminated with several literature reviews of ERP implementations CSFs that include some agreement as well as differences (Al-Mashari, Al-Mudimigh & Zairi, 2003; Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, et al., 2006).

The CSF literature has inconsistent language for defining, categorizing, and weighting CSFs, leading to a handful of literature reviews and taxonomies attempting to find agreement (Dawson & Owens, 2008). However, the taxonomies are not current and report different categorizations for CSFs (Dezdar & Sulaiman, 2009). For the purposes of the present study, two taxonomies of ERP implementations are particularly interesting: Finney and Corbett (2007) and Dezdar and Sulaiman (2009). The Finney and Corbett taxonomy is selected because 26 CSFs were determined; the highest number of the taxonomies because the CSFs were more finely defined. The Dezdar and Sulaiman taxonomy is selected because it is the most comprehensive and compares their results against previous taxonomies thereby validating the CSFs and it includes two CSFs not included in the Finney and Corbett: system quality and user involvement.

Finney and Corbett (2007) discovered 26 CSFs from their content analysis of the literature on ERP implementations and used a frequency analysis to rank them from most cited to least. Their findings indicate that more research is needed to address stakeholder CSFs and exactly what change management entails, even though it is one of the most widely cited CSFs. The authors' CSF categories were more specifically defined than other taxonomies resulting in a larger number. For example, the Dezdar and Sulaiman (2009) taxonomy resulted in 17 CSFs but grouped some of the CSFs found in the Finney and Corbett taxonomy into one category. Dezdar and Sulaiman also grouped Finney and Corbett's 26 CSFs into two categories: strategic and tactical, as did Holland and Light (1999).

The more recent taxonomy by Dezdar and Sulaiman compared the results from three literature reviews with their findings, resulting in a 70% majority of agreement, 12 out of 17 CSFs, and two CSFs not found in the other three: system quality and user involvement (Dezdar

& Sulaiman, 2009; Finney & Corbett, 2007; Nah et al., 2001; Somers & Nelson, 2001). The authors' 17 CSFs were classified into five categories for the purpose of developing a holistic model of CSFs and how they fit within the ERP implementation and as a practical application for stakeholders to see where implementation problems might arise.

2.3 Theoretical Framework

Based on the literature review a theoretical framework has been developed from the IS and ERP literature. By combining the models of DeLone and McLean (1992), Kwon and Zmud (1987), and Rogers (1983), a framework is developed for understanding how the dependent variable, success, is impacted by factors related to information systems in general.

There are four issue areas of ECM that should be considered when adopting the new system: enterprise, process, technology and content (Tyrvainen et al., 2006). Each area has factors to be considered that can positively or negatively impact an ECM implementation. The factors from each issue area may be interrelated, similar to the concepts discussed by DeLone and McLean (1992). For example, although a new implementation project may have a clear project plan with well defined goals and milestones (a process related factor), it may not achieve intended success if it lacks top management support (an enterprise related factor). Also, if an implementation considers all enterprise, process, and content factors, but fails to select a technology that is a good functional fit for the goals of the project, it may not achieve intended success. This study uses the theories and models as discussed earlier to justify three of the four issue areas: enterprise, process and technology. The fourth issue area, content, is not discussed in the theoretical framework because there is not a tested model for content. The content

issue area is included in the research model as an extension of the framework, as derived from Tyrvainen et al.'s (2006) untested model, and is discussed in Chapter 3.

DeLone and McLean's model indicates that a successful IS implementation results in expected system quality and information quality, it meets expected system usage and user satisfaction, and it meets expected individual and organizational impacts. Success is achieved by the combination of expected system use and user satisfaction and their direct effect on individual and organizational impacts. This model has been widely tested and is appropriate for defining ECM implementation success (DeLone & McLean, 2003).

Implementation success is impacted by independent variables that positively or negatively influence the implementation process. Kwon and Zmud's (1987) unified IS model has a set of factor categories, three of which directly correlate to Tyrvainen et al.'s three issue areas of the ECM problem space: individual factors (enterprise), task-related factors (process), and technological factors (technology). Kwon and Zmud's model is used for these three issue areas because it has been widely tested and is appropriate for ECM factor use (Carayannis & Turner, 2006; Hwang, Ku, Yen & Cheng, 2004; Rajagopal, 2002; Wu & Chuang, 2010).

Rogers (1983) theory of diffusion of innovation provides overall support of the framework in several ways. For example, when considering individual factors, was the decision to implement an ECM an authoritative or collective decision for the enterprise? Was the communication between management, users, consultants, and clients homophilous or heterophilous? Meaning that the language and experiences between implementers and users was well understood. Did the users recognize a relative advantage of the new system, its compatibility to the enterprise needs, and its usefulness? Did the implementation plan include

roles of opinion leadership, a change agent, or aide to foster change management? Were the consequences of the implementation desirable and anticipated with direct impacts on the project goals for individuals and the enterprise?

There have been many defining versions of the stages of IS implementations (Haug, 2012; Kwon & Zmud, 1987; Nordheim & Paivarinta, 2006; vom Brocke, Simons & Cleven, 2011; vom Brocke et al., 2011). Rogers defined five stages in which an innovation is diffused over time: knowledge, persuasion, decision, implementation, and confirmation. The knowledge stage includes activities such as visioning and planning, building a business case, and identifying project goals. The persuasion stage includes activites such as requesting RFI and RFPs, sharing the project vision across the enteprise, including end-users in the development process, and legacy system considerations. The decision stage includes activities such as determining technologies, project budget planning, project team development, and change management plans. The implementation stage includes activities such as BPR, integrating technologies, data conversion and integrity, system testing, and training and job redesign. Finally, the confirmation stage includes activities such as post-implementation evaluations and further customization. These stages are chosen for the framework because of their high level of conceptualizion and ease of comprehension.

The combination of these models in the framework will allow for implementation factors to be categorized into the appropriate issue areas and to determine their impact on implementation success. See Figure 3 for an illustration of the framework where DeLone and McLean constructs are represented in purple, Kwon and Zmud constructs are represented in blue, and Rogers constructs are represented in green.

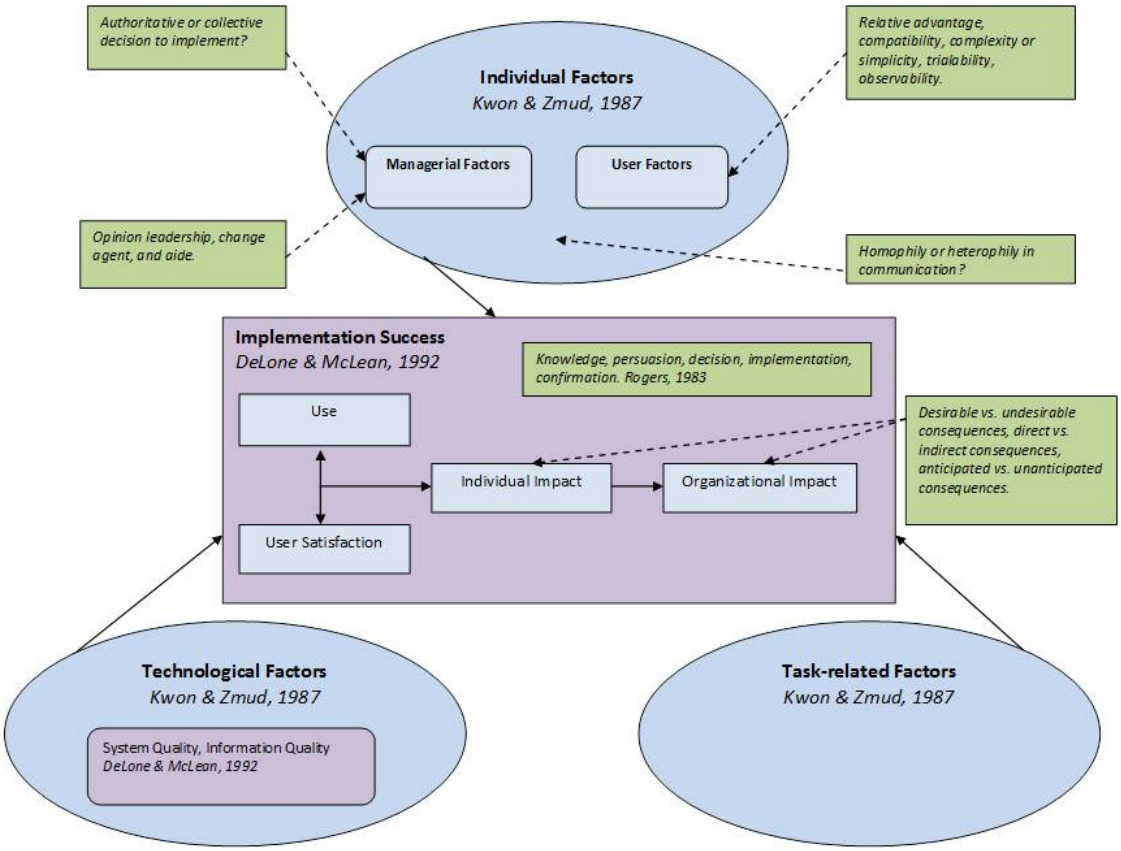

Figure 3. ECM System Implementation theoretical framework.

CHAPTER 3

METHODOLOGY

The purpose of the research design is to address the existing gap in enterprise content management (ECM) systems research and further investigate issues related to ECM implementations with the objectives of identifying a set of key success factors. Guided by research in related areas and the theoretical framework, this study developed a research model to identify ECM success factors and their relationship to enterprise, process, technology and content. The research model directed the development of a research design for a case study of an ECM system implementation in a large enterprise.

Yin (1989) indicates that a single case study is appropriate for testing a well-formulated theory and can be instrumental in supporting the theory-building process. The research questions can serve as a set of preconceived propositions that guide, organize, and analyze the data.

> The theory has specified a clear set of propositions as well as the circumstances within which the propositions are believed to be true. To confirm, challenge, or extend the theory, there may exist a single case, meeting all of the conditions for testing the theory. The single case can then be used to determine whether a theory's propositions are correct, or whether some alternative set of explanations might be more relevant. (p. 47)

Yin (1989) also indicates that a sound case study follows three principles. First, collecting multiple sources of evidence strengthens construct validity (Merriam, 1988). This study used mixed methods approach: qualitative in the form of interviews and content analysis of documents collected from the participants. Mixed method approach provides the opportunity for convergence validation or triangulation of results.

Creswell (2009) indicates that in a social constructivist paradigm, the researcher seeks to find meaning in context by gathering information personally and interpreting the findings based on personal background and experiences. The researcher does this by entering the case setting and asking open ended questions of participants and allowing them freedom to shape answers according to their experience. This type of research is best suited to humans who can interact and gather information beyond the spoken word while conducting interviews by observation thereby making the researcher the key instrument (Merriam, 1988; Bogdan & Bilken, 1992). The researcher for the present study has a unique position in that she has held the position of team lead for an ECM system implementation and has background and experiences to bring to the study as the primary instrument. Creswell (2009) indicates five stages of qualitative research that were followed for this case study:

- The researcher gathers information
- The researcher asks open ended questions
- The researcher analyzes data to form themes or categories
- The researcher looks for broad patterns, generalizations, or theories from themes or categories
- The researcher poses generalizations or theories from past experiences and literature (p. 63)

The final principle is to "increase reliability of the information in a case study, is to maintain a chain of evidence" (p. 102). This study follows these recommendations to create a chain of evidence by citing the information in the Nvivo database (http://www.qsrinternational.com/products_nvivo.aspx), by allowing the database to present the findings of the evidence, by adhering to the research model, and by making connections between the research model, research questions and the data (Merriam, 1988; Miles & Huberman, 1984). The evidence is presented as "rich, thick description" for transferability

(Guba & Lincoln, 1985; Merriam, 1988). The following sections discuss the research model, definitions for the ECM areas and factors, case study research methods, data analysis methods, and summary.

3.1 Research Model

The research model is based on the theoretical framework that identifies success factors for the three of the four ECM issue areas. The theoretical framework included the issue areas of enterprise, process and technology. The framework was extended in the research model to include Tyrvainen et al.'s (2006) untested issue area of content. The model includes a collection of factors derived from the literature and have been divided into the individual (enterprise), task-related (processes), and technological (technology) categories defined in the theoretical framework. The category of content, taken from Tyrvainen et al.'s (2006) four issue areas, extends the framework for the research model with the assumption that content is an important area in ECM. The individual category in the theoretical framework has been divided into managerial and user to represent the significance of each, leaving a total of five categories for the model. See Figure 4 for an illustration of the research model.

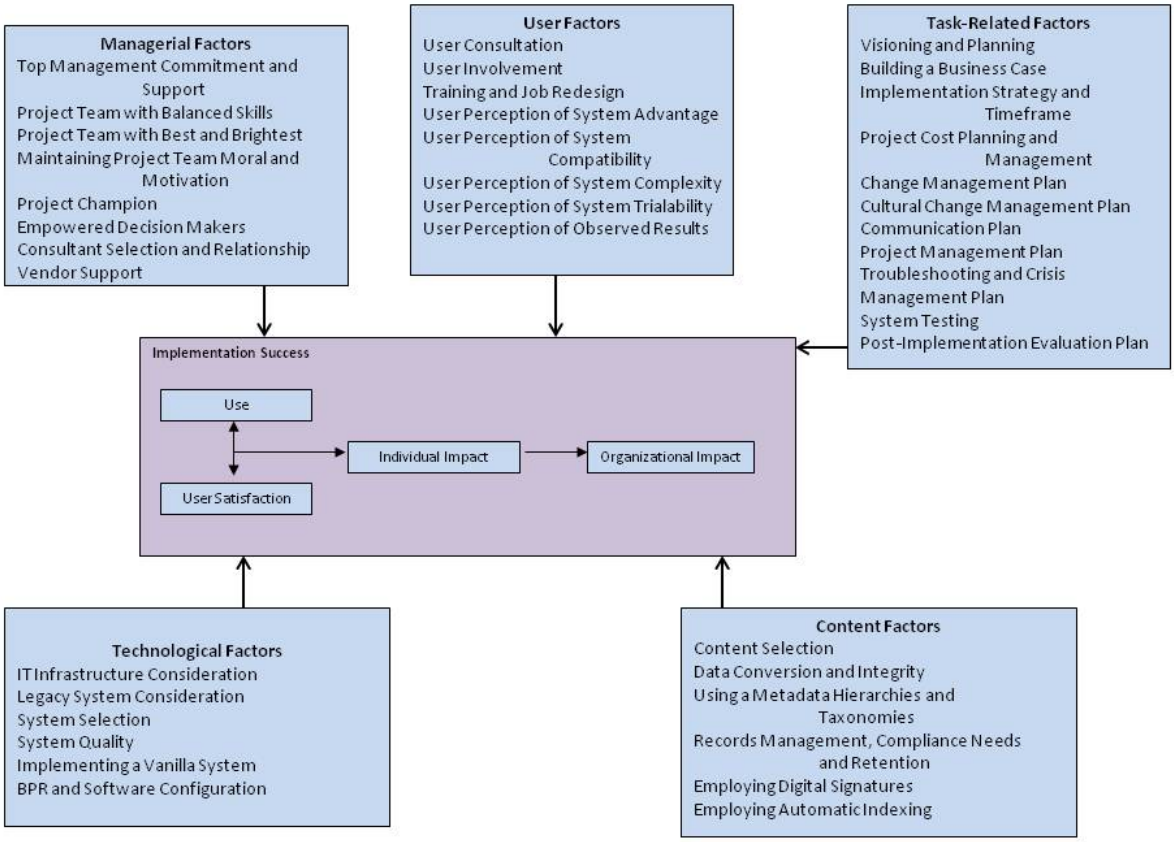

Figure 4. ECM system success factor research model.

3.2 ECM Areas and Factors

This next section discusses each area along with their corresponding factors. Support for these factors and citations from literature reviews, taxonomies and academic research and can be found in Appendix A.

3.2.1 Managerial Factors

Managerial factors are a sub-category of Kwon and Zmud's individual factors and are represented as a category because of their strong relationship with other enterprise factors (Li, Lim & Raman, 2003). It is well documented that managerial factors have an important impact

on information system (IS) implementation success and it is reasonable to assume that ECM implementations are similarly impacted (Finney & Corbett, 2007; Haug, 2012; Liu & Seddon, 2009; Poon & Wagner, 2001). According to Al-Mashari et al., 2003, "Leadership and top management commitment are the most critical factors in organizations embarking on ERP [enterprise resource planning] implementation, as they ensure a smooth change management and system rollout" (p. 356). It is also important to note that top management support does not end with system selection, but needs to extend throughout the entire project to make quick decisions during crisis management, to encourage organization wide acceptance, and to constantly provide direction (Al-Mashari et al., 2003, p. 356). Managerial factors are practices and strategies that top management and the project teams can employ to improve the success of implementations. The leadership from management can have an enormous effect on other factors such as change management, crisis management, resolving disputes, communication between stakeholders, and others (Zhang, Lee, Zhang & Banerjee, 2002). Management can provide strategic direction and it is in control of a variety of resources: two elements that are critical for system implementation success. Management factors include general support, empowering decision makers, developing a relationship with the implementation consultants, maintaining the relationship with the vendor, appointing a project champion, change agent, or aide, and promoting a collective decision to adopt the system. See Table 2 for definitions of managerial factors.

Table 2

Managerial Factors

Factor	Definition
Top management commitment and support	The need to have committed leadership at the top management level with involvement in management, planning, and who are technically orientated. (Finney & Corbett, 2007)
Project team with best and brightest	The need to put in place solid, core team members who are the organization's best and brightest with proven reputations that are allocated to the project full time. It may be necessary to train these individuals. (Finney & Corbett, 2007)
Project team with balanced skills	The team needs to span the organization and to possess a balance of business and IT skills. (Finney & Corbett, 2007)
Maintaining project team moral and motivation	The needs for the project lead/champion to nurture and maintain a high level of employee morale and motivation during the project to reduce the possibility of losing talented staff. (Finney & Corbett, 2007)
Project champion	The need to have an individual with strong leadership, business, technical, and person managerial skills promoting the project. (Finney & Corbett, 2007)
Empowered decision makers	The need for the team to be empowered to make necessary decisions in due time to allow for effective timing with respect to the implementation (Finney & Corbett, 2007)
Consultant selection and relationship	The need to have a consultant as part of the implementation team and to have effective knowledge transfer from the consultant to the company to decrease dependency on the vendor. (Finney & Corbett, 2007)
Vendor support	The need for vendor-customer cooperation and partnership. Usage of vendor tools. Vender is technically competent; communicates effectively with team and users; effective domain knowledge and service of the vendor. (Dezdar & Sulaiman, 2009)

3.2.2 User Factors

User factors are the second element of Kwon and Zmud's individual factor and are equally as important as managerial factors (Li et al., 2003). These factors are also widely supported in the literature (Davis, 1989; Finney & Corbett, 2007; Liu & Seddon, 2009). Users need to be consulted and communicated to about the project and the expected impacts to the individual and organization. The involvement of users in the development and design process

has been shown to be critical for implementation success. User acceptance and satisfaction with the system lead to implementation success (DeLone & McLean, 1992).

The human side of an organization can often be a hidden cost of implementation (Bingi, Sharma & Godla, 1999; Gargeya & Brady, 2005). Training and job redesign are critical factors that impact system use. IS systems are complex and training needs can be lengthy and intensive. As business processes change, so do employee tasks and it is important to plan for training for the new system and business processes.

There is a variety of user perceptions of the system that impact individual and organizational impacts (Davis, 1989; Rogers, 1983; Venkatesh & Davis, 2000; Wixom & Watson, 2001). User perceptions of ease of use, system complexity and compatibility, results and advantages can impact their use of the new system. See Table 3 for definitions of user factors.

Table 3

User Factors

Factor	Definition
User involvement	The need for one or more end users actively involved in project planning and implementation. (Dezdar & Sulaiman, 2009)
User consultation	The need for communication and consultation with the various stakeholders, in particular the end users. Keeping them apprised of the project to avoid misconceptions. (Finney & Corbett, 2007)
Training and job redesign	The need to include training and to consider the impact of the change on the nature of work and the specific job descriptions. Also the need for project team training. (Finney & Corbett, 2007)

(table continues)

(continued)

Factor	Definition
User perception of system advantage	The user perceives an advantage over the previous ways of performing the same task; that use of the system will increase their job performance within the organization. (Agarwal & Prasad, 1997; Davis, 1993)
User perception of system compatibility	The user perceives that the system is compatible with their job. It will allow them to do what they need to do to complete their work. (Davis, 1993)
User perception of system complexity	The user perceives that the system will be easy to use and learn. (Davis, 1993)
User perception of system trialability	The user perceives that they will be able to try the new system before it is required for performing their job. (Davis, 1993)
User perception of system results	The user observes that the information and data returned by the system is correct and useful. (Davis, 1993)

3.2.3 Task-Related Factors

Task-related factors, also called process factors, are the functional elements of an implementation that are performed continuously throughout the implementation process (Tyrvainen et al., 2006). Task-related factors are numerous and it is difficult to narrow this category to determine the most important (Finney & Corbett, 2007; Liu & Seddon, 2009; Poon & Wagner, 2001; Smith & McKeen, 2003; vom Brocke, Simons, Herbst, Derungs & Novotny, 2011). These factors are interdependent with other categories, such as managerial, user, and technological factors. This category is also considered a methodological category due to the development and deployment processes involved (Tyrvainen et al., 2006). They are mostly oriented toward project planning, development and evaluation. Visioning and planning, building a business case, implementation strategies and timeframes, and change management plans are some of the activities involved. See Table 4 for definitions of task-related factors.

Table 4

Task-Related Factors

Factor	Definition
Visioning and planning	The need for articulating a business vision to the organizations with clear, measurable goals and objective linked to business goals and IS strategy. Planning should include risk and quality management, tasks to be accomplished, and benchmarking internal and external best practices for system implementation. (Finney & Corbett, 2007)
Building a business case	A need to conduct economic and strategic justifications for implementing the system. (Finney & Corbett, 2007)
Implementation strategy and timeframe	The need to address the implementation strategy and to have a phased approach. Determining if the implementation should be centralized or decentralized, considering multi-site issues. (Finney & Corbett, 2007)
Project cost planning and management	The need to know up front exactly what the implementation costs and to dedicate the necessary funds and to plan a loose budget policy to handle unforeseen and unexpected occurrences that increase costs. (Finney & Corbett, 2007)
Change management plan	The need for the team to formally prepare a change management program to build user acceptance and cultivate positive user attitude by education, securing support of opinion leaders, and negotiating between political turfs. Must be a change management initiative as opposed to an IT initiative. (Finney & Corbett, 2007)
Cultural change management plan	The need to be consciously aware of the cultural differences and preferences from both organizational and geographical perspectives such as business characteristics. The need for a culture that is conductive to change. The reduction of adoption costs for all stakeholders and consideration for the identification and usage of strategies that are necessary to implement cultural change. Possibly a sub-category of change management. (Finney & Corbett, 2007)

(table continues)

(continued)

Factor	Definition
Communication plan	The need for a communication plan between functions and levels of the organization, such as IT and business functions, and between all stakeholders such as end users, lower employees, and clients. (Finney & Corbett, 2007)
Project management plan	The need for planning ongoing management of the project. Planning stages, allocation of responsibilities, defining milestones, training and HR planning, and determining measures of success. Possibly a steering committee with members from all levels of the organization for system selection, monitoring implementation and managing outside consultants. (Finney & Corbett, 2007)
Troubleshooting and crisis management plan	The need to be able to learn from unforeseen events and to be able to handle unexpected crises with troubleshooting skills. (Finney & Corbett, 2007)
System testing	The need for the inclusion of testing exercises as well as simulation exercises before the system goes live. (Finney & Corbett, 2007)
Post-implementation evaluation plan	The need for the allowance for some kind of post-evaluation or possibly a feedback network and continued management support. Possibly develop established metrics or focused performance measures. (Finney & Corbett, 2007)

3.2.4 Technological Factors

Technological factors are related to the information technology (IT) infrastructure (including IT staff and existing technologies), technologies introduced, integrated, and implemented and include the hardware, software, and other base components of the system (Finney & Corbett, 2007; Haug, 2012; Liu & Seddon, 2009; Poon & Wagner, 2001). These factors are critical because the IT staff and existing systems are intimately involved in the entire implementation (Al-Mashari, et al. 2003). For example, determinations of which current technologies will be integrated with the new system, which will be phased out of use, aligning business process restructuring (BPR) with integration planning, and determining the extent of

how much customization to implement are all factors that involve the IT infrastructure. IT staff needs to have a thorough understanding of the organizational business needs and need to be involved in strategic planning of the implementation.

Nordheim and Paivarinta's (2006) case study at Statoil surfaced several technological issues while implementing an ECM system. Determining functional fit between candidate software packages and enterprise goals was difficult indicating that software selection and quality are important considerations. It was important to Statoil that they select a standardized software solution to integrate with existing products. Other technological issues encountered were related to architecture, integration of new products, and functionality. See Table 5 for definitions of technological factors.

Table 5

Technological Factors

Factor	Definition
IT infrastructure consideration	The need to assess the IT readiness of the organization including architecture and skills and to consider upgrading or revamping the infrastructure. (Finney & Corbett, 2007)
Legacy system consideration	The need to consider the current legacy systems in place to identify potential problems or technical and organizational change required. (Finney & Corbett, 2007)
System selection	The need for careful attention to system selection to be a good functional fit for business processes. (Finney & Corbett, 2007)
System quality	The need for good system quality with proven vendor reputation and support. (Dezdar & Sulaiman, 2009)
Implementing a vanilla system	The need to implement a basic version with little or no customization. (Finney & Corbett, 2007)
BPR and software configuration	The need for careful BPR and software configuration. How the usage of the system matches the business goals and how the business will operate after the package is in use. (Ribbers & Schoo, 2002)

3.2.5 Content Factors

Unlike ERP and other transactional information systems, ECM is a content intensive operation and the because of the role it plays in ECM implementations, it is included here as a category and will be evaluated for the first time as part of the research model (Nordheim & Paivarinta, 2006; O'Callaghan & Smits, 2005; Paivarinta & Munkvold, 2005; Smith & McKeen, 2003). This category is unique to ECM and little is known about how content factors impact implementation success. Data conversion and integrity are factors that are relevant in an ECM system, but there are few studies in the practical and academic literature that name specific content factors. A variety of issues surround content, such as determining content candidates, developing metadata and taxonomies and planning for implementing automatic indexing, but research in this category is largely absent. It is included as a category here to extend the theoretical framework in the research model to explore factors related to content. See Table 6 for definitions of content factors.

Table 6

Content Factors

Factor	Definition
Content selection	The need for a process to determine what content and business processes should be included in the new system. (O'Callaghan & Smits, 2005)
Data conversion and integrity	The need for the assurance of data accuracy during the conversion process and may also involve data clean up. (Finney & Corbett, 2007)
Using metadata hierarchies and taxonomies	The need for logical and conceptual structuring of the content. Taxonomies can contain a list of all content types managed by the ECM system together with, for example, definitions of metadata fields. The main goal is to allow users access and navigation through the content. (Grahlmann, 2012)
Records management, compliance needs and retention	The need to comply with internal and external content regulations. (Miles, 2011; Paivarinta & Munkvold, 2005)
Employing digital signatures	The need for digital signature functionality. Can be part of a workflow for authenticating digital content. (Grahlmann, 2012)
Employing automatic indexing	The need for computer automated indexing of metadata fields for content. (Paivarinta & Munkvold, 2005; Tyrvainen et al., 2006)

3.3 Case Study and Research Methods

The case is a large scale academic institution that purchased and implemented an ECM system over the last seven years. There was an existing document system in place that was used by core departments in the institution such as the Registrar, Graduate Admissions, Undergraduate Admissions, Financial Aid, Human Resources and others. The document product was old and needed to be phased out due to lack of support and the core departments wanted more ECM functionality for the new system such as workflow, records management, versioning, etc.

A steering committee was selected from the core departments that included a variety of positions: directors, assistant directors, future team leads, and functional users. The committee

sent out requests for information and spent time with several vendors. The new system needed to be able to integrate with the existing ERP system and data from the document system had to be converted over to the new system. A product was selected and an enterprise team lead was hired and sent to the vendor for training. Departmental team leads and members were selected according to each department's discretion. Planning for the implementations began in 2006 and they took close to six years to complete and some are ongoing.

3.3.1 Sample Frame and Data Sources

A purposive sampling of participants has been chosen because they have specific knowledge of an ECM implementation that is appropriate for this study. The participants are also a convenience sample, due to the recent acquisition and implementation efforts of ECM software (Bogdan & Bilken, 1992). A convenience sample is one that is readily accessible and may have prior connections with the researcher, as is the case for this study.

The sample frame had a 37% response rate and included 15 team leads and members from 11 departments that had implemented the ECM system or were in the last stages of implementation. The participants included a wide range of positions in the departments, such as directors, administrative assistants, IT managers, and functional users. There were 11 women and four men. Age ranged from the 20s to the 60s. There were two types of departments that implemented: large core departments that were retiring the previous document system and required data conversions and medium to smaller departments that were implementing the system for selected business processes. Business processes included mostly student records, human resources and financial processes.

The 15 participants were interviewed at location of their choice in the university. Each interview lasted between 50 to 80 minutes. Each participant was contacted by email requesting an interview and scheduling a time and location. The email included a consent form and cover letter that defined for the participant: the purpose of the study; a description of the study; procedures, risks, and benefits. All participants were compensated with a $10 Starbucks gift card. See Appendix B for the consent form. Finally, the participants were asked for any documents pertaining to their implementations that they were willing to share and 14 documents were collected. See Table 7 for document descriptions and formats.

Table 7

Document Collection

Document	Description	Format
Advisor Meeting Notes	Notes from a meeting between a department team and department advisors	Word Document
Software Configuration Map	A table that recorded software settings for an implementation	Word Document
Custom Properties Metadata	A guide for metadata entry for student records	Word Document
Getting Started Guide	Training guide	Word Document
Implementation Plan	A staged implementation plan	Word Document
Prep List	A list of actions to be completed before planning with the enterprise team	Word Document
Letter of Records Destroyed	An email indicating records that had been processed for disposition	Word Document
Custom Properties Process	A guide indicating metadata entry responsibilities	Word Document
Guide to Records Management	Guide for records management processes	Word Document
Web Access Training Guide	A training guide for web access of the ECM system	Word Document
Document Types	A list of document types created during planning	PDF
Workflow	A workflow map created during planning	PDF
Workflow 1	A graphic workflow map	Visio
Conference Presentation	A “lessons learned” presentation	PowerPoint

3.3.2 Instrumentation

The research instrument was an interview schedule that was followed for each interview. See Appendix C for the interview schedule. The interview schedule is a traditional and appropriate instrument for qualitative case studies (Merriam, 1988). The interview schedule was semi-structured which allowed for representation of the research model and questions, but also allowed for flexibility (Yin, 1989).The interview method is also informed by Myers and Newman's (2007) interview guidelines. These guidelines recommend that the researcher be mindful of the interview as a social interaction. For example, the researcher should use strategies to minimize social dissonance and strive to make the participant as comfortable as possible such as allowing the participants to choose a time and location for the interviews. The interviews conducted were focused on the research topic and around an hour each.

The primary research instrument is the researcher who brought previous experience and background with ECM implementations was responsible for designing and managing the instrumentation process. (Bogden & Bilken, 1992; Merriam, 1988). She was a team lead for a college with three departments at the same university using the same product. The implementation in this college included student records processes for the three departments. The implementation of the system in the college lasted 30 months.

Yin (1989) indicates several skills needed by the primary instrument:

- To be able to ask good questions
- To be adaptive and flexible to new situations and see them as opportunities
- To have a firm grasp of the issues being studied
- To be unbiased by preconceived notions

There are several strengths that the researcher can bring to this study that address Yin's skill set. The researcher must ask "good questions" by following the interview schedule and by allowing deviation from the schedule when exploring a participant's train of thought with *why* questions. The researcher also practiced good listening skills by speaking little and allowing the participants to discuss topics at length. The researcher maintained an adaptive and flexible attitude by encouraging discussions on topics about the implementations that were not anticipated. Her knowledge of the product allowed her to fully comprehend the technical problems and issues described by the participants. The knowledge of student records processes allowed the researcher to understand most of the participants' descriptions of their business processes. The knowledge of working with the enterprise team, department team members, end users, and internal and external user groups allowed the researcher to be familiar with descriptions of these topics. Most of the participants knew the researcher either from the user groups or from working directly with the researcher and this allowed for easy rapport development during the interviews (Krathwohl, 2009).

"Bias is inevitable" noted Krathwohl (2009) and the researcher took measures of triangulation to control bias related to background and experience. "Triangulation is not so much a tactic as a way of life. If you self-consciously set out to collect and double-check findings, using multiple sources and modes of evidence, the verification process will largely be built into the data collection as you go" (Miles & Huberman, 1984, p. 267). Biases for this study included personal perceptions of the technology, the university, people, methods of implementation, and important factors. The first method of triangulation was to collect data from multiple sources and to collect two types of data: interview audios and a collection of

documents. This allowed the "data to speak for itself" during analysis as themes developed. A second method was to practice bracketing bias when it occurred to allow the researcher to set bias aside while analyzing the data.

> Bracketing is a methodological device of phenomenological inquiry that requires deliberate putting aside one's own belief about the phenomenon under investigation or what one already knows about the subject prior to and throughout the phenomenological investigation. (Chan, Fung & Chien, 2013)

Bracketing was achieved by conducting semi-structured interviews with open ended questions and by maintaining a journal in Nvivo. For example, if there was a preconception that documentation was an important factor, this would be noted in the journal as a reminder to allow the data to build a case for that factor if it was significant.

3.3.3 Data Collection

An email was sent first to the sample frame containing the consent form and a request for an interview. A second email was sent to schedule an interview time and location. There was a 37% respondent rate for a total of 15 interviews. All interviews were conducted within a two week timeframe.

The interview began with short and broad questions, or "grand tour" questions, for discussing each stage of the participant's implementation (Yin, 2011). This first section enabled the participant to revisit their implementation and recall details by describing their project. The second section presented the participant with a list of factors and was asked to discuss the most important factors for their project for each category. The next section asked participants to evaluate the success of their projects. Final questions addressed what factors participants felt they needed and did not have as well as factors that they did have and how they impacted success.

Interviews were recorded with a cell phone voice recorder as m4a files which were imported into NVivo software for transcribing. Documents related to the implementations were also collected from participants and content analysis was performed by importing them into NVivo for content analysis. The documents were used as a triangulation method to increase construct validity (Merriam, 1988).

3.3.4 Ethical Considerations

Ethical considerations when performing research with subjects must include full disclosure of the nature of the research and the obligations involved, to enter the research voluntarily, and to not be exposed to harm (Bogden & Bilken, 1992). The participants were informed of the research and the obligations by the consent form. Each participant entered the research voluntarily and was informed that they could end the interview at any time. The participants were not at risk of physical or emotional harm.

The participants were informed that they would not be identified by the research and that they would be assigned labels as Participant 1 or Participant 2. The location of the study is also not disclosed. The participants were treated with respect and were compensated for their time.

3.4 Data Analysis Methods

"Hunches, working hypotheses, and educated guesses direct the investigator's attention to certain data and then to refining and/or verifying one's hunches. The process of data collection and analysis is recursive and dynamic" (Merriam, 1988). The researcher employed these methods as initial data analysis and as another method of triangulation to support the

evidence from the database. From prior experience with ECM and by experiencing the interviews, ideas and notions were developed about what factors the evidence would support.

Content analysis is a reductionist method of describing data into categories or classifications and can be achieved in a variety of methods and may be either quantitative or qualitative (Weber, 1990). Content analysis is a flexible in that it can be suited to theoretical approach and problem to be studied (Hsieh & Shannon, 2005). Krippendorff (1980) indicates that there are problems with reliability for content analysis and that measures need to be taken to ensure the stability, reproducibility and accuracy of the results. This research uses two methods to support reliability: directed content analysis and the use of two data sources for triangulation. Directed content analysis was used to "validate or extend conceptually a theoretical framework" by using the factors in the research model to focus the content of the interviews and documents and develop the coding scheme (Hsieh & Shannon, 2005, p. 1281). The interview schedule was designed from the research model and the content analysis of the interview data is directed by the research model by using the categories and factors as classifications. Data analysis of documents collected from the participants follows the same method of classification and results are presented separately from the interview data so that a comparison of support for factors can be accomplished.

The method of coding the interview data followed pattern coding, also referred to as pattern-matching (Miles & Huberman, 1984; Yin, 1989). Pattern coding begins with a first set of themes and narrowing themes to second level. By relying on theoretical propositions, the first levels of themes were created from the research model (Yin, 1989). Post levels were determined by methods of convergence and divergence (Merriam, 1988). Convergence

identifies data that fits together or merge into a theme. Convergent themes are themes that are descriptive of the factor and are within the research model. Divergence identifies data that needs to be added to a new sub-category. Divergent themes are themes that develop outside of the research model as unique findings. Themes were allowed to emerge according to Guba and Lincoln's (1985) criteria: the frequency of sources, the frequency of occurrence, uniqueness of occurrence, and unexpected occurrence.

The first level of codes created in NVivo were the factor categories taken directly from the model: managerial, user, task-related, technological, and content. The second level of codes were the factors for each category. The initial data coded were from the second section of the interviews that asked respondents to choose the top factors for each category. These data were selected for initial coding because the answers were generally straightforward and were easily coded. Next, each interview was analyzed and coded based on ease of coding and uncertain data were left un-coded. Ease of coding applied to data that had meaning related to a first or second level code and could be descriptive of a factor, an indication of importance as a factor, or other meaning relating it to a factor. A second pass through the interviews were performed to assess and code uncertain data once more. Each first and second level of codes was assessed for further granularity and resulted in a third level of codes as themes developed within the second level. The second and third levels of codes were re-assessed multiple times. A final pass through the transcribed interviews was performed to assess and code uncertain data a last time.

A review of the research model and questions began the data analysis process to remind the researcher of the original intent of the study (Merriam, 1988). Data analysis included four

methods to determine factor support: calculation of frequency of sources and calculation of frequency of occurrences (Guba & Lincoln, 1985).

Coded data was first analyzed in NVivo by the frequency of sources, in this case the participants (Guba & Lincoln, 1985). This analysis answered the question “Which factors are discussed by the most participants?” Secondly, the frequencies of occurrences were analyzed for each category of factors and for each factor. This analysis answered the question “Which factors were discussed most often?”

Documents collected from participants were imported into Nvivo and directed content analysis was conducted by coding the content in the same method as the transcribed interviews: content of each document was coded into corresponding factors and sources and occurrences were calculated separately from the interview content to allow for comparison of the results.

3.5 Summary

This research is approached with a constructivist paradigm to find meaning in a single case study. The framework for this case study is the research model with five research questions for factors that impact ECM implementation success. This study uses a purposive, convenience sample and two instruments: the researcher and the interview schedule. Primary data collected was transcribed and coded audio and documents were collected and analyzed by content analysis for triangulation. Coding protocol followed pattern matching and convergent and divergent methods. Data analysis was conducted according to two methods: frequencies of sources and frequencies of occurrences. A collection of documents related to the implementations were coded for content analysis.

CHAPTER 4

RESULTS AND FINDINGS

This chapter discusses the findings of the case study by addressing each category of factors in the research model. The factors are discussed in the order of higher frequencies of occurrences to lower frequencies of occurrences. Convergent themes, or themes that develop within the research model are discussed where they occur. There was one divergent theme, a theme that developed outside of the research model, and is discussed in the project team factors section. The content of a small collection of documents and its importance is discussed and concludes with a summary of the results and findings.

4.1 Data Analysis of Interviews

Analysis began by reviewing the data as a whole, according to the five categories, and the category frequency of occurrences are as follows: Managerial is 538/31%, User is 240/14%, Task-related is 578/35%, Technological is 195/11%, and Content is 118/7%. This analysis is useful for describing the case study globally and answered the question "What categories of factors are discussed most often?" The categories are not equal in number of factors and it is necessary to analyze each category separately. See Figure 5 for the division of category percentages.

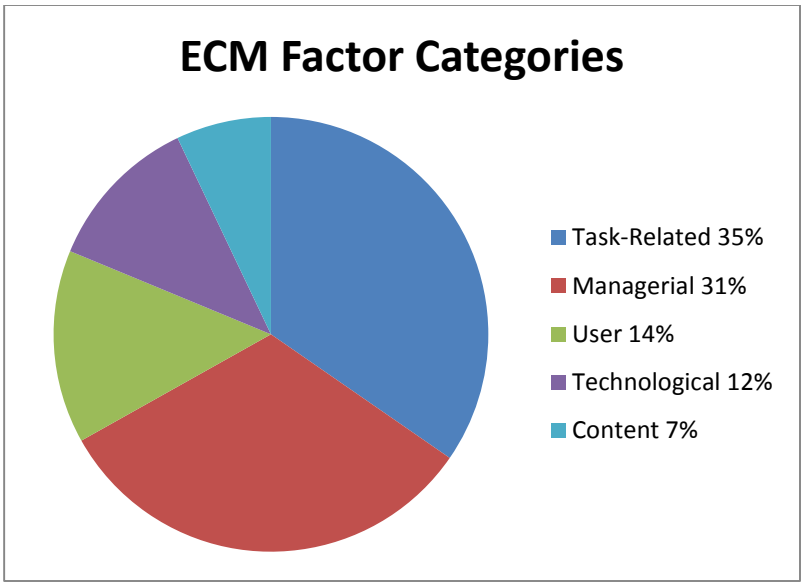

Figure 5. ECM factor occurrence frequency percentages.

4.1.1 Managerial Factors

The second to largest category for frequency of occurrence, Managerial Factors were fully discussed by participants. The factors with the most source and occurrences were top management commitment and support, empowered decision makers, and consultant selection and relationship. See Table 8 for the factor sub-themes and frequencies of sources and occurrences.

Table 8

Managerial Factors: Frequencies of Sources and Occurrences

Factor	Sub-theme	Sources	Occurrences
Top Management Commitment and Support	1. Adoption was mandated 2. Participants felt they had this factor 3.Participants felt they did not have this factor 4. Specific indications of importance	100%	43%
Empowered Decision Makers		27%	17%
Consultant Selection and Relationship		87%	12%
Project Team with Balanced Skills	1. Enterprise team needed technical skills 2. Enterprise team was not supported by top management or IT 3. Positive feedback for enterprise team 4. Negative feedback for enterprise team	100%	10%
Project Champion		87%	9%
Vendor Support	1. Consultant misrepresented the system functionality	73%	5%
Project Team with Best and Brightest	1. Lack of system knowledge for department team	60%	3%
Maintaining Project Team Moral and Motivation		53%	1%

4.1.1.1 Top Management Commitment and Support

All participants discussed this factor and four convergent themes developed within this category: top management had mandated the project, participants who did not feel they had this factor, participants that felt they did have this factor and participants that specifically indicated this factor as important.

Top management includes the university and department levels. University level support was primarily evidenced by purchasing the product and consulting, by hiring and training an enterprise team, and by mandating product use. There is a theme that the university

level's support and commitment ended with these activities and that there was a need for continued university level support.

Participant 10 indicated that top management at the university level did not support the enterprise team with resources needed for such a large project and also failed to view the project as a campus wide implementation.

> Because they were piecemealing the implementation, they operated the team that was tasked with implementing it on a very shoestring budget for the project, that was being done, in my opinion, and they did not give this project the weight it needed to really have been implemented the way it should have.

Participant 11 also indicated frustration because university top management continued to fail to recognize an enterprise benefit from implementation and to support the project team.

> It's just frustrating that after all these years that we've shown it works, we show that there's savings and money, not just in paper costs, but in performance time. They haven't funded the department [enterprise team] that it needs to be to continue to add more users.

Many participants indicated that the project was mandated to their department from top management. There were reoccurring words such as 'mandate,' 'directive,' and 'initiative' that were common for this theme. Some occurrences for this convergent theme are short and to the point and many indicated a perception that top management support ended with the mandate as indicated by participant 3:

> Starting at the top, [it] was dictated to us in a sense from the university level to our college dean, so the college dean was told by the university level that we would be using this new process.

The departmental levels were varied in their amount of verbal and resource support. Some participant's indicated that their implementations were strongly supported departmentally and that it contributed to their success while others had opposite experiences.

However, most participants indicated that top management support is 'important,' 'crucial,' and 'vital' to the success of their projects regardless of their experience as indicated by participant 14:

> Top management commitment and support is crucial, not only for rolling out a department, but for growing a system.

Participant 2 had strong departmental top management support and believed that it had a strong impact on the project:

> I definitely think that top management commitment and support was vital. If the dean had not been just really gung ho about the project, then it probably wouldn't have gotten implemented nearly as quickly as it did for us. We could also fall back on his support if we got push back from the staff, the end users having to change their processes, got frustrated a little bit at times, it was helpful to be able to say "this is coming down from the dean" and we really meant it because it really was coming down from him.

Participant 12 did not have effective departmental top management support and indicated that it made the project more difficult:

> Then, of course, the real commitment of management would have made things better for us, instead of just the perceived. They were wanting to check the box that they were told to do it, so they were going to give it minimal support.

4.1.1.2 Empowered Decision Makers

This factor is supported by a wide range of feedback for this factor such as "we had empowered decision makers, that was not a problem" and "there were no empowered decision makers." There were nine occurrences that indicated this to be an important factor because empowered team leads and members were able to make decisions that impacted the success of their projects. There were a small few departments that included functional end users on the team and gave them a voice on how the system was developed for their positions. Participant 6

indicated strong support from departmental top management and that it had a positive impact on the project:

> [Top management] was very much "I can trust what you guys decide. You all were there from the beginning, you are now my expert for this and I'm going to trust what decisions you make." To be empowered with that made a huge difference.

There were also participants who felt they lacked the ability to make decisions for themselves and that it negatively impacted their projects. There were examples of this in the context of departmental top management and also when interacting with the enterprise team. There were complaints such as having to ask top management to make small decisions for their project or the enterprise team held control of some system functionalities.

Participant 12 indicated that decisions for the project had to be approved by departmental top management and that this was one of the factors that greatly slowed the project, which was several years into implementation:

> I think empowered decision makers and a balanced team are some of the most important because if you don't have decision makers, or people that are there that can make the decision, if you have to keep going back for approval, it doesn't make for an efficient project. You get your hands tied because you have to explain things that they may or may not understand and grasp. That was one of the issues we had with the initial implementation was, I was on the project, I was the only one the project, but I wasn't allowed to make the decisions I knew would help. I had to run everything back through the director and they're just not grasping, they don't know what it can and can't do and how things work. It just doesn't work, it just makes it very, very difficult.

Some system functionalities, such as the ability to print, were out of the control of the team lead and caused frustrations as indicated by participant 11:

> The failures always seem to be from the outside, they were frustrated in the sense that we were told to use it, but yet we really had no control. Securities were set beyond our level, that we could no longer print. Well, heck, that's why we put it in there is if we need to give it to an auditor, we should be able to print. But those decisions were being made by someone else because they wanted us to be paperless.

Participant 5 indicated frustration because the team leads did not have control of system security. For example, the process of adding a new employee and assigning security levels was lengthy and out of the hands of the team lead:

> As network manager, I have no control over those rights. That makes implementation of this system basically a nightmare. I can't make changes on the fly to see what impact they may have for doing things. There are eight people involved in getting somebody added into the system. It's ridiculous. It's just ridiculous.

However, the position of the participants was directly tied to their opinion of this factor. Higher positions in the organization ensured their ability to be empowered, while lower positions hindered their ability to make decisions for their projects. But there were indications from both levels that they did not have full control of their systems.

4.1.1.3 Consultant Selection and Relationship

This factor was discussed by the participants who had access to the consultant early in the implementation and excludes departments that implemented two or three years later. The majority of occurrences for this factor were negative feedback; most of the participants that engaged with the consultant early in implementation expressed frustration. Issues with the consultant included lack of listening, lack of understanding for existing systems and business processes, and insisting on certain implementation strategies which caused problems later. This factor is interrelated to the new factor, lack of system knowledge, discussed in the next section.

The team leads were at a disadvantage when interacting with the consultant because they did not understand the system that resulted in the leads taking the advice of the consultant over their own intuition about system configuration as indicated by participant 10:

> Consultant selection, yes, probably most of all, consultant selection and relationship. The consultant really had only his idea of how it should go and he wasn't listening to what we were telling him. And I think in the end that was the biggest negative to the implementation was we didn't force the issue and said "Look, you have to stop your mindset and you have to listen to what we are trying to tell you."

Participant 6 indicated that the consultant failed to make the client's concerns his own during the conversion process:

> I think that conversion process was almost a side note, on the side of the consultants. For them it was like "Oh, just push it in there and don't worry about it" kind of thing.

4.1.1.4 Project Team Factors

The project team factors results were divided to address the enterprise team and the department teams. The participants fully discussed both teams during the interviews, but occurrences for the combined project team with best and brightest are low. The combined occurrences for the project team with balanced skills factor were moderate. There were convergent themes and one divergent theme that developed for these factors.

There was only one occurrence for project team with best and brightest for the enterprise team. There were ten occurrences for project team with balanced skills and six of them indicated a need for the team to have balanced skills. The enterprise team had begun with one person who was a functional team lead and another team member was added who was also functional. This second member later left and another functional member was added. The participants indicated that the enterprise team would have benefitted from a technical

team member. Another convergent theme developed that the enterprise team was not supported by the IT infrastructure or top management and that they did not have the resources they needed for an enterprise implementation. This suggests that top management commitment and support may have a direct impact on the quality and performance of the enterprise team as indicated by participant 10:

> The implementation team that they created wasn't near large enough. They had one person for the most part. Then it became a two person. Management basically handed it to her and was like this [hands off]. So, she didn't have the IT support that she needed and she may not have even realized the IT support she needed. So that is huge, you got to have that one.

Two other convergent themes developed for the enterprise team that included positive and negative feedback for the team. Positive feedback had 14 occurrences and included enterprise team support and commitment, regular system health checks, timeframe scheduling, and administrative competence. Negative feedback had 27 occurrences and included limited time, lack of technical skills and training, small sized team, and lack of system knowledge for the enterprise team and some frustration with the team ticketing system.

Participant 5 believed that the enterprise team was critical for the success of their project:

> It was critical for us to have an [enterprise] team that was willing to work with us and sit us down at the beginning. That was critical for us because it allowed us to move forward in leaps because we had general ideas about how things were going and once we got there we were like "oh, this is reality and so we are going to do it this way."

Participant 12 felt that the enterprise team was lacking in technical skills and that it slowed the progress of their project:

> If you have a project team that has the skills necessary…definitely think that's a big issue. We didn't have that on our [enterprise] team. They didn't have the technical background, they were just functional. They knew how to make it work on this end, but if you had a question "Well, I don't know. I'll have to check with the consultant" or "I'll have to check with the product and see if we can even do that."

There were ten occurrences indicating project team best and brightest for the department teams is important or had this factor, but this data may be skewed because the participants are referring to themselves and their team members. There were 25 occurrences for project team with balanced skills and there were a few that indicated this as an important factor. Four participants indicated that having a balanced skill set on the team impacted implementation success. Two participants indicated that having a "content expert" on the team would have impacted success. They described the content expert as someone within the department that not only had a thorough understanding of the department content, but of business processes as well.

Lack of system knowledge was the divergent theme that developed during discussions of the department project teams. Of the 142 occurrences for the department team with balanced skills, 53 of them diverged to the topic of lack of system knowledge. This theme was also repeated by many participants as other factors were discussed in other categories. Team leads and members approached their projects without training in the new system. They were expected to design, convert, and implement with no prior knowledge of system functionality, design, or capabilities. This resulted in project redesign after implementation for many participants. Some participants indicated lack of functionality for their projects due to lack of awareness of system functionality. Phrases such as 'I didn't know,' 'we didn't know,' and 'just had to figure it out' were common. There were many complaints that there was an absence of

system documentation from the vendor as well as the enterprise team. The participants implemented by using the system to discover functionality and by going to internal and external user groups. One department paid for training in workflows for the team lead and one department hired an outside consultant with prior knowledge of the system for a short period of time. Participant 10 had a comment that summarized the impacts from lack of system knowledge:

> The problem is we would go into implementation meetings kind of blind because we really didn't have a good foundation for the new system. We really didn't understand how it worked; we didn't really understand its key indexing values. So, we go into meetings with the consultant, and the consultant and the institutional team lead are halfway down the road and we are still back at the starting block and we're trying to play catch up with them. Trying to understand what it is we are even talking about because we didn't have a really good idea of how the system worked overall. We were really, and at the time we didn't even know it, that's the problem. We didn't even know we were behind. So, we're talking to them about indexing values and all this other stuff, not understanding down the road how this was going to affect the converted data as well as going forward.

Participant 1 also indicated lack of system knowledge was due to minimal documentation for the system:

> Basically because the documentation wasn't clear, wasn't complete. So, we didn't really have the information about the product that we needed to make those critical decisions.

4.1.1.5 Project Champion

There was not a project champion identified for the university and few identified for the departments. Those that were identified were the team leads themselves. There was mixed results on whether a project champion was important or needed for implementation. There was feedback such as a lack of a champion, the presence of a champion, or the need for a

champion, but there was not enough consistent data to develop convergent or divergent themes.

4.1.1.6 Vendor Support

This factor had few occurrences, but a convergent theme within these occurrences is a complaint that the vendor misrepresented the software functionality. During demonstrations of the software, the vendor indicated robust functionality. But when the product was delivered, the vanilla system was lacking in functionality and users were told that modifications would require scripts to be written at a significant extra cost as indicated by participant 10:

> The only other thing is the system, the other piece to that is finding out that we were really bringing in a vanilla system and some of the things we thought we were getting, we weren't getting because those would be additional scripts that we would have to pay for.

Also, future plans of expanded functionality provided by an upgrade were never realized as indicated by participant 13:

> The software kept saying, the company kept saying, they would come out with this new technology that you could fill out and it would automatically populate in the repository and it would send out to the different branches that needed the workflow. That never happened.

4.1.1.7 Maintaining project team moral and motivation

This factor had five occurrences by four participants. One occurrence indicated this to be an important factor. Percentages of occurrences for each managerial factor represent a distribution within 100% of all managerial factors. See Figure 6 for a summary of managerial factors.

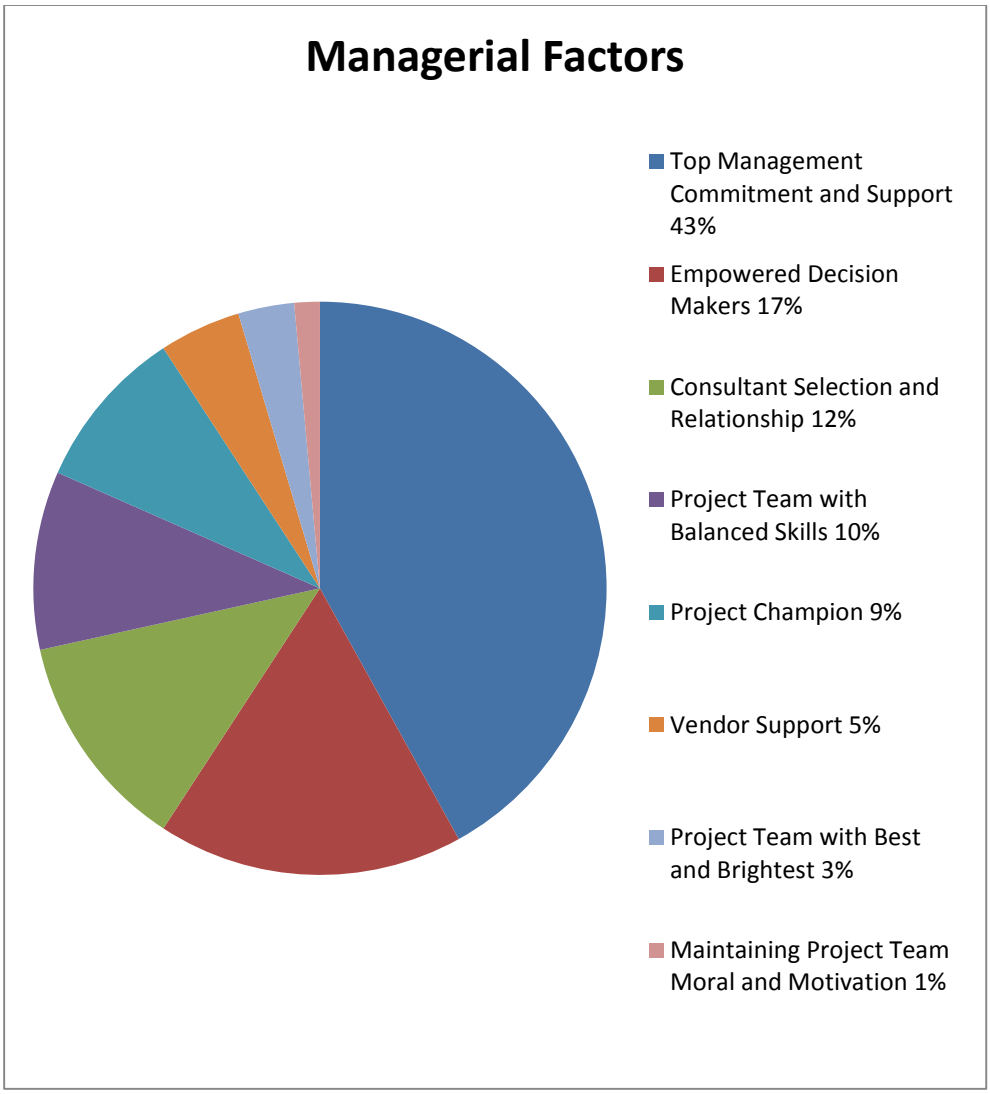

Figure 6. Managerial factor occurrence frequency percentages.

4.1.2 User Factors

The factors with the most occurrences for this category are user involvement, training and job redesign, and user perception of system advantage. See Table 9 for the frequencies of sources and occurrences.

Table 9

User Factors: Frequencies of Sources and Occurrences

Factors	Sources	Occurrences
User Involvement	100%	30%
Training and Job Redesign	100%	25%
User Perception of System Advantage	87%	14%
User Consultation	80%	12%
User Perception of Observed Results	13%	10%
User Perception of System Complexity	40%	6%
User Perception of System Compatibility	13%	2%
User Perception of System Trialability	20%	1%

4.1.2.1 User Involvement

Participants indicated that end user involvement impacted success and that this factor was important for redesigning business processes, configuring the software, conversion considerations, testing, and gaining end user buy in. Participant 1 discusses how users were involved in the project:

> That was the biggest part of our project. We did redesign processes and we included each of the various groups of the compensation area, employment area, all the different HR groups were included in that plan and in the decision making about when and in what order the implementation would affect them, which pieces of their work would be implemented first.

The departments had different levels of user involvement from formal planning to casual consultations. Some departments had specific representative end users on the implementation team as was the case for participant 6:

> I also think having a voice helped. I think having our representative two on the group [department team] helped tremendously to make sure that we were setting the system up for the users and not setting up the system and letting it go.

Some departments included the users in general and they were involved at key points of the implementation as indicated by participant 10:

> We brought in the experts on the data, the staff members that were experts on the existing data. They had to be brought in as part of the implementation to help us make sure we weren't missing a step as far as the plan on the conversion.

Few departments did not have end user involvement and these participants indicated that this factor should have had a larger role in their implementation, as did participant 12:

> I wish we…we probably should have had more end user involvement to get buy in earlier on. That way our project may not have taken… wouldn't have taken as much time, I think.

4.1.2.2 Training and Job Redesign

All departments experienced training to some degree and training methods for end users were discussed by most participants and training strategies varied from informal one-on-one sessions and small groups to formalized training strategies and practices with defined timeframes.

Training methods were developed according to the departmental culture and what methods the team leads felt would be best accepted by their end users. Participant 4 focused on a combination of group and individual training:

> We did do training with our end users as we did one training en mass where we had something up on the projector and "here's what you are going to be doing." A lot of it, though, was one-on-one, going around to everybody's cubicle and making sure they and the security they needed and sitting down and answering any questions they had and making sure they were comfortable and knowing where to go.

Participant 11 indicated that the users would be more responsive to minimal training due to workload time constraints:

> The managers…it took some training. They were willing to go with it if it saved time and they didn't have to do it. So, as long as I was willing to go through the training and give them the quickest tutorial, then they were on board. For them, they didn't realize it as a burden; it was now part of the routine. Our personalities as accountants – just do it enough repetitive times and it's like "OK, then this is the way."

One department approached training in a unique way. Due to the nature of the financial processes, there were several months each year where workload was high and training was performed over the months with lower workload. Training was also optional for the first year and then became mandatory. End users were also allowed to choose which tasks they would perform in the new system and which tasks they would perform as a paper process. The results of this training method were that all but two end users chose to train in the new system and by the time the high workload months arrived, these end users were almost fully using the system for all processes and the workload was completed efficiently. Participant 11 described this method:

> We decided that we would do a test pilot within the department for six months prior to the next fiscal year so we could get buy in from the staff. I would say we have a staff of twelve, at least ten of them did it on a routine basis, not maybe everything got in that way. And it was a great sell. Taking the time that I was there for the six month pilot, working with each one, teaching them the tools, going through training, showing them how easy it was to link, that was great buy in. So, by the time it went to mandatory, they pretty much were almost doing it before mandatory started.

It was also indicated that more training was needed for the implementation teams, possibly from the enterprise team, and this ties back to the system knowledge factor. This lack of training greatly increased implementation difficulty for some departments as indicated by participant 10:

> A lot of it was self taught, the training gave you an initial foundation and everything else was self taught. Just like everything else with views and ….the whole using of the system was self taught. If we had better training going into the implementation, we would have known what we were doing. We didn't know.

Job redesign was primarily concerned with developing an implementation team from existing human resources within the departments and allocating staff tasks such as scanning and linking. There were indications that it was important to have dedicated staff to full time linking, as opposed to student workers, to reduce linking errors and perform quality control.

4.1.2.3 User Perception of System Advantage

There is an indication that this factor increased user acceptance when they could see improvements in their jobs and cost, space and time savings as discussed by participant 7:

> But I know that multiple people mentioned to me that "Oh, this is great!" How amazing it was and, of course, freeing up the file space, that was kind of an obvious impact – that was a huge impact. Yes, I definitely think the organizational impact was realized.

Some participants indicated that the advantages extended to the clients of the university. Students could get information faster and vendors could save time by faxing in documents as indicated by participant 13:

> The biggest accomplishment was walking into the file room and seeing it had been converted into an office. Students could get their information a lot faster and easier and weren't having to call five times a day.

Some departments could now work together within the system for workflow and document sharing as indicated by participant 3:

> We also began finding needs to share on a greater basis, like outside our department. It became useful for advisors to be able to view all the transcripts for other schools that we have scanned in for student records. So, it makes it much easier to be able to share.

4.1.2.4 User Consultation

None of the participants indicated that this factor was specifically important, but rather steps were taken to inform end users of the project. User consultation methods included

announcing the project at staff meetings, notifying staff of future changes, demonstrating the product, and discussions of how business processes and positions would change with end users. Participant 2 discussed methods of user consultation:

> So, we had the most to lose, the most to gain and so our staff were made very aware. They were part of the process for making sure that this was coming, this was how it's going to change, the training protocols, trying to calm concerns and worries. New technology brings fear.

4.1.2.5 User Perceptions Factors

The factors of user perceptions of system compatibility, complexity, trialability and observed results had few occurrences. System compatibility was supported by two sources and four occurrences and is not an important factor for this case study. Occurrences are about end users expressing concerns about how they will perform their jobs in the new system. System complexity is primarily describing user concerns about the difficulty of performing their job in the new system. System trialability was supported with three sources and three occurrences indicating that the users did not get to explore the system before having to perform their jobs. Observed results factor is a mix of description of system outputs and how those are perceived by users and positive and negative feedback. There were no specific indications that this factor was important. Percentages of occurrences for each user factor represent a distribution within 100% of all user factors. See Figure 7 for percentages of occurrences.

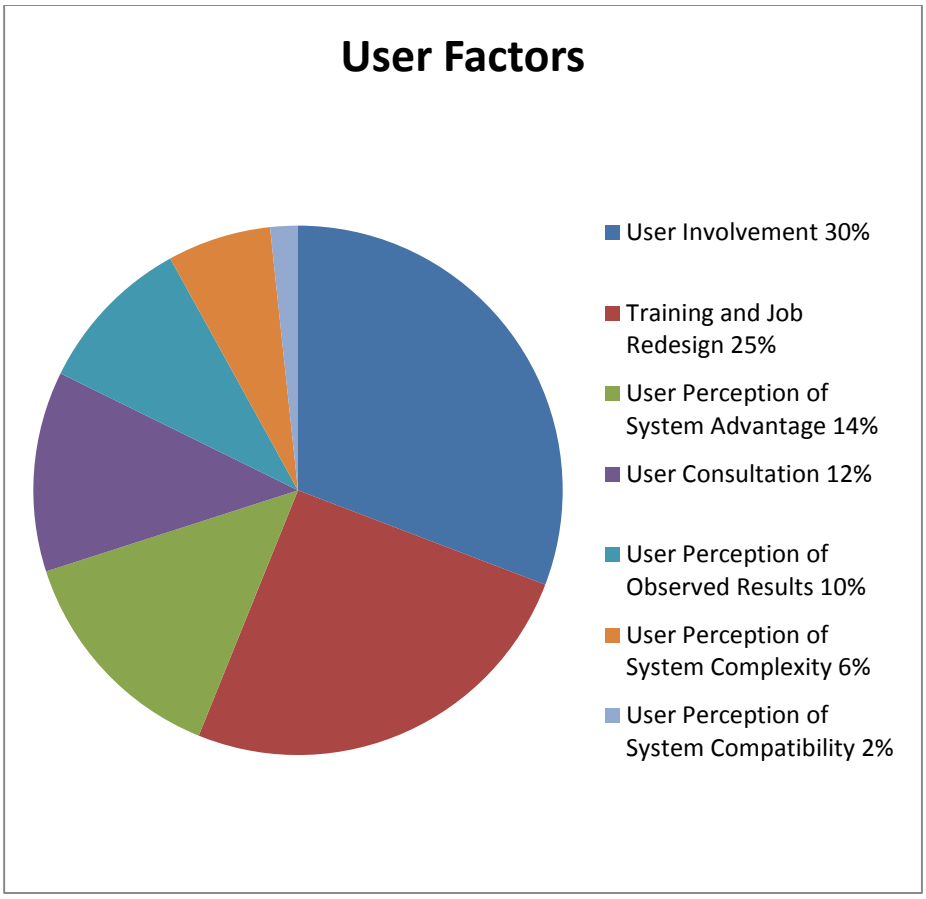

Figure 7. User factor occurrence of frequency percentages.

4.1.3 Task-Related Factors

Task- related factors are the largest group of factors and the factors with the most occurrences are change management, communication, implementation strategy and timeframe plans and visioning and planning. See Table 10 for frequencies of sources and occurrences for these factors.

Table 10

Task-Related Factors: Frequencies for Sources and Occurrences

Factor	Sub-themes	Sources	Occurrences
Change Management Plan	1. User acceptance 2. User rejection 3. Change management methods	73%	25%
Communication Plan	1. Positive feedback about communication 2. Negative communication about communication	100%	19%
Implementation Strategy and Timeframe	1. Timeframes were difficult to maintain	80%	17%
Visioning and Planning	1. This factor was performed at a higher level	67%	15%
System Testing		87%	7%
Building a Business Case		93%	4%
Cultural Change Management Plan		40%	4%
Project Cost Planning and Management	1. Not necessary 2. Items that needed to be purchased 3. High cost of further functionality from the vendor	100%	3%
Post-Implementation Evaluation Plan		87%	3%
Troubleshooting and Crisis Management plan		53%	2%
Project Management Plan		33%	1%

4.1.3.1 Visioning and Planning

Visioning and planning was performed on two levels: the university level when initially determining product needs and the department level determining how they would use the product. This factor was fully discussed by all participants by describing the visioning and planning process; considerations when determining product needs and project goals. Many participants indicated specifically that this factor was important, such as participant 8:

> Of course, the visioning and planning is probably going to be one of the biggest ones there because we have to decide what was critical, what processes were critical, and what was going to make the biggest impact.

There was a convergent theme for some participants that the main visioning and planning was performed at a higher level of management and then there were the team leads that had been on the steering committee as indicated by participant 2:

> There was an imaging task force. I was on it. There were several higher level staff up to senior director level and even maybe assistant VP level.

The primary need for the new system was driven by the retirement of the legacy system. Participant 5 and others indicated that there was also a university wide push for environmental consideration and 'going paperless' was part of that initiative:

> There was really a big push on campus about four or five years ago to go green and they've followed through on a lot of those initiatives: buildings and not using so much paper.

There were also criticisms about the visioning and planning; that planning was not fully developed and implementing campus wide was not part of planning. This factor ties back to top management commitment and support and is described by participant 4:

> While we had it on paper, it didn't correlate to real time. For various and sundry reasons, it kept getting pushed like it really wasn't as important as they told us it was or should be.

4.1.3.2 Building a Business Case

The occurrences for this factor indicate little importance because building a business case for this university was not necessary; the legacy system had to be retired and a new system had to replace it. Most of the occurrences for this factor indicated that it was not important either for the university level or department level.

4.1.3.3 Implementation Strategy and Timeframe

All participants fully discussed this factor and there were eight occurrences indicating specifically that it was important. Some departments had formally documented plans for

implementation and some were verbal plans, but all departments had some kind of plan. Some participants indicated that while there was a plan, there were failures with timeframes.

There was a convergent theme about difficulties that participants encountered with their strategies and timeframes. Timeframes were particularly difficult to maintain, development was more complicated than expected, staffing changes and organizational changes disrupted the project, reworking software configuration, data conversion problems, and others. Participant 10 indicates that the strategies and timeframes are interrelated to system knowledge:

> And then we were just wrong on the strategy and timeframe. The strategy should have involved more people and it should have included us having the ability to truly understand the system before we ever sat down to talk about implementing.

4.1.3.4 Project Cost Planning and Management

The feedback for this factor fell into three convergent themes. Most participants indicated that their department did not need to manage cost planning because the university had already purchased a product and was open for use. Cost factors that were discussed were concerning the licensing, scanners, monitors and in some cases, staff, that needed to be purchased or planned for, but these tended to be minor concerns. A few participants discussed the high cost of purchasing more functionality from the vendor, which had never been planned for because they were unaware that it wasn't included in the vanilla system and were therefore never purchased. Participant 2 discussed how top management commitment and support are interrelated to cost planning and management:

> We were talking about having top management commitment and support, it's kind of a circle of life. We have technological factors, but we keep going to square one where we say "Now we have the product, but we want to intercept with Brainware or the latest feature. But to do that it's going to be 200,000 dollars or 100,000 dollars or maybe we can buy them as a bundle and who's going to be the champion to pay for this?" It's just an ongoing circle.

4.1.3.5 Change Management Plan

This factor had a very high amount of occurrences for a single factor as participants discussed change management issues in their departments. There were several change management needs such as securing user buy in, anticipating resistance, calming concerns, maintaining user confidence in the system and others. Participant 13 discussed the resistant behaviors of staff toward change:

> The older people, or the people who had been working there for a longer amount of time, wanted to use that [previous system] and then they would hire new employees that almost would be receptive of the new software, but they would be told by these older employees that "You don't want to use this new software. You need to be using the older software." So that was a constant battle.

There were convergent themes of user acceptance and rejection within this factor. Positive feedback included indications such as technically adept users, users observing results and advantages of the system, and users that were looking forward to the positive changes to their jobs. Negative feedback occurrences doubled that of positive and indicated issues such as problems with development, changes in the development, retreating to legacy systems, complaining, and others. Participant 12 indicates an interrelation between perceptions of system complexity and user acceptance:

> Getting the staff to really look at it and use it and see that it's not such a big unknown as they make it out to be or as scary as they make it out to be. Because once they get in it they're like "Oh, OK! That's not so bad." And I've even had some old timers going "When are we going to get more imaging? When are we going to do this?"

Another convergent theme that developed was how participants addressed change management; the methods they used to gain user acceptance. Some of the methods included slower integration, training, testing, user pilot testing, communication, mandatory use, consistency, and others. Participant discussed presentation methods that were successful for user acceptance:

> We just started pulling people back in the small groups and I think it helped kind of infect the rest of the office. Because people would go back and be "Oh, my gosh! This looks completely different than it did. It looks like it's going to be so much faster."

Participant 8 indicated that department culture (discussed next) is interrelated with user acceptance. These users were culturally ready to change the way they worked:

> When we started on the new system, it was about as smooth a transition as you can get. Our people didn't want paper, didn't like paper, they had kind of already been getting away from it in that we would process it and then send it away and all they switched was now it was on their desktop and they processed it and moved it out of the way instead of having the paper. Our users were looking forward to having that and the system was pretty user friendly on that side of it and so it worked well.

4.1.3.6 Cultural Change Management Plan

While this factor did not have a large amount of occurrences, 67% of participants specifically indicated that this factor was important for their project. Some participants indicated that they understood that their department's culture needed to change and some participants indicated that they felt their department was culturally ready for the new system. Participant 6 discussed the need for a cultural change management plan, as did others:

> I think that one was the big one that we didn't think of first. How's your culture going to change? But we really did, once we got into it and could see what it could do, we had to sit down and say "How are we going to handle it?" So, we did have to come up with that plan. That is an important one.

4.1.3.7 Communication Plan

Two convergent themes within this factor developed about project communication: positive and negative feedback about communication between top management, consultant, enterprise team, department teams, and end users. Positive feedback indicated that communication was good between the enterprise team and the department teams as evidenced by participant 6:

> When we talk about communication between the different areas, I do think that the communication was good and I think a lot of that was lead by [enterprise team lead]. I think she was very adamant about making sure that everybody knew what was going on across the board because we were all going to be impacted by it. She was really effective in the way that she make sure that everybody was kept up to data on the IT side just to make sure that we were all on the same page; because if not, it could have been a lot worse.

There was also indication that beneficial communication resulted in improved solutions from departments sharing knowledge between each other and department teams learning from other users in external user groups. Participant 4 discussed how interdepartmental communication improved the project:

> We had some rough patches where we were losing a lot of documents in imaging and we had to…happened to…it was kind of a stroke of luck. We happened to hear about a presentation by [another department] and so we went down and actually studied their processes and they were doing one little thing differently from what we were doing and once we did that, all of those issues went right out the window.

A similar experience was had by participant 14 when communication with another university resulted in system solutions:

> That's what Higher Ed, we're good at, because we have our counterparts and the University of Missouri is using the same system and I contacted them and they were like "Oh, yeah, you have to have your IT team build you a custom tab where your data is static." And that's what we had to do.

Negative feedback slightly outweighed positive feedback and included complaints that the department teams did not have access to the vendor, that they sometimes received erroneous information, a lack of technical answers and communication, misunderstandings between the enterprise team, consultant, and department teams and others.

Participant 1 indicates that team leads could not communicate directly with the vendor and had to rely on the enterprise team to gather information and that this negatively impacted the project:

> We didn't have enough access to the vendor to get answers. We had to go through the [enterprise] team and sometimes the questions were distorted so that the answers were then distorted when we got them back. So, our information gathering took more time than it should have taken and I do believe that the biggest reason for that was there wasn't sufficient documentation or communication.

Participant 4 discussed communication problems between top management, the enterprise team, and the department teams. Communication lacked consistency and was primarily during crisis events:

> [Enterprise team] is over there and they were let to do what they wanted to do and only when there was an issue were they brought back over here and it's like "OK, we have to work this out. Now we've worked that out." Now they are back over there. To me they should always be here [under IT] and that communication going back and forth, up and down, through all three areas: the end users, [enterprise] team, and IT infrastructure.

4.1.3.8 Project Management Plan

Three of the occurrences indicate that the project was not approached by the University as a campus wide roll out with IT infrastructure involved. There was minimal discussion of this factor by participants.

4.1.3.9 Troubleshooting and Crisis Management Plan

This factor is supported by few occurrences and the mix of feedback such as a lack of a plan and descriptive troubleshooting methods.

4.1.3.10 System Testing

This factor had 13 occurrences where participants specifically indicated that this factor is important. Participant 2 indicated an interrelation between system testing and user perceptions of system results:

> We tested for a long time down in the lab and that is where a lot of the [user] perception issues cropped up because we are testing and they found Stephanie's transcript, but it "took them forever and we don't have time to do this."

Some departments had a development system for testing and some did not and there was an indication that there was a need for a development system. Participant 6 indicated that having a development system for testing would have greatly improved the implementation:

> If there is anything that I could change about this whole project it would be that fact that we did not have that development system. We needed a testing environment with the amount of people we knew were going to be telling to go into imaging and to be….that's where they are going to work from! We needed to have a testing environment and we did not. So I really think that was needed.

4.1.3.11 Post-implementation Evaluation Plan

This factor was discussed by participants by indicating that they did not have an evaluation plan, did not perform an evaluation of their projects, or the evaluation was as simple as "is it working or is it not?" Two departments evaluated their projects: one performed end user surveys and the other created a presentation of lessons learned.

4.1.3.12 Task-related Factors Summary

The factors for this category with the most occurrences included change management, communication, implementation strategy and timeframe, and visioning and planning plans. Percentages of occurrences for each managerial factor represent a distribution within 100% of all task-related factors. See Figure 8 for percentages of occurrences.

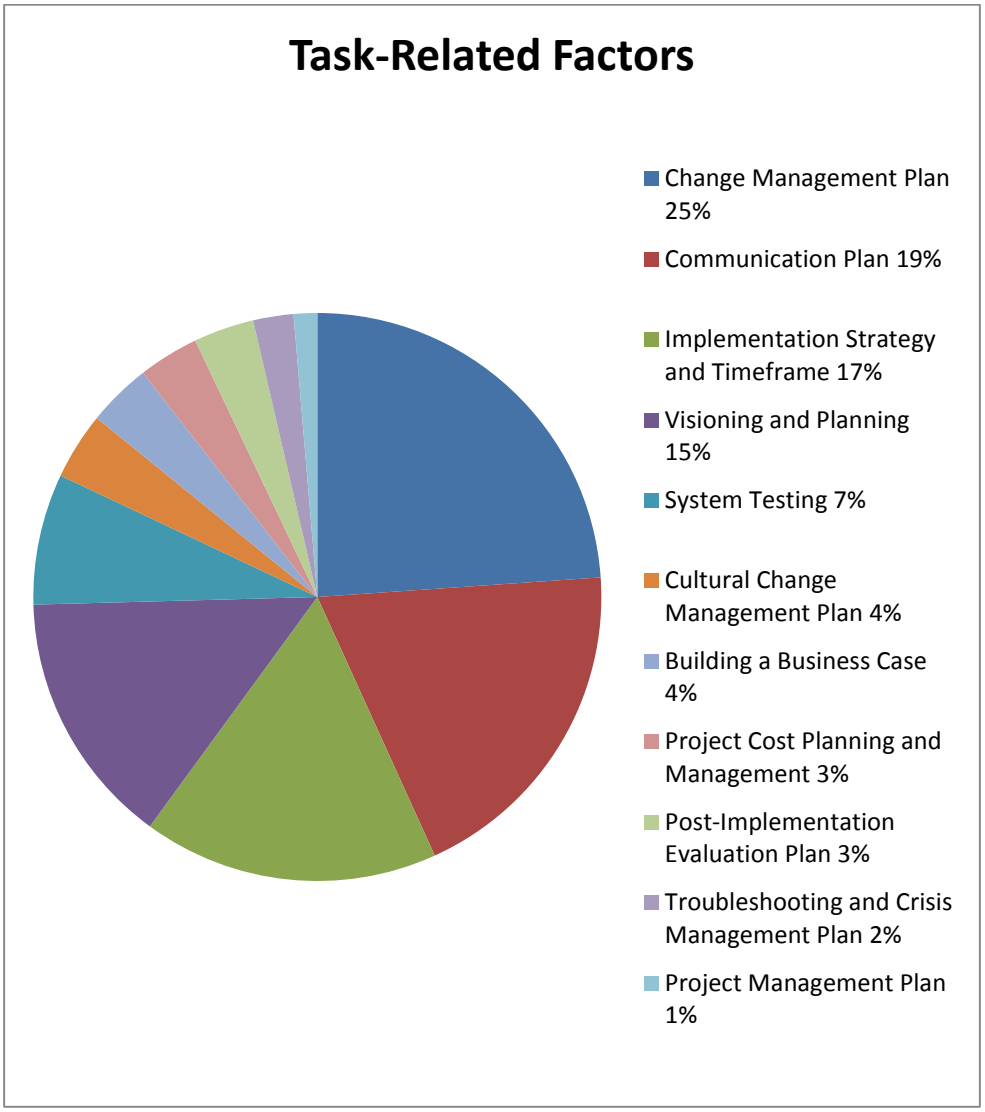

Figure 8. Task-related factor occurrence frequency percentages.

4.1.4 Technological Factors

The factors with the most occurrences for this category are BPR and software configuration, IT infrastructure consideration, legacy system consideration, and system selection. See Table 11 for the frequencies of sources and occurrences.

Table 11

Technological Factors: Frequencies of Sources and Occurrences

Factors	Sources	Occurrences
BPR and Software Configuration	93%	27%
IT Infrastructure Consideration	80%	16%
Legacy System Consideration	100%	16%
System Selection	87%	16%
Implementing a Vanilla System	73%	13%
System Quality	60%	12%

4.1.4.1 IT Infrastructure Consideration

This factor had eight occurrences indicating specifically that this factor is important. A convergent theme that developed was that the IT infrastructure was not considered when initially implementing and that IT involvement with the system is minimal. Participant 10 indicated that the failure to consider the IT infrastructure negatively impacted the project:

> There were a couple of times where we were like "Shouldn't IT be at the table?" "No, IT doesn't need to be at the table." And there were times when the consultant would say "they." We didn't know who "they" were. Turns out the consultant, when they were saying "they," they were talking about *our* IT. If we had known that, we would have insisted that IT has to be at this table. IT infrastructure consideration is most important and that's where we dropped the ball.

IT was involved in the conversion piece of implementation because department teams were not technically qualified to convert their data, nor was the enterprise team. It was indicated that IT should have been considered from the beginning and as a result, the IT infrastructure is not helpful with the new system and there is no clear leadership at IT for

determining functional fit of technologies on campus. The IT disconnect is discussed by participant 11:

> Although the customizations per users were really helpful, whenever you had your computers to into repair, those individuals that worked in IT were so isolated from the functional use of the system, they wouldn't save your favorites, so you'd get back your machine and you had to go back and put in all your customizations again. It was just frustrating that you couldn't even get buy in within their own structure. And they still don't. So there is this lack of connectivity, or even desire on their part, to want to collaborate and know that program.

4.1.4.2 Legacy System Consideration

The participants indicated that the legacy systems must be considered because one system had to have large amounts of data converted to the new system as indicated by participant 2:

> Legacy system consideration, I think, was very important because we had histories of legacy systems before this particular product. We were looking for a particular system that can not only convert our existing current generation of imaging solution, but two more solutions that were long since gone away.

There was also a need for the new system to integrate with the existing ERP system and that it would be used for populating index values as indicated by participant 11:

> We decided that it was important that we had the linkage with EIS [ERP] because it would help match those key data fields for us so there would be less duplication of error and determining what should go into that field. We wanted to be able to have that linkage match what was already a fixed data field within the system.

4.1.4.3 System Selection

There was an absence of occurrences that indicate that this factor is important. There is a mix of feedback that includes the selection process, system needs, and participants expressing that they were not involved in system selection. Participant 2 indicated an interrelation between the system selection, vendor support, and project cost planning; that the

vanilla product does not include all functionality presented by the vendor but is available through further purchases:

> I feel like we chose the right product in the end. I get a little frustrated with our product because it is a company… in the end while the right product and I think in the long term it's going to be the product that gets us where we need to be as a campus. It's a company that drives itself on new innovations, but then charges an arm and a leg for the new innovations and you can't always get to where you want without paying for it.

4.1.4.4 System Quality

This factor had few occurrences and most of them are quality evaluations, positive and negative, of the system and there was one occurrence indicating that system quality is an important factor.

4.1.4.5 Implementing a Vanilla System

Participants indicated that all implementations were within the system functionality, but some departments developed their project more fully. The only customization was a script that allowed for linking with the ERP system. Participant 9 indicated that there is an interrelation between a vanilla system and change management; that development had to be minimal for user acceptance:

> I'm glad we made it simple and easy. It was easy because we made it easy. We just wanted to view only, nothing else, because we knew up front a lot of people were not going to deal with all the additional stuff.

Participant 8 indicated that there is an interrelation between a vanilla system and IT infrastructure because customizations by IT staff would not be delivered in a timely manner:

> Implementing a vanilla system, that's important as well because you kind of have to work with what you get out of the box because if you…you can't wait for years to get somebody to script something.

4.1.4.6 BPR and Software Configuration

All projects except for one performed BPR at some level; some departments had minimal restructuring and some performed major restructuring over months. There are indications that decisions must be made about the balance of BPR versus software configuration. Mapping business processes and developing BPR can be difficult and time consuming, as indicated by participant 12:

> So, myself and [X and Y] worked out our workflow, our business process, and it was huge! They had it hanging up in the IT services for months; it took up one whole wall about that long, on how things needed to run and how it needed to route, and why we needed to do what we did.

Participant 10 indicated that there needs to be a balance between BPR and system configuration:

> Some of it had to be done, to take advantage of the system we had to, and it's like with any, you've got to modify business processes at some point to accommodate a new system. At the same time, you can't let a system dictate what your business process is going to be. There's a halfway medium.

Software configuration may have an impact on users' buy in by mirroring existing processes into the new system or by streamlining business processes. BPR and software configuration may be impacted by cultural change management. For example, some implementations mirrored the existing business processes because the team believed that was the best method to ensure user acceptance. Some implementations had major BPR and software configuration to streamline business processes because their users were not as afraid of technology and accepted the system due to the advantages to their jobs. Percentages of occurrences for each managerial factor represent a distribution within 100% of all technological factors. See Figure 9 for percentages of occurrences.

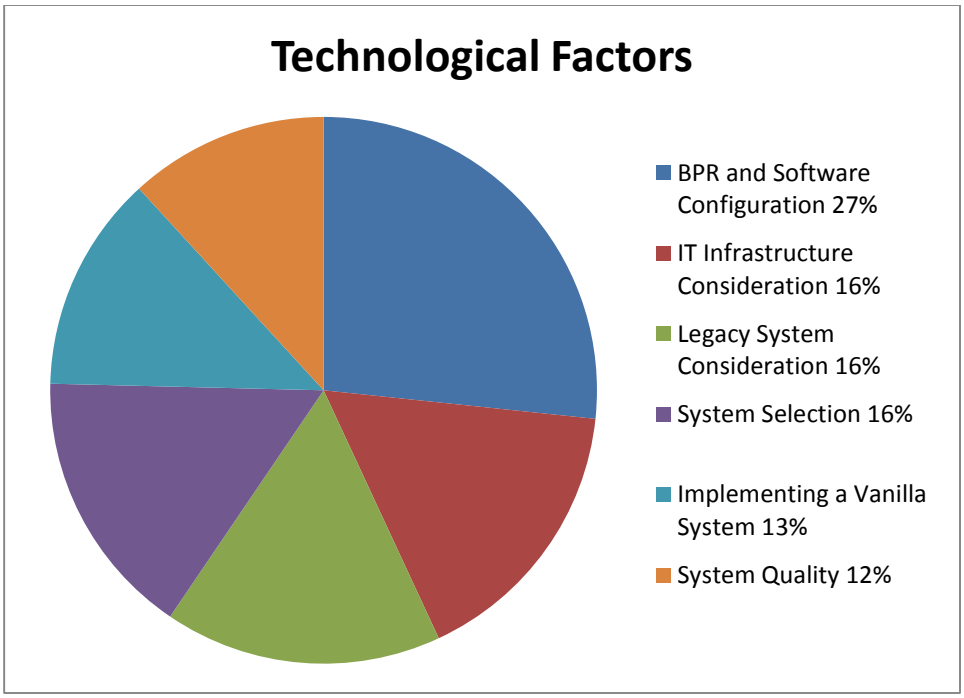

Figure 9. Technological factor occurrence frequency percentages.

4.1.5 Content Factors

The content factors with the most occurrences were records management, compliance needs and retention, data conversion and integrity, using metadata hierarchies and taxonomies, and integrity needs and content selection. See Table 12 for the frequencies of sources and occurrences.

Table 12

Content Frequencies of Sources and Occurrences

Factors	Sources	Occurrences
Records Management, Compliance Needs and Retention	100%	28%
Data Conversion and Integrity	93%	26%
Using Metadata Hierarchies and Taxonomies	80%	14%
Content Selection	67%	14%
Employing Digital Signatures	73%	10%
Employing Automatic Indexing	40%	8%

4.1.5.1 Content Selection

All departments had clear understandings of what content needed to be included either because there was an obvious need for certain content or it was mandated by retention needs. There were no participants that discussed strategies to determine content for their project. Content selection was also directly impacted by records management, compliance needs and retention and compliance and records management often dictated content selection.

4.1.5.2 Data Conversion and Integrity

The core departments had large amounts of content to convert to the new system. There were 16 occurrences indicating specifically that this factor is important. This factor is interrelated with system testing because all conversions were tested to varying degrees. Participant 3 discussed the importance of data conversion and integrity:

> Data conversion and integrity were important, especially in the beginning because we moved from one system to another. We still do some validation on data from time to time, so quality assurance, integrity, is an ongoing issue.

Participant 2 indicated that it was more data conversion and integrity was more important than system knowledge so that time between implementation and resuming workflows is a short as possible:

> I think peoples' immediate concerns were driven by conversion. Everyone understood, we have a new product and immediately minds were turning, less on understanding the product. And no one was concerned about "I'm not going to be able to understand a new solution." The concern was always "We need to make sure we are driving conversations on how we are going to make the new solution successful and get our data converted so users can use it quickly."

4.1.5.3 Using Metadata Hierarchies and Taxonomies

Most of the participants considered this factor as important for their project and some considered it to be critical. Even if the participants were not familiar with the terms metadata

or taxonomies, they knew that determining indexing values for their content was vital for retrieval. It was described by participant 8 that poor metadata decisions, recommended by the consultant, resulted in extended data conversion processes.

> Your consultants don't know name conventions and naming structures. Well, just recently the [enterprise] team went back and renamed all those drawers to match the naming conventions…..you really don't know that coming in.

Care was taken by other departments to select metadata terms and in some cases, end users were involved as indicated by participant 7:

> That [metadata] in particular was extremely big for our project. Custom properties, not just that, but developing a new…taxonomy, developing even a folksonomy, a new kind of vocabulary for our staff. It's vocabulary that comes naturally for them but they don't think about putting it in the system as something that could be indexed. We had to sit down and actually think about "OK, what do we call this and why and how would you label this?" So that became pretty big for us.

Metadata was also used for managing records management and compliance as indicated by participant 2:

> So data conversion and integrity and using metadata hierarchies and taxonomies solved the solution for records management and compliance.

4.1.5.4 Records Management, Compliance Needs and Retention

This factor was unanimously considered an important factor by participants and most indicated that it was critical for their content. This was due to various internal and external compliance and retention regulations imposed on the departments. Participant 10 discusses the importance of considering this factor from the beginning:

> Records management, compliance needs and retention, for us that's at the heart of everything we do. So for us, that's just day to day business. So as far as in the context of implementing this new system, that's really taken care of at the RFP stage, they're going to understand the security aspect to this and the permanent factor aspect to this.

4.1.5.6 Employing Digital Signatures and Automatic Indexing

These two content factors were not supported by the data. The majority of departments did not use digital signatures and one department said it was important for their project. True automatic indexing was not a part of any implementation at the university. There was a script created for capturing information in the ERP system to index content in the ECM system, but there was still a human component for that feature. Percentages of occurrences for each managerial factor represent a distribution within 100% of all content factors. See Figure 10 for percentages of occurrences.

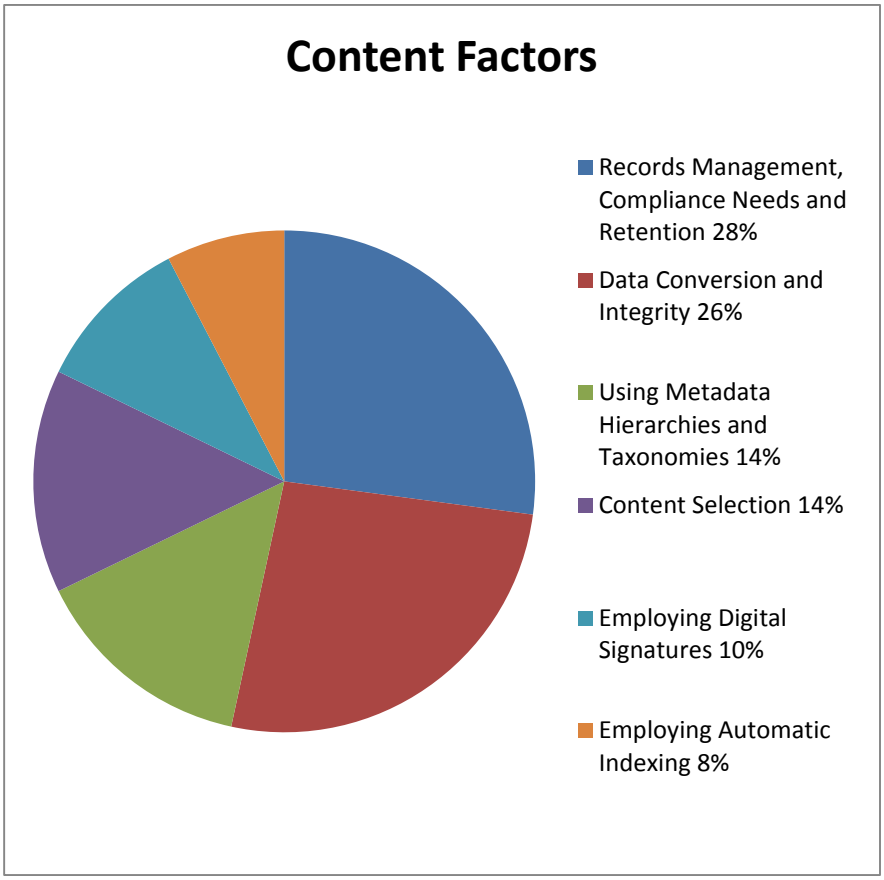

Figure 10. Content factor occurrence frequency percentages.

4.2 Document Content Findings

The 14 documents collected from participants were analyzed and used as a method of triangulation. There was a variety of formats such as Word documents, PowerPoint, Visio graphics and PDFs. Document content included implementation plans, evaluations, records management practices, and configuration documents. A content analysis was conducted to identify factors represented by the documents. See Table 13 for factors from each category that were represented in the documents.

Table 13

Factors Represented in the Documents

Managerial Factors	Empowered decision makers
	System knowledge
	Consultant selection and relationship
User Factors	Training and job redesign
Task-Related Factors	Implementation strategy and timeframe
	Project management plan
	Post implementation evaluation plan
	Visioning and planning
	Building a business case
	Change management
	Project cost planning and management
Technological Factors	BPR and software configuration
	Legacy system consideration
	IT infrastructure consideration
Content Factors	Content selection
	Using metadata hierarchies and taxonomies
	Records management, compliance needs and retention
	Data conversion and integrity

The limited number of documents created by participants and their teams for the ECM implementations was due to time constraints of the department teams since the implementations were added to the normal workload for existing employees. Any remaining documents were not accessible to the researcher due to confidentiality concerns. A few

participants regretted the lack of documentation for their projects, as expressed by Participant 15:

> We didn't document well. You couldn't go find a document that said "This is what we are going to do and this is how it is going to look."

Participant 10 felt that documentation had an impact on training as well because the lack of documentation impeded successful knowledge transfer of the system during personnel turnover:

> We kept being told "train the trainer, train the trainer." Well, it will only work if number one, the trainer is very good a documenting what they have learned and number two, you don't have turnover. Train the trainer works if no one ever leaves and nothing ever changes. It would have been helpful for me to have that documentation as a foundation as I've tried to train other people.

There was also a lack of documentation from the software provider because of the "train the trainer" business model and that this also impacted system knowledge during implementation as indicated by Participant 2:

> We bought a system that had no documentation whatsoever. Documentation is not a bad thing, it's a good thing. "Train the trainer" is not a viable training document. I think any product should have ample documentation to go with the product - if you're not going to have formal training for all users.

A few participants also indicated that the enterprise team did not provide enough documentation about their systems and that it impacted knowledge transfer within the department as expressed by Participant 4:

> I don't understand it [the system] as well as I think I should and sometimes that makes me, or whatever supervisor is working, feel inadequate to then pass along any knowledge. Just little things and it's almost like you don't know it until you need to know it and then there is no documentation. It's just "here's what it is and I hope your remember" kind of thing.

It was not clear why the software provider does not offer documentation for the product nor was it clear why the enterprise team did not develop documentation for the department teams to aid them during their implementations.

The fact that there was so little documentation for the participants due to time constraints may indicate that the documentation that was created was important. One document was a bulleted list of requirements to be met before the enterprise team will work with a department team to implement. This list includes a variety of tasks for the department team to complete such as identifying a team lead with time and authority to make decisions, records management tasks, BPR, determining system configuration needs, and legacy system considerations. A similar document had been created by a department team lead for their end users to complete and it also included BPR, records management, and legacy system considerations.

There was one document that was an implementation plan that included many stages of the implementation process such as building a business case, identifying project goals, BPR, software configuration, timeframes, training plans, and project evaluation metrics. While this document was comprehensive of the stages of implementation, it was a high level organizational view of the project and lacked details of each work area.

There were two training guides that were intended for end users and outlined how to perform specific tasks in the new system. One document defined job responsibilities within the new system and how to perform tasks for them. Metadata creation was also addressed in the training guides and one document was entirely about metadata creation for student records.

One document was created to aid in preparing for implementing and included records

management tasks, document disposition, determining equipment and system configuration needs. There were also documents related to system configuration only and detailed workflows and system settings.

Finally, there was a PowerPoint created for a conference presentation on lessons learned that defined key factors for an implementation. This document indicated that both the department teams and the consultant needed to have a thorough understanding of the existing data and systems, metadata hierarchies and taxonomies, and the new system. All stakeholders need to be involved and the implementation needs to be treated as an enterprise-wide endeavor. It also indicated a need to document everything about the project as it is learned by the department teams.

There is support that a lack of documentation is a factor in itself, but the importance of this factor is not clear. It is clear that documentation and system knowledge are interrelated because participants discussed the two factors together and indicated that the lack of documentation directly impacted their system knowledge. Some participants also expressed a desire for documentation from the vendor and enterprise team and that they regretted failures to document their projects.

4.3 Results Summary

The data analysis resulted in identifying a set of factors in each category that were highly supported based on the content analysis of the interviews and frequencies of sources and occurrences calculations. However, some factors required further analysis by the researcher to determine strength of support. These cases were analyzed by combining other evidence for support: the content of the occurrences, further theme development within a

factor, participants' indications of importance, impacts of the factors upon the implementations, and the researcher's experience of the interviews. By combining these evidence with frequencies of sources and occurrences, the researcher interprets the data for each factor, as is appropriate for qualitative research, and support is designated as strongly supported, moderately supported, or weakly supported as represented in Tables 12, 13 and 14 (Bogden & Bilkin, 1992; Creswell, 2009; Guba & Lincoln, 1985; Merriam, 1988).

Strongly supported factors not only have a high number of sources and occurrences, they also have multiple indications of importance by participants and may have further convergent theme development. No further interpretation was needed from the researcher because the content analysis clearly indicated support for these factors. There were 16 factors that were strongly supported by numbers of sources and occurrences and had specific indications of importance by participants and some of these factors developed sub-themes. These factors were fully discussed by most or all participants and are indicated to be key factors for the ECM implementations. Table 14 shows the factors designated as strongly supported, their frequencies of sources and occurrences based on the content analysis of the interviews and factors that were supported by the documents for triangulation.

Table 14

Strongly Supported Factors

Strongly Supported Factors	#Sources	#Occurrences within the Category	Document Represented
Managerial Factors			
Top management commitment and support	100%	43%	No
Empowered decision makers	27%	17%	Yes
Consultant selection and relationship	87%	12%	Yes
User Factors			
User involvement	100%	30%	No
Training and job redesign	100%	25%	Yes
User perception of system advantage	87%	14%	No
Task-related Factors			
Change management	73%	25%	Yes
Communication plan	100%	19%	No
Implementation strategy and timeframe	80%	17%	Yes
Visioning and planning	67%	15%	Yes
Technological Factors			
BPR and software configuration	93%	27%	Yes
IT infrastructure consideration	80%	16%	Yes
Legacy system consideration	100%	16%	Yes
Content Factors			
Records management, compliance needs and retention	100%	28%	Yes
Data conversion and integrity	93%	26%	Yes
Using metadata hierarchies and taxonomies	80%	14%	Yes

Moderately supported factors have a moderate number of sources and occurrences, but may have multiple indications of importance, direct impacts on success, but no further theme development. These few factors required further interpretation from the researcher because the content analysis indicated that the data does not clearly strongly support the factor, but it also does not clearly indicate the factor as weakly supported. There were six factors that were moderately supported due to a combination of number of sources and occurrences, indications of importance, and content of the data and one new factor that that had developed outside the research model.

While the project team with balanced skills factor had a moderate amount of occurrences, but several of them indicated this factor as important and this factor was discussed by all participants. The divergent theme, system knowledge, is included as a new factor due to the frequency of sources and occurrences and this factor is also supported by the documents. The user consultation factor had moderate amount of occurrences but did not have any specific indications that this was an important factor. However, most participants discussed methods used to inform users of the developing system. The cultural change management factor had a moderate amount of occurrences, but there were several specific indications of its importance including an understanding that the department needed to be culturally ready for the change. System testing had a moderate amount of occurrences but had a high number of specific indications of importance and some participants indicated a need for a development system.

The technological factors were fairly evenly divided among frequency of occurrences and system selection and implementing a vanilla system were both ranked as moderately supported factors. System selection had a moderate amount of occurrences but lacked any indication by participants that this was important. However, system needs and how the system was selected were discussed by most participants. While implementing outside of a vanilla system was not an option for participants due to cost restraints, some participants indicated that developing a system with minimal functionality was important for their projects. Also, some participants indicated an interrelation between a vanilla system and change management and IT infrastructure considerations. Table 15 shows these moderately supported factors as

based on the content analysis of the interviews, participant comments and researcher assessment as well as triangulated data using the document content analysis.

Table 15

Moderately Supported Factors

Moderately Supported Factors	#Sources	#Occurrences within the Category	Document Identified
Managerial Factors			
Project team with balanced skills	93%	10%	No
System knowledge (New factor)	87%	10%	Yes
User Factors			
User consultation	80%	12%	No
Task-related Factors			
System testing	87%	7%	No
Cultural change management	40%	4%	No
Technological Factors			
System selection	87%	16%	No
Implementing a vanilla system	73%	13%	No

Weakly supported factors have moderate to low numbers of sources and occurrences as well as little or no indications of importance by participants and content is neutral about the factor or has specific indications by participants that this was not an important factor. No further interpretation by the researcher was needed. There were 17 weakly supported factors for this case study and these factors were ranked as weak due to a combination of moderate to low sources and/or occurrences, neutral content, and specific indications by participants that they were not important. Table 16 shows weakly supported factors, their frequencies of sources and occurrences and triangulated data using the document content analysis.

Table 16

Weakly Supported Factors

Weakly Supported Factors	#Sources	#Occurrences within the Category	Document Identified
Managerial Factors			
Project Champion	87%	9%	No
Vendor Support	73%	5%	No
Project team with best and brightest	60%	3%	No
Maintaining project team moral and motivation	53%	1%	No
User Factors			
User perception of observed results	13%	10%	No
User perception of system complexity	40%	6%	No
User perception of compatibility	13%	2%	No
User perception of system trialability	20%	1%	No
Task-related Factors			
Building a business case	93%	4%	Yes
Project cost planning and management	100%	3%	Yes
Post-implementation evaluation plan	87%	3%	Yes
Troubleshooting and crisis management plan	53%	2%	No
Project management plan	33%	1%	Yes
Technological Factors			
System Quality	60%	12%	No
Content Factors			
Content selection	67%	14%	Yes
Employing digital signatures	73%	10%	No
Employing automatic indexing	40%	8%	No

There were 12 factors that were supported by both the interview and document data and may be considered the key factors for this case study. These factors are represented in Table 17.

Table 17

Common Factors

Common Factors	Ranking
Training and Job Redesign	Strong
BPR and Software Configuration	Strong
Implementation Strategy and Timeframe	Strong
Using Metadata Hierarchies and Taxonomies	Strong
Records Management, Compliance Needs and Retention	Strong
Visioning and Planning	Strong
Empowered Decision Makers	Strong
Consultant Selection and Relationship	Strong
Change Management	Strong
IT Infrastructure	Strong
Data Conversion and Integrity	Strong
System Knowledge (New Factor)	Moderate

4.4 Summary

This chapter discussed the findings of the case study according factors in each category and by frequencies of sources and occurrences. After analysis of the data, these evidence are considered and interpreted in combination with participant emphasis to determine rankings and resulted in 16 strongly supported factors, 7 moderately supported factors and 17 weakly supported factors including the discovery of a new factor for the research model, system knowledge. A small collection of documents gathered by the researcher from the participants is discussed and 18 factors were supported. The lack of documentations on the projects is also found to be a new factor. While it is clear that documentation for ECM implementations is a factor, the importance of this factor is not clear. The next chapter discusses the implications of the findings as well as recommendations and future research.

CHAPTER 5

DISCUSSION AND CONCLUSION

This case study is in response to a knowledge gap for research in the area of enterprise content management (ECM) implementations and success factors (Alalwan & Weistroffer, 2012). The intent was to identify key success factors for ECM implementations by borrowing methods from the similar field of IS, as other ECM researchers have done (Haug, 2012; Nordheim & Paivarinta, 2006). The qualitative case study was appropriate for testing the research model as a theory-building process as well as allowing for flexibility (Yin, 1989). The data collection and analysis methods provided for the evaluation of the factors' impacts on ECM implementations as well as allowing for unique data to develop. The 15 participants identified many factors that impacted the successes and failures of their projects over the five stages of implementations: knowledge, persuasion, decision, implementation and confirmation (Rogers, 1983). The collection of documents represented 18 of the factors. The next section discusses the results for the case study followed by the research significance, recommendations for the industry, future research, and conclusions.

5.1 Discussion

This case study began with the need to retire a legacy system that was used by core university departments and stored massive amounts of data. There was also a critical need for a new system to integrate with the existing enterprise resource planning (ERP). The process of implementation, from visioning and planning to post-evaluation, was captured for this university through interviews with department team leads and members and a small collection of documents. The participants identified 16 strongly supported factors and 7 moderately

supported factors, 12 of which were represented by the documents. Each factor category of the research model was represented by the results. Many of the factors were indicated to be interrelated and multidimensional supporting the conclusions about success factors by the researchers Smith and McKeen (2003) and DeLone and McLean (1992).

There was an indication that top management commitment and support may impact project team, project cost planning, IT infrastructure consideration and end user perceptions and that this factor is needed for the duration of the project supporting the findings of Al-Mashari et al. (2003). The university had partial support from top management that enabled the projects to be initiated, but lacked support throughout the implementations. This is first evidenced by the development of a minimal enterprise team, comprising of two people, neither of which had the technical skills needed for an enterprise wide implementation involving four campuses. Also, funding for the project ended with the initial software purchase and team development and further functionality from the vendor was not budgeted, indicating an interrelationship between top management and cost planning. This issue leads back to the enterprise team, which would have benefited from a technical team member who could write the scripts needed for expanding functionality without purchasing from the vendor. Top management did not develop a vision of an enterprise wide implementation and there was little indication that there was leadership directing the IT infrastructure to support the enterprise team, even though the team functioned within the IT infrastructure. Many of the difficulties experienced by participants may have been improved had top management developed a collective vision for the implementation, as suggested by Rogers (1983), and communicated that vision throughout the enterprise.

Participants that felt empowered to make decisions for their projects indicated a positive impact on their projects and likewise, those that did not feel empowered indicated a negative impact on their projects. Participants who were empowered to make decisions throughout their project indicated that it had a direct and positive impact on implementation strategies and timeframes. Participants who were empowered decision makers either were already part of an upper level of management or they were trusted by upper management to run their projects. These participants were able to make decisions to improve their systems and speed implementation timeframes. Participants who were required to gain upper management approval for decision making indicated frustration because of the lack of system knowledge by upper management and this greatly slowed implementation timeframes. Some participants enjoyed more security rights in the system over others and had technical control of their systems allowing them to make software configuration changes that improved strategies and timelines. Those who did not had slower implementations and were less knowledgeable about their systems. Some participants indicated strong frustration with restricted security rights because it not only slowed implementation timeframes but also impeded their ability to learn their system because the enterprise team performed configuration tasks for them.

Consultant selection and relationship is indicated by the participants as key for success and may impact a variety of other factors such as legacy system consideration, metadata hierarchies and taxonomies, implementation strategy and timeframe and others. The consultant's experience with the system was not as robust at it needed to be and he fell back on previous implementation strategies instead of analyzing the current university's business processes and needs for some departments. Some participants indicated that the consultant

had been involved in few higher education implementations and that this was not enough experience for a large university with multiple campuses. Other participants indicated that the consultant insisted on certain indexing values, which were limited to five, and that these valuable fields were not efficiently employed. The consultant also did not attempt to understand the legacy systems or the content and that this was a factor in misunderstanding the metadata. These issues had direct impacts on data conversions, BPR, metadata development, and strategies and timelines. Some participants had limited time with the consultant and they had to implement with little direction and some departments implemented with the enterprise team only.

Participants indicated that technical skills were needed on the teams and that the projects would have been improved by this factor. Participants did not receive training or documentation for their systems and their knowledge of the system was minimal, which increased implementation difficulties. Visioning and planning and implementation strategies and timeframes were impacted because team members did not realize system complexity and functionality. Some departmental visions of how the system would perform were limited in scope due to system knowledge. Some departments rushed into implementation before understanding functionality and this lead to less efficient systems. Feedback about timeframes from participants was unanimous that timeframes were extended beyond expectations and that this was due to system knowledge. The lack of system knowledge also created cost planning issues because it was not understood that all functionality presented was not included in the vanilla system. This ties back in with the issue of top management support; top

management may not have budgeted continued funding because the steering committee failed to understand that it might be necessary.

Participants that had user involvement reported positive impacts on their projects and other participants felt that there should have been more involvement by users. Having user input during the implementation had a clear positive impact on some implementations. This factor may be interrelated to BPR and software configuration, system testing, and user perceptions of the system. There were indications that user involvement improved system configuration, workflows, and BPR. Some departments that did not involve users were faced with strong resistance to change and negative attitudes. Users that contributed to system development and configuration had more positive attitudes about changing to the new business processes and in some cases these positive users influenced other users, increasing use and user satisfaction; factors that are important for success (DeLone & McLean, 1992). A few departments with strong user resistance resulted in minimal functionality and one department used the system as a repository only due to users refusing to use the system. User participation in system testing, in some cases, was related to positive user perception of trialability because the testing environment allowed the user to query and route before using the system for their jobs. Some departments that involved users in testing resulted in reconfigurations from their input.

Training and job redesign was key for all participants and there was a need for more training, especially for the project teams. Training may impact user perceptions of the system and user acceptance. It was strongly indicated that training for the department teams would have improved success and is related to the factors of system knowledge, consultant selection

and relationship, visioning and planning, implementation strategy and timeframe, and data conversion and integrity. Because top management did not plan for training team members and there was not a successful transfer of knowledge from the consultant and the enterprise team, team members experienced many failures in their projects. Metadata decisions for data conversions were confused and it was difficult to vision how the system would work once implemented.

Training methods are related to cultural change management because each department developed training methods that would be accepted by staff and how they learn and work. For example, one department's staff wanted training to be as short as possible so it would minimally impact their workload and another department had intensive one-on-one training. There was job redesign for some departments and decisions on who would scan and link and who would process content were important. For example, one department needed to allocate full time staff to scanning, linking, and quality control do to the high volume of content, while another department divided these tasks to various staff members.

User perception of system advantage improved user buy in for most projects, supporting DeLone and McLean's (1992) model of success. Individual and organizational benefits were recognized by some users and were incentives for users to accept the system. This factor is related to change management because as users realized the benefits to their jobs, they more readily accepted the change to the new system. This factor is also related to user involvement because involved users were able to develop mental models of how the system would perform and could anticipate advantages before a complete implementation. These users were also able to share that vision within the department thereby improving user

acceptance. Users who were not involved had difficulty envisioning the system advantages and acceptance was achieved more slowly.

Positive user perceptions of system advantages also included advantages that impacted clients, such as students, vendors, and other departments on campus that shared content. Some departments that used the system for student records could see the advantages to the students by improved information quality and timeliness. Other departments that dealt with outside vendors could see time advantages for payment processing. Electronic interdepartmental document sharing was also a perceived advantage for documents such as transcripts that had to be reviewed by multiple departments during peak application and enrollment periods.

Visioning and planning was practiced on the university and departmental levels and was impacted by environmental and technology mandates. Some participants indicated that poor visioning and planning negatively impacted projects and extended implementation times. All participants also had implementation strategies and timeframes of varying levels and many participants indicated difficulties maintaining them. Some implementation strategies had a negative impact on the project, due to lack of system knowledge, which lead to software reconfigurations and end user frustration.

There was a need for more developed visioning and planning at the university level and this is related to top management commitment and support because this support ended with the purchase of the product and development of the enterprise team. Some participants indicated that top management did not develop an enterprise vision for the implementation, as they had when implementing the ERP system. The ERP implementation involved all key

stakeholders, including the IT infrastructure, and that it was a campus wide plan that was carefully planned, staged, and vetted before implementation. The piecemeal ECM implementation was considered to be a major failure of the top management vision and plan.

All participants had some type of implementation and timeframe plan and this factor was directly impacted by system knowledge factor. Many of these projects experienced reconsidered strategies and increased timeframes due to a lack of understanding of the system. Timeframes were particularly difficult to maintain and this was impacted by other factors such as staffing changes, organizational changes, and simply by the need to maintain day to day business processes during the implementation.

Change management plans were important for all participants and a variety of methods were used to manage change and increase user acceptance. Positive and negative issues for change management also impacted the participants' implementations. Most participants experienced user resistance to change and had to develop strategies to increase acceptance.

Change management was directly impacted by top management commitment and support because departments with users that felt that support was weak were less likely to accept the new system, while departments with strong support enabled team members to gain buy in from their users. Users that perceived a lack of university level top management support had more negative attitudes to the system because they felt that if the project was not important at that level, it would eventually fail. The same was true for departmental level management; if the directive to use the new system was not from the dean and directors, there was more resistance to use the system.

Change management was also related to cultural change management because some participants indicated that their users were culturally ready for the new system and that minimized change management plans. Some participants indicated that age and technical abilities of users also had an impact on acceptance. For example, there were some older users with less technical skills who were hesitant to use the system. But in one case, once these users perceived the advantages of the system, they accepted the change and requested more processes be implemented in the ECM system.

There was a variety of change management strategies employed to gain user acceptance. Some departments introduced one business process at a time to increase user perception of system advantage. Others relied on intensive testing and training. One department allowed a period of voluntary use before mandatory use and gained user acceptance with great success. Another department restricted the use of legacy systems until users were comfortable using the system.

Communication difficulties between department teams and the enterprise team had direct impacts on implementation strategies and timeframes and software configuration. The department teams did not have access to the vendor and had to go through the enterprise team and this slowed project progress and misinformation or lack of information on system functionality slowed configuration. Had the enterprise team been larger with more technical skills and had the support of the IT infrastructure, direct communication with the vendor might not have been an issue. Also, communication between top management, the IT infrastructure and the enterprise team was insufficient and resulted in department team frustrations. For example, when there were disagreements between the enterprise team and the department

team, there was little communication from top management or IT management to resolve the issue; or when there was communication, it ceased once the issue was resolved and some users perceived this as taking a step backwards.

Positive communication with the enterprise team was shown to improve implementation strategies and timelines. Some participants indicated timely responses to questions and issues and some worked with the enterprise team to develop solutions and further functionality for their systems. Negative communication with the enterprise team impacted information gathering that slowed some projects as did the enforcement of the ticketing system, which frustrated several participants.

Positive communication between internal and external user groups impacted software configuration by sharing solutions to common problems. Internal user groups met regularly and were able to share problem and solution ideas. One department was going to end the implementation due to some critical problems until another department suggested a viable solution. External user groups also met regularly to share implementation strategies and system configuration methods. A similar instance of solution sharing was between two universities using the same software; a solution was suggested by one university to improve integration with the ERP system.

Communication plans within the departments is related to user consultation. Many participants indicated that communication of the impending changes to the end users was important for gaining user acceptance. Communication with staff was practiced through staff meetings, memos, and through casual conversation.

Most participants indicated that cultural change management was important and that there was an awareness that their departments needed to be culturally ready for the change. Most participants also indicated that system testing was important for their projects and that a development system was needed.

The IT infrastructure was not involved from the beginning of project planning, even though their participation was critical for data conversion, and IT personnel attitudes may have been impacted by this decision leading to a disconnect between the IT infrastructure and the new system. Participants indicated that IT personnel were not included in visioning and planning stages, did not support the enterprise team, and were not involved with the software outside of data conversion. It was considered a major error to not have considered and included the IT infrastructure from the beginning of the project. There seemed to be little leadership from top management tasking the IT infrastructure to participate in the implementations or in continued ECM system support. The absence of IT involvement leads to little support for the enterprise team and failures to consider the ECM system during routine computer maintenance.

Legacy system consideration was key for this university and is related to system selection because they had outgrown their legacy document system and the new system had to meet the performance of the old system and to have expanded functionality. The new system also needed to integrate with the existing ERP system. This factor is related to consultant selection and relationship because there was a need for the consultant to understand the history of legacy systems and content and he did not consider these factors. The failure of the consultant to consider the legacy systems contributed to failed data conversions and extended

timeframes. For some departments, this was a major failure for their project that greatly extended timeframes and resulted in reconfiguration.

Most participants indicated that BPR had to be performed for the implementation to be successful and that this can be a difficult and time consuming task. BPR is related to visioning and planning because BPR has to be considered before implementation and poor BPR resulted in limited functionality for some departments. Some departments had extensive BPR that lasted for months and impacted implementation timeframes. Some participants indicated that there is a balance needed when considering BPR and system configuration; BPR should be conducted to match the system functionality without allowing the system to dictate business processes. Software configuration was key to the success of an implementation and failures in this area caused some project time and effort for reconfiguration.

BPR and software configuration is related to cultural and change management because some departments were culturally ready for a change to a streamlined, paperless process and other departments wanted to see the same business processes duplicated in the system. One department was particularly ready for the change and significant BPR was performed while other departments mirrored business processes to gain user acceptance. All projects for this case study implemented within system functionality and with varying complexity of configuration.

Data conversion and integrity, using metadata hierarchies and taxonomies, and records management, compliance needs and retention were strongly interrelated because all participants indicated rigorous internal or external compliance and retention demands and that data conversion and integrity and metadata were critical to meet those needs. Data conversion

was the impetus for the project as a whole due to a legacy system that was highly used and had to be retired. It was critical to maintain data integrity for records management, compliance and retention needs. Student record, human resources, and financial data for the university had intensive compliance and retention requirements. This factor was related to IT infrastructure for those departments that were converting large amounts of data into the new system. As mentioned in previous sections, it was critical for IT staff to be involved in data conversion and the failure to include them from the beginning of the project has had lasting impacts. For other departments that were scanning in paper processes, there were various methods of testing to determine data integrity and also to develop ongoing testing methods after implementation.

The metadata decisions for these projects directly impacted search and retrieval for end users and in some cases poor metadata choices set projects back to reconfiguration. Creating metadata for indexing that could be understood and used by staff was indicated as important by all participants. This factor is related to user involvement because in many cases, users were involved in metadata decisions. This factor is also related to consultant selection and relationship for the departments that worked closely with the consultant. As mentioned in previous sections, the failure of the consultant to consider legacy systems, content and naming conventions resulted in multiple issues.

Records management, compliance needs and retention were critical for all departments. The departments are regulated by internal, external, state and federal compliance bodies and organizational documents had complex retention needs and financial departments had further auditing compliance needs. All participants were concerned with compliance and developing retention functionality was indicated as important.

The primary factors that resulted in difficulties for this institution stemmed from top management decision making, poor consultant selection and the absence of the IT infrastructure in the project. Issues in these three factor areas had a cascading effect for many other factors as seen in the category discussions. Many of the difficulties and setbacks could have been avoided had top management approached the ECM adoption as an enterprise wide implementation with effective leadership and financial support. A consultant should have been chosen with substantial institutional experience and rigorous knowledge of the system. Also, institutional, enterprise wide system implementations need continuous IT staff involvement and communication during the project.

5.2 Significance and Recommendations

The academic significance of this research is in addressing the call from Alalwan and Weistroffer (2012) for more academic research in the area of ECM implementation critical success factors and in taking the first step for ECM implementation research to define ECM success and the possible factor categories that impact success. This research developed a model to define ECM implementation success and five factor categories that impact success. The research model was tested in a case study and resulted in the identification of 12 key factors by the interview and document data. Two new factors, system knowledge and documentation were evidenced from the study and can be added to the research model as well as the interview schedule in future research. Also, it is recommended that the research model allow for two project teams: an enterprise team and department teams for indicating factors that apply to each. See Figure 11 for an illustration of the updated model that includes system

knowledge and documentation, factors that impact both teams, and common factors for interview and document data are indicated in bold text.

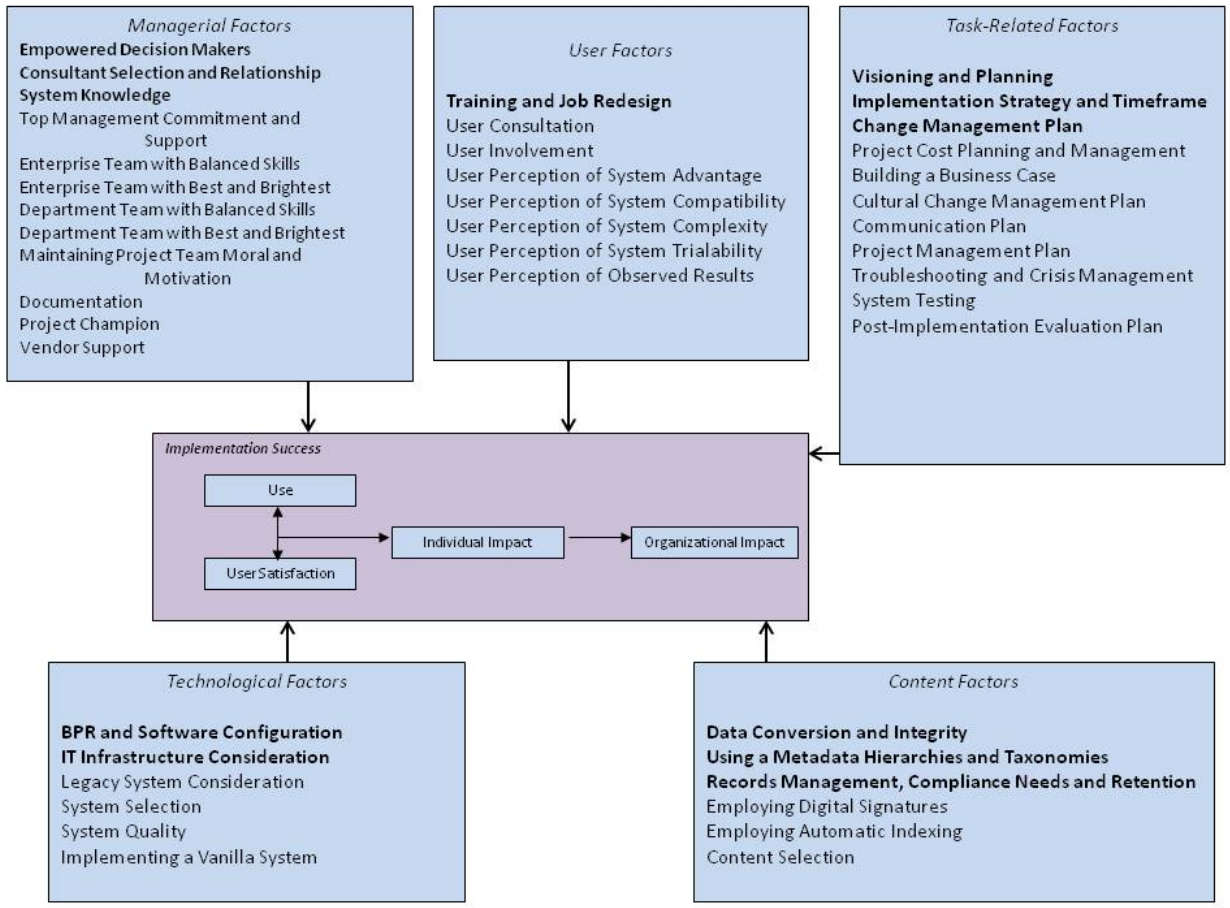

Figure 11. Updated ECM system success factor research model.

This study also indicates that using ERP critical success factors was an appropriate method for examining ECM systems and supports Haug's (2012) use of ERP critical factors for an ECM implementation. It is clear from the case study summary that most key success factors do not stand alone, but are interrelated to each other in complex ways supporting Smith and McKeen's (2003) findings and a reductionist approach to factor considerations may be inadequate. This research contributes a research model for ECM implementations for further

testing. The results of this study, as the first ECM key factor research, can be added to the small body of ECM research.

The practical implication of this research is to shed light on the problems and issues experienced by a practical application in higher education. Although every case study is unique, this university experienced several ERP critical success factors during the implementation of an ECM system. The factors were shown to be interrelated in complex ways and implementers should consider success factors as many parts of a whole that are interdependent upon one another to achieve a successful ECM project. It is recommended that success factor consideration should be a part of the knowledge, persuasion and decision stages of implementation as a factor of itself. Just as project considerations of needs, goals, system requirements, and implementation strategies are considered; stepping back and developing an awareness of factors that will impact the project over the implementation and how they can be leveraged should be considered as well. Consideration should include all available factors for an understanding of what can impact a project and to determine which factors may apply to a specific project. For example, automatic indexing was not a need for this case study and need not be considered as a factor, but legacy system consideration was critical to success. Particular consideration of key success factors in other projects, such as this one, can be an indicator of factors that may apply to ECM implementations in general.

It is recommended that top management fully develop a vision for the project, whether implementing for a few areas of the enterprise or the entire enterprise, and to be involved throughout the implementation to manage departmental issues. For any IT implementation, top management needs to ensure communication and involvement of the IT infrastructure

from the beginning of the project and through the duration of the system life. Communication between all stakeholders must be maintained for project and crisis management. Top management needs to evaluate the needs of an enterprise team for the size of the project and to develop a team with the appropriate skills and size. Top management also needs to plan and provide training for department teams. Top management at the department level needs to be involved in their projects and to share their vision and support to the entire department throughout the implementation.

Department team leads need to be selected in such a way that they may be empowered to make decisions for their projects and to have technical control of their systems. Team leads should fully understand their system before implementation and vet the consultant carefully to reduce timeframe extensions. It is recommended that department teams develop a strategy for involving users, whether by consulting all users or by selecting representatives of end users to be on the implementation team. Team leads should develop training plans to fit the department culture and include end users in this process.

There is a need for future research to confirm the importance of these key factors to further test the research model, and to confirm support for the two new factors, system knowledge and documentation. Further case studies, such as this one, would strengthen which factors can be applied to most ECM implementations, such as case studies including multiple organizations in multiple industries. Another step in this research would be to conduct a survey developed from the research model in an ECM conference sample frame. This would provide a much larger sample and could be generalized across industries. There is also a need for

research that determines how key factors are interrelated, such as case studies using general systems theory for analysis (Senge, 1994; von Bertalanffy, 1968).

5.3 Limitations

A limitation of this study is the case study methodology. Qualitative case studies can be limited due to a different interpretation of the data by another researcher. Also, the use of only one coder for content analysis is a limitation. Conducting the case study at a university limits generalities to higher education. Researcher bias is due to previous experience as a team lead for implementing an ECM system and is a limitation. The small collection of documents as well as the researcher's restricted access to further documents limits methods of triangulation. Finally, the 37% response rate may have not reflected the full cross section of the implementations.

5.4 Conclusion

Enterprise content management is a new area in the IS field and are related to sub-areas such as knowledge management and content management. ECM includes the strategies, methods and technologies employed to manage structured, semi-structured, and unstructured enterprise content. The functions of an ECM system can include many functions such as collecting and storing content, records management functionality, workflow management, and publication methods.

ECM systems have increasingly been implemented in organizations in an attempt to address various content management needs. The need to manage the exponential growth of unstructured content is the primary reason for considering an ECM system implementation. Increasing retention and compliance needs from internal and external regulations is also a

driver for implementations. These systems are complex and difficult to implement and there is a practical need for information identifying successful methods of implementation.

The ECM academic research is limited and there is a gap in the knowledge for key factors that impact implementation success. This qualitative case study addressed this gap for key success factors by focusing on interviewing team leads and team members that participated in ECM implementations for their departments within a university. The goal of this research was to identify key success factors for these implementations by developing a research model from the literature review and testing it in a practical application. Data analysis revealed support for the five factor categories with key success factors and 12 were supported with triangulation. This research also revealed that key success factors are interrelated and that a holistic consideration of factors is needed for ECM implementations. Practical implications include recommendations for developing a holistic view of success factors and recommendations for top management and department team factor considerations.

Academic value of this research is by adding to the small body of ECM research and beginning the research for key factors. This study also contributes an updated research model to study ECM key success factors. Future research is needed in the area of ECM implementation key success factors to support the findings from this study, to further test the research model, and add to the body of ECM academic literature.

APPENDIX A

FACTORS SUPPORT TABLE

Factors	CSF Literature Reviews	CSF Research
Managerial Factors		
Top management commitment and support	Alalwan & Weistroffer, 2012; Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Bingi, Prasad, Maneesh & Godla, 1999; Holland & Light, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Kumar, Maheshwari & Kumar, 2003; Motwani, Mirchandani, Madan, & Gunasekaran, 2002; Nah, Zuchweiler & Lau, 2003; Parr & Shanks, 2000; Poon & Wagner, 2001; Slevin & Pinto, 1987; Zhang, Lee, Zhang & Banerjee, 2002
Project team with balanced skills	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Slevin & Pinto, 1987; Bingi, Prasad, Maneesh & Godla, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Kumar, Maheshwari & Kumar, 2003; Nah, Zuchweiler & Lau, 2003; Parr & Shanks, 2000; Sethi, Sethi, Jeyaraj & Duffy, 2008
Project team with best and brightest	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001	Bingi, Prasad, Maneesh & Godla, 1999; Nah, Zuchweiler & Lau, 2003; Poon & Wagner, 2001; Sethi, Sethi, Jeyaraj & Duffy, 2008
Maintaining project team moral and motivation	Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001	Bingi, Prasad, Maneesh & Godla, 1999; Pan, Nunes & Peng, 2011
Project champion	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Garcia-Sanchez & Perez-Bernal, 2007; Nah, Zuchweiler & Lau, 2003; Parr & Shanks, 2000
Empowered decision makers	Finney & Corbett, 2007; Ngai, Law & Wat, 2006	Parr & Shanks, 2000
Consultant selection and relationship	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Somers & Nelson, 2001	Bingi, Prasad, Maneesh & Godla, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Kumar, Maheshwari & Kumar, 2003
Vendor support	Dezdar & Sulaiman, 2009;	Somers & Nelson, 2001; Maguire, Ojiako & Said, 2009; Pan, Nunes & Peng, 2011
User Factors		
User involvement	Dezdar & Sulaiman, 2009; Nah, Lau & Kuang, 2001	Baronas & Louis, 1988; Garcia-Sanchez & Perez-Bernal, 2007; Holland & Light, 1999; Maguire, Ojiako & Said, 2009
User consultation	Finney & Corbett, 2007	Holland & Light, 1999; Maguire, Ojiako & Said, 2009; Slevin & Pinto, 1987

Training and job redesign	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Bingi, Prasad, Maneesh & Godla, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Kumar, Maheshwari & Kumar, 2003; Maguire, Ojiako & Said, 2009; Paivarinta & Munkvold, 2005; Sethi, Sethi, Jeyaraj & Duffy, 2008; Zhang, Lee, Zhang & Banerjee, 2002
User perception of system advantage		Agarwal & Prasad, 1997; Rogers, 1983; Scott, 2011; Venkatesh & Davis, 2000; Wixom & Todd, 2005
User perception of system compatibility		Rogers, 1983; Venkatesh & Davis, 2000
User perception of system complexity		Rogers, 1983; Venkatesh & Davis, 2000; Wixom & Todd, 2005
User perception of system trialability		Rogers, 1983
User perception of observed results of the system		Rogers, 1983; Venkatesh & Davis, 2000; Wixom & Todd, 2005
Task-Related Factors		
Visioning and planning	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al- Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Holland & Light, 1999; Parr & Shanks, 2000; Paivarinta & Munkvold, 2005
Building a business case	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006	Chen, 2001; Tarafdar & Roy, 2003; Xu, Nord, Brown & Nord, 2002
Implementation strategy and timeframe	Finney & Corbett, 2007; Liu & Seddon, 2009; Ngai, Law & Wat, 2006	Holland & Light, 1999; Parr & Shanks, 2000
Project cost planning and management	Finney & Corbett, 2007; Nah, Lau & Kuang, 2001	Gargeya & Brady, 2005; Kumar, Maheshwari & Kumar, 2003; Slevin & Pinto, 1987
Cultural change management plan	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001	Gargeya & Brady, 2005; Nah, Zuchweiler & Lau, 2003
Change management plan	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Kumar, Maheshwari & Kumar, 2003; Nah, Zuchweiler & Lau, 2003; Paivarinta & Munkvold, 2005; Munkvold et al., 2006; Pan, Nunes & Peng, 2011; Parr &

		Shanks, 2000; Poon & Wagner, 2001; Sethi, Sethi, Jeyaraj & Duffy, 2008; vom Brocke et al., 2011
Communication plan	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Holland & Light, 1999; Slevin & Pinto, 1987
Project management plan	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Kumar, Maheshwari & Kumar, 2003; Maguire, Ojiako & Said, 2009; Nah, Zuchweiler & Lau, 2003; Zhang, Lee, Zhang & Banerjee, 2002
Troubleshooting and crisis management plan	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006	Garcia-Sanchez & Perez-Bernal, 2007; Slevin & Pinto, 1987
System testing	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006	Al-Mashari, Al-Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Kumar, Maguire, Ojiako & Said, 2009; Maheshwari & Kumar, 2003; Sethi, Sethi, Jeyaraj & Duffy, 2008
Post-implementation evaluation plan	Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006	Al-Mashari, Al-Mudimigh & Zairi, 2003; Kumar, Maheshwari & Kumar, 2003
Technological Factors		
IT infrastructure consideration	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001	Garcia-Sanchez & Perez-Bernal, 2007; Kumar, Maheshwari & Kumar, 2003
Legacy system consideration	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Garcia-Sanchez & Perez-Bernal, 2007; Holland & Light, 1999
System selection	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Bingi, Prasad, Maneesh & Godla, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Kumar, Maheshwari & Kumar, 2003; Maguire, Ojiako & Said, 2009; Poon & Wagner, 2001; Zhang, Lee, Zhang & Banerjee, 2002
System quality	Dezdar & Sulaiman, 2009; Liu & Seddon, 2009; Ngai, Law & Wat, 2006	Bingi, Prasad, Maneesh & Godla, 1999; Hong & Kim, 2002

Implementing a vanilla system	Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Somers & Nelson, 2001	Holland & Light, 1999; Maguire, Ojiako & Said, 2009; Nah, Zuchweiler & Lau, 2003; Parr & Shanks, 2000; Rothenberger & Srite, 2009
BPR and software configuration	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Liu & Seddon, 2009; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Al-Mashari, Al-Mudimigh & Zairi, 2003; Bingi, Prasad, Maneesh & Godla, 1999; Garcia-Sanchez & Perez-Bernal, 2007; Gargeya & Brady, 2005; Holland & Light, 1999; Kumar, Maheshwari & Kumar, 2003; Nah, Zuchweiler & Lau, 2003; Zhang, Lee, Zhang & Banerjee, 2002
Content Factors		
Content selection		Haug, 2012; O'Callaghan & Smits, 2005; Smith & McKeen, 2003; vom Brocke, Simons & Cleven, 2011; vom Brocke, Simons, Herbst, Derungs & Novotny, 2011
Data conversion and integrity	Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Nah, Lau & Kuang, 2001; Ngai, Law & Wat, 2006; Somers & Nelson, 2001	Pan, Nunes & Peng, 2011; Poon & Wagner, 2001; Zhang, Lee, Zhang & Banerjee, 2002
Using metadata hierarchies and taxonomies	Alalwan & Weistroffer, 2012; Grahlmann et al., 2012	Miles, 2011; Munkvold et al., 2006; O'Callaghan & Smits, 2005; Scott, 2011; Tyrvainen et al., 2006; Zykov, 2006
Records management, compliance needs and retention	Alalwan & Weistroffer, 2012	Miles, 2011; Paivarinta & Munkvold, 2005
Employing digital signatures (Functionality related to the systems view of the content category.)		Paivarinta & Munkvold, 2005; Tyrvainen et al., 2006
Employing automatic indexing (Functionality related to the systems view of the content category.)		Paivarinta & Munkvold, 2005; Tyrvainen et al., 2006

APPENDIX B

CONSENT FORM

Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: Identifying key success factors for the implementation of enterprise content management (ECM) systems implementations.

Student Investigator: Stephanie Horne, University of North Texas (UNT) College of Information.

Supervising Investigator: Dr. Suliman Hawamdeh

Purpose of the Study: You are being asked to participate in a research study because your organization has implemented and ECM system (Perceptive Software) for some of your business processes. I am conducting an interview to identify factors you considered most important for your project.

Study Procedures: You will also be asked to participate in a 60-90 minute interview at the UNT location of your choice.

Foreseeable Risks: There are no foreseeable risks for this study.

Benefits to the Subjects or Others: We expect the study to benefit you by sharing the results, which may be helpful for further development of your project.

Compensation for Participants: If you chose to participate in an interview, you will receive a Starbucks gift card for the amount of $10.00 as compensation for your participation which will be presented at the conclusion of the interview.

Procedures for Maintaining Confidentiality of Research Records: There is no personally identifiable information collected in this study. The survey is anonymous and the interview data is collected and saved as Participant 1, Participant 2, etc.

Questions about the Study: If you have any questions about the study, you may contact Stephanie Horne at [redacted] or Dr. Suliman Hawamdeh at [redacted].

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your participation in the interview confirms that you have read all of the above and that you agree to all of the following:

- Stephanie Horne has explained the study to you and you have had an opportunity to contact her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.

You understand you may print a copy of this form for your records.

APPENDIX C

DATA COLLECTION INSTRUMENT: INTERVIEW SCHEDULE

Implementation Success Evaluation

1. *These questions are intended to start the participant thinking about their implementation overall by asking them to describe each stage of their project. The knowledge, persuasion, decision, implementation and confirmation stages will be explained to them and that each stage may not be relevant for them.*

   How would you describe the knowledge stage of your project?
   How would you describe the persuasion stage of your project?
   How would you describe the decision stage of your project?
   How would you describe the implementation stage of your project?
   How would you describe the confirmation stage of your project?

2. *These questions are intended to help the participants to delve further into their recollection of how the implementation developed and who was involved.*

   How was the decision made to implement?
   Who were involved in the decision?
   Was/were there specific people tasked to influence users to use the new system?
   How were they chosen?
   How do you describe communication about the project between top management, project management, IT staff, users, and clients?

Success Factor Evaluation

3. *These questions are intended to help the participants describe important factors for their project. They will be given a list of the factors as a starting point for discussion.*

   Which managerial factors did you feel were the most important for your project?
   Did you have these factors for your project?
   Which user factors did you feel were the most important for your project?
   Did you have these factors for your project?
   Which task-related factors did you feel were the most important for your project?
   Did you have these factors for your project?
   Which technological factors did you feel were the most important for your project?
   Did you have these factors for your project?
   Which content related factors did you feel were the most important for your project?
   Did you have these factors for your project?

Overall Factors

4. *These questions are intended to help the participant summarize their thoughts about factors impact their project.*

Looking back over your implementation, what factors (whether on the list or not) did you feel you needed that you did not have?
What would you say were the top five factors that impacted success for your implementation?
What would you say were the top five factors that impacted failures for your implementation?

5. *These questions are intended to have the participant evaluate the success of their project.*

   Discuss your evaluation of the overall success of your implementation.
   Did you feel you met expected system quality?
   Did you feel you met expected information quality?
   Do your users use the system to the intended expectation?
   How do they express their thoughts about the system?
   Do you think individual impacts were realized? Why or why not?
   Do you think organizational impacts were realized? Why or why not?
   Where would you say that your department is on the learning curve for implementing an ECM project?

REFERENCES

AIIM, (2012). *What is enterprise content management (ECM)?* http://www.aiim.org/What-is-ECM-Enterprise-Content-Management

Agarwal, R. & Jayesh, P. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*(3), 557-582.

Alalwan, J. & Weistroffer, R. (2011). Decision support capabilities of enterprise content management: A framework*. Proceedings of the Southern Association for Information Systems Conference Paper 3,* 6-11. http://aisel.aisnet.org/sais2011/3

Alalwan, J. & Weistroffer, R. (2012). Enterprise content management research: A comprehensive review. *Journal of Enterprise Information Management, 25*(5), 441-461. doi: 10.1108/17410391200265133

Al-Mashari, M., Al-Mudimigh, A. & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research, 146*, 352-364.

Andersen, R. (2008). The rhetoric of enterprise content management (ECM): Confronting the assumptions driving ECM adoption and transforming technical communication. *Technical Communication Quarterly, 17*(1), 61-87. doi: 10.1080/10572250701588657

Baronas, A. K. & Louis, M. R. (1988). Restoring a sense of control during implementation: How user involvement leads to system acceptance. *MIS Quarterly, 12*(1), 111-124.

Benevolo, C. & Negri, S. (2007). Evaluation of content management systems (CMS): A supply analysis. *Electronic Journal Information Systems Evaluation, 10*(1), 9-22.

Bingi, P., Sharma, M. K. & Golda, J. K. (1999). Critical issues affecting an ERP implementation. *Information Systems Management, 16*(3), 7-14.

Bogdan, R. C. & Bilken, S. K. (1992). *Qualitative research for education: An introduction to theory and methods*. Needham Heights, MA: Simon & Schuster, Inc.

Boiko, B. (2002). *Content management bible*. New York, NY: Wiley Publishing, Inc.

Boynton, A. C. & Zmud, R. W. (1984). An assessment of critical success factors. *Sloan Management Review, 25*(4), 17-27.

Bullen, C. V., & Rockart, J. F. (1981). *A primer on critical success factor*. (Sloan WP No. 1220-81). Cambridge, MA: Centre for Information Systems Research No. 69, Sloan School of Management.

Carayannis, E. G. & Turner, E. (2006). Innovation diffusion and technology acceptance: The case of PKI technology. *Technovation, 26*, 847-855.

Chan, Z. C. Y., Fung, Y. & Chien, W. (2013). Bracketing in phenomenology: Only undertaken in the data collection and analysis process? *The Qualitative Report, 18*(59), 1-9. http://www.nova.edu/sss/QR/QR18/chan59.pdf

Chen, I. J. (2001). Planning for ERP systems: Analysis and future trend. *Business Process Management, 7*(5), 374-386.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: SAGE Publications, Inc.

Dawson, J. & Owens, J. (2008). Critical success factors in the chartering phase: A case study of an ERP implementation. *International Journal of Enterprise Information Systems, 4*(3), 9-24.

DeLone, W. H. & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research, 3*(1), 60-95.

DeLone, W. H. & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9-30.

Dezdar, S. & Sulaiman, A. (2009). Successful enterprise resource planning implementation: Taxonomy of critical factors. *Industrial Management & Data Systems, 109*(8), 1037-1052. doi: 10.1108/02635570910991283

Fichman, R. G. & Kemerer, C. F. (1999). The illusory diffusion of innovation: An examination of assimilation gaps. *Information Systems Research, 10*(3), 255-275. doi: 10.1287/isre.10.3.255

Finney, S. & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal, 13*(3), 329-347. doi: 10.1108/14637150710752272

Garcia-Sanchez, N. & Perez-Bernal, L. E. (2007). Determination of critical success factors in implementing an ERP system: A field study in Mexican enterprises. *Information Technology for Development, 13*(3), 293-309.

Gargeya, V. B. & Brady, C. (2005). Success and failure factors of adopting SAP in ERP system implementation. *Business Process Management, 11*(5), 501-516.

Grahlmann, K. R., Helms, R. W., Hilhorst, C., Brinkkemper, S. & van Amerongen, S. (2012). Reviewing enterprise content management: A functional framework. *European Journal of Information Systems, 21*, 268-286.

Guba, E. G. & Lincoln, Y. S. (1985). *Naturalistic inquiry*. Newbury Park, CA: SAGE Publications.

Haug, A. (2012). The implementation of enterprise content management systems in SMEs. *Journal of Enterprise Information Management, 25*(4), 349-372. doi: 10.1108/17410391211245838

Holland, C. P. & Light, B. (1999). A critical success factors model for ERP implementation. *IEEE Software, 16*(3), 30-36. doi: 10.1002/itdj

Hong, K. K. & Kim, Y. G. (2002). The critical success factors for ERP implementation: An organizational fit perspective. *Information & Management, 40*, 25-40.

Hsieh, H. F. & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277-1288. doi: 10.1177/1049732305276687

Hwang, H. G., Ku, C. Y., Yen, D. C. & Cheng, C. C. (2004). Critical factors influencing the adoption of data warehouse technology: A study of the banking industry in Taiwan. *Decision Support Systems, 37,* 1-21.

Jones, D. (2012, July 30). *AIIM Industry Watch: The SharePoint Puzzle*. Retrieved from the AIIM Research and Publications webpage: http://www.aiim.org/pdfdocuments/IW-SharePoint-Puzzle_2012.pdf

Krathwohl, D. R. (2009). *Methods of education and social science research: The logic of methods.* Long Grove, IL: Waveland Press, Inc.

Krippendorff, K. (1980). *Content analysis: An introduction to its methodology.* Beverly Hills, CA: Sage Publications.

Kumar, V., Maheshwari, B. & Kumar, U. (2003). An investigation of critical management issues in ERP implementation: Empirical evidence from Canadian organizations. *Technovation, 23*, 793-807.

Kwon, T. H. & Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. In R. J. Boland, Jr. & R. A. Hirschheim, *Critical issues in information systems research,* (pp. 227-251). New York, NY: John Wiley & Sons.

Li, H., Lim, J. & Raman, K. S. (2003, June 16). An exploratory case study on IS implementation and organizational change in China*. Proceedings of the European Conference on Information Systems Paper 91.* Retrieved from http://aisel.aisnet.org/ecis2003/91.

Liu, A. Z. & Seddon, P. B. (2009). Understanding how project critical success factors affect organizational benefits from enterprise systems. *Business Process Management Journal, 15*(5), 716-743. doi: 10.1108/14637150910987928

Lundblad, J. P. (2003). A review and critique of Rogers' diffusion of innovation theory as it applies to organizations. *Organization Development Journal, 21*(4), 50-64.

Maguire, S., Ojiako, U. & Said, A. (2009). ERP implementation in Omantel: A case study. *Industrial Management & Data Systems, 110*(1), 78-92. doi: 10.1108/02635571011008416

Markus, M. L., Tanis, C. & van Fenema, P. C. (2000). Multisite ERP implementations: The meanings of "enterprise" and "site" vary depending on unique organizational circumstances. *Communications of the ACM, 43*(4), 42-46.

Merriam, S. B. (1988). *Case study research: A qualitative approach*. San Francisco, CA: Jossey-Bass Inc.

Miles, D. (2011, March 21). *State of the ECM Industry 2011: How well is it meeting industry needs?* Retrieved from AIIM Research and Publications webpage:

http://www.aiim.org/Research-and-Publications/Publications/Industry-Watch/State-of-the-ECM-Industry-2011

Miles, M. B. & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Newbury Park, CA: SAGE Publications.

Motwani, J., Mirchandani, D., Madan, M & Gunasekaran, A. (2002). Successful implementation of ERP projects: Evidence from two case studies. *International Journal of Production Economics, 75*, 83-96.

Mustonen-Ollila, E. & Lyytinen, K. (2003). Why organizations adopt information system process innovations: A longitudinal study using diffusion of innovation theory. *Information Systems Journal, 13*, 275-297.

Myers, M. D. & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization, 17*(1), 2-26.

Nah, F. F., Lau, J. L. & Kuang, J. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal, 7*(3), 285-296.

Nah, F. F., Zuchweiler, K., M., & Lau, J. L. (2003). ERP implementation: Chief information officers' perceptions of critical success factors. *International Journal of Human-Computer Interaction, 16*(1), 5-22.

Ngai, E. W. T., Law, C. C. H. & Wat, F. K. T. (2006). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in Industry, 59*, 548-564. doi: 10.1016/j.compind.2007.12.001

Nordheim, S. & Paivarinta, T. (2006). Implementing enterprise content management: From evolution through strategy to contradictions out-of-the-box. *European Journal of Information Systems, 15*, 648-662.

O'Callaghan, R. & Smits, M. (2005). A strategy development process for enterprise content management. *Proceedings of the European Conference on Information Systems (ECIS).* Retrieved from http://aisel.aisnet.org/ecis2005/148/

Paivarinta, T. & Munkvold, B. E. (2005). Enterprise content management: An integrated perspective on information management. *Proceedings of the International Conference on System Sciences*. Retrieved from http://dl.acm.org/citation.cfm?id=1042890

Pan, K., Nunes, M. B. & Peng, G. C. (2011). Risks affecting ERP post-implementation: Insights fram a large Chinese manufacturing group. *Journal of Manufacturing Technology Management, 22*(1), 107-130.

Parr, A. & Shanks, G. (2000). A model of ERP project implementation. *Journal of Information Technology, 15*, 289-303. doi: 10.1080/02683960010009051

Poon, P. & Wagner, C. (2001). Critical success factors revisited: Success and failure cases of information systems for senior executives. *Decision Support Systems, 30*, 393-418.

Rajagopal, P. (2002). An innovation-diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model. *Information Management, 40*, 87-114.

Rockart, J. F. (1979). Chief executives define their own data needs. *Harvard Business Review, 57*(2), 81-93.

Rogers, E. M. (1983). *Diffusion of Innovations* (3rd ed.) New York, NY: The Free Press.

Roth, M. A., Wolfson, D. C., Kleewien, J. C. & Nelin, C. J. (2002). Information integration: A new generation of information technology. *IMB Systems Journal, 41*(4), 563-577.

Rothenberger, M. A. & Srite, M. (2009). An investigation of customization in ERP system implementations. *IEEE Transactions on Engineering Management, 56*(4), 663-676.

Scott, J. E. (2011, January 4). User perceptions of an enterprise content management system. *Proceedings of the International Conference on System Sciences*. doi: 10.1109/HICSS.2011.473

Senge, P. M. (1994). *The fifth discipline: The art & practice of the learning organization*. New York, NY: Doubleday.

Sethi, V., Sethi, V., Jeyaraj, A. & Duffy, K. (2008). Enterprise resource planning systems implementation in a global subsidiary organization: Lessons learned. *Journal of Asia-Pacific Business, 9*(4), 373-394. doi: 10.1080/10599230802453620

Slevin, D. P. & Pinto, J. K. (1987). Balancing strategy and tactics in project implementation. *Sloan Management Review, 29*(1), 33-41.

Smith, H. A. & McKeen, J. D. (2003). Developments in practice VIII: Enterprise content management. *Communications of the Association for Information Systems, 11*, 647-659.

Somers, T. M. & Nelson, K. (2001, January 3). The impact of critical success factors across the stages of enterprise resource planning implementations. *Proceedings of the International Conference on Systems Sciences.* doi: 10.1109/HICSS.2001.927129

Sprague, R. H. (1980). A framework for research on decision support systems. *MIS Quarterly, 4*(4), 1-26.

Sprague, R. H. & Watson, H. J. (1983). Bit by bit: Toward decision support systems. In W. House (Ed.), *Decision support systems: A data-based, model-oriented, user-developed discipline*, (pp. 15-32). Princeton, NY: Petrocelli Books.

Tarafdar, M. & Roy, R. K. (2003). Analyzing the adoption of enterprise resource planning systems in Indian organizations: A process framework. *Journal of Global Information Technology Management, 6*(1), 31-51.

Tyrvainen, P., Paivarinta, T., Salminen, A. & Iivari, J. (2006). Characterizing the evolving research on enterprise content management. *European Journal of Information Systems, 15*, 627-643.

Van de Ven, A. H., & Poole, M. S. (1995). Explaining development and change in organizations. *Academy of Management Review, 20*(3), 510-540.

Venkatesh, V. & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

von Bertalanffy, L. (1968). *General Systems Theory*. New Jersey: Englewood Cliffs.

vom Brocke, J., Simons, A. & Cleven, A. (2011). Towards a business process-oriented approach to enterprise content management: The ECM-blueprinting framework. *Information Systems E-Business Management, 9*, 475-496. doi: 10.1007/s10257-009-0124-6

vom Brocke, J., Simons, A., Herbst, A., Derungs, R. & Novotny, S. (2011). The business drivers behind ECM initiatives: A process perspective. *Business Process Management Journal, 17*(6), 965-985. doi: 10.11108/14637151111182710

Weber, R. P. (1990). *Basic Content Analysis*. Newbury Park, CA: Sage Publications, Inc.

Wixom, B. H. & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research, 16*(1), 85-102.

Wixom, B. H. & Watson, H. J. (2001). An empirical investigation of the factors affecting data warehousing success. *MIS Quarterly, 25*(1), 17-41.

Wu, I. L. & Chuang, C. H. (2010). Examining the diffusion of electronic supply chain management with external antecedents and firm performance: A multi-stage analysis. *Decision Support Systems, 50*, 103-115.

Xu, H., Nord, J. H., Brown, N. & Nord, G. D. (2002). Data quality issues in implementing and ERP. *Industrial Management & Data Systems, 102*(1/2), 47-58.

Yin, R. K. (1989). *Case study research: Design and methods*. Newbury Park, CA: SAGE Publications.

Yin, R. K. (2011). *Qualitative research from start to finish*. New York, NY: A Division of Guilford Publications, Inc.

Zhang, L., Lee, M. K. O., Zhang, Z. & Banerjee, P. (2002, January 6). Critical success factors of enterprise resource planning systems implementation success in China. *Proceedings of the International Conference on System Sciences*. doi: 10.1109/HICSS.2003.1174613