Relating Knowledge Management Success Factors to Economic Value within United States' Airline Industry Firms

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Approval Page

Relating Knowledge Management Success Factors to Economic Value within United States' Airline Industry Firms

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Abstract

Assessing Knowledge Management (KM) efforts' contribution toward the value of the firm is needed to further the science of KM. There is a scarcity in the existing body of research linking the impact of successful knowledge management KM to a company's financial results. The problem addressed in this study was the issue of KM success and its relationship to Economic Value Added (EVA). The purpose of this correlational predictive quantitative study was to examine the relationship between the outcome variable of knowledge management success and the five predictor variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. airline industry. The relationship between KM success and firm value using EVA was then investigated. In this study, Halawi's application of the DeLone and McLean model was used as the conceptual foundation for research. Three hundred members of the Airline Electrical Engineering Committee consisting of U.S. based airline representatives were surveyed. Factor analysis, correlation analysis and regression analysis were used to analyze the study's model. Two hypotheses were developed, of which one was supported. The confirmation of the relationship among constructs of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact warrants further research via either replication of this research or by developing a new theoretical model. The significant validity and reliability measures obtained in this study indicate that Halawi's model has the potential for use in future KM success studies.

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Chapter 1: Introduction

Knowledge Management (KM) is defined as the set of processes focused on the acquisition, transmission, and application of knowledge within a firm (Gao, Li, & Clarke, 2008). A knowledge-based view (KBV) of a firm, rather than a resource-based perspective, has emerged recognizing the unique importance of knowledge as an asset to the firm (Penrose, 1960). KM aids the manager by developing a mechanism for tapping into the collective intelligence and skills of employees thereby constructing a greater organizational knowledge base (Al-Alawi, Al-Marzooqi, & Mohammed, 2007). KM represents the strategies, processes, and practices organizations employ to identify, create, represent, distribute, and enable the adoption of insights, and experiences (Alavi, Kayworth, & Leidner, 2006). Improved organizational knowledge creates and develops core competencies, which leads to a competitive advantage (Firestone & McElroy, 2005; Grant, 1996; Kiss & Danis, 2008). Firms with well-developed KM capabilities realize stronger financial performance than companies that do not (Holsapple & Wu, 2008). Empirical support for the linkage of KM efforts contributing toward the value of the firm is needed to further the science of KM (Holsapple &Wu, 2008).

Background

KM is a discipline not firmly established within the aviation industry (Zawawi, Akpolat, & Bagia, 2011). Changes within the airline industry beginning with deregulation have increased fiscal and industrial pressures on firms to demonstrate solid financial performance (Paolo, Michele, Stefano, & Renato, 2009). A major shift in this period has been the source of financing moving from the state to the stock market (Paolo et al., 2009). The resulting imperative demands management emphasis on improvements

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in operating efficiency to achieve positive fiscal performance. Despite these changes, the KM literature has not yet focused significant attention on the valuation of companies belonging to this industry (Paolo et al., 2009).

A generally applicable study into the facilitators and barriers of holistic firm knowledge success and its corresponding value are needed to complete our understanding of KM (Pinho, Rego, & Cunha, 2012). Airline managers and executives endeavor to understand the value and benefits of KM efforts as these efforts impact the airline firm's financial position (Eurn & Foon, 2008). The relationship between successful KM and airline industry firm financial performance as measured using Economic Value Added (EVA) are analyzed to investigate the relationship between successful KM and airline industry firm financial performance vis-à-vis EVA to explore the link between KM and firm profit. A statement of the problem of KM success' relationship to firm value, along with an explanation of the purpose of the study is presented. A brief review of the literature is included with a description of the proposed research method used in the course of this research. Appendix A to this paper provides a brief synopsis of relevant literature on the topics of knowledge, knowledge management, valuing knowledge and the economics related to knowledge.

Statement of the Problem

The specific problem addressed in this study is the challenging and persistent issue of KM and its relationship to EVA, which may lead to loss of profit, wasted effort and misapplied capital resources (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). A knowledge-based economy and the information-driven business models underscore the need to understand

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effective knowledge practices (Holsapple & Wu, 2008). The result is wasted effort and capital resources misapplied to KM in an industry where waste threatens a firm's very existence (Zawawi, Akpolat & Bagia, 2011). Enumerating the financial benefits of knowledge management remains a challenging and persistent problem for airline industry firms (Harazin, & Padar, 2013; Masconi & Roy, 2013; Aspers, 2009).

Current methods to relate financial benefit to KM have been described as incomplete and varied (Vorakulpipat & Rezgui, 2008). A knowledge-based economy and the information-driven business model underscore the need to understand effective knowledge management practices and the importance of relating this effectiveness to a company's profitability (Goel et al., 2010). The results of this study attempt to enable more effective measures of successful knowledge management efforts and relate these efforts to financial value using firms within the U.S. airline industry (Barclay & Pinelli, 1998).

Existing airline industry implementations of KM have outcomes based on luck rather than a substantive, or defined methodology (Kwong & Lee, 2009). Forgoing an understanding of KM success and its resultant valuation benefits, airlines will continue to focus on less effective and less deliberate methods to improve financial performance (Kwong & Lee, 2009; Zawawi, Akpolat & Bagia, 2011). The significance of KM success regarding if, and to what extent KM success is related to firm value is important for airline senior executives to manage their businesses effectively.

Purpose of the Study

The purpose of this correlational predictive quantitative study is to examine the relationship between the outcome variable of knowledge management success and the

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five predictor variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. airline industry AEEC member firms by applying Halawi's (2005) survey instrument. In general, there is little empirical support linking a firm's KM initiatives to its performance (Holsapple & Wu, 2011; McKeen, Zack, & Singh, 2009). Specific to the airline industry an established relationship between KM success and firm performance may provide additional avenues of management focus for positively influencing firm value. The establishment of a relationship between KM success and firm performance may provide the larger KM audience sorely needed empirical evidence of this linkage. Establishing KM success from these five dimensions assists in creating a link between KM success and firm value using EVA by applying the methods of Holsapple and Wu (2011). The geographic location of this study is the United States. The data are obtained through the use of online surveys. A sample of at least 74 responses is obtained from a population of 300 participants from U.S. based airline industry members of the AEEC. The AEEC is selected for its broad voluntary representation of U.S. airline industry participants who strive to improve the efficiency of airline operation through the publication of technical and operational standards. The participants contribute research data through the use of an internet-based survey. This study's research design applies the survey previously developed by Halawi (2005), derived from the DeLone and McLean (2003) Information System Success model which successfully measured KM success across multiple industries. The Jennex & Olfman (2009) KM Success model is itself an extension of DeLone and McLean's IS Success model. The DeLone and McLean (2003) models and its derivatives are believed to have wide applicability (Aujirapongpan, Vadhanasindhu,

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Chandrachai, & Cooparat, 2010). The Halawi (2005) study demonstrates the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact can be successfully and quantifiably measured. Further, KM studies have employed the model developed by DeLone and McLean (2003) (Aujirapongpan, Vadhanasindhu, Chandrachai & Cooparat, 2010; Jennex & Olfman, 2009, Velasquez, Durcikova, & Sabherwal, 2009; Butler, Feller, Pope, Emerson, & Murphy, 2008). A statistical model using multiple regression analysis is fit to explore the relationship of the five KM factors as the predictor variable to KM success as the outcome variable. Applying the methods of Holsapple and Wu (2011), the relationship between KM success and firm value based on EVA is then be investigated. The data from the survey are investigated along with publicly available financial data from the firms of the survey respondents. The method of multiple regression is used to evaluate the hypotheses for the collected data set. A power of .80 and a standard alpha level of 0.05 are selected

Theoretical Framework

The roles of management are controlling, leading, organizing, and planning (Robbins & Judge, 2007). Central to these activities are the decisions made by managers to carry out these functions. A dominant view in management literature is sound decisions are dependent on the information available at the time the decision is made (Andone, 2009; Gao, Li & Clarke, 2008; Grant, 1996; Mills & Smith, 2010). High quality decisions require not just information, facts, and data, but experience and other qualitative factors (Alavi & Leidner, 2001). The management and synthesis of these elements and factors culminate in knowledge within the firm. Managing the firm's

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diverse set of knowledge assets successfully, so that value is delivered to the enterprise and the individual knowledge workers is an enormous task (Kulkarni, Ravindran, & Freeze, 2007). The discipline of KM strives to accomplish this task. Methods to assess the firm's economic benefits attributable to KM remain elusive (Denning, 2007; Hua-Wei, Hong-Yu, Hsaiao-Wen, & Che-Hung, 2006; Holsapple & Wu, 2011; Sharma et al., 2007). The term knowledge management first appears in the academic literature in 1975. At that time the contributions of Goerl (1975), Henry (1975), and McCaffery (1975) popularized knowledge management in the academic community.

The term knowledge management emerged in the course of investigating the development and shaping of public policy (Henry, 1975). The concept of KM evolved from an informed process by which public administration officials improved the content and quality of decisions (Henry, 1975). The initial definition of KM was narrowly suited to addressing public administration and bureaucracy by emphasizing knowledge as a separate and distinct entity over data and information. Henry (1975) defined KM as "public policy for the production, dissemination, accessibility, and use of information as it applies to public policy formulation" (p. 572).

The work of Goerl (1975) continues the efforts of Henry (1975) by advocating an informed public sector through the use of KM. Cybernetics, as Goerl (1975) then termed KM, focused on efficiency in government. From Goerl's (1975) perspective, the professionals in society are looked upon to influence societal and political change based on their access to objective information and sharing of their knowledge among peers. From its earliest stages of development, KM is recognized as influential on fiscal operations (McCaffery, 1975). Measuring this benefit has remained elusive.

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The future of KM lies in the valuation of knowledge and assessing value creation (Vorakulpipat & Rezgui, 2006). The intangibility of knowledge makes this a tough undertaking. According to Vorakulpipat and Rezgui (2006) within our knowledge-based economy, intangible assets have more potential to create value than tangible or physical assets.

Several theories emerge from an investigation of knowledge management as it is applied and employed within the firm. The prevailing perspectives on knowledge management focus on people, processes, technology, culture, and structures (Bollinger & Smith, 2001). The preponderance of the existing literature focuses on technology solutions to aid KM. The existing literature leaves a gap to explore the contributions of the remaining KM factors on firm performance. Halawi's (2005) instrument considered KM success based on system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact. This model offers management tangible areas associated with KM success within the firm as viewed from the individual user's perspective. The Halawi (2005) instrument as derived from the DeLone and McLean (2003) success model is highly regarded due to its strong theoretical grounding, its validity based on observed phenomena and its fit and alignment to a set of critical success factors culled from 200 studies.

Nonaka and Takeuchi's (1995) SECI model offers a template for firms to advance their goals by focusing on knowledge transfer. A firm's key and sustainable advantage originates from what an organization collectively knows, how efficiently it uses what it knows, how it acquires new knowledge, and then employs this new knowledge for further gain (Davenport & Prusak, 1998). An organization's core competencies may be

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leveraged to increase firm value. A strong correlation between a firm's value creation capability and KM is established in previous studies (Liebowitz & Suen, 2000; Holsapple & Wu, 2008).

Firms traditionally consult measures, such as return on investment, as a means to express KM value when investing information technology resources (Goel, Rana, & Rastogi, 2010). Contemporary financial measures may not fully appreciate the impact of KM resources at work within the firm. EVA is one measure of firm economic value that can be applied variously to IT projects as well as non-IT projects such as KM to assess their impact on firm financial performance (Hua-Wei et al., 2006).

To effectively manage knowledge, metrics are essential to measure progress for a sustained and fruitful effort. The need for empirical and quantitative methods to more fully develop KM as a discipline is recognized within the KM domain (Andone, 2009, Holsapple& Wu, 2011).

This study advances Halawi's (2005) KM research by establishing quantitative linkage between the aforementioned five KM factors and firm profit. Airline firm KM success is analyzed along with the reported financial results to evaluate each firm's EVA. Positive economic measures such as EVA when related to KM are likely to prompt companies to develop, and strengthen their knowledge management capabilities.

Research Questions

The results of this research explore the relationship between KM success and financial value for U.S. airline industry AEEC member firms. The investigation of KM as it is applied and employed within airline industry firms highlights the need to focus on

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system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact.

The research questions provide data to assess how the factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact predict KM success. At the detailed level, each factor is investigated using multiple regression to assess the relative strength or weakness in supporting KM success within the firm.

Q1: What is the relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, if any, and knowledge management success as practiced within U.S. airline industry AEEC member firms?

Q2: What relationship, if any, exists between KM success and firm value as measured by EVA within U.S. airline industry AEEC member firms?

Hypotheses

$H1_0$. There is no significant relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis, within U.S. airline industry AEEC member firms.

$H1_a$. There is a significant relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis within the U.S. airline industry AEEC member firms.

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$H2_0$. There is no relationship between KM success factors and U.S. airline industry AEEC member firm's value as measured by EVA.

$H2_a$. There is a relationship between KM success factors and U.S. airline industry AEEC member firm's value as measured by EVA.

Nature of the Study

System quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact have been identified as factors that may lead to KM success (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). This quantitative, descriptive study examines airline firms' KM success factors and examines the relationship between KM success and EVA.

The research method chosen for this study is a predictive quantitative approach using a cross-sectional investigation. A quantitative method is selected to provide statistically significant conclusions about the KM domain. In considering various research methods, including qualitative, quantitative and mixed methods, the quantitative approach is deemed most appropriate for determining the relationship between independent variables and dependent variables (Creswell, 2005).

This cross-sectional quantitative study examines the relationship between the dependent variable of knowledge management success and the five independent variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. airline industry firms. A questionnaire on user perspectives of KM based on the instruments used by Halawi (2005) and Hua-Wei et al., (2006) is appropriately suited for data collection and allows for a more objective assessment of the subject. Multiple regression analysis is utilized to

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determine the relationship between the predictor variables and the outcome variable. The KM success factor is computed for each firm by adding the values rated for each firm's KM dimensions. EVA for each firm is calculated. A correlation analysis is conducted to determine the relationship between knowledge management success and EVA to assess firm value. Establishing KM success from these five dimensions assists in investigating a link between KM success and firm value.

Significance of the Study

Enumerating the factors and benefits of knowledge management remains a challenging and persistent problem for airline industry firms (Harazin, & Padar, 2013; Masconi & Roy, 2013; Aspers, 2009). The problem of relating KM factors which lead to KM success and its relationship to firm financial performance continues to persist (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). This knowledge gap leads to loss of profit, wasted effort and misapplied capital resources (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007).

Better decisions strengthen the firm's competitive position in the marketplace (Firestone & McElroy, 2005). A positive relationship exists between knowledge management efforts and a firm's financial performance (Holsapple & Wu, 2008, 2011). Firms with strong knowledge management capabilities realize stronger financial performance than those firms that do not (Holsapple & Wu, 2008). This study attempts to advance Halawi's (2005) theoretical framework of KM by establishing quantitative linkage between the aforementioned five KM factors and firm profit. Positive economic

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measures such as EVA when related to KM are likely to prompt companies to develop, and strengthen their knowledge management capabilities.

Relating the five KM dimensions to KM value provides managers tangible areas for intervention to positively influence KM outcomes. The specific problem addressed in this study is the challenging and persistent issue of KM and its relationship to EVA, which leads to loss of profit, wasted effort and misapplied capital resources (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). A knowledge-based economy and the information-driven business models underscore the need to understand effective knowledge practices (Holsapple & Wu, 2008). The result is wasted effort and capital resources misapplied to KM in an industry where waste threatens a firm's very existence (Zawawi, Akpolat & Bagia, 2011). Enumerating the financial benefits of knowledge management remains a challenging and persistent problem for airline industry firms (Harazin, & Padar, 2013; Masconi & Roy, 2013; Aspers, 2009).

Definition of Key Terms

This research proposal describes a number of conceptual models and frameworks. This section describes the key terms used in the discussion of KM.

System quality. System quality is a measure of how well a knowledge management system performs the functions of knowledge creation, storage, retrieval, transfer and application (Jennex & Olfman, 2003).

Knowledge/information quality. Knowledge/information quality refers to the information characteristics of information systems (IS), which include accuracy,

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precision, currency, reliability, completeness, conciseness, relevance, understandability, meaningfulness, timeliness, comparability, and format (DeLone & McLean, 1992).

Use/user satisfaction. Use/user satisfaction indicates the actual level of knowledge management system use and the user's satisfaction with the system. This measure is most appropriate when a KM system is required since KM effectiveness is contingent on user satisfaction with the system (Jennex & Olfman, 2003).

Perceived benefit. Perceived benefit measures perceptions of the advantages and impacts of a knowledge management system based on Thompson, Higgins and Howell (1991) perceived benefit model. Perceived benefit is best utilized for predicting continued knowledge management system use when such system's use is voluntary.

Net impact. Net impact is the cumulative effect of the user's personal benefits of efficient knowledge management such as improved personal productivity as well as the organizational benefits when aggregated across multiple individuals (Jennex & Olfman, 2003).

Knowledge Management Success. Knowledge Management Success is the degree to which an organization's KM activities meet the goals or fulfill the purposes of its KM initiatives (Holsapple & Wu, 2011). KM success is measured based on the perceptions of employees as to the effectiveness of the firm's employment of KM efforts in each of the five dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit and net impact (Jennex & Olfman, 2003).

Economic Value Added (EVA)*:* EVA is the measure of a firm's effectiveness in increasing its value during a given year (Sharma et al., 2007). EVA is the after-tax cash flow generated by a business minus the cost of the capital it has deployed to generate that

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cash flow, thus representing real profit versus paper profit (Hua-Wei, Hong-Yu, Hsaiao-Wen, & Che-Hung, 2006).

Intellectual capital. Intellectual capital is the end product of a knowledge transformation process performed by individual employees to expand the company's knowledge base. Intellectual capital incorporates three main components when combined form value: human capital, organizational (structural) capital, and customer (or relational) capital (Dzinkowski, 2000).

Knowledge management (KM). Knowledge Management represents the strategies, processes, and practices organizations employ to identify, create, represent, distribute, and enable the adoption of insights, and experiences (Alavi et al., 2006). In the context of the airline industry, knowledge management represents those processes and practices employed to capture and disseminate domain specific knowledge of aircraft operation and maintenance, material and services procurement and revenue generation systems.

Management interventions. Interventions are those decisions and implementations that influence success or failure of an effort (Massingham & Diment, 2009). Typical interventions may consist of investments in new information systems, development, and implementation of new processes and procedures.

Organizational knowledge base. Organizational knowledge base is the collection of facts, data, information, experiences, know-how, lessons learned, and analyses that comprise the intelligence of the organization which enables the firm to function (Bollinger, 2001; Nonaka, 1994).

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Summary

The problem of relating KM factors which lead to KM success and its relationship to firm financial performance continues to persist (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). The failure to effectively understand and manage the firm's KM dimensions may lead to loss of profit, wasted effort and misapplied capital resources (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Sharma, Yu-Hui, & Tan, 2007). A knowledge-based economy and the information-driven business models underscore the need to understand effective knowledge practices (Holsapple & Wu, 2008).

The KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact relate to a firm's KM success (Jennex & Olfman, 2009). KM success may impact firm financial performance (Firestone & McElroy, 2005; Grant, 1996; Kiss & Danis, 2008). The relationship between KM success and firm financial performance is, therefore, worthy of improved understanding.

Chapter 1 included an overview of the research problem of KM success factors and the relationship to firm financial performance, the purpose of the study, theoretical framework, research questions and hypotheses. The chapter concludes with a discussion of the nature of the study, the significance of the study, definitions of key terms, and a summary of key points previously identified. Chapter 2 includes an examination of literature regarding KM success and EVA.

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Chapter 2: Literature Review

Firms increasingly value knowledge as an organizational asset (Teece, 2013). The challenging and persistent issue for management professionals is relating KM to verifiable benefit (Holsapple &Wu, 2008). Failure to relate KM to its benefit can lead to loss of profit, wasted effort and misapplied capital resources (Aspers, 2009; Bose & Thomas, 2007; Denning, 2006; Holsapple & Wu, 2008, 2011; Wu & Holsapple, 2013). It is crucial for firms to determine whether the investment in a KM system pays off in terms of demonstrable performance improvement (Li et al., 2015). For airlines, profitablity is an ongoing challenge that demands new and highly effective management techniques to eke out greater operational efficency (Collins et al., 2011). KM offers potential benefit to the airline industry as it seeks to capitalize on knowledge investments. Knowledge as an asset has been a vexing problem due to its intangible nature and disagreement on measures (Xu & Bernard, 2010). Managing knowledge to produce value is not without its challenges (Andries & Wastyn, 2012). Identification and understanding these obstacles can illuminate a means to overcome them. Within the aviation industry the application of KM is not well documented (Eurn & Foon, 2008). KM success as an antecedent to firm value within the aviation industry is an area in need of further research (Fainberg, 2006). The financial constraints within the air transport sector present an opportunity to enhance KM efforts to facilitate effective resource allocation, eliminate waste, and promote collaboration on higher value pursuits.

Documentation

The literature search strategy included an extensive search of peer-reviewed articles, textbooks, and scholarly journals in the fields of KM and business found within

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ProQuest, EBSCOhost, Sage Journals Online, Google Scholar, in addition to a review of holdings at the University of Memphis, a local university library. Strategic subject areas encompassed within the literature search are, but not limited to, the following: (a) managing information, (b) intellectual capital, (c) leadership theory, (d) economic theory, (e) Economic Value Add, (d) professional learning communities, (e) firm performance, and (f) knowledge transfer. The search renders several articles related to the business sector regarding information management systems and their performance assessment. The parameters for the search are limited to peer-reviewed articles and research studies, published within the last three to five years. Foundational and seminal works cited, older than five years provided the theoretical underpinnings for this research and literature review.

The research for this study included the definition of KM and discovering the components considered characteristics of KM. There are benefits and disadvantages to using a KM system, and both topics are explored in this study. KM relies on the business process which exists within firms (Zikmund et al., 2013). Additionally, KM and organizational financial performance are discussed. The assessment of KM capability and its role in company financial performance is an additional topic. Finally, putting the KM assessment and firm financial performance together created the groundwork for the basis of this research.

Within the literature review, the research situates the theoretical framework of KM, in relation to influencing an organization's economic value. This study renders information for leaders to leverage KM and derives financial benefit among their organizations. A historical perspective of KM is relevant to position this research within

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organizational and generational theories, as organizations are slow to change long held structures, and each KM dimension has different needs to reach its full potential (Jennings, 2010). This literature review discusses the importance of knowledge management to the firm, the classifications within KM, exploration of the five KM dimensions and methodologies for assessing value. The following is a review of the existing literature concerning KM, and its relation to firm performance.

Defining the Subject of the Measure, Knowledge

According to Webster's dictionary (2015), knowledge is defined variously as "(i) the act, fact, or state of knowing; a) acquaintance or familiarity (with a fact, place, etc.), b) awareness, c) understanding, (ii) acquaintance with facts; range of information, awareness, or understanding, (iii) all that has been perceived or grasped by the mind; learning; enlightenment, and (iv) the body of facts, principles, etc. accumulated by mankind." Others have categorized knowledge as intangible, fluid, personal, elusive, invisible, immeasurable, and ever evolving (Gorelick & Tantawy-Monsou, 2005), and as "a multifaceted concept with multilayered meaning" (Nonaka, 1994, p.15). Researchers Alavi and Leidner (2001) view knowledge as a state of mind, a process, a condition of having access to information, or a capability. Alavi and Leidner (2001) emphasize knowledge enables individuals to expand their personal learning and apply it to meet their needs. Alavi and Leidner (2001) categorize knowledge into two dimensions: understanding as a result of experience, or study and the range, or accumulation of what has been perceived, discovered, or learned.

Data are observed and recorded as results. Data are facts that have no meaning in and of themselves that can be either qualitative or quantitative in nature (Jessup

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&Valacich, 1999). Information is data that has been categorized, classified, corrected, and condensed, the result being the addition of meaning. Information is organized and analyzed data (Allee, 2003). Even though the terms information and knowledge are often used interchangeably, there is a clear distinction between them.

Knowledge may be viewed as a thing, to be stored and manipulated. An extended view of knowledge as an object can be understood by way of having access to information. Knowledge is also seen as a capability. Thus, it has the potential to influence future outcomes. Knowledge's potential to influence future results and the view of knowledge as a capability is the focus of this research paper. Alavi and Leidner (2001) contest the predictive nature of knowledge itself. However, the researchers recognize knowledge as the gateway to applying, utilizing and interpreting information and data. Alavi and Leidner (2001) acknowledge knowledge's role as central to improved decision-making processes. However, when knowledge is held by the individual, for personal and group knowledge to be beneficial, knowledge must be transformed so as to be successfully interpreted by the receivers.

A common definition of knowledge held by most people is that it is know-how. Collison and Parcell (2004) add to the definition by stating knowledge also contains know-why, know-what, know-who, know-where, and know-when. Know-how involves the process, procedures, techniques, and tools for getting something done. Know-why is comprehending cause and relationships which include the strategic insights related to the value of action. Know-what is understanding the facts or information required before taking action. Know-who involves the social relationships and network of contacts, and by which people exchange information from one another. Know-who is created through

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the social interactions among individuals and organizations (Nonaka, Toyama, & Konno, 2000). Know-where is the ability to successfully navigate and locate information. Lastly, know-when is identifying the ideal timing for taking action, making a decision, or terminating action.

The theoretical basis of Holsapple and Wu's (2011) study asserts firm performance is achieved through the exercise of a unique set of firm resources which have value, are rare, not easily imitated and cannot be substituted with other resources. Knowledge, suggest Holsapple and Wu (2011), offers competitive advantage not only by its existence but most importantly, by how it is managed.

The Evolution of KM

The term knowledge management first appeared in the academic literature in 1975. At that time the contributions of Goerl (1975), Henry (1975), and McCaffery (1975) popularized KM in the academic community. Initially in the context of public administration, the positions furthered by Goerl (1975), Henry (1975) and McCaffery (1975) posited improved information management could have a positive effect on society in the form of improved public policy. Likewise, Henry (1975) envisioned the potential negative impact of KM through the stress and strains placed on public policy formation.

KM emerges from an informed process by which public administration officials improve the content and quality of decisions (Henry, 1975). The initial definition of KM is narrowly suited to addressing public administration and bureaucracy by emphasizing knowledge as a separate and distinct entity over data and information. Henry (1975) defines KM as public policy for the production, dissemination, accessibility, and use of information.

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The work of Goerl (1975) continues the efforts of Henry (1975) by advocating an informed public sector through the use of KM. Cybernetics, as Goerl (1975) then termed KM, focuses on efficiency in government. From Goerl's (1975) perspective, the professionals in society are looked upon to influence societal and political change based on their access to objective information and sharing of knowledge among peers. From its earliest stages of development, KM is recognized as influential on fiscal operations (McCaffery, 1975). Measuring the potential benefit of the intangible asset of knowledge remains elusive. To realize the potential benefits an effective knowledge management process must be established to appropriately identify, capture, create and transfer.

Tacit versus explicit knowledge.

Polanyi (1962) distinguishes knowledge into two primary constructs: explicit and tacit knowledge. Explicit knowledge is knowledge that is easily explainable; explicit knowledge may be described in terms of a textbook or universal truths. Explicit knowledge is general in nature and easily transferred from one generation to another. Nonaka & Takeuchi (1995) define explicit knowledge as knowledge can be transmitted using formal, systematic language. Conversely, tacit knowledge is not easily defined. Tacit knowledge is knowledge gained experientially, and it is based on personal experience and is generally less communicable (Spender, 1996). Tacit knowledge is much more volatile to an organization and thus highly researched for its convertability to explicit knowledge.

One opportunity for the firm in managing knowledge is capturing tacit knowledge for use in organizational practice (Masa'deh, Obeidat, Al-Dmour, & Tarhini , 2015). Basu (2014) defines the bounds of KM to include areas such as education and the sharing

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of best practices as well as employee training and development and a company's media communications. Another perspective for managers to consider is KM as a management philosophy within their organizations (Andreeva & Kianto, 2012). The differences in managing tacit and explicit knowledge within an organization should be recognized by aspiring KM practitioners because the mode of knowledge capture, creation, transferral, and sharing differs (Bloodgood & Chilton, 2012; Nonaka, 1994; Suppiah & Sandhu, 2011). Securing and managing knowledge as an organizational asset requires effective knowledge capture, creation, transfer, and sharing.

Knowledge capture.

The two categories of knowledge, tacit and explicit, differ in that tacit knowledge is personal and difficult to capture while explicit knowledge is easier to capture and manage (Bloodgood & Chilton, 2012; Nonaka, 1994). Bloodgood and Chilton (2012) identify organizational knowledge capture as the recording of facts through documents, concepts through instruction, and procedures through examples and experience. Knowledge losses at the knowledge capture stage are common and should be minimized in order to prevent loss of knowledge at later stages (Shankar et al., 2013). A knowledge plan is key to minimizing organizational knowledge loss as should be the case with a vulnerable organizational asset.

The KM framework proposed by Jabar et al. (2011) to facilitate the capture of tacit knowledge encompasses knowledge of people, knowledge of processes, and the entirety of the organization's product knowledge. This framework formalizes the organization's knowledge as inventory for use by the workforce. Jabar's et al. (2011) framework also provides a method to assess employee competency and productivity.

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Researchers Dzekashu and McCollum (2014) studied the impact of quality management integration on the tacit knowledge process due to knowledge loss from an aging workforce. The results of Dzekashu and McCollum's (2014) study produced a tacit knowledge capture process across the spectrum of KM operations from identification to acquisition to refinement to storage of the knowledge. Knowledge capture supports the knowledge creation process, which elevates the organizational knowledge base.

Knowledge creation.

The SECI (Socialization, Externalization, Combination, Internalization) model for organizational knowledge creation is a spiral process (Nonaka, 1994; Nonaka et al., 2000). The knowledge creation process flows from socialization (tacit-to-tacit) to externalization (tacit-to-explicit), externalization to combination (explicit-to-explicit), combination to internalization (explicit-to-tacit), and internalization to socialization, it continues to cycle without stopping (Nonaka, 1994; Nonaka et al., 2000). The knowledge creation process encompasses internal and external organizations while supporting both internal and external stakeholders of an organization, increasing firm performance (Nonaka et al., 2000).

The SECI model helps to underline the connection between social media and knowledge creation (Wagner, Vollmar, & Wagner, 2014). Organizational knowledge creation is supported by the emerging and new behaviors observed with social media, such as authoring, reviewability, editability, recombinability, association, and experimentation (Wagner et al., 2014). Wagner, Vollmar, and Wagner (2014) propose organizational competitive advantage is increased through investments in organizational knowledge assets fostered through social media usage.

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The concept of organizational learning connects to knowledge creation through the dimensions of learning, knowledge, and information organization according to Lliora and Moreno-Luzon (2014). Argote and Miron-Spektor (2011) examine organizational learning through the factors of task performance experience, knowledge, and active member participation. Argote and Miron-Spektor's (2011) research finds empirical support for knowledge creation, knowledge transfer, and knowledge retention through organizational learning. Argote and Miron-Spektor's (2011) framework is similar Nonaka's (1994) dynamic theory of organizational knowledge creation.

Argote and Miron-Spector's (2011) concepts are supported by the findings of Martelo-Landroguez and Cegarra-Navarro (2014) where knowledge use entails the full lifecycle where knowledge is created, retained for integration into transfer and storage/retrieval phases. Mahr and Lievens (2012) studied knowledge creation in virtual communities and found the creation of knowledge differs among virtual communities based on individual focus areas. Their research concludes that created knowledge requires transference to others for the organization to be effective.

Knowledge transfer.

Knowledge transfer supports strategic KM implementation within a learning organization (Al-adaileh et al., 2012). Szulanski (1996) describes knowledge transfer as a process of dyadic exchanges of knowledge between the source and recipient units consisting of four stages: initiation, implementation, ramp-up, and integration. Transformation of tacit-to-explicit knowledge occurs through training or through experience (Okoroafor, 2014). Teo & Bhattacherjee (2014) contend that tacit knowledge

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may be harder to attain than explicit which makes the transfer and utilization of knowledge more critical to understand throughout the organization.

The complexion of knowledge transfer within organizations includes innovation as well as the bonding of a workforce through common activities (Sankowska, 2013). The methods of knowledge transfer may include storytelling , mentorship, narration, and job engagement (Venkitchalam & Busch, 2012). The modes of knowledge transfer change based on the different places where knowledge creation occurs.

Conversations between workers support the externalization portion of SECI. Through this action, individuals convert tacit knowledge to explicit knowledge. Modern distributed work arrangements and flexible work schedules present a challenge to knowledge retention as it may hinder the effective transfer of knowledge (Argote & Miron-Spektor, 2011). Knowledge losses are likely to occur at the knowledge transfer stage in the absence of robust knowledge transfer practices and assigned knowledge ownership (Shankar et al., 2013). When knowledge is effectively transferred, the value of the knowledge increases productivity and interconnection of knowledge can occur (Tuan, 2012). Researchers are able to measure productivity while the measurement of knowledge transfer can take several different forms (Islam, Low, & Rahman, 2012). Managers previously used instruments such as the balance sheet to measure organizational productivity which provides a lagging indicator of the results; however, companies need knowledge transfer measurements that enable leaders to be forward-looking (Van Buren, 1999). Effective measures of knowledge assets and the processes they undergo are not well established.

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Some proposed knowledge transfer measures are the number of transfers over time, knowledge transfers within time and budget, customer satisfaction, recipient-level knowledge replication, and recipient ownership of the knowledge (Islam et al., 2012). Knowledge transfer measures provide an organization feedback on the most effective methods to meet their organizational goals.

The future of KM lies in the valuation of knowledge and assessing value creation (Vorakulpipat & Rezgui, 2006). The intangibility of knowledge makes this a tough undertaking. According to Vorakulpipat & Rezgui (2006) within our knowledge-based economy, intangible assets have more potential to create value than tangible or physical assets.

Intangible Resources

Businesses have traditionally been appraised based on its tangible assets represented on the balance sheet. Organizations associate cost and price to its tangible resources thereby creating a link between resource measurements and organizational performance. Tangible assets have been the determining factor of wealth in the 20th century, whereas future wealth will be determined by an organization's intangible assets (Garcia-Parra, Simo, Sallan, & Mundet, 2009).

Davis, Cloake, Fedde, and Horne (1940) studied intangible assets, such as goodwill to determine to what degree do these assets hold value for organizations. Goodwill is defined by the researchers as the value attached to the use of a trademark or a trade name, or the amount paid for an active business involving the ownership of a trademark, brand, or a trade name, in excess of the net value of all other assets

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received. Brundage (1945) proposed a new accounting practice for intangible assets so that goodwill assets are disclosed on the balance sheet.

Kimbro and Xu (2016) offer perspectives assessing a company's goodwill. One view states that goodwill represents an above-normal earnings capacity. It can be viewed as the present value of the anticipated excess earnings discounted over a certain number of years (Kimbro & Xu 2016). In the second view, goodwill represents various assets of the organization that are currently not shown on the balance sheet. These intangible assets include customer lists, organization costs, development costs, brand and trademark-related names, proprietary processes and methods, patents, copyrights, licenses, franchises, and other exclusive capabilities (Kimbro & Xu 2016).

Using either of these views intangible assets can be classified in financial terms. This classification includes intangibles such as goodwill, trademarks, brands, and patents as well as deferred charges such as advertising, research and development, and training. Intangible assets may also be classified into items that generate business and create value. Marketing items such as advertisements, product development and supporting marketing efforts are intangibles. Additional marketing resources such as trademarks, branding, and information systems are part of this category as well as items that synthesize marketing assets to provide a competitive advantage. Items that manifest value including company image, reputation, and premium pricing should also be part of the intangible asset class (Salamudin, Bakar, Ibrahim, & Hassan, 2010).

The International Accounting Standards Board (IASB, 2014) defines the intangible asset as "an identifiable non-monetary asset without physical substance" (IASB, 2014, p. 1). Organizations can sell, transfer, license, rent, and exchange an

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intangible asset. It follows logically that intangible assets are assigned a value to the organization. The American Financial Accounting Standards Board (FASB) and categorizes intangible assets into seven groups. FASB's categories include technology, customer, market, workforce, contract, organization, and statutory-based assets (IASB, 2014). The organization's intangible assets cut across the organization and have linkage to workers, business processes, organizational structures, and customers.

Ratiu and Tudor (2013) identify three characteristics of intangible assets. The first characteristic is its immaterial nature—a non-physical existence such as an idea, rather than the paper, on which the idea is written. The second characteristic is the ability of intangible assets to self-renew after the assets have been used. The third characteristic is the ability to change while the assets are being used, so the stock can increase as being used (Ratiu & Tudor, 2013). Intangible assets, being non-physical, self-renewed and the ability to change while being used, have characteristics that set them apart from all other asset classes.

Intangible assets have characteristics very different from those of physical assets. Intangible assets can be considered atemporal as they may be used simultaneously in multiple situations. Concurrent use of intangible assets lowers the asset's cost basis as it is easily reproduced at low cost after expending the initial development cost (Kimouche & Rouabhi, 2016). These characteristics constitute the source of sustainable competitive advantage.

The Benefits of KM

From the existing literature, the benefits to firms implementing KM can be categorized into seven major benefits. They are to: strengthen an organization's business

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foundations, reduce levels of management and inefficient bureaucracy, treat information as an asset, increase revenues, foster competitiveness and innovation, share best practices and to provide management with insight.

Strengthen an organization's business foundations.

Mousavizadeh, Harden, Ryan, and Windsor (2015) describe KM as the deliberate process of acquiring, organizing, and communicating the knowledge of constituent members so that others can make use of it for improved effectiveness and productivity. Fundamentally, knowledge has always been a key factor in furthering a civilization's economy. The significance of this key factor has only recently been highlighted. The change in emphasis from the production of materiel to the production of knowledge is recognized by the Organization of Economic Cooperation and Development (OECD) as a fundamental paradigm shift (OECD, 1996).

Alavi and Leidner (2001) acknowledge knowledge's role as central to improved decision-making processes. Knowledge alone is insufficient according to Alavi and Leidner (2001); successful firms transform information to form new capabilities valued by the market. Dykeman (1998) proposes businesses must innovate by taking existing information and assembling these assets in a new way. Assembly of information occurs when firms link structured data with unstructured information (people and experiences). This new assemblage of information is applied to existing business processes, or problems, or create new business opportunities (Dykeman, 1998). An additional business benefit of KM is the application of existing data and information to decision making. The accuracy and efficiency advantage through KM offer incentives in the marketplace to the fastest and most accurate businesses (Dykeman, 1998).

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As an example, top managers at Dow Chemical are utilizing KM to capture best business processes and worker expertise and share them internationally. This initiative is driven as a result of reported increased revenues and savings attributed to Dow's internal KM initiatives (Hibbard, 1997).

Reduce levels of management and inefficient bureaucracies.

Drucker (1998) believes management levels and the number of management can be reduced sharply when a company concentrates its data-processing to support information to feed a new organizational structure. The reduction in management is because existing layers of management do not add value to the existing organizational structure. Managers today do little more than function as relays for what passes as communication in the traditional pre-information organization.

KM serves as a means for an organization to uncover exactly what it does best, and to apply capital resources and management assets effectively thereby improving the corporation's competitive position by leveraging the strengths of its employees (Hatten & Rosenthal, 2001). Efficient KM organizations are extremely focused on the needs of its valued customers from its advantaged position using the strength of its knowledge while having reduced asset commitments.

Treat information as an asset.

KM in itself according to Vorakulpipat & Rezgui (2006) is the means by which information is translated into value. Quinn, Anderson and Finkelstein (1998) reason in a postindustrial economy, corporate success lies in information rather than the firm's physical assets because professional knowledge workers create the majority of value in the 21st-century economy. Significantly, Quinn, Anderson, and Finkelstein (1998)

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demonstrate the increasing value of these intellectual in relationship to their use. Maholtra (2001) supports this position with his view of information enabled businesses characterized by improved capital returns generated as a result of information and knowledge-based assets.

Increase Revenues.

Drucker (1998) believes knowledge is the resource of principle value in the emerging economy. Drucker notes the economist's traditional factors of production such as land, labor, and capital become secondary to information assets. Sharma (2008) conceptualizes his views of this in an economy where information enabled business enterprises are involved in a perpetual rebuilding and retooling of organizational vision, goals, processes. The anticipated economy of the future is characterized by increasing returns based on information and knowledge-based assets (Maholtra, 2001).

In the present economy, knowledge has become a key success factor. In the past, the factors of production had diminishing returns, whereas explicit knowledge is subject to increasing returns (Grant, 2000). Through KM practices, implicit knowledge, which may be transformed into explicit knowledge, is expected to produce increasing returns. Many of today's products are loaded with intelligent information to enhance the product, or service quality to better meet customer needs. From traditional commodity production of appliances through airplanes, and from cell phones to personal computers, these machines are becoming smarter to deliver better service. Within organizations, information and technologies are put to better use to produce smart machines and more efficient services. Walters and Macrae (2003) sum it up by stating organizations now

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operate in the knowledge economy, and knowledge is the ultimate competitive advantage.

Foster Competitiveness and Innovation.

Wu and Holsapple (2013) propose knowledge is the vital source of the emerging economy's competitiveness. It is essential for companies to offer something unique to customers in order to achieve and sustain the competitive advantage and resultant profitability. Developing this unique offering requires an intimate knowledge of clients and their needs, market trends, as well as a thorough understanding of the organization's capabilities and how to mobilize on them (Wu & Holsapple, 2013).

Technology has leveled the competitive field so that quality and customer service have become the norm (Dykeman, 1998), it has become harder to differentiate a business to customers. Koulopoulos (2015) offers some insight into the situation by observing today the remaining competitive edge lies in innovation. The key to success rests in using knowledge as the switch for innovation which is the only competitive advantage companies can sustain indefinitely (Hibbard, 1997).

Nonaka (1998) believes the one sure source of enduring competitive advantage is knowledge. He adds another dimension to the discussion in that successful knowledge creation is as much about ideals as it is about ideas and the ultimate goal is to recreate the world according to this new vision or ideal. The ideas, tips, insights and overall knowledge in employees' heads help to shape this vision and create this ideal (Evans, 2002).

Hibbard (1997) asserts knowledge flow is what precipitates innovation and reconciles these viewpoints. She believes knowledge has become the prevalent means of

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competition. Innovation is the single enduring differentiator among businesses. The raw material of innovation, she surmises, is knowledge. Brown (1998) points out innovation occurs all levels of a company, when employees confront problems, deal with unforeseen contingencies, and work their way around breakdowns in normal operations. He states innovation is the result of a combination of research and other, more prosaic parts of the business organization. He also believes the customer is the ultimate innovation partner to a company's market research department.

Share Best Practices.

Knowledge sharing is viewed as a form of generalized social exchange (Fulk, Flanagin, Kalman, Monge, & Ryan, 1996). Common knowledge exchanges include various types of web-based intranets such as forums and boards, email, and web pages (Grover & Davenport, 2001). The reciprocity, in this case, is relatively indirect as it happens between knowledge contributors and seekers (Kankanhalli, Tan, & Wei, 2005) and the assistance is not always reciprocated by the person who originally receives the help (Wasko & Faraj, 2005). Anyone who has access to the system has a chance to contribute and an opportunity to benefit from the knowledge available through the system. In addition to the benefits individuals receive directly from the information exchange; there are other benefits they may also perceive such as respect from others, enhanced reputation and even tangible rewards based on their status of expert in a particular discipline, or industry gained by sharing their knowledge with other coworkers via a KM system. As employees share best practices, either formally or informally, the dialogue offers management a view of dynamic information exchange at multiple levels of the organization.

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Provide Management Insight.

Prusak (2014) conducted a five-year study investigating management within more than 80 firms to understand the source of insights needed to run their business. The results of the study uncovered the *ad hoc*, informal conversations with peers, employees, and trained experts such as consultants and lawyers as the source of business insights. When the information obtained in this manner is accurate, this highly trained intuition allows someone to know instinctively what to do and exactly when to do the required task (Prusak, 2014).

Nonaka (1998) believes the success of organizations depends on effectively managing the creation of new knowledge. To accomplish this requires management to exploit the tacit and subjective insights of individual workers and make those insights available for analysis and application by the company as a whole. Although the information may be communicated to all employees, not all employees are equally motivated, or qualified to maximize the use of the knowledge resources (Maholtra, 2001). Management frequently reaches decisions other than those presented by the available technology, information, and knowledge. Maholtra's (2001) research indicates although comprehensive reports and databases are readily available to executives, many still make decisions based simply on collaboration with colleagues whom they believe are knowledgeable on the issues at hand.

KM can be viewed as a tool for managers to ensure knowledge capture, creation, transference, and sharing occurs in support of positive firm performance (Massingham & Massingham, 2014). KM also empowers management to consider the potential value with respect to future investment in organizational knowledge (Massingham &

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Massingham, 2014). Some firms may have physical tools or software to enable organizational KM while others depend on less sophisticated methods such as sharing lessons learned and training intended to boost the organizational performance.

Organizational Performance

Organizational performance in capitalist terms is a firm's ability to increase market share, operate efficiently, and improve services, products, or sales, innovative practices, and overall profit shares (Chang & Chuang, 2011; Wang & Wang, 2012). Cohen and Olsen, (2015) propose one form of a firm's human capital is the tacit knowledge held by employees. However, Song and Kolb's (2012) research found financial aspects of firm performance were not statistically significant when investigating learning organizations and knowledge creation. Nold's (2012) investigation of organizational culture and firm performance reveal organizational trust and knowledge management initiatives positively influence superior firm performance. The literature reveals human aspects of the organization have positive impacts on organizational performance.

Wang and Wang's (2012) study focused in on knowledge sharing, innovation, and firm performance. The results of the Wang and Wang (2012) study revealed statistically significant relationships between tacit knowledge sharing, innovation quality, and both financial and operational performance. A statistically significant relationship between explicit knowledge and financial performance was observed in the Wang and Wang (2012). However, no relationship was observed among the variables studied with operational performance (Wang & Wang, 2012). The finding of this study provides management with specific areas of knowledge sharing and innovation within the firm to

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focus on for higher organizational performance. Through management's focus on innovation in concert with knowledge management practices, organizations may realize greater growth.

Innovation promotes organizational growth (Hung & Chou, 2013). Hung and Chou (2013) studied open innovation's impact on firm performance using 791 tech firms. Hung and Chou (2013) found open innovation principles and activities influenced firm performance in multiple industries. During an examination of intellectual capital and knowledge management, Hsu and Sabherwal (2012) found a positive relationship between firm performance, organizational innovation and active learning culture. Chang and Chuang (2011) observe corporations with robust knowledge management practices experience employee utilization and knowledge sharing which leads to increased competitive advantage.

The KM processes of acquisition and dissemination influence firm performance in smaller organizations according to Jayasingam, Ansari, Ramayah, and Jantan (2013). The impact of employee departure is particularly influenctionon firm perfomance as this negatively affects knowledge transfer, which may lead to the departure of the bulk of knowledge within the organization (Jayasingam et al., 2013). However, in a review of the meta-analysis of previous research regarding employee turnover as a predictor of organizational performance, Hancock et al. (2013) found employee turnover was not an accurate predictor of organizational performance. It is interesting to note employee turnover is not a predictor of firm performance, however evidence exist to demonstrate knowledge management and innovation are predictors of firm performance.

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KM's Relationship to Organizational Performance

KM proposes to benefit an organization by providing employees with the necessary information to contribute to the organization's knowledge base, establishing a strategy for KM, identifying the expected benefits and managing their realization, and making the most of existing technology to store and disseminate information that is most critical to an organization's success (KPMG, 1998). KM improves organizational efficiency and productivity by reusing and sharing experience and know-how, as well as improving the ability to respond more efficiently to customer's demands and marketplace changes (Martin, 2003).

Despite all of its benefits, KM is often underestimated because of its poorly demonstrated relationship to successful organizational performance. The weak relationship between KM and organizational performance improvement impedes managers in making strategic decisions, especially when there are other competing initiatives and resource constraints (Carrillo et al., 2003). The main reasons for the weak connection between KM and organizational performance are that the relationships are complex and indirect (Hsu, 2008; Martin, 2003). Within typical corporate structures, KM is implemented in a larger context with other organizational initiatives and activities, diluting the cause and effect relationship. KM is often implemented informally and thus is not easily converted into a measurement of financial performance (Carrillo, 2003; Choi & Lee, 2003).

Despite these drawbacks, many researchers have attempted to make an association between KM and organizational performance, either directly, or indirectly. Choi and Lee (2003) studied the relationship between four different types of KM styles:

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dynamic, system-oriented, human-oriented, and passive and organizational performance by surveying middle managers in South Korean companies. Choi and Lee (2003) found dynamic KM has the greatest impact on organizational performance, followed by system-oriented, human-oriented, and passive KM styles. Choi and Lee's (2003) study found perceptions of successful organizational performance failed to correlate with actual successful organizational performance. Hsu's (2008) study attempted to demonstrate a relationship between human capital and organizational effectiveness using mediation of the KM process capability. The results of Hsu's (2008) study indicate three latent variables are positively related, and human capital is particularly positively associated with organizational effectiveness, but mediated by both KM process capability and structural capital. Hsu (2008) hypothesized organizational effectiveness impacts organizational performance, yet no results are reported.

Wu (2008) attempts to link the impact of KM to organizational performance by using different financial measurement tools, such as Return On Assets (ROA), Return On Sales (ROS), Operating Incomes to Assets (OI/A), Operating Income to Sales (OI/S), Operating Income to Employees (OI/E), as well as Tobin's q. Wu (2008) compares 36 organizations named Most Admired Knowledge Enterprise (MAKE) from 1998 to 2006 using control population of firms that have similar companies matching Standard Industrial Classification (SIC) codes. Wu (2008) identifies the 36 honored companies as having superior profitability and firm market value. One limitation of this study is the failure to identify the successful KM methods and processes of the 36 firms in the study. Indeed, the body of existing research fails to identify successful KM processes and

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practices as well as how these processes relate to organizational performance in financial as well as nonfinancial terms.

The Importance of KM to the Airline Industry

The United States is the largest fully privatized airline industry in the world (Collins et al., 2011). U. S. airlines have always been financed by private holdings in contrast to airlines in other parts of the world (Collins et al., 2011). As a result of this unique difference, the U. S. domestic airline industry has been the subject of numerous scholarly investigations. Researchers use various micro-economic approaches to gauge an airline's ownership and funding strategies, cost functions, revenue generation, marketing, and efficiency measures. Schotter's (1997) theory of the firm states: firms exist to make decisions and allocate resources in order to maximize profits. In high start-up cost industries, such as airlines, stakeholders are willing to stay in the business until revenue is no longer sufficient to cover the firm's variable costs (Montresor, 2004). When airline operational losses reach shut-down levels, they often merge with better performing competitors to leverage capacity, establish market share, and revenue synergies (Collins, 2011). Profitability and lack of profits in the airline industry have been attributed to multiple complex factors associated with the dynamic environment of airline operations. Significant external factors such as unemployment, gross domestic product, national income, monetary and fiscal policy, consumer price index, as well as policy issues such as deregulation and agency regulatory oversight, and other noneconomic variables including terrorism, international politics, and geopolitical risks influence the airline industry, its viability or profitability.

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In parts of the world outside the United States nationalized airlines operate and serve the dual purposes of air transportation and national flagship for national governments (Merkert & Hensher, 2011). The U.S. airline industry is entirely privatized and profitability dictates the attraction of investments. Researchers have investigated airline industry profitability by looking at the various cost-related operational and revenue generating factors and how they impact the industry's viability. Merkert and Pearson (2015) evaluated the impact of operational performance on the profitability of the U. S. domestic airline industry. Pearse (2014) used productivity and service quality metrics to conclude labor productivity has a statistically significant impact on profitability in the United States airline industry. Adrangi et al. (2013) investigated the variable of airline profitability to assess the impact of airline deregulation in the United States. The impact of profitability has been shown to have implications for other airline operational variables as well.

The Importance of KM to the Firm

Holsapple and Wu (2011) identify the limited quantitative empirical support linking a firm's KM initiatives and that firm's financial performance. Accordingly, the authors respond by investigating business effects of successful KM initiatives. Holsapple and Wu's (2011) study developed from their previous Holsapple and Wu (2008) study, establishing the theoretical linkage between KM performance and firm performance concluding effective KM is defined as those efforts allowing a firm to establish greater value from all available resources. A significant departure for the Holsapple and Wu (2011) study compared to other authors attempting to characterize the relationship between KM and firm performance is the elimination of reliance on perceptions of

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individuals within the firm under study. Rather, Holsapple and Wu (2011) utilize eight years of ratings by KM experts as predictors of the 42 firms selected for the study.

The theoretical basis of the Holsapple and Wu (2011) study extends their 2008 study which asserts firm performance is achieved through the exercise of a unique set of firm resources that have value, are rare, not easily imitated and cannot be substituted with other resources. Knowledge, suggest Holsapple and Wu (2011), offers competitive advantage not by its existence but most importantly, by how it is managed.

In addition to financial measures such as return on investment and increased profits, Booz, Allen and Hamilton suggest two types of non-financial measures for KM (Van Buren, 1999). They are operational performance measures which include lead time measures, customer satisfaction, and employee productivity and learning measures which include the number of participants in the community of practice, the number of employees trained and the number of customers affected by KM.

The methodology employed by Holsapple and Wu (2011) measures KM performance and financial performance using Most Admired Knowledge Enterprise (MAKE) rankings and the respective firm's publically available financial data. The MAKE rankings are based on KM performance criteria. Using a Matched Sample Comparison Grouping (MSCG) method Holsapple and Wu (2011) evaluate 42 organizations using this approach. The MSCG method uses a benchmark of firms for control comparison during the same period of study to account for effects due to extraneous variables and market forces that could impact firm performance. MSCG has been used widely in academic and industry analysis but has the drawback of comparing the survey population to a single benchmark (Hu, Liu, Shin & Zhang, 2010). The wide

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variation among firm size within an industry can, according to Hu, Liu, Shin & Zhang (2010) skew results. Holsapple and Wu (2011) employ a Wilcoxon Signed Rank test to evaluate the research hypotheses comparing of firm financial performance. The Wilcoxon Signed Rank test is used in situations where normality conditions cannot be met (Tabrizi, Foong, & Ebrahimi, 2011). The conclusion of the Holsapple and Wu (2011) study furnishes empirical evidence that superior KM performance predicts firm financial performance. While the results of the Holsapple and Wu (2011) study are promising, the efforts undertaken to reduce the dependency on individual perceptions are for naught as MAKE rankings are determined, in part, by assessments of firm culture. Rather than viewing individual perceptions as a limitation on the accuracy of the assessment, future studies should account for the possible inaccuracies within the research methodology and analysis.

Classifications within knowledge management

Knowledge capabilities within the firm can be studied from different angles or perspectives. Perez and Hynes's (1999) five dimensions of KM expounded upon Hansen's (1999) personalization and codification approach. Perez and Hynes (1999), and Hansen (1999) dissect knowledge-based perspectives according to technology, process, context, people, and content to determine strengths and weakness of a firm's KM efforts. Kilkarni, Ravindran, and Freeze's (2007) KM success model quantify a firm's KM strengths as well. Their approach assesses a firm's exploitation of expertise, lessons learned, policies and procedures, data, and knowledge documents.

Jennex and Olfman (2009) present a KM success/effectiveness model based on DeLone and McLean's (1992) Information System Success Model. The Jennex/Olfman

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(2009) model considers KM success as based on system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact. Each of these perspectives lends understanding of both where the firm strengths and weaknesses exist, and how knowledge is made explicit. The Jennex and Olfman (2009) model facilitates assessment of KM success from the perspective of the individual KM user.

The Exploration of Five KM Dimensions

The DeLone and McLean (1992) Information System Success and the Jennex and Olfman (2009) KM success/effectiveness models provide useful partitions this research will use to investigate a firm's KM success based on five dimensions: system quality, knowledge, and information quality, user satisfaction, perceived benefit, and net impact. These five dimensions are referenced in this research to investigate user perspectives of KM success, and form the basis of the research questions developed for this research.

System quality is an assessment of the performance of the KM system in use (Jennex & Olfman, 2009). System quality performs the functions of KM to identify, create, represent, distribute, and enable the adoption of insights, and experiences. From a systems-based perspective, KM, as instituted within the firm, has attributes related to process and technology to support the objectives of and functions of KM. System quality is the synthesis of technology, KM level, and form (Jennex & Olfman, 2009). System quality may be measured through user competence surveys, information system capabilities, and infrastructure. Forms of KM are measured through surveys of knowledge sources, and knowledge construct. Levels of KM are assessed through the satisfaction of retrieval times, and usability of KM systems.

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Knowledge and information quality ensures the necessary information is captured and has sufficient context to be relevant to users (Alavi & Leidner, 2001). Knowledge and information quality are concerned with knowledge strategy, processes, the richness of the knowledge, and the linkages of information (Alavi & Leidner, 2001). The temporal component of information plays a role with knowledge and information (Jennex & Olfman, 2009). For knowledge and information to be considered high quality, the knowledge and information must be relevant. Knowledge and information quality speaks to the right information being available to users at the right time (DeLone & McLean, 1992). KM strategy and process are assessed through the drivers for putting knowledge into the KM system, and the presence and maturity of a formal strategy and process. Richness is concerned with the adequacy of stored knowledge, and content and satisfaction with the existence of the needed information. Linkages are the relationships connecting relevant information together.

User satisfaction indicates the satisfaction of KM users. User satisfaction is indicated by the levels of KM use (Ong & Lai, 2005). The effectiveness of KM depends on users being satisfied with the KM system employed, and the ability to facilitate user production.

Perceived benefit measures the perceptions of the advantages, and the resulting impact of KM by users (Jennex & Olfman, 2009). The perceived benefit is the user's perspective of the utility of the KM to achieve individual and firm objectives. Perceptions may differ from individual to individual. Also, these perceptions may not exactly associate with actual benefits realized by the individual, or the firm (Jennex & Olfman, 2009).

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Net impact is an individual's use of KM which results in a personal performance improvement (Jennex & Olfman, 2009). Each individual improvement will have a subsequent organization-wide impact (Alavi & Leidner, 2001). The relationship between individual, and organizational impact is not additive. However, the net impact construct combines these impacts so as to recognize the positive and negative factors in totality to assess KM from its total benefit, or disadvantage (Jennex & Olfman, 2009).

In aggregate, these KM factors determine the KM success within a firm, which has been linked to organizational performance (Fong & Choi, 2009; Gold et al., 2001; Grant, 1996). Management can create an environment which supports knowledge transfer within the firm. Robust systems for knowledge acquisition, conversion, application, and protection are necessary prerequisites for successful KM (Albino et al., 1999; Gold, Malhotra & Segars, 2001). These preconditions enable knowledge transfer to occur. Conversely, three dilemmas inhibiting knowledge transfer which emerge from the literature are: (1) member motivations, (2) free riding members, and (3) efficiency of knowledge transfer (Dyer & Nobeoka, 2000). Common reasons for knowledge transfer failure are strategic misalignment, lack of relationship-specific investments, and inadequate knowledge sharing practices (Richey & Autrey, 2009). Numerous strategies exist to enable firms to adopt, implement, apply KM, but determinants of successful KM performance and their relationship to the value afforded the firm remains elusive.

The Postcapitalist Era

The evolution of the marketplace has been a part of human interaction since the beginning of time. Exchanging items of value have been of benefit to society's development. From the ancient feudal system to today's capitalistic society, economies

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and their primary currencies continue to morph as societies develop. In today's society, capitalism is giving way to a postcapitalist society whereby individualism has replaced collectivism and solidarity (Mason, 2016).

As with the end of feudalism 500 years ago, capitalism's replacement by postcapitalism is accelerated by external shocks and shaped by the emergence of a new kind of human contribution. Just as automation in the industrial revolution gave society a boost in production, "Luddites" rebelled against it due to the cost on human vocation (Pricken, 2014).

The number of blue-collar workers has been observed to be in decline since the 1960s as more people moved into office work and became salespeople, clerical workers, managers, and administrators. These changes indicate the development of information and knowledge as the start of the revolution in the creation of wealth within highly developed nations. Knowledge workers do not produce products, as blue-collar workers do, but rather, they produce knowledge. Information and knowledge are both the raw material of knowledge worker's labor and their product according to Stewart (1997). Knowledge work is not clearly defined as a class or a type of work. The U.S. government does not include "knowledge work" as a separate occupational category. Instead, the U.S. government uses categories such as "managers and professionals" and "white-collar" employees (U.S. Congress, Office of Technology Assessment, 1988). The term "knowledge work" describes a broad type of work involving the use of mental effort for the purpose of creating information (Davis, Collins, Eierman & Nance, 1991). Information and knowledge workers include "all those people who create, manipulate, or disseminate information for a living." (Laudon et al., 1996).

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Postcapitalism is possible because of three major changes information technology has brought about in the past 25 years. First, it has reduced the need for work, blurred the edges between work and free time and loosened the relationship between labor and wages (Pricken, 2014). The continuing wave of automation will hugely diminish the amount of human work needed for subsistence, and provide a bounty for all humans to have a decent life.

Second, information is corroding the market's ability to form prices correctly (Pricken, 2014). Price erosion occurs because markets are based on scarcity while information is abundant. The system's defense mechanism is to form monopolies. The giant tech companies are currently doing so on a scale not seen in the past 200 years. History tells a cautious tale for such structures built around restricting the flow of information. Such structures cannot last. By building business models and share valuations based on the capture and privatization of all socially produced information, firms are constructing a fragile corporate edifice at odds with a most basic need of humanity, which is to use ideas freely.

Third, we see the spontaneous rise of collaborative production: goods, services, and organizations are appearing that no longer respond to the dictates of the market and the managerial hierarchy (Pricken, 2014). The biggest information product in the world, Wikipedia, is made by volunteers for free, abolishing the encyclopedia business and depriving the advertising industry of an estimated $3 billion a year in revenue (Pricken, 2014).

The preceding discussion on change in production challenges the determination of existing value, or valuation system (Mason, 2015). Traditionally value's provenance is

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co-evolutionary. Value is dependent on the object and the observer, who together establish value. The greater the number of observers who value an object, the greater the value. Value, according to Pricken (2014), depends on at least 80 separate, identified, visible and invisible parameters. These 80 parameters constitute the value catalog. However, as the object of discussion shifts from a tangible asset to the ephemeris of information, its valuation becomes more elusive to capture.

Methodologies for Assessing KM Value

For a time, the literature addressing the KM-performance link was supposition consisting of theories proposing hypothetical relationships between aspects of KM and organizational outcomes (Carneiro, 2000; Adams and Lamont, 2003; Chapman and Magnusson, 2006), and case studies of highly successful KM applications (Nonaka & Takeuchi, 1995; Edvinsson & Malone, 1997; Zaim et al., 2007). The situation has changed recently, as studies empirically assessing the impact of KM on performance in larger samples of firms have appeared (Lee & Choi, 2003; Gloet & Terziovski, 2004; Marque´s & Simo´n, 2006; Darroch, 2005; Tanriverdi, 2005; Zack et al., 2009; Kianto, 2011). The overall conclusion derived from these studies is KM has some impact on performance, although there is some disagreement as to whether this impact is direct, or mediated by variables, such as organizational processes, or intermediate performance indicators.

In the 1980's two research groups independently developed models attempting to assign value to intellectual capital. The Konrad group strove to help Swedish knowledge-based companies "present their company's most important resource, its personnel, in a more informative way than through pretty colour photographs" (Sveiby 1989).

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Concurrently Kaplan and Norton (1996) developed the Balanced Scorecard Model in the United States. Both models reached the same conclusion: the value of a company equals financial value plus some intangible value. However, the studies differed on their definition of intangible value. The Konrad group's intangible value is defined as "customer + structural + human capital"; while Kaplan and Norton (1996) assess intangible value using three groupings: "learning and growth, business, and customer." The models developed by Kaplan and Norton (1996) and The Konrad group are foundational for subsequent performance-based models such as the Intellectual Capital Rating Model (Edvinsson 2002) and the Intellectual Capital Index Model (Roos et al. 1997) in continued use today.

The Konrad group's "Invisible Balance Sheet" identifies 40 key indicators for measuring intangible performance. The invisible balance sheet method proffered by The Konrad group segregats knowledge capital into two categories: "individual and organizational." The Konrad group defines individual capital as the specific "know–how" that a person possesses and deploys to solve problems. Individual capital is increased through years of experience, education level, personal, and social abilities (Sveiby 1989). Not every employee in an organization contributes their individual capital. Employees who do contribute intellectual capital are considered "pros" or "revenue people" (Sveiby 1989).

Conversely, organizational capital is held by the organization and includes the processes that allow the organization to function (Sveiby 1989). Organizational capital includes handbooks, computer programs, and administrative personnel and processes. It represents the way the organization repetitvely and reliably solves a problem.

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Konrad group's primary contribution is the development of the classification schemes and key indicators for examining intangible assets. The Konrad classification system and key indicators laid the foundation for Sveiby's Intangible Asset Monitor. The principles behind the Intangible Asset Monitor (IAM) is total market value of a company is comprised of equity and intangible assets. Sveiby (1989) believed the majority of an organization's value lay in its "invisible knowledge-based assets." Sveiby's (1989) IAM classifies intangible assets into three categories: "external structure, internal structure, and competence." External structure is composed primarily of customer and supplier relationships. Internal structure is comprised of investments in infrastructure, development of new products and services, and the core values of the company. Competence is the unique mix of knowledge and know-how than individuals bring to an organization. Sveiby (1989) suggests value is created for the firm through these three categories following one of four paths: "growth, renewal, stability, and efficiency."

Although performance-based models provide a methodology for evaluating intangible assets, they do not provide a method of appraisal of those assets. This problem of assigning value has stumped researchers for many years and produced varying approaches (Teece, 2013). So far, none of the previously mentioned methodologies has proven superior; and researchers are still attempting to value intangible assets quantitatively. Table 2.1 below summarizes the research of proposed techniques for valuing intangible assets quantitatively.

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Table 1

Summary of Intangible Asset Value Research

Author	Intangible Asset Value Technique
Arthur Anderson (1992)	characterize knowledge valuation methods as either "cost, market value, or economic value"
Luthy (1998)	segregates valuation models into four approaches: "direct intellectual capital, market capitalization, return on assets, and scorecard methods".
Bontis (2001)	found many models use similar theories and metrics with varying definitions of key terms.
Marr et al. (2003)	analyze various valuation methodologies and examine empirical evidence to evaluate their effectiveness.
Pike and Roos (2004)	evaluate the rigor of intellectual capital valuation methodologies as compared to measurement theory and advocate the need for a fifth category: proper measurement systems.
Chang, Hung, Tsai (2005)	show how intangible assets can be valued using real options.
Green and Ryan (2005)	develop a strategic framework for valuing intangible assets across companies in a repeatable manner.

The Invisible Balance Sheet and the Invisible Asset Monitor methods provide easy to understand depictions of a company's knowledge assets. The models are limited however, in that they do not easily permit comparison of the intangible assets of one company to those of another. Additionally the models do not proscribe a method to assign a financial value to an asset. Moreover, the assets believed by the company to be the most critical may not actually be the most valuable knowledge assets of the organization. In spite of these limitations, intangible asset valuation methods offer a starting basis so that the intangible assets are not overlooked.

The intangible nature of knowledge confounds the measure or assessment of its value (Sharma et al., 2007). Although difficult, measurement and metrics are necessary for business practice (Denning, 2006). Hua-Wei et al., (2006), Spender (2006), and Wang (2011) employed Economic Value Added (EVA) methodologies to quantify the

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impact of KM on firm value. For businesses to justify modifying or investing in KM endeavors, tangible benefits to shareholders must be enumerated. Since 2005 researchers have employed Economic Value Added (EVA) as a value measure for KM particularly in IT based initiatives.

EVA

The EVA model was developed by Stern Stewart & Co. in 1997 to arrive at an intangible asset value by subtracting capital times the cost of capital from net operating profit after taxes. The premise of this model is that the goal of the company, like all publicly held companies is to maximize shareholder value. EVA integrates principles of financial accounting, capital budgeting, performance measurement, and strategic planning to arrive at a single financial metric which Stern Stewart & Co believes is easy for non-financial managers to comprehend. Using the EVA metric, managers have an easily understood starting ground for financial discussions. The beauty in its simplicity of the EVA model is that managers understand that there is a charge for using company capital assets.

A limitation of the EVA model is that non-financial managers may not comprehend the "cost of capital." Although the of "cost of capital" can be explained to non-financial managers, the true "cost of capital" does not remain constant. Therefore, EVA is subject to change thereby conflicting common starting ground principle Stern Stewart & Co. was attempting to achieve. The model requires choosing between "accuracy and complexity" (Bontis et al. 1999).

The EVA model allows managers to adjust the variable inputs. However, as adjustments are made the complexity of the model increases. While the final result is

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more accurate, it is often too complicated for managers to comprehend. Another complexity to the EVA model is the use of book values. Book values reflect historic costs, not current market values. This too confounds the underlying premise which states the goal of the company is to maximize shareholder value as book values may be less than the current market rate (Bontis et al. 1999). EVA was not designed to be applied as a valuation model for intangible assets (Andriessen 2004). However, by applying this methodology to intangible assets EVA may be used as a proxy for the intangible asset value, without providing the actual value of the intangible asset.

Applying a Tangible Economic Value Added to an Intangible

Knowledge is an intangible along with human capital, structural capital, and customer capital as its components (Chang, 2004). Tangible assets can be easily imitated or purchased in a free market; thus, they are not strategic in nature and thus do not create a competitive advantage for the business.

EVA traces to its roots in Stewart's (1991) study conducted by Stern Stewart and Company in his research on corporate finance. Stewart (1991) investigates the difference between managing for value improvement, which is increasing shareholder wealth, in contrast to managing for increased profitability. The difference between managing for shareholder wealth versus profitability traces back to strategic and operational decisions impacting the firm's financial performance in relation to different time horizons (Arnold, 2003). From its first use, EVA is applied to evaluate individual projects and corporate, divisional and sub-level performance (Uyemura, Kantor & Pettit, 1996)

EVA is the measure of a firm's effectiveness in increasing its value during a given year (Sharma et al., 2007; Wang, 2011). EVA is the after-tax cash flow generated by a

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business minus the cost of the capital it has deployed to generate that cash flow, thus representing real profit versus paper profit (Bose, 2004). EVA is further defined as the difference between net sales and the sum of operating expenses, taxes and capital charges where capital charges are calculated as the weighted average cost of capital multiplied by the total capital invested (Dillon & Owers, 1997). In practice, EVA is increased if the weighted average cost of capital is less than the return on net assets, and vice versa. EVA provides accurate information about the effect of KM on firm performance (Ghosh et al., 2009).

EVA as an effective measure of corporate financial performance has been controversial (Holler, 2008). Traditional corporate financial measures have been overwhelmingly focused on earnings per share (EPS) at the macro level, and return on investment (ROI) at the project level (de Wet, 2005, Cuganesan, Free, & Briers, 2004 Erasmus & Lambrechts, 2006). EVA has been applied and validated for evaluation of internal investment projects (Yao, Sutton, & Chan, 2009), as well as organizational financial performance and firm wealth (Silverman, 2010). The relevance of EVA to KM is the model's ability to account for, and to some extent, mitigate extraneous effects on financial data to identify cause and effect relationships (Hahn & Kuhn, 2011). EVA is a holistic approach, accounting for external and market effects to make EVA an attractive measure of firm performance.

The earliest empirical studies measuring the value of knowledge are initiated in the 1980s (Tseng, 2006). Bontis' (2001) study examines the impact of intellectual capital on business performance. The results presented by Bontis (2001) demonstrates a valid,

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reliable, significant and substantive causal link between the multiple dimensions of KM and business performance.

Chang's (2004) study of KM and business performance in the Taiwanese biotechnology industry demonstrates the positive relationship. Recent research by Richieri et al. (2008), Ting and Lang (2009), Hsu and Fang (2009), Nogueira et al. (2010), and Abdullah and Sofian (2012) confirm the positive relationship between KM and firm performance. Each of these studies examines components of the knowledge-based industry from differing perspectives. Despite the perspective examined, the positive relationship between firm value and KM persists (Salehi et al., 2014).

Fong and Choi (2009) employ a cross-sectional study based on a questionnaire survey to assess KM practices within firms. Lo and Chin's (2008) user satisfaction based KM performance measurement demonstrates the validity of user based surveys in assessing KM perceptions within the enterprise.

Summary

Knowledge as an organizational asset is an emerging management perspective (Teece, 2013). The intangible nature of knowledge introduces complexities in quantifying and measuring knowledge. First understanding the object of study, knowledge, can provide the limits and scope to aid in the measure. Treating knowledge as a thing to be created, stored and retrieved gives way to a quantifiable measure of knowledge. Managing knowledge to produce value is not without its challenges (Andries & Wastyn, 2012). Holsapple and Wu (2011) establish KM success leads to improved firm value. Capturing firm value as a result of KM can be approached from multiple perspectives. The predominant perspectives center on the classifications of technology,

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process, context, people, and content. These classifications are further broken down to the measures of system quality, knowledge and information quality, user satisfaction, perceived benefit, and net impact.

Researchers employ Economic Value Added (EVA) as a value measure for KM, particularly in information technology based initiatives. EVA is the measure of a firm's effectiveness in increasing its value during a given year (Sharma et al., 2007; Wang, 2011). The financial constraints due to a firm's internal competing priorities underscore the need to facilitate effective resource allocation, eliminate waste, and promote collaboration on higher value pursuits. Deploying KM efforts effectively and efficiently may lead to improved firm financial performance. Demonstrating the contribution of KM on firm financial performance using EVA measures may provide the justification for initial, or continued investment in KM.

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Chapter 3: Research Method

In this chapter, the methodology for the study is presented. This chapter begins with a review of the research methods and design followed by the research questions examined. The hypotheses derived from the research questions are presented. Following the hypotheses, a description of the study's variables is provided. Details regarding the development of the measurement instrument, the data collection methods, and an explanation of the data analysis are also provided.

Research Methods and Design

The specific problem to be addressed in this study is the challenging and persistent issue of KM and its relationship to EVA. The purpose of this study is to examine the relationship between the outcome variable of KM success and the five predictor variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. airline industry AEEC member firms. The research method chosen for this study is a predictive quantitative approach using a cross-sectional investigation. A quantitative method is selected to provide statistically significant conclusions about the KM domain. A quantitative design focuses the researcher on a specific question, or problem (Caputo, 2004). The research questions are suited to statistical methods to answer the questions. The predictive method, as opposed to the experimental method, is selected since the predictor variable could not be controlled by the researcher (Vogt, 1999). Quantitative methods are chosen over qualitative methods to investigate multiple factors and the relationship of those factors to predict an outcome of interest (Black, 1999). The current voids in the KM body of knowledge, particularly in regards to KM value, suggest

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research should be as widely applicable as possible so as to maximize the benefits to KM practitioners. Mixed methods, a combination of both quantitative and qualitative methods (Johnson & Onwuegbuzie, 2004), was considered, but not implemented due to the limitations of the qualitative methods described above.

Establishing KM success from these five dimensions assists in exploring the relationship between KM success and firm value. The following research questions and corresponding hypotheses are addressed:

Q1: What is the relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, if any, and knowledge management success as practiced within U.S. airline industry AEEC member firms?

Q2: What relationship, if any, exists between KM success and firm value as measured by EVA within U.S. airline industry AEEC member firms?

$H1_0$: There is no significant relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis, within U.S. airline industry AEEC member firms.

$H1_a$: There is a significant relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis within the U.S. airline industry AEEC member firms.

$H2_0$: There is no relationship between KM success factors and U.S. airline industry AEEC member firm's value as measured by EVA.

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$H2_a$: There is a relationship between KM success factors and U.S. airline industry AEEC member firm's value as measured by EVA.

This study is conducted in the United States using participants solicited from U.S. airline industry AEEC member firms. The participants are recruited from the Airline Electrical Engineering Committee. Recruitment takes place through verbal announcements at the annual General Session meetings, email notifications, and flyers distributed during regularly scheduled committee meetings. The announcements provide a background explanation of the study, goals of the study and solicit AEEC member participation in the study. The AEEC membership comprises members of the technical community of airline operations including engineering and flight operations. The AEEC membership is solicited for direct participation and referral to other members of their airline firms.

Multiple regression analysis is utilized to determine the relationship between the predictor variables of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact and the outcome variable of knowledge management success. The KM success factor for each firm is computed by adding the values rated for each firm's KM dimensions. EVA for each firm is also calculated. The method of calculation of EVA follows a standard formula described as Earnings Before Interest and Taxes (EBIT) less Interest (I) equals Net Income. From this, the Cost of Capital is subtracted to yield EVA. These values are obtained from publically available financial data. A correlation analysis is conducted to determine the relationship between knowledge management success and EVA to assess firm value.

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This information enhances the existing KM body of knowledge by investigating the linkage between knowledge management and financial impacts. Multiple regression analysis is chosen to provide substantive quantitative data to determine the relationships between the predictor and outcome variables. With this information, practical KM strategies can be developed. Management interventions focused on improving KM success enable firms to achieve more efficient business operations, and the pursuit of higher value knowledge capture activities, thus increasing firm value.

A questionnaire on user perspectives of KM based on the instruments used by Halawi (2005) and Hua-Wei et al., (2006) is appropriately suited for data collection and allows for a more objective assessment of the subject. This 67-question survey takes approximately 10 minutes for respondents to complete.

The population under research is composed of individuals employed by U.S. airline industry AEEC member firms. This industry is of interest due to its persistent financial constraints and potential benefits offered by KM (Morrell & Swan, 2006). The sample population consists of individual respondents from members of the Airline Electrical Engineering Committee (AEEC). Based on results from the a priori power analysis using an effect size of .15 (based on a prior study conducted by Jennex and Olfman, 2009), 74 responses are required for this survey to achieve statistical validity of the results. The effect size enables an assessment of the strength of the predictor variables to influence the outcome variable (Wilkinson, 1999). The chosen effect size informs the subsequent selection of power and sample size. A power of .80 and a standard alpha level of 0.05 is selected. Setting the power to a value of .80 minimizes the risk of a Type 2 error and is the level recommended by Cohen (1992). The power

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analysis indicates 74 participants are needed for detecting a small effect with a power of .80 and a standard alpha level of 0.05.

The proposed research explores KM success factors by requesting respondents to rate perceptions of their respective firm's KM efforts on a Likert scale (Aspers, 2009). The results of the surveys are analyzed through standardized statistical methods including basic descriptive statistics and regression analysis between predictor and outcome variables. The proposed research explores the effect of the five KM factors on firm KM success. These factors are used as predictors to assess firm KM success. Firm value is assessed using firm financial performance, as indicated by EVA (Bose & Thomas, 2007).

The outcome variables in this study are KM success and firm value. The measures for KM success are initially developed based on existing measures of information systems success (Andone, 2009; Firestone & McElroy, 2005; Jennex & Olfmann, 2009). KM success is examined using multiple regression to explore the relationship between predictor variables of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net effect on knowledge management success. Correlating KM success to EVA permits the consideration of firm value due to KM efforts.

This study assesses KM success using the five parameters of system quality, knowledge and information quality, user satisfaction, perceived benefit and net impact. This assessment strives to answer research question one. The KM success factor is used as input for correlation with EVA. The output of this analysis provides the basis for answering research question two.

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The analysis investigates the relationship between firm KM success, as measured by the five parameters and, compares and contrasts each firm's KM success to its financial performance. A one-tailed test is used for this analytical investigation. Previous studies provide evidence to support this directionality. A one-tailed test provides the evidence to support or refute this relationship. The directional hypotheses are used to determine if knowledge and effective KM has an economic benefit; KM is of value to the firm.

Multiple regression analysis enables the confirmation, or rejection of the hypothesis that successful knowledge efforts are correlated with system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact. Each of these variable relationships are investigated simultaneously to identify particular areas of intervention or understanding of the present success.

EVA is calculated for each of the firm identified in the survey responses. The data for EVA calculations is derived from publicly available data as reported in audited year-end financial statements. EVA is compiled and reported as a single value for each firm. The method of calculation of EVA follows a standard formula described as Earnings Before Interest and Taxes (EBIT) less Interest (I) equals Net Income. From this, the Cost of Capital is subtracted to yield EVA. In this manner, EVA describes the efficiency of the firm to utilize its capital resources.

Correlation analysis is conducted utilizing EVA and KM success to assess KM value. The calculated EVA and KM success factors from the surveys are analyzed to yield KM value. Using multiple regression analysis, the proposed hypotheses regarding KM success and EVA are confirmed, or rejected.

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Population

The population under research is individual participants of AEEC employed by airline industry firms with headquarters in the United States geographic boundaries. Survey participants are recruited or contacted via email utilizing Airline Electrical Engineering Committee (AEEC) mailing lists and in person during regularly scheduled airline industry conferences held by the AEEC. Responses from at least 74 members of the 300 member AEEC minimize the risk of incurring a Type II error.

A field test is conducted by three experts within the U.S. airline industry who play a role in firm KM, either as users, or suppliers. The responses from this field test allow the researcher to conduct an early assessment of the survey instrument to determine if there are errors in the skip patterns, if the wording of items are not clear if the data did not download correctly. The first item in this survey is the informed consent document. Then the response is either yes or no. If a respondent answers no then, then the skip pattern takes the respondent to the end of the survey (no questions), thanks that person for his or her time, and ends the survey. If the respondent answers yes to the informed consent question, then the survey proceeds with the survey. The data are analyzed using the methods described for the main study. Multiple regression analysis is performed on the data collected in the field test to identify any problems with the data, collection methods, or analysis. Results from the field test are incorporated into the development of the final questionnaire.

Sample

The data are obtained through the use of online surveys. Approximately three hundred participants from U.S. based airline industry members of the AEEC are solicited

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to complete the survey to obtain a random sample of at least 74 responses. The AEEC is selected for its broad voluntary representation of U.S. airline industry participants who strive to improve the efficiency of airline operation through the publication of technical and operational standards. The participants contribute research data through the use of an internet-based survey.

The population under research is composed of individuals employed by U.S. airline industry AEEC member firms. This industry is of interest due to its persistent financial constraints and potential benefits offered by KM (Morrell & Swan, 2006). The sample population consists of individual respondents from members of the Airline Electrical Engineering Committee (AEEC). Based on results from the a priori power analysis using an effect size of .15 (based on a prior study conducted by Jennex and Olfman, 2009), 74 responses are required for this survey to achieve statistical validity of the results. The effect size enables an assessment of the strength of the predictor variables to influence the outcome variable (Wilkinson, 1999). The chosen effect size informs the subsequent selection of power and sample size. A power of .80 and a standard alpha level of 0.05 have been selected. Setting the power to a value of .80 minimizes the risk of a Type II error and is the level recommended by Cohen (1992). The power analysis indicates 74 participants are needed to detect a small effect with a power of .80 and a standard alpha level of 0.05.

Materials/Instruments

Halawi's (2005) instrument is applied to assess Knowledge Management Success within U.S. airline firms. Halawi's (2005) instrument operationalizes the five critical success factors of KMS success derived from the DeLone and McLean (2003) IS Success

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model. The self-administered survey is distributed based upon a contact list of AEEC organization membership representing U.S. airlines. The survey method is an emailed invitation to participate in the study by completing the on-line questionnaire. The study is not limited to knowledge experts within US airlines but is intended to be broad in scope so as to include users at all knowledge levels within an organization.

Reliability refers to the property of a measurement instrument that causes it to give similar results for similar inputs. Cronbach's Alpha is commonly used to assess reliability. The value of Alpha ranges from zero- to one. When Alpha gets closer to one, this implies the reliability of the instrument is high. Cronbach's Alpha is examined to assess the survey's reliability.

Construct validity considers the extent to which a scale measures a theoretical variable of interest. Straub's (1989) process of validating instruments in MIS research to test construct validity in terms of convergent and discriminant validity Straub's (1989) process is used to assess construct validity.

Discriminant validity refers to how well scale items differentiate between separate constructs (Kerlinger, 1986). Construct validity is evaluated by performing correlation and factor analysis. To test the construct validity, item analysis and factor analysis with varimax rotation is conducted. Discriminant validity is checked using the factor loading values. Items with item-to-total correlation lower than 0.5 are evaluated for elimination from the study. Internal consistency for all constructs is investigated using Cronbach's alpha values.

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Measurement Development

Items for all independent variables: knowledge quality, system quality, service quality, intention to use and user satisfaction are developed based on relevant theories and prior studies. The wording of the items is modified to make them pertinent to the knowledge management systems context. Items for knowledge management systems success are adapted from Halawi's (2005) study. Additional questions are added which ask the interviewee about his/her background, experience within the organization, organization name, gender and position within the organization.

The format of the survey instrument consists of an online survey (Appendix B) using surveymonkey. The first section of the survey is a letter that explains the purpose of the research study and procedures for completing the survey. The questions are divided into two sections. The first section consists of the following: seven questions relating to the KMS system usage, thirteen questions relating to KMS system quality, ten questions relating to KMS knowledge quality, one question assessing the overall user satisfaction with the KMS system, forty-five questions assessing the KMS service quality, and four questions assessing the KMS net benefits. The second section includes six demographic questions and some optional information.

Operational Definition of Variables

The application of knowledge management leads to the development of terminology common to the practice, and use of KM constructs. To empirically test the DeLone and McLean (2003) and Jennex and Oflman (2003) models, the variables in the model are operationalized and validated by Halawi (2005). Existing measures of knowledge management success that have acceptable psychometric qualities are used.

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The following variables are examined: system quality, knowledge, and information quality, user satisfaction, perceived benefit, net impact, and EVA.

System quality. System quality is an assessment of the performance of the knowledge management system in use. The values are scored on a seven-point Likert ordinal scale. The level of measurement is from a value of 1 (strongly disagree), 2 (somewhat disagree), 3 (disagree), 4 (neither disagree nor agree), 5 (agree), 6 (somewhat agree), 7(strongly agree). A composite score is calculated by summing each item and then the mean computed from the sum of the scale

Knowledge and information quality. Knowledge and information quality ensures the necessary information is captured and has sufficient context to be relevant to users. The values are scored on a seven-point Likert ordinal scale. The level of measurement is from a value of 1 (strongly disagree), 2 (somewhat disagree), 3 (disagree), 4 (neither disagree nor agree), 5 (agree), 6 (somewhat agree), 7(strongly agree). A composite score is calculated by summing each item and then the mean computed from the sum of the scale.

Knowledge Management Success. KM success is measured based on the perceptions of employees as to the effectiveness of the firm's employment of KM efforts in each of the five dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit and net impact (Jennex & Olfman, 2003). KM success is the outcome of the five predictors (system quality, knowledge/information quality, use/user satisfaction, perceived benefit and net impact).

User satisfaction. User satisfaction indicates the satisfaction of KM users. User satisfaction is indicated by the levels of KM use. The values are made on a seven-point

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Likert ordinal scale. The level of measurement is from a value of 1 (strongly disagree), 2 (somewhat disagree), 3 (disagree), 4 (neither disagree nor agree), 5 (agree), 6 (somewhat agree), 7(strongly agree). The items are summed, and a score computed by calculating the average across all items. Seddon and Yip's (1992) instrument is found to have a favorable reliability coefficient (alpha) of 0.91 (Halawi, 2005).

Perceived benefit. Perceived benefit measures the perceptions of the benefits, and the resulting impact of KM by users. The perceived benefit is the user's perspective of the utility of the KM to achieve individual and firm objectives. The values are scored on a seven-point Likert ordinal scale. The level of measurement is from a value of 1 (strongly disagree), 2 (somewhat disagree), 3 (disagree), 4 (neither disagree nor agree), 5 (agree), 6 (somewhat agree), 7(strongly agree). A composite score is calculated by summing each item and then the mean computed from the sum of the scale. Seddon and Yip's (1992), and Davenport et al. (1998) instruments contain seven items to operationalize the perceived benefit variable.

Net impact. Net impact is an individual's use of KM, which results in a personal performance improvement. The values are scored on a seven-point Likert ordinal scale. The level of measurement is from a value of 1 (strongly disagree), 2 (somewhat disagree), 3 (disagree), 4 (neither disagree nor agree), 5 (agree), 6 (somewhat agree), 7(strongly agree). A composite score is calculated through the use of averages. The Doll and Torkzadeh (1998) instrument reliability has been reported in prior work to be of 0.92 (Halawi, 2005).

Economic value added (EVA). EVA is the after-tax cash flow generated by a business minus the cost of the capital it has deployed to generate that cash flow, thus

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representing real profit versus paper profit (Bose & Thomas, 2007). EVA is defined as the difference between net sales and the sum of operating expenses, taxes, and capital charges where capital charges are calculated as the weighted average cost of capital multiplied by the total capital invested (Dillon & Owers, 1997). EVA is derived from company publicly available firm financial data. If EVA is not directly reported in published financial data, it will be calculated using the reported values of net sales, operating expenses, taxes and capital charges. The reliability and validity are ensured through the requirements of audited financial statements as required by 2004 Sarbanes-Oxley laws. EVA has been previously established as an indicator of intellectual capital's value in an organization (Sharma et al., 2007).

Data Collection, Processing, and Analysis

The proposed research explores KM success factors by requesting respondents to rate perceptions of their respective firm's KM efforts on a Likert scale (Aspers, 2009). The results of the surveys are quantitatively analyzed through standardized statistical methods including basic descriptive statistics and a regression analysis between predictor and outcome variables. The proposed research explores the effect of the five KM factors on firm KM success. These factors are used as predictors to assess firm KM success. Firm value is evaluated using firm financial performance, as indicated by EVA (Bose & Thomas, 2007).

The outcome variables in this study are KM success and firm value. The measures for KM success are initially developed based on existing measures of information systems success (Andone, 2009; Firestone & McElroy, 2005; Jennex & Olfmann, 2009). KM success is examined using multiple regression to explore the

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relationship between predictor variables of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net effect on knowledge management success. Correlating KM success to EVA permits the consideration of firm value due to KM efforts.

This study assesses KM success using the five parameters of system quality, knowledge and information quality, user satisfaction, perceived benefit and net impact. This assessment strives to answer research question one. The KM success factor is used as input for correlation with EVA. The output of this analysis will provide the basis for answering research question two.

The analysis investigates the relationship between firm KM success as measured by the five parameters and compares and contrasts each firm's KM success to its financial performance. A one-tailed test is used for this analytical investigation. Previous studies have provided evidence to support this directionality. A one-tailed test provides the evidence to support, or refute this relationship. The directional hypotheses are used to determine if knowledge and effective KM has an economic benefit; is KM of value.

Multiple regression analysis enables the confirmation or rejection of the hypothesis that successful knowledge efforts are correlated with system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact. Each of these variable relationships is investigated simultaneously to identify particular areas of intervention or understanding of the present success.

EVA is calculated for each of the firms identified in the survey responses. The data for EVA calculations is derived from publicly available data as reported in audited year-end financial statements. EVA are compiled and reported as a single value for each

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firm. The method of calculation of EVA follows a standard formula described as Earnings Before Interest and Taxes (EBIT) less Interest (I) equals Net Income. From this, the Cost of Capital is subtracted to yield EVA. This describes the efficiency of the firm to utilize its capital resources.

Correlation analysis is conducted utilizing EVA and KM success to assess KM value. The calculated EVA and KM success factor from the surveys are analyzed to yield KM value. Using multiple regression analysis, the proposed hypotheses regarding KM success and EVA are confirmed or rejected.

Assumptions

An assumption of this study includes the validity of the scale through multiple source consciences. The assumption is made that the scale is valid for the respondents because they are trained to be consistent with reporting as representatives to an airline industry group developing consistent technical standards. Another assumption of this study is participant honesty. The means to promote respondent honesty is to ask respondents to answer honestly, reiterate the anonymity of survey participation and to provide a private place to complete the questionnaire. The assumption of adequate response rate is achieved through the recruitment of a sufficient sample. A power analysis is completed to determine the number of people needed in the study for quantitative studies. To mitigate the risk of an insufficient sample, interviews will be conducted until saturation is reached for completion of this qualitative study.

Limitations

A limitation of the study is the possible inaccuracy of the variable scale. Another limitation of this study is the variable definitions used in determining the presence of

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knowledge management within an institution. The variable definitions have been researched and collaborated with subject experts in the knowledge management field thus ensuring validity, but not tested for validity. Reporting accuracy from respondents is critical for the study to maintain validity. The number of respondents from a single airline company is not restricted. Another limitation of the study is the use of a convenience sample, limited to a specific geographical area (United States).

Delimitations

A delimitation of the study is a result the homogeneous racial/ethnic composition of the sample due to the use of respondents in the United States. Similarly, the gender of airline technical representatives is overwhelmingly male. These factors may introduce differences which may be attributed to factors other than the intervention. A delimitation of this research also includes the content validity of the data collection instruments because the collection instruments are self-designed using information developed by experts in the field of knowledge management.

Ethical Assurances

Institutional Review Board approval is sought prior to any data being collected. This ensures conformity with the standards for academic research using human subjects. Halawi's (2005) survey for assessing KM success is utilized for this research. Halawi's (2005) instrument, based on the Jennex and Olfman (2003) KM success model, has been shown to be previously validated. For research purposes, respondents are assigned numbers to protect their identities and keep their information secure. Only the researcher has access to the identification numbers assigned, and the researcher will not use the numbers for any other purpose.

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Copyright permissions are deemed unnecessary due to the fair use standard of publically available financial reports. Confidentiality is maintained using MS Excel® files assigned a password by the researcher. Because institutions are not named, the confidentiality of the participating institutions is preserved. As the data are statistically analyzed and displayed, institutional names are utilized. The processing steps are accomplished in order, and data files protected by password to protect the information they contain.

Through the use of secured files and assigned identification numbers, participant anonymity is protected. After permission is received from the host airline organization (AEEC) and the Internal Review Board approves the research, research will proceed using the Internet-based data collection. Institutions are assigned an identification number to protect their anonymity. No ethical issues are anticipated during this study.

Copyright protection of the consulted and referenced works for this study has been considered. Copyrighted work used in the course of this research is within the scope of education and for research purposes only.

Summary

In this chapter, the methodology for the proposed study is presented. The need for additional research is identified. The necessity of the proposed research is followed by the research questions examined. The hypotheses derived from the research questions are presented. Following the hypotheses, a description of the study's variables is provided. Details regarding the development of the measurement instrument, the data collection methods, and an explanation of the data analysis are also provided.

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Chapter 4: Findings

This chapter presents the results of the statistical analysis methods described in the previous chapter. The purpose of this correlational predictive quantitative study is to examine the relationship between the outcome variable of knowledge management (KM) success and the five predictor variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. Airline Electrical Engineering Committee member firms by applying the Halawi (2005) instrument. Establishing KM success from these five dimensions assists in creating a link between KM success and firm value using EVA by applying the methods of Holsapple and Wu (2011). This chapter begins with a summary of the survey results, followed by a description of various demographic classifications of the study respondents. Analyses of the hypotheses testing are presented. This chapter includes an evaluation of the findings of this study.

Results

A total of 300 surveys are distributed to members of US airline industry. The survey respondents are identified through the sponsorship of the Airline Electrical Engineering Committee (AEEC). Individuals are contacted based upon their membership in the AEEC.

Response Rate

Of the 300 questionnaires mailed, a total of 96 responses are returned from nine organizations. This reflects a total survey response rate of 32 percent. Generally, a 20 percent response rate is desirable (Yu & Cooper, 1983). Out of the 96 responses, 18 are

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unusable because they are not answered completely. For the analysis, the remaining 78 questionnaires are used.

Analysis of the Results

After the survey is completed, the data are coded and analyzed using the Statistical Package for the Social Sciences (SPSS) software package. SPSS is chosen because of the variety of statistical techniques it supports. Each of the questions mapped into a variable within the SPSS software. Construct validity of the questions pertaining to the variables is tested using Cronbach's Alpha test. Descriptive statistics are used to report on the demographic information that is returned.

The first step in the data analysis is to perform factor analysis in order to determine the dimensionality of the measurement scales. Principal component analysis is conducted to summarize the results from the six scales. The results of the survey are analyzed using multivariate analysis. Pearson's correlation coefficient is calculated to determine the correlation of each of the variables from the questionnaire. Multiple linear regression is commonly applied when a single dependent variable is related to multiple independent variables. Multiple linear regression analysis is used to test the hypotheses.

Respondent Demographics

The population under study in each of these sites are users of their organization's knowledge management systems. The respondents to the survey represent all levels within the organization. The distribution of respondents by job title is reflected in Table 2.

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Table 2

Respondents by Job Title

	Frequency	Percent	Cumulative Percentage
Non-Management or Professional	48	61.54	61.54
Manager	23	29.49	91.03
Senior Manager / Director	5	6.41	97.44
Vice President / Executive	2	2.56	100
President/CEO/COO/CIO/CKO	0	0.0	100

The respondents' education levels are high, with 54.4 percent of the respondents having completed a Bachelor's degree, or beyond. The distribution of the respondents by education level is reflected in table 3.

Table 3

Respondents by Education Level

	Frequency	Percent	Cumulative Percentage
Some or No College Degree	8	10.26	10.26
Associates Degree	12	15.38	25.64
Bachelor's Degree	36	46.15	71.79
Master's Degree or beyond	22	28.21	100

The distribution of the respondents by the length of KMS usage is reflected in table 4.

Table 4

Respondents by KMS Usage

	Frequency	Percent	Cumulative Percentage
Less Than One Year	6	7.69	7.69
One to Three Years	10	12.82	20.51
Three to Five Years	5	6.41	26.92
Five to Ten Years	18	23.08	50
Greater Than Ten Years	39	50	100

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The distribution of the respondents by employment years is reflected in table 5.

Table 5

Respondents by Years of Employment

	Frequency	Percent	Cumulative Percentage
Less Than One Year	2	2.56	2.56
One To Three Years	4	5.13	7.69
Three To Five Years	2	2.56	10.25
Five To Ten Years	22	28.21	38.46
Greater Than Ten Years	48	61.54	100

Missing Data

Missing data may create hidden biases within the results. As such, there must be a plan in place to deal with the problems created by missing data (Seaman & White, 2013). Eighteen of the ninety-six returned surveys contain missing answers where the respondents failed to complete the entire questionnaire and therefore are excluded from analysis.

Outliers

Outliers are observations with a unique combination of characteristics identifiable as distinctly different from the other observations (Seaman & White, 2013). Outliers are identified and accounted for to mitigate skewing the results. Outliers are retained unless there is demonstrable proof that they are truly aberrant and not representative of the population under study. However, when they do represent a segment of the population, they are be retained to ensure generalizability to the entire population (Seaman & White, 2013). The outliers in this study are retained and analyzed to ensure they do not distort the analysis.

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Factor analysis is used to analyze construct validity. Factor analysis is commonly used for data reduction and summarization in which redundant items are combined and inappropriate items deleted (Seaman & White, 2013). It is also one of the power methods to test construct validity (Kerlinger, 1986; Straub, 1989, Cooper & Schindler, 1998). The results reported here for the factor analysis investigated whether multiple variables measured the same concept. Hyuncheol, (2013) argues loadings greater than 0.50 are considered very significant.

Factor Analysis - Independent Variables

Systems Quality Scale (SQ)

This set of questions is designed to assess feelings and opinions toward the quality of the KMS within the organization. The thirteen items on this scale do not load on a single factor, rather, they load on all three factors. Four items (SQ3, SQ7, SQ9, SQ10) do not make the cutoff, so they are dropped from further analysis. The results are summarized in tables 6 and 7.

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Table 6

Rotated Component Matrix for SQ

	Component		
	1	2	3
SQ1	.645	.098	-.390
SQ2	.763	-.265	-.135
SQ3	.180	.028	.871
SQ4	.666	-.223	-.133
SQ5	.710	.100	-.038
SQ6	.793	-.096	.089
SQ7	-.347	.199	.522
SQ8	.823	-.162	-.030
SQ9	-.048	.889	.034
SQ10	-.233	.827	.115
SQ11	.751	-.328	-.081
SQ12	.833	-.071	-.022
SQ13	.784	-.203	.052

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 7

Final Factor for SQ

	Component 1
SQ1	.653
SQ2	.822
SQ4	.701
SQ5	.663
SQ6	.784
SQ8	.844
SQ11	.807
SQ12	.831
SQ13	.807

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

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The Knowledge/Information Quality Scale (KIQ)

This scale consists of ten items from Halawi (2005). The scale asks the user to assess perceptions and opinions regarding the quality of knowledge residing in the organization's KMS. The ten items on this scale do not load on a single factor, rather, they load on two factors. Two items (KIQ20, KIQ23) do not make the cutoff, so they are dropped from further analysis. The results are summarized in table 8 and 9.

Table 8

Rotated Component Matrix for KIQ

	Component	
	1	2
KIQ14	.840	.290
KIQ15.	.753	.001
KIQ16	.777	.178
KIQ17	.661	.444
KIQ18	.665	-.100
KIQ19	.817	.366
KIQ20	.085	-.859
KIQ21	.668	.329
KIQ22	.560	.423
KIQ23	.453	.566

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

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Table 9

Final Factor for KIQ

	Component 1
KIQ14	.891
KIQ15	.705
KIQ16	.799
KIQ17	.780
KIQ18	.600
KIQ19	.901
KIQ21	.746
KIQ22	.676

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Net Impact Scale

The Net impact (NI) scale consists of four items. The scale asks the user to assess improvements to efficiency and productivity resulting from the use the organization's KMS. The four items on this scale are loaded on a single factor. The results are summarized in table 10.

Table 10

Final Factor for Net Impact

	Component 1
NI31	.936
NI32	.855
NI33	.942
NI34	.956

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

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Use/User Satisfaction Scale

The scale measures system adequacy, system efficiency, system effectiveness and general satisfaction with the system. All four items are load highly on one factor. The results are summarized in table 11.

Table 11

Final Factor for User Satisfaction

	Component 1
US35	.912
US36	.956
US37	.938
US38	.937

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Perceived Benefit Scale

This scale consists of five-dimensional constructs composed of tangibles, reliability, responsiveness, and assurance for a total of 44 items. Table 12 displays the rotated component matrix for the perceived benefit variable.

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Table 12

Rotated Component Matrix for Perceived Benefit

	Component					
	1	2	3	4	5	6
PB39	.770	.058	.092	.118	-.149	-.121
PB40	.437	.082	-.001	.710	-.273	.024
PB41	.102	-.002	.300	.833	.115	-.019
PB42	.431	-.021	.032	.753	.087	-.012
PB43	.859	-.115	.022	.102	-.108	-.177
PB44	.851	-.010	-.149	-.080	.218	.164
PB45	.848	.022	.010	.046	-.243	-.166
PB46	.912	-.032	-.047	.058	-.037	.049
PB47	.806	-.077	.038	.230	-.140	-.190
PB48	.849	-.032	.152	.189	-.153	-.010
PB49	.840	-.006	-.035	-.006	.171	.332
PB50	.852	.091	-.116	-.065	.258	.137
PB51	.695	.034	-.029	.027	.165	.392
PB52	.879	-.003	.098	.095	.008	-.182
PB53	.796	.059	.111	.110	.197	-.356
PB54	.800	.120	.124	.078	.401	.006
PB55	.887	.021	.093	.081	.005	-.096
PB56	.835	.059	.149	.083	-.120	.179
PB57	.760	.032	.223	.200	-.181	.089
PB58	.875	.086	.085	.012	.133	.161
PB59	.821	-.017	.004	.065	.210	.076
PB60	.885	.020	.059	.090	-.234	.050
PB61	.045	.629	.383	-.076	-.401	-.116
PB62	.231	.205	.736	.176	-.188	.009
PB63	.108	.245	.788	.117	.253	-.047
PB64	.112	.433	.724	.055	-.071	.031
PB65	.023	.847	.022	-.036	-.174	.082
PB66	-.009	.832	.058	-.153	.074	.216
PB67	.135	.895	-.041	.014	.104	.157
PB68	.119	.791	.178	.011	-.155	-.134
PB69	.038	.692	.232	.081	-.082	-.207

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Table 12 (continued)

Rotated Component Matrix for Perceived Benefit

	Component					
	1	2	3	4	5	6
PB70	-.181	.761	.256	.013	-.230	.006
PB71	-.035	.864	-.043	.044	.166	.219
PB72	.097	.833	.009	-.012	.315	.229
PB73	.089	.796	.087	-.001	.078	.395
PB74	-.058	.857	.083	.035	.008	-.235
PB75	.003	.797	.160	.076	.127	-.223
PB76	.036	.788	.134	.059	.358	.032
PB77	-.032	.844	.054	-.071	-.040	-.246
PB78	.056	.810	.024	-.018	-.043	.392
PB79	.027	.695	.275	.110	-.291	.136
PB80	.036	.791	-.028	.179	.312	.204
PB81	-.092	.866	.205	.056	.090	-.146
PB82	-.031	.839	.027	-.091	-.295	-.116
PB83	.029	.899	-.009	-.041	-.094	-.145

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

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Table 13

Final Factor for PB

	Component 1
PB39	.788
PB43	.861
PB44	.816
PB45	.814
PB46	.909
PB47	.847
PB48	.879
PB49	.864
PB50	.852
PB51	.715
PB52	.898
PB53	.783
PB54	.744
PB55	.889
PB56	.866
PB57	.823
PB58	.889
PB59	.811
PB60	.906

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Factor Analysis – Dependent Variable

The Knowledge Management Success Scale

The Knowledge Management Success (KMS) scale assesses the extent to which the KMS impacts job aspects of task productivity, task innovation, customer satisfaction and management control. The results are summarized in table 14.

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Table 14

Rotated Component Matrix for KMSS

	Component	
	1	2
KMSS24	.880	-.046
KMSS25	.792	-.199
KMSS26	.736	.149
KMSS27	.742	.184
KMSS28	-.046	.940
KMSS29	.805	-.206
KMS30	.841	-.228

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 15

Final Factor for KMSS

Component Matrix[a]

	Component
	1
KMSS24	.883
KMSS25	.807
KMSS26	.714
KMSS27	.718
KMSS29	.824
KMSS30	.862

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Reliability

Reliability deals with error-free measurement. Reliability is considered high if the measurement is repeatable under the same conditions (Murtagh & Heck, 2012, Kerlinger, 1986). Cronbach's Coefficient Alpha is commonly used in social science

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research. Alpha values of more than 0.7 are desirable, though this limit may be as low as 0.60 for exploratory research (Murtagh & Heck, 2012). The alpha values in this study scored a low of 0.749 and a high of 0.953. The reliability analyses for these measures are contained in table 16.

Table 16

Cronbach's Alpha Reliability Analysis

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
SQ1-SQ13	.763	.749	13
KIQ14-KIQ23	.852	.851	10
KMSS14-KMSS30	.812	.811	7
NI31-NI34	.942	.942	4
US35-US38	.952	.953	4
PB38-PB83	.952	.953	45

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Table 17

Pearson's Correlation Matrix of the Six Variables Under Study

		SQ_TOT	KIQ_TOT	KMS_TOT	NI_TOT	US_TOT	PB_TOT
SQ_TOT	Pearson Correlation	1	.842**	.729**	.618**	.743**	.414**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	77	75	75	75	75	74
KIQ_TOT	Pearson Correlation	.842**	1	.835**	.725**	.859**	.499**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	75	75	75	75	75	74
KMS_TOT	Pearson Correlation	.729**	.835**	1	.792**	.866**	.489**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	75	75	75	75	75	74
NI_TOT	Pearson Correlation	.618**	.725**	.792**	1	.838**	.468**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	75	75	75	75	75	74
US_TOT	Pearson Correlation	.743**	.859**	.866**	.838**	1	.556**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	75	75	75	75	75	74
PB_TOT	Pearson Correlation	.414**	.499**	.489**	.468**	.556**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	74	74	74	74	74	74

**. Correlation is significant at the 0.01 level (2-tailed).

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Regression Analysis

The following is an analysis of the results as applied to each of the hypotheses which are the basis of this study. Each of the hypotheses is examined for statistical significance.

Regression analysis is used to test the hypotheses concerning the relationship of the independent variables firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis.

Regression analysis is also used to test the hypotheses concerning the relationship between KM success factors and U.S. airline industry AEEC member firm's value as measured by EVA.

Analysis of Hypothesis 1

Systems Quality and Knowledge Management Success

A regression analysis is performed using KMS success as the dependent variable while systems quality as the independent variable. The coefficient of determination (R2) is calculated to be .531. Systems quality accounts for 53.1 percent of the variation in KMS success. The calculated F of 82.767 is significant at an alpha <0.05, so we reject the null hypothesis that there is no or a negative relationship between systems quality and the success of a knowledge management system. The positive beta of .729 indicates system quality has a positive effect on KMS success. This indicates there is statistical evidence for the positive relationship between systems quality and KMS success. Tables 18 and 19 indicate the results of the regression analysis. Hypothesis 1 is supported for systems quality and KMS Success.

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Table 18

ANOVA of Systems Quality and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.923	1	45.923	82.767	.000[b]
	Residual	40.504	73	.555		
	Total	86.426	74			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), SQ_TOT

Table 19

Coefficients of Systems Quality and Knowledge Management Success

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.509	.455		1.117	.268		
	SQ_TOT	.905	.100	.729	9.098	.000	1.000	1.000

a. Dependent Variable: KMS_TOT

Knowledge Information Quality and Knowledge Management Success

A regression analysis is performed using KMS success as the dependent variable and knowledge information quality as the independent variable. The coefficient of determination (R2) is calculated to be .697. Knowledge information quality accounts for 69.7 percent of the variation in KMS success. The calculated F of 168.266 is significant at an alpha <0.05, so we reject the null hypothesis that there is no or a negative relationship between knowledge information quality and the success of a knowledge management system. The positive beta of .835 indicates knowledge information quality has a positive effect on KMS success. This indicates there is significant statistical evidence for the positive relationship between knowledge information quality and KMS

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success. Tables 20 and 21 present the results of the regression analysis. Hypothesis 1 is supported for knowledge information quality and KMS success.

Table 20

ANOVA of Knowledge Information Quality and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.276	1	60.276	168.266	.000[b]
	Residual	26.150	73	.358		
	Total	86.426	74			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), KIQ_TOT

Table 21

Coefficients of Knowledge Information Quality and Knowledge Management Success

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.848	.296		2.866	.005		
	KIQ_TOT	.858	.066	.835	12.972	.000	1.000	1.000

a. Dependent Variable: KMS_TOT

Net Impact and Knowledge Management Success

A regression analysis is performed on net impact and KMS success. KMS success is the dependent variable while net impact is the independent variable. The coefficient of determination (R2) is calculated to be .627. Net impact accounts for 62.7 percent of the variation in KMS success. The calculated F of 122.857 is significant at an alpha <0.05, so we reject the null hypothesis that there is no or a negative relationship between net impact and the success of a knowledge management system. The positive

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beta of .792 indicates net impact has a positive effect on KMS success. This indicates there is significant statistical evidence for the positive relationship between net impact and KMS Success. Tables 22 and 23 illustrate the results of the regression analysis. Hypothesis 1 is supported for net impact and KMS success.

Table 22

ANOVA of Net Impact and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.213	1	54.213	122.857	.000[b]
	Residual	32.213	73	.441		
	Total	86.426	74			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), NI_TOT

Table 23

Coefficients of Net Impact and Knowledge Management Success

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.958	.248		7.883	.000		
	NI_TOT	.561	.051	.792	11.084	.000	1.000	1.000

a. Dependent Variable: KMS_TOT

User Satisfaction and Knowledge Management Success

A regression analysis is performed between user satisfaction and KMS success. KMS success is the dependent variable while user satisfaction is the independent variable. The coefficient of determination (R2) is calculated to be .750. User satisfaction accounts for 75.0 percent of the variation in KMS success. The calculated F of 219.350 is significant at an alpha <0.05, so we reject the null hypothesis that there is no or a

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negative relationship between user satisfaction and the success of a knowledge management system. The positive beta of .866 indicates user satisfaction has a positive effect on KMS success. This indicates there is significant statistical evidence for the positive relationship between user satisfaction and KMS success. Tables 24 and 25 indicate the results of the regression analysis. Hypothesis 1 is supported for user satisfaction and KMS success.

Table 24

ANOVA of User Satisfaction and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.845	1	64.845	219.350	.000[b]
	Residual	21.581	73	.296		
	Total	86.426	74			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), US_TOT

Table 25

Coefficients of User Satisfaction and Knowledge Management Success

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.245	.170		13.244	.000		
	US_TOT	.568	.038	.866	14.810	.000	1.000	1.000

a. Dependent Variable: KMS_TOT

Potential Benefit and Knowledge Management Success

A regression analysis is performed on the variables potential benefit and KMS success. KMS success is the dependent variable while potential benefit is the independent variable. The coefficient of determination (R2) is calculated to be .239.

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Potential benefit accounts for 23.9 percent of the variation in KMS success. The calculated F of 22.58 is significant at an alpha <0.05, so we reject the null hypothesis that there is no or a negative relationship between potential benefit and the success of a knowledge management system. The positive beta of .489 indicates potential benefit has a positive effect on KMS success. This indicates there is significant statistical evidence for the positive relationship between potential benefit and KMS Success. Tables 26 and 27 indicate the results of the regression analysis. Hypothesis 1 is supported for potential benefit and KMS success.

Table 26

ANOVA of Potential Benefit and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.629	1	20.629	22.580	.000[b]
	Residual	65.779	72	.914		
	Total	86.407	73			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), PB_TOT

Table 27

Coefficients of Potential Benefit and Knowledge Management Success

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.452	.667		2.178	.033		
	PB_TOT	.616	.130	.489	4.752	.000	1.000	1.000

a. Dependent Variable: KMS_TOT

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Table 28

ANOVA of Five predictor variables and Knowledge Management Success

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.862	5	13.772	53.379	.000[b]
	Residual	17.545	68	.258		
	Total	86.407	73			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), PB_TOT, SQ_TOT, NI_TOT, KIQ_TOT, US_TOT

Table 29

Coefficients of Five predictor variables and Knowledge Management Success

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.173	.478		2.453	.017		
	SQ_TOT	.069	.127	.056	.545	.588	.287	3.486
	KIQ_TOT	.307	.137	.299	2.243	.028	.169	5.932
	NI_TOT	.154	.071	.217	2.170	.034	.298	3.356
	US_TOT	.254	.091	.386	2.783	.007	.155	6.456
	PB_TOT	.000	.083	.000	.005	.996	.689	1.452

a. Dependent Variable: KMS_TOT

Regression Analysis

Analysis of Hypothesis 2

System Quality and EVA

A regression analysis is performed on variables systems quality and EVA. EVA is the dependent variable while systems quality is the independent variable. The coefficient of determination (R2) is calculated to be .289. Systems quality accounts for 28.9 percent of the variation in EVA. The calculated F of .108 is significant at an alpha <

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0.05, so we reject the null hypothesis that there is no or a negative relationship between systems quality and the EVA of a knowledge management system. The positive beta of .617 indicates system quality has a positive effect on EVA. This indicates there is statistical evidence for a positive relationship between systems quality and EVA. Tables 30, 31, 32 and 33 indicate the results of the regression analysis. Hypothesis 2 is supported for systems quality and EVA.

Table 30

Model Summary of Systems Quality and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.038[a]	.001	-.012	.823

a. Predictors: (Constant), EVA

b. Dependent Variable: SQ_TOT

Table 31

ANOVA of Systems Quality and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.073	1	.073	.108	.743[b]
	Residual	49.429	73	.677		
	Total	49.502	74			

a. Dependent Variable: SQ_TOT

b. Predictors: (Constant), EVA

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Table 32

Coefficients of Systems Quality and EVA

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.442	.298		14.918	.000
	EVA	9.510E-14	.000	.038	.329	.743

a. Dependent Variable: SQ_TOT

Table 33

Residual Statistics of Systems Quality and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.44	4.55	4.53	.031	75
Std. Predicted Value	-2.949	.343	.000	1.000	75
Standard Error of Predicted Value	.101	.298	.121	.059	75
Adjusted Predicted Value	4.13	4.67	4.53	.061	75
Residual	-1.853	2.551	.000	.817	75
Std. Residual	-2.252	3.100	.000	.993	75
Stud. Residual	-2.269	3.291	.000	1.014	75
Deleted Residual	-1.881	2.875	.000	.852	75
Stud. Deleted Residual	-2.337	3.541	.001	1.033	75
Mahal. Distance	.118	8.695	.987	2.538	75
Cook's Distance	.000	.687	.022	.086	75
Centered Leverage Value	.002	.118	.013	.034	75

a. Dependent Variable: SQ_TOT

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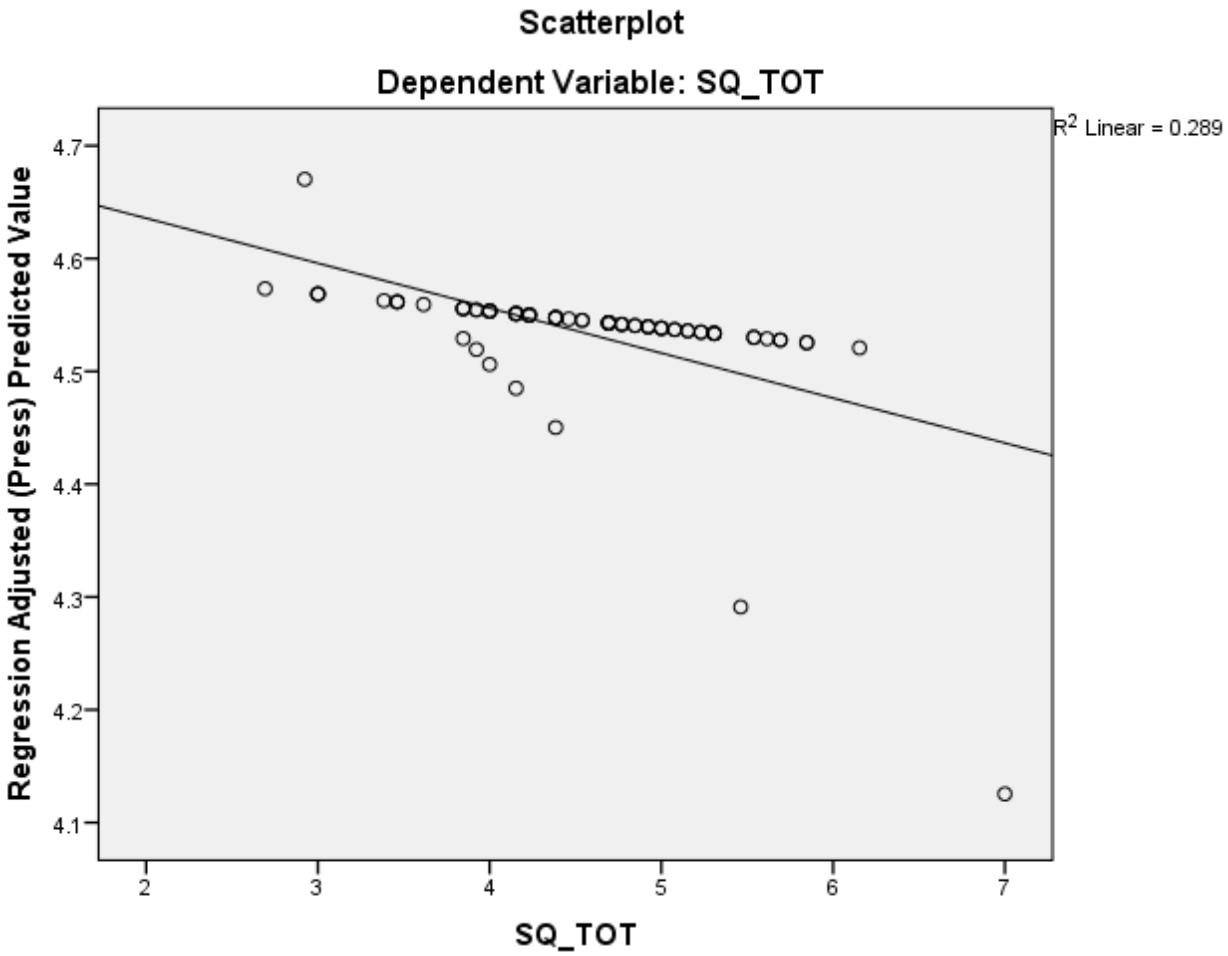

Figure 1 Regression Scatterplot between Systems Quality and EVA

Knowledge Information Quality and EVA

A regression analysis is performed on the variables knowledge information quality and EVA. EVA is the dependent variable while knowledge information quality is the independent variable. The coefficient of determination (R2) is calculated to be .333. Knowledge information quality accounts for 33.3 percent of the variation in EVA. The calculated F of 0.024 is not significant at an alpha of <.050, so we do not reject the null hypothesis that there is no or a negative relationship between knowledge information quality and the EVA of a knowledge management system. Hypothesis 2 is not supported for knowledge information quality and EVA.

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Table 34

Model Summary of Knowledge Information Quality and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.018[a]	.000	-.014	1.036

a. Predictors: (Constant), EVA

b. Dependent Variable: KIQ_TOT

Table 35

ANOVA of Knowledge Information Quality and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.026	1	.026	.024	.877[b]
	Residual	76.167	71	1.073		
	Total	76.193	72			

a. Dependent Variable: KIQ_TOT

b. Predictors: (Constant), EVA

Table 36

Coefficients of Knowledge Information Quality and EVA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.449	.375		11.872	.000
	EVA	-5.644E-14	.000	-.018	-.155	.877

a. Dependent Variable: KIQ_TOT

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Table 37

Residual Statistics of Knowledge Information Quality and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.39	4.45	4.39	.019	73
Std. Predicted Value	-.348	2.904	.000	1.000	73
Standard Error of Predicted Value	.128	.375	.154	.075	73
Adjusted Predicted Value	4.12	4.67	4.39	.061	73
Residual	-2.288	2.555	.000	1.029	73
Std. Residual	-2.209	2.467	.000	.993	73
Stud. Residual	-2.226	2.619	.000	1.010	73
Deleted Residual	-2.323	2.880	.000	1.065	73
Stud. Deleted Residual	-2.292	2.736	.000	1.022	73
Mahal. Distance	.121	8.434	.986	2.489	73
Cook's Distance	.000	.435	.018	.057	73
Centered Leverage Value	.002	.117	.014	.035	73

a. Dependent Variable: KIQ_TOT

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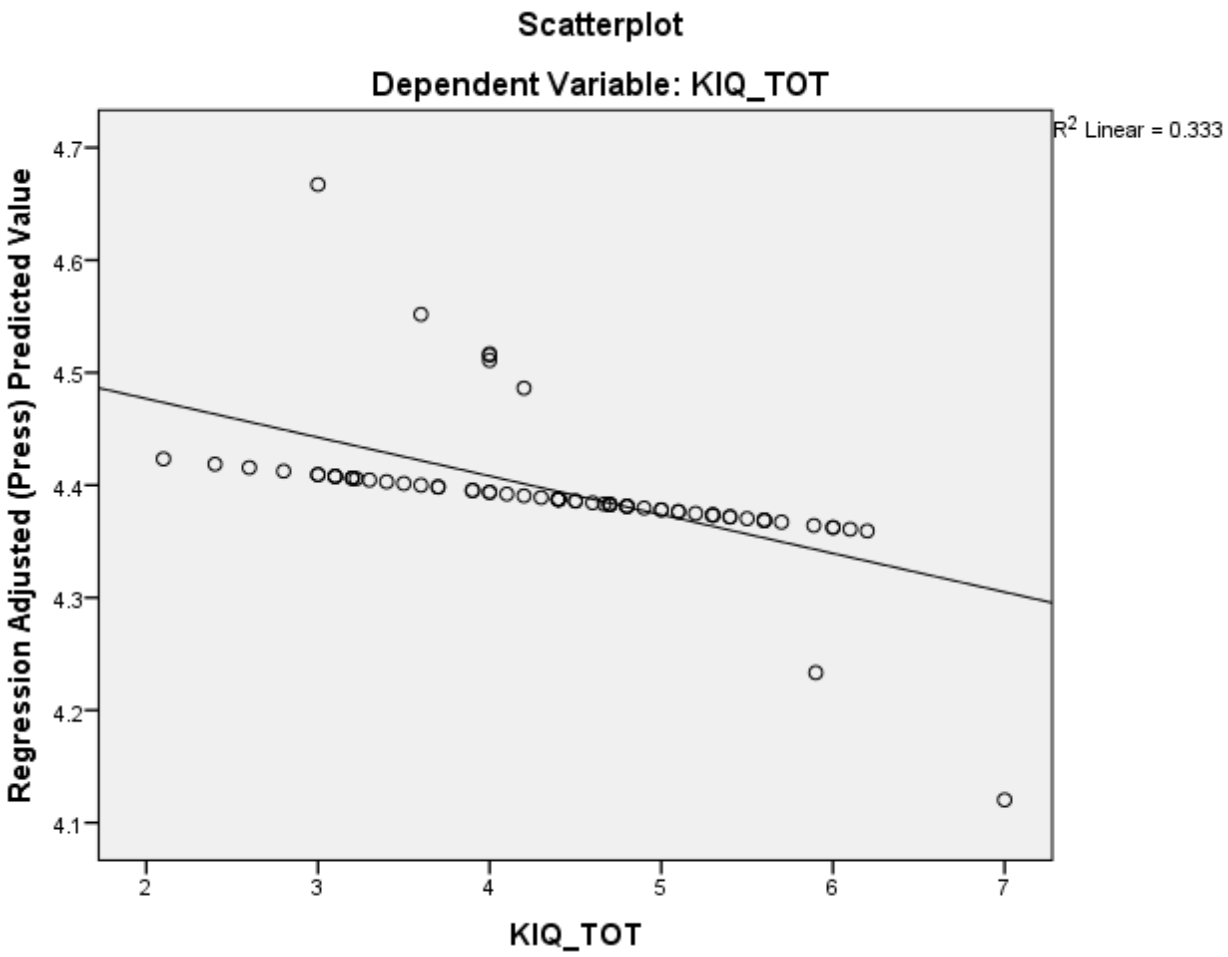

Figure 2 Regression Scatterplot between Knowledge/Information Quality and EVA

Net Impact and EVA

A regression analysis is performed on the variables net impact and EVA. EVA is the dependent variable while net impact is the independent variable. The coefficient of determination (R2) is calculated to be .152. Net impact accounts for 15.2 percent of the variation in EVA. The calculated F of .149 is significant at an alpha of <0.05, so we reject the null hypothesis that there is no or a negative relationship between net impact and the EVA of a knowledge management system. The positive beta of .306 indicates net impact has a positive effect on EVA. This indicates there is statistical evidence for the

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relationship between net impact and EVA. Tables 38, 39, 40 and 41 indicates the results of the regression analysis. Hypothesis 2 is supported for net impact and EVA.

Table 38

Model Summary of Net Impact and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.046[a]	.002	-.012	1.508

a. Predictors: (Constant), EVA

b. Dependent Variable: NI_TOT

Table 39

ANOVA of Net Impact and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.339	1	.339	.149	.701[b]
	Residual	161.496	71	2.275		
	Total	161.835	72			

a. Dependent Variable: NI_TOT

b. Predictors: (Constant), EVA

Table 40

Coefficients of Net Impact and EVA

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.906	.546		8.990	.000
	EVA	-2.051E-13	.000	-.046	-.386	.701

a. Dependent Variable: NI_TOT

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Table 41

Residual Statistics of Net Impact and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.68	4.91	4.71	.069	73
Std. Predicted Value	-.348	2.904	.000	1.000	73
Standard Error of Predicted Value	.187	.546	.225	.109	73
Adjusted Predicted Value	4.59	5.12	4.71	.097	73
Residual	-3.683	2.317	.000	1.498	73
Std. Residual	-2.442	1.536	.000	.993	73
Stud. Residual	-2.461	1.548	.000	1.007	73
Deleted Residual	-3.740	2.406	.000	1.540	73
Stud. Deleted Residual	-2.555	1.564	-.005	1.020	73
Mahal. Distance	.121	8.434	.986	2.489	73
Cook's Distance	.000	.164	.014	.028	73
Centered Leverage Value	.002	.117	.014	.035	73

a. Dependent Variable: NI_TOT

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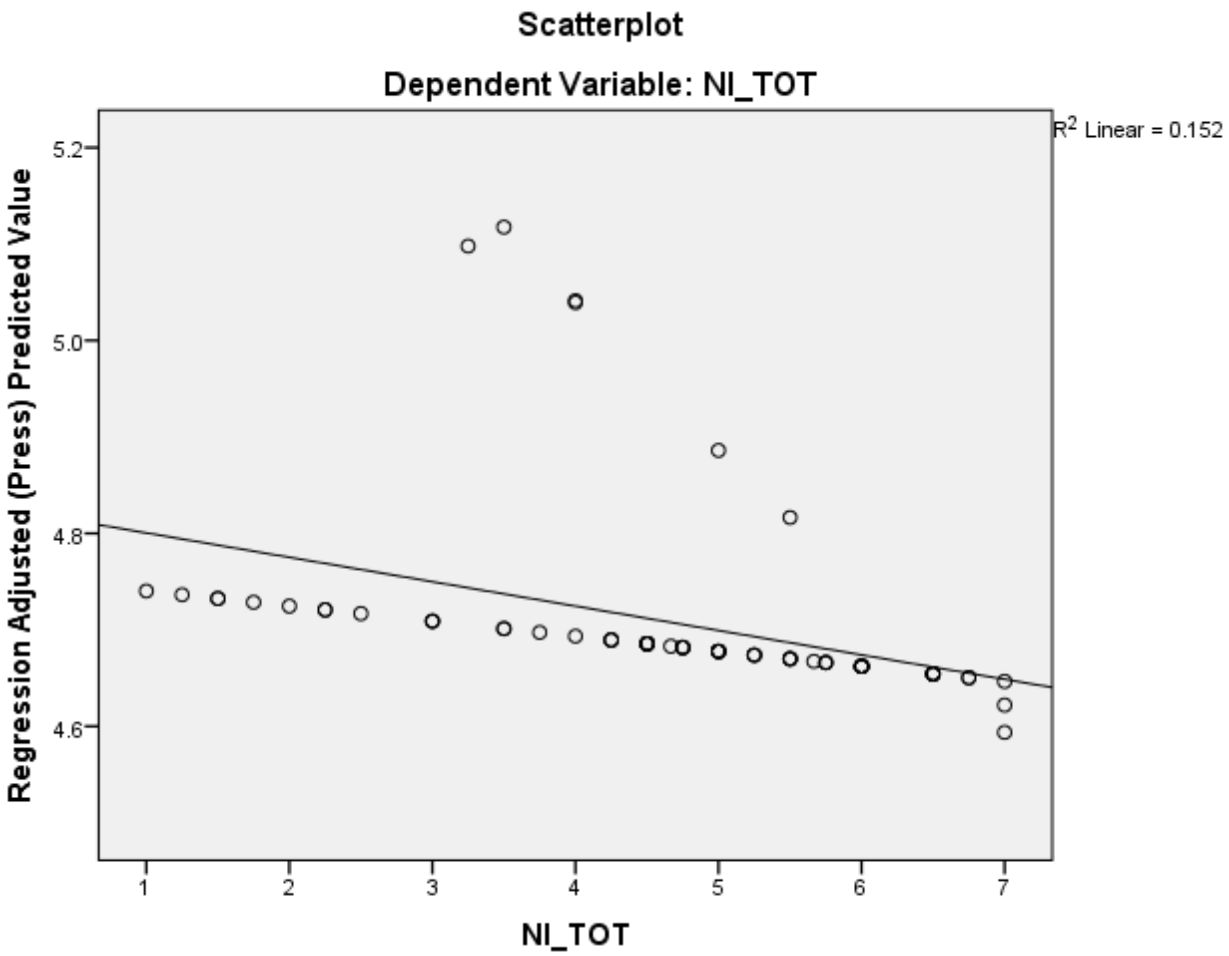

Figure 3 Regression Scatterplot between Net Impact and EVA

Perceived Benefit and EVA

A regression analysis is performed using EVA as the dependent variable while perceived benefit is the independent variable. The coefficient of determination (R2) is calculated to be .289. Perceived benefit accounts for 28.9 percent of the variation in EVA. The calculated F of .004 is not significant at an alpha <0.05, so we do not reject the null hypothesis that there is no or a negative relationship between perceived benefit and the EVA of a knowledge management system. This indicates there is no statistical evidence for the relationship between perceived benefit and EVA. Tables 42, 43, 44 and

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45 indicate the results of the regression analysis. Hypothesis 2 is not supported for perceived benefit and EVA.

Table 42

Model Summary of Perceived Benefit and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.008[a]	.000	-.014	.877

a. Predictors: (Constant), EVA

b. Dependent Variable: PB_TOT

Table 43

ANOVA of Perceived Benefit and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.003	1	.003	.004	.947[b]
	Residual	53.875	70	.770		
	Total	53.879	71			

a. Dependent Variable: PB_TOT

b. Predictors: (Constant), EVA

Table 44

Coefficients of Perceived Benefit and EVA

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5.063	.317		15.950	.000
	EVA	2.071E-14	.000	.008	.067	.947

a. Dependent Variable: PB_TOT

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Table 45

Residual Statistics of Perceived Benefit and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.06	5.09	5.08	.007	72
Std. Predicted Value	-2.882	.351	.000	1.000	72
Standard Error of Predicted Value	.110	.317	.132	.063	72
Adjusted Predicted Value	4.82	5.25	5.08	.055	72
Residual	-2.245	1.935	.000	.871	72
Std. Residual	-2.559	2.206	.000	.993	72
Stud. Residual	-2.579	2.342	.000	1.012	72
Deleted Residual	-2.280	2.181	.000	.907	72
Stud. Deleted Residual	-2.691	2.422	.000	1.024	72
Mahal. Distance	.123	8.303	.986	2.464	72
Cook's Distance	.000	.348	.021	.058	72
Centered Leverage Value	.002	.117	.014	.035	72

a. Dependent Variable: PB_TOT

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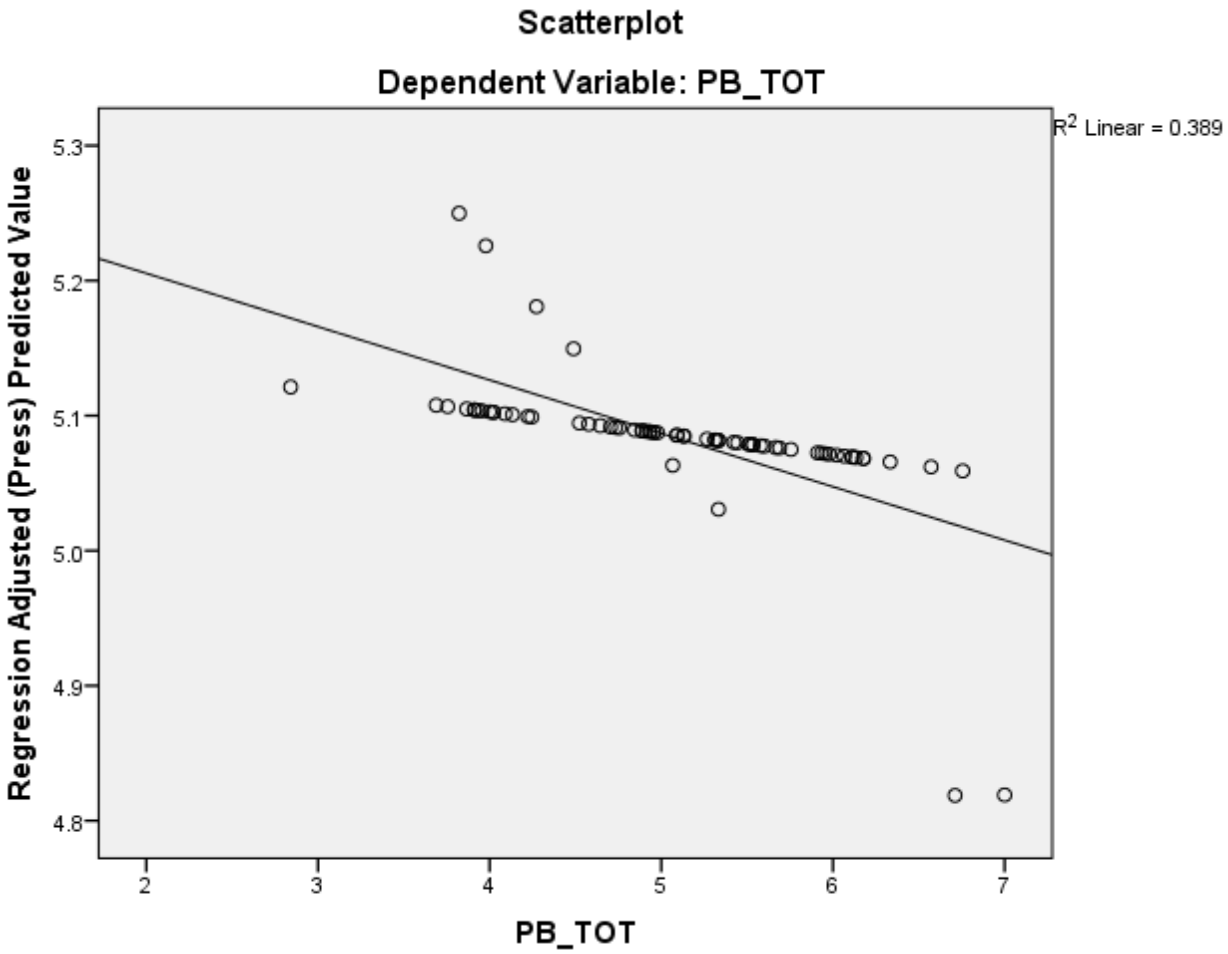

Figure 4 Regression Scatterplot between Perceived Benefit and EVA

User Satisfaction

A regression analysis is performed using EVA as the dependent variable and user satisfaction as the independent variable. The coefficient of determination (R2) is calculated to be .358. User satisfaction accounts for 35.8 percent of the variation in EVA. The calculated F of .012 is not significant at an alpha <0.05, so we do not reject the null hypothesis that there is no or a negative relationship between user satisfaction and the EVA of a knowledge management system. Tables 46, 47, 48 and 49 indicate the results of the regression analysis. Hypothesis 2 is not supported for user satisfaction and EVA.

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Table 46

Model Summary of User Satisfaction and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.013[a]	.000	-.014	1.640

a. Predictors: (Constant), EVA

b. Dependent Variable: US_TOT

Table 47

ANOVA of User Satisfaction and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.033	1	.033	.012	.912[b]
	Residual	190.947	71	2.689		
	Total	190.979	72			

a. Dependent Variable: US_TOT

b. Predictors: (Constant), EVA

Table 48

Coefficients of User Satisfaction and EVA

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.085	.593		6.885	.000
	EVA	6.373E-14	.000	.013	.110	.912

a. Dependent Variable: US_TOT

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Table 49

Residual Statistics of User Satisfaction and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.09	4.15	4.15	.021	73
Std. Predicted Value	-2.904	.348	.000	1.000	73
Standard Error of Predicted Value	.203	.593	.245	.118	73
Adjusted Predicted Value	3.65	4.47	4.15	.098	73
Residual	-3.155	2.914	.000	1.629	73
Std. Residual	-1.924	1.777	.000	.993	73
Stud. Residual	-1.939	1.904	.000	1.011	73
Deleted Residual	-3.204	3.347	.000	1.689	73
Stud. Deleted Residual	-1.978	1.941	-.002	1.020	73
Mahal. Distance	.121	8.434	.986	2.489	73
Cook's Distance	.000	.269	.019	.049	73
Centered Leverage Value	.002	.117	.014	.035	73

a. Dependent Variable: US_TOT

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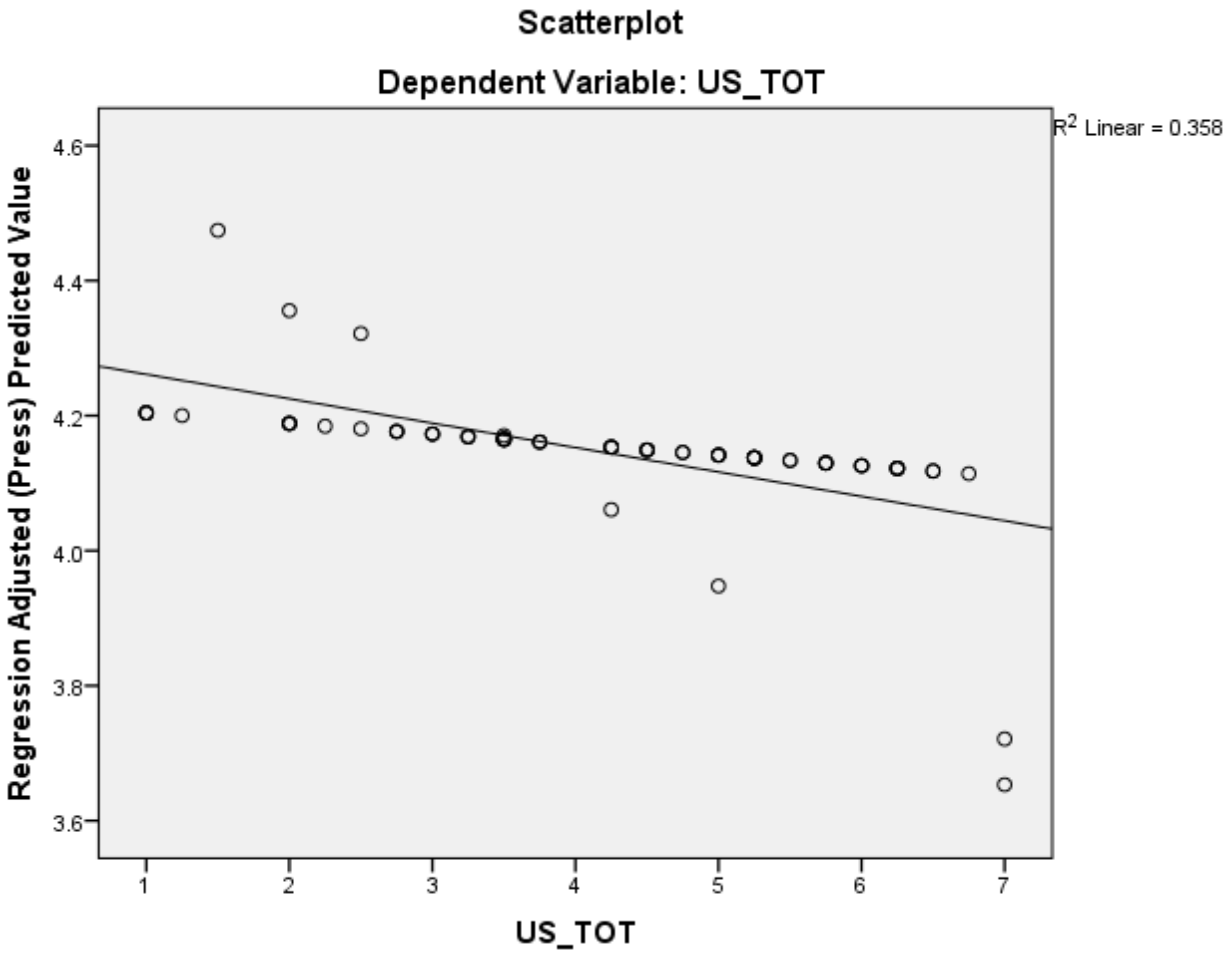

Figure 5 Regression Scatterplot between User Satisfaction and EVA

Knowledge Management Success

A regression analysis is performed with EVA as the dependent variable and KM success as the independent variable. The coefficient of determination (R2) is calculated to be .283. KM success accounts for 28.3 percent of the variation in EVA. The calculated F of .049 is not significant at an alpha <0.05, so we do not reject the null hypothesis that there is no or a negative relationship between KM success and the EVA of a knowledge management system. This indicates there is no statistical evidence for a relationship between KM success and EVA. Tables 50, 51, 52 and 53 indicate the results of the regression analysis. Hypothesis 2 is not supported for KM success and EVA.

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Table 50

Model Summary of Knowledge Management Success and EVA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.026[a]	.001	-.013	1.086

a. Predictors: (Constant), EVA

b. Dependent Variable: KMS_TOT

Table 51

ANOVA of Knowledge Management Success and EVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.058	1	.058	.049	.825[b]
	Residual	83.729	71	1.179		
	Total	83.787	72			

a. Dependent Variable: KMS_TOT

b. Predictors: (Constant), EVA

Table 52

Coefficients of Knowledge Management Success and EVA

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.524	.393		11.513	.000
	EVA	8.508E-14	.000	.026	.222	.825

a. Dependent Variable: KMS_TOT

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Table 53

Residual Statistics of Knowledge Management Success and EVA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.52	4.62	4.61	.028	73
Std. Predicted Value	-2.904	.348	.000	1.000	73
Standard Error of Predicted Value	.135	.393	.162	.078	73
Adjusted Predicted Value	4.22	4.71	4.61	.059	73
Residual	-3.045	2.469	.000	1.078	73
Std. Residual	-2.804	2.274	.000	.993	73
Stud. Residual	-2.826	2.414	.000	1.008	73
Deleted Residual	-3.093	2.783	.000	1.111	73
Stud. Deleted Residual	-2.978	2.502	-.002	1.025	73
Mahal. Distance	.121	8.434	.986	2.489	73
Cook's Distance	.000	.370	.016	.046	73
Centered Leverage Value	.002	.117	.014	.035	73

a. Dependent Variable: KMS_TOT

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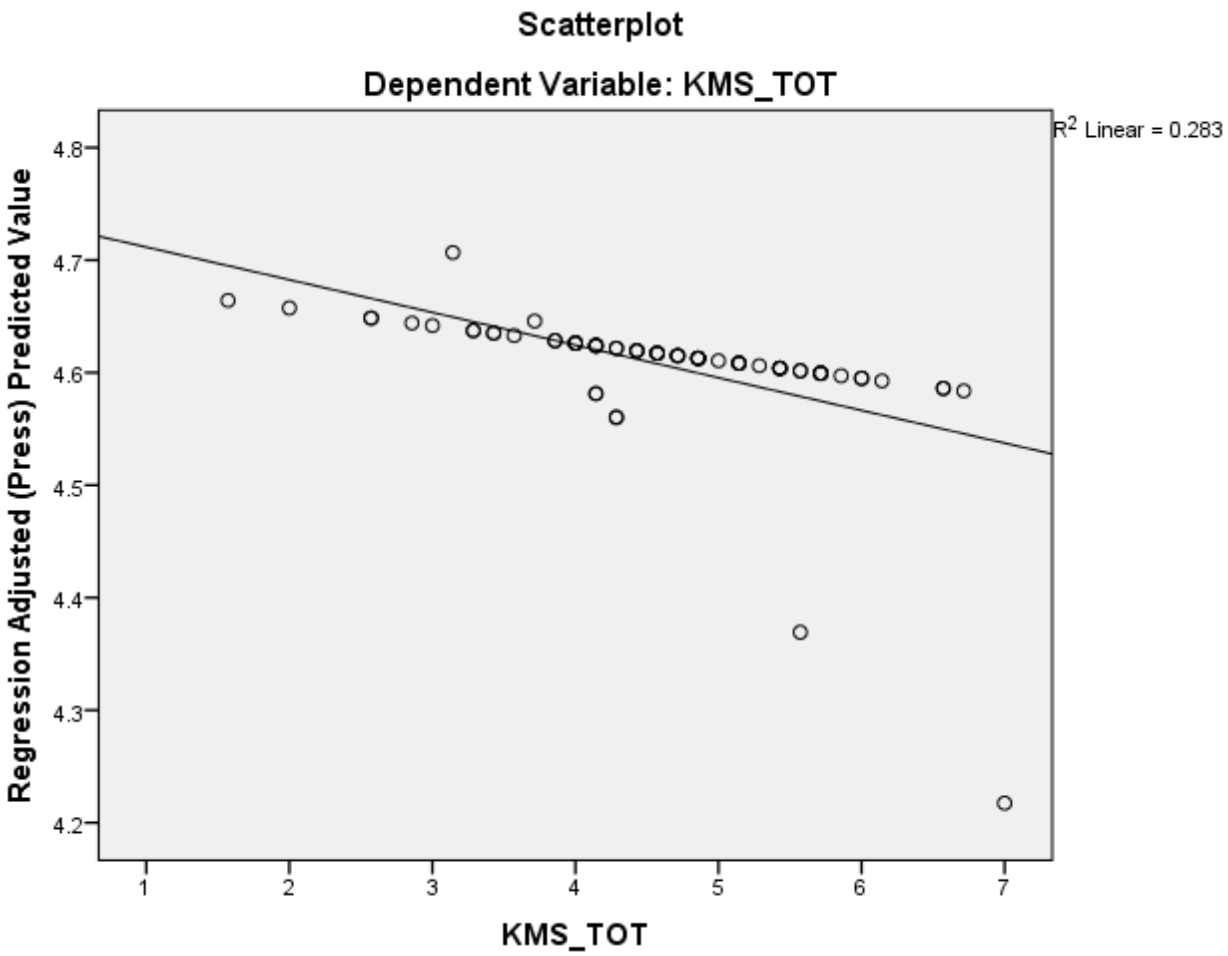

Figure 6 Regression Scatterplot between Knowledge Management Success and EVA

Evaluation of Findings

The findings from this research support the first hypothesis which states there is a significant relationship between a firm's KM factors of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success, as determined by multiple regression analysis within the U.S. airline industry AEEC member firms. This conclusion is in line with the existing body of research.

The findings from this research provide mixed results for the research's second hypothesis which state there is a relationship between KM success factors and U.S.

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airline industry AEEC member firm's value as measured by EVA. The data reveals systems quality and EVA are linked. The data from this study also demonstrate net impact and EVA are linked. The data from this study could not confirm a link between the variables perceived benefit, use/user satisfaction, knowledge/information quality and knowledge management success and EVA.

The study research questions are answered by formulating two hypotheses. Hypothesis 1 is supported. Hypothesis 2 is not supported. The empirical results of our study indicate a significant relationship between the six constructs (system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact, and knowledge management success) and does support the Halawi (2005) model as it is originally proposed.

The first hypothesis tested in our study followed directly from the Halawi (2005) model. There are five constructs involved: system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact. The existing literature provides strong support for the conclusions reached in hypothesis H1 (Bailey & Pearson, 1983; Ives et al., 1983; Baroudi & Orlikowski, 1988; Seddon & Yip, 1992; Davis, 1989; Doll & Torkzadeh, 1988; Kraemer, Danzinger, Dunkle & King, 1993).

The results of this research indicate user satisfaction has a positive relationship to organizational impact. The model in this study demonstrates strong support for the relationships between knowledge quality, system quality, service quality, intention to use, user satisfaction, and knowledge management system success. User satisfaction and intention to use reflect a user's perceptions of both quality of the system itself, the quality of the knowledge can be obtained from the quality of the service. Based on the results of

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this study it appears the Halawi (2005) model, derived from Jennex and Olfman, which itself is a derivative of Delone and McLean model, is acceptable for assessing the success of a knowledge management system. Adapting the model to a knowledge management system is a viable approach to assessing KMS success (Jennex & Olfman, 2003).

Hypothesis H2 is not fully supported. The result of the analyses indicates weak relationships exist between systems quality and EVA and between net impact and EVA. The statistical analysis conducted does not indicate a relationship between EVA and the factors of knowledge/information quality, perceived benefit, and user satisfaction. The research of this study also does not support a statistically significant relationship between EVA and knowledge management success.

Summary

In this chapter, the sample data are presented, along with the basis for determining reliability and validity of the instrument used to collect the sample data. The results for each of the hypotheses described in the research design are analyzed and reported.

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Chapter 5: Implications, Recommendations, and Conclusions

Knowledge Management (KM) is defined as the set of processes focused on the acquisition, transmission, and application of knowledge within a firm (Gao, Li, & Clarke, 2008). A knowledge-based view (KBV) of a firm, rather than a resource-based perspective, has emerged to recognize the unique importance of knowledge as an asset to the firm (Penrose, 1960). KM aids the manager by developing a mechanism for tapping into the collective intelligence and skills of employees thereby constructing a greater organizational knowledge base (Al-Alawi, Al-Marzooqi, & Mohammed, 2007). KM represents the strategies, processes, and practices organizations employ to identify, create, represent, distribute, and enable the adoption of insights, and experiences (Alavi, Kayworth, & Leidner, 2006). Improved organizational knowledge creates and develops core competencies, which leads to a competitive advantage (Firestone & McElroy, 2005; Grant, 1996; Kiss & Danis, 2008). Firms with well-developed KM capabilities realize stronger financial performance than firms that do not (Holsapple & Wu, 2008). Empirical support for the linkage of KM efforts contributing toward the value of the firm is needed to further the science of KM (Holsapple &Wu, 2008).

The purpose of this study is to examine the relationship between the outcome variable of knowledge management success and the five predictor variables of the KM dimensions of system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact within U.S. airline industry AEEC member firms by applying the Halawi (2005) instrument. This research adopts the generic framework of the IS Success Model and customizes the model to the context of knowledge

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management systems. Further, the value of successful KMS to the firm is assessed using the Economic Value Added (EVA) model.

This research aims at providing an empirical study by constructing a set of questionnaire items to measure knowledge management system success and to answer the following questions: (1) What are the appropriate dimensions for evaluating the success of KMS? (2) Is there any relationship between these dimensions? (3) What relationship, if any, exists between firm value and the five KMS dimensions?

Individuals at nine organizations are surveyed. 300 individuals are contacted based upon their participation in the Airline Electrical Engineering Committee (AEEC). A total of ninety-six usable questionnaires are obtained. Factor analysis, correlation analysis, and regression analysis are used to analyze the study's model. The findings of this study support the Halawi (2005) model as it is proposed. The findings of this study do not support Holsapple and Wu's (2008) conclusions in applications where an EVA construct is used for assessing the financial benefit of KMS to the firm.

Implications

Before considering the implications of these results, it is important to recognize the limitations of the study. There are a number of limitations, which could have affected the accuracy of the research results. One limitation of this study is related to the data collection method. A survey questionnaire used to collect data as the measurement instrument. The reliability of the collected is subject to the respondents' attention to detail when answering the questions.

A second limitation is related the use of Economic Value Added (EVA) to measure the potential contribution to firm value attributable to KMS efforts. A wide

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difference in overall capitalization of each of the nine firms exists. The EVA values are not normalized and may have impacted the results. Additional factors that may affect the knowledge management systems success or individual characteristics of users are not considered as part of this analysis. A significant limitation of this study is the broad nature of KMS definition as related to a firm's investment. Such broad definition made extraction of precise knowledge management investments difficult. The broad definition of KMS investments may have led to investments being overlooked due to mislabeling or aggregated in other information technology related infrastructure investments. The inability to definitively assess precise KMS investments impacts EVA calculations.

Potential Contributions

A central contribution of our study is the development of a survey instrument comprised of six constructs. This set of constructs is derived by incorporating multiple theories to address different aspects of KMS and the economic benefit of KMS systems as determined by EVA in an effort to provide an application to practice and research. This instrument has been validated through a rigorous process as well as prior use. Factor analysis and tests of internal consistency are conducted. Second, our study is the first empirical investigation of the value of KMS success incorporating EVA measures as a separate construct.

Implications for Theory

The study of knowledge management systems success is still relatively new in both theory and practice. The evolving line of research, initiated in the 1990s, focuses on the investigation of KMS particularly in the information technology (IT) domain (Davenport, 1997a). Later case descriptions of such systems in different organizations

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emerged to further the course of KMS (Alavi & Leidner, 1999). The literature review reveals most studies in the literature are descriptive. This study makes a significant contribution to the existing body of literature by providing a quantitative look at the vexing question of the value of KMS to the firm.

The research study further develops the knowledge management systems success model. Prior to our study, this issue is investigated by Jennex and Olfman (2002, 2003) and Halawi (2005) in a comprehensive manner. Their proposed knowledge management system success model of Jennex and Olfman (2003) is a further refinement of the DeLone and McLean IS Success Model and the modified DeLone and McLean model (2002). The Jennex and Olfman (2003) model does not include a service quality factor. Jennex and Olfman (2003) considered the service quality dimension as part of the system quality dimension. Halawi (2005) demonstrated empirically that a KMS success model should include a service quality dimension when concentrating on KMS success within the organization. The results of this study support Halawi's (2005) findings regarding service quality. Thus, this research further extends the work of Jennex and Olfman (2003) who attempted to conceptualize knowledge management systems success.

Implications for Practice

There are a number of implications of this study for managers and executives in organizations involved in, or embarking on knowledge management initiatives. First and foremost, this current study contributes to the body of knowledge by conducting a practical assessment of the usefulness of applying the Halawi model, as derived from the DeLone and McLean model, in US based airlines. This study extended the DeLone and McLean model and applied it to the domain of KMS within US airline industry. This

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study has also helped provide quantifiable metrics to measure success by drawing attention to a unique, quantifiable perspective of KMS, namely the success of KMS.

The six variable model and instruments developed and validated in this study can be used to measure the success of existing KMS within organizations. Corporate executives and managers within the airline industry expect strong, positive justification for investments in knowledge management systems. The anticipated business performance outcome is used to make decisions to launch or continue KMS investments. An important and significant challenge involves how to evaluate the success of knowledge management systems and how to ensure that success of knowledge management systems is providing value organization. Managers could use the results of our evaluation to present empirical evidence toward overseeing the level of success of their knowledge management system and in turn justifying the resources investments in these systems.

The findings of this study provide guidance to KMS practitioners and influencers on ways they may improve the success of the knowledge management system within their organizations. The results of this study suggest that as system quality, knowledge/information quality, and net impact increase use/user satisfaction and perceived benefit also increase which results in an increase in KMS success. Thus, managers may positively influence the success of knowledge management systems through increasing the quality of knowledge, quality of systems and improving the net impact.

Although relating the five KMS success factors to firm value could not be strongly demonstrated, empirical evidence within the study indicates a relationship does

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exist. The linkages between systems quality, net impact, and EVA offers a new and specific avenue to explore in KM research. In practice, prioritizing KMS investments positively impact systems quality and net impact may lead to better results.

One theme of resulting from this study and emerging within the literature is knowledge management system success is not a technology issue. The results of this study offer additional evidence that organizations must look at other elements within the organization such as the organizational culture and social structures which may support, or preclude information sharing.

Recommendations

Several areas for future research have surfaced from the results of our work. First, future research should perform a longitudinal study to obtain identical quantitative data over time. Real observations over the course of years may present valuable insights regarding the success of their knowledge management system and the value over the period of study. Second, since the data is collected data only from US airline firms, future research is planned to complete a larger study of international airlines knowledge management systems success to evaluate the degree of similarities or differences. Third, since the definition of KMS is broad and difficult to apply consistently to each firm's investments, it is proposed to investigate a specific information technology application, applicable to KM, to determine if a cause and effect relationship could be observed relative to firm value.

Conclusions

This research study examined airline firms' KM success factors and examined the relationship between KM success and EVA. A comprehensive literature review is

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conducted, factors that contribute to knowledge management systems success are identified, and a method of quantifying the influence of these factors on knowledge management success, hypotheses are proposed. A survey instrument is then applied to collect data from knowledge management systems users. Firm financial performance is obtained from publicly available financial reports. Multiple regression techniques are used to test the hypotheses. The results support the first hypothesis of five factors influencing knowledge management success. However, no evidence is found to support a direct causal relationship between knowledge management success and firm value. Two factors, systems quality, and net impact are observed to have a relationship with firm value.

One of the valuable findings is there is a strong positive relationship between system quality, knowledge/information quality, use/user satisfaction, perceived benefit, and net impact and knowledge management systems success. This contributes significantly to the literature for both knowledge management systems and builds on the work of Halawi, Jennex and Olfman, and DeLone and McLean.

Limitations of this research ae presented. Implications for both research and practice are also presented. Recommendations and areas for future research in knowledge management research are proposed.

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Appendixes

Knowledge Management (KM) is defined as the set of processes focused on the acquisition, transmission, and application of knowledge within a firm (Gao, Li, & Clarke, 2008). A knowledge-based view (KBV) of a firm, rather than a resource-based perspective, has emerged to recognize the unique importance of knowledge as an asset to the firm (Penrose, 1960). KM aids the manager by developing a mechanism for tapping into the collective intelligence and skills of employees thereby constructing a greater organizational knowledge base (Al-Alawi, Al-Marzooqi, & Mohammed, 2007). KM represents the strategies, processes, and practices organizations employ to identify, create, represent, distribute, and enable the adoption of insights, and experiences (Alavi, Kayworth, & Leidner, 2006). Improved organizational knowledge creates and develops core competencies, which leads to a competitive advantage (Firestone & McElroy, 2005; Grant, 1996; Kiss & Danis, 2008). Firms with well-developed KM capabilities realize stronger financial performance than companies that do not (Holsapple & Wu, 2008). Empirical support for the linkage of KM efforts contributing toward the value of the firm is needed to further the science of KM (Holsapple &Wu, 2008).

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Appendix A: Sample Survey

Background

This survey is part of an important research project that investigates the relationship between the successful knowledge management systems and company financial performance. As a respondent to this survey, you have been identified as a user of a knowledge management system, though your organization may not specifically refer to the system using that terminology. Knowledge management systems leverage the expertise of individuals and the efficient transfer of knowledge within your organization. They can be used to disseminate information to make more effective decisions. Knowledge management systems consist of (but are not limited to) such things as best practices, identification of experts or expertise within a firm, enterprise portals (e.g. PeopleSoft) or systems that aid in problem-solving by transferring knowledge from one source to an individual who needs it. Strictly speaking, knowledge management does not include expert systems. The research is being conducted as part of the fulfillment of requirements, by the researcher, for the Doctorate of Business Administration Program at Northcentral University, Prescott, AZ.

Confidentiality

Individual responses will be used only to form summary results. Individual responses will not be communicated in any way. The confidentiality of your responses will be strictly protected. At the end of the survey, you have the option of including your name, telephone number and/or email address. This is included only if you wish to have the researcher contact you for follow-up questions regarding this project. If you chose to participate, your individual confidentiality will be maintained, unless permission is granted otherwise.

Questions

You may direct any questions or comments regarding this survey to the researcher:
Joseph Slavinsky
1347 River Ridge Drive
Collierville, TN 38017
(901) 850-9160
jwslavinsky@gmail.com

Directions for Completing the Survey

Please respond to *all* questions, indicating the *one* response that *best* reflects your answer to the question.
Thank you for your participation in this important research project.

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PART1-Questions Related to your Organization's Knowledge Management System.
Questions that refer to knowledge management systems may refer to a variety of computer systems including, groupware, knowledgeware, collaborative computing databases, knowledge repositories, or best practices databases.
Each of the statements is accompanied by a 7-point scale anchored at the ends by the labels "1 strongly disagree" (SD), "2 moderately disagree (MD)", "3 somewhat disagree (SWD)", "4 neutral (N)", "5 somewhat agree (SWA)", "6 moderately agree (MA)", "7 strongly agree" (SA).

		SD	MD	SWD	N	SWA	MA	SA	
1	My organization's knowledge management system allows me to perform both knowledge and people search	1	2	3	4	5	6	7	SYSTEM QUALITY
2	Whenever I do an online search on the organizational knowledge base, the retrieved knowledge is always what I need.	1	2	3	4	5	6	7	
3	People in one department generally dislike interacting with those from other departments	1	2	3	4	5	6	7	
4	Whenever I do an online search on the organizational yellow pages/expert directory, the returned linkage can always lead me to the right person to help me with the problem.	1	2	3	4	5	6	7	
5	Whenever I do an online search, the search result displays in a timely manner.	1	2	3	4	5	6	7	
6	My organization's knowledge management system allows me to write a query to search for needed information/knowledge.	1	2	3	4	5	6	7	
7	The knowledge management system I use is subject to frequent problems and crashes	1	2	3	4	5	6	7	
8	I can find most of the organizational knowledge I need online.	1	2	3	4	5	6	7	
9	Whenever I do online search, I need to try different ways to locate the needed knowledge.	1	2	3	4	5	6	7	
10	Whenever I do online search, I need to try different ways to locate the right person.	1	2	3	4	5	6	7	
11	The elapsed time between a user-initiated request for service or action and reply to that request in our knowledge management system meets my needs.	1	2	3	4	5	6	7	
12	Our knowledge management system is easy to use	1	2	3	4	5	6	7	
13	The set of vocabulary, syntax, and grammatical rules to interact with the knowledge management system meet my needs.	1	2	3	4	5	6	7	
14	My organization's knowledge management system provides me with the knowledge that I need.	1	2	3	4	5	6	7	KNOWLEDGE/INFO QUALITY
15	Knowledge provided by my organization's knowledge management system is usually more than I need.	1	2	3	4	5	6	7	
16	The knowledge within our knowledge management system is available when I need it.	1	2	3	4	5	6	7	
17	Knowledge within our knowledge management system is up to date.	1	2	3	4	5	6	7	
18	The knowledge in my organization's knowledge management system uses recognized vocabulary that I can understand rather than highly specialized terminology that confuses me.	1	2	3	4	5	6	7	
19	My organization's knowledge management system provides knowledge from multiple sources that is adequate for me to finish tasks and / or make decisions.	1	2	3	4	5	6	7	
20	Knowledge provided by my organization's knowledge management system has errors that I must work around.	1	2	3	4	5	6	7	
21	The knowledge in my organizational knowledge base provides contextual knowledge so that I can truly understand how that knowledge can be applied.	1	2	3	4	5	6	7	
22	My organization's knowledge management	1	2	3	4	5	6	7	

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	system allows me and my coworkers to exchange ideas and thoughts on common work practices.								
23	My organization keeps updating the linkages to the online directory so that I can locate newly hired or newly acquired expertise without any problem.	1	2	3	4	5	6	7	
24	The knowledge management system implementation in this business unit is generally considered a success.	1	2	3	4	5	6	7	USE/USER SATISFACTION
25	The knowledge management system initiative has received sufficient resources (people, money, etc.) to facilitate its success.	1	2	3	4	5	6	7	
26	Since its inception, the number of participants using the knowledge management system has consistently increased.	1	2	3	4	5	6	7	
27	Since its inception, the volume of knowledge content within the knowledge management system has consistently increased.	1	2	3	4	5	6	7	
28	Without the support of one or two key individuals, the knowledge management system would not likely survive.	1	2	3	4	5	6	7	
29	The process or function that I am most closely associated with has enjoyed benefits in terms of efficiencies or financial returns, from the use of the knowledge management system.	1	2	3	4	5	6	7	
30	This business unit as a whole has enjoyed benefits in terms of efficiencies or financial returns from the use of the knowledge management system.	1	2	3	4	5	6	7	
31	The knowledge management system increased my productivity.	1	2	3	4	5	6	7	NET BENEFIT
32	The knowledge management system has created innovative ideas.	1	2	3	4	5	6	7	
33	The knowledge management system has helped me meet customer needs.	1	2	3	4	5	6	7	
34	The knowledge management system improved the management of my work.	1	2	3	4	5	6	7	
35	The knowledge management systems meets the knowledge needs of my area of responsibility.	1	2	3	4	5	6	7	USER SATISFACTION
36	The knowledge management system is very effective.	1	2	3	4	5	6	7	
37	The knowledge management system is very efficient.	1	2	3	4	5	6	7	
38	Overall, I am satisfied with the knowledge management system in our organization.	1	2	3	4	5	6	7	

The following set of statements relate to your *feelings* about your knowledge management system unit. Please show the extent to which you believe your unit has the feature described by the statement. Each of the statements is accompanied by a 7-point scale anchored at the ends by the labels "strongly disagree" (=1), and "strongly agree" (=7).

		SD	MD	SWD	N	SWA	MA	SA	
39	The knowledge management system unit has up-to-date hardware and software.	1	2	3	4	5	6	7	PERCIE
40	The knowledge management system unit physical facilities are visually appealing.	1	2	3	4	5	6	7	
41	The knowledge management system unit employees are well dressed and neat in appearance.	1	2	3	4	5	6	7	

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42	The appearance of the physical facilities of the knowledge management system unit is in keeping with the kind of services provided.	1	2	3	4	5	6	7	V E D
43	When the knowledge management system unit promises to do something by a certain time, it does so.	1	2	3	4	5	6	7	
44	When users have a problem, the knowledge management system unit shows a sincere interest in solving it.	1	2	3	4	5	6	7	B E N E F I T
45	The knowledge management system unit is dependable.	1	2	3	4	5	6	7	
46	The knowledge management system unit provides its services at the times it promises to do so.	1	2	3	4	5	6	7	
47	The knowledge management system unit insists on error free records.	1	2	3	4	5	6	7	
48	The knowledge management system unit tells users exactly when services will be performed.	1	2	3	4	5	6	7	
49	Knowledge management system unit employees give prompt service to users.	1	2	3	4	5	6	7	
50	Knowledge management system unit employees are always willing to help users.	1	2	3	4	5	6	7	
51	Knowledge management system unit employees are never too busy to respond to users' requests.	1	2	3	4	5	6	7	
52	The behavior of the knowledge management system unit employees instills confidence in users.	1	2	3	4	5	6	7	
53	Users feel safe in their transactions with the knowledge management system's unit employees.	1	2	3	4	5	6	7	
54	Knowledge management system unit employees are consistently courteous with users.	1	2	3	4	5	6	7	
55	Knowledge management system unit employees have the knowledge to do their job well.	1	2	3	4	5	6	7	
56	The knowledge management system unit gives users individual attention.	1	2	3	4	5	6	7	
57	The knowledge management system unit has operation hours convenient to all users.	1	2	3	4	5	6	7	
58	The knowledge management system unit has employees who give users personal attention.	1	2	3	4	5	6	7	
59	The knowledge management system unit has the users' best interests at heart.	1	2	3	4	5	6	7	
60	Employees of the knowledge management system unit understand the specific needs of its users.	1	2	3	4	5	6	7	
61	Overall, the quality of service provided by the knowledge management system unit meet my needs.	1	2	3	4	5	6	7	

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PART 2 - DEMOGRAPHIC INFORMATION

Please complete the following demographic information

62. Gender: Male _____ Female_____

63. Your Company's Name:_____

64. Number of Years Employed with the Company

Less Than One Year	One To Three Years	Three To Five Years	Five To Ten Years	Greater Than Ten Years
1	2	3	4	5

65. Length of time using knowledge management system

Less Than One Year	One To Two Years	Two to Three Years	Three To Five Years	Greater Than Five Years
1	2	3	4	5

66. Your education level is:

Some or No Degree	Associates Degree	Bachelor's Degree	Master's Degree or beyond
1	2	3	4

67. Your position in this company is:

Non-Mgmt Professional	Supervisor / Manager	Sr. Manager / Director	Executive	President / CEO COO/CIO/CKO
1	2	3	4	5

OPTIONAL INFORMATION
Instructions:
If you choose to respond your answers will be kept strictly confidential, unless you indicate otherwise.

Name:
Phone Number:
EMAIL:

May we contact you for additional information?
Yes___ No____

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