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ORGANIZATIONAL AND SYSTEMS FACTORS
LEADING TO SYSTEMS INTEGRATION SUCCESS
AFTER MERGER AND ACQUISITION

MONIKA GLAZAR-STAVNICKY

Bachelor of Science in Business Administration

John Carroll University

May 1999

Master of Business Administration

Cleveland State University

May 2002

submitted in partial fulfillment of requirements for the degree

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at the

CLEVELAND STATE UNIVERSITY

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We hereby approve this dissertation

for

MONIKA GLAZAR-STAVNICKY

Candidate for the

Doctor of Business Administration degree for the

Department of

Computer & Information Science

and

CLEVELAND STATE UNIVERSITY'S

College of Graduate Studies by

____

Committee Chair, Dr. Raymond Henry
Department of Computer & Information Science / May 4, 2016

____

Dr. Radha Appan
Department of Computer & Information Science / May 4, 2016

____

Dr. Timothy Arndt
Department of Electrical & Computer Engineering / May 4, 2016

____

Dr. Richard Reed
Department of Management / May 4, 2016

May 4, 2016

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Date of Defense

DEDICATION

To my parents, who have supported me my whole life and continually prayed for my success.

To my husband, who encouraged me during the most difficult times and with patience, gave me focus.

To my daughters, who always make me smile and teach me something new every day.

This is a tribute to all of you. Thank you for all of the love, support, and encouragement.

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ORGANIZATIONAL AND SYSTEMS FACTORS LEADING TO SYSTEMS INTEGRATION SUCCESS AFTER MERGER AND ACQUISITION

MONIKA GLAZAR-STAVNICKY

ABSTRACT

Mergers and acquisitions (M&A) are a common technique used by companies to grow and enter new markets. The success rate of these transactions continues to be less than desired. Information Systems (IS) have been proven to be a key component influencing the success of mergers. While numerous factors have been found to lead to systems integration success, the studies have not analyzed the fit that is required when two organizations and systems are joined. This research focuses on the match between organizational variables of competencies and processes of two merging companies, as well as the match between systems variables of capabilities and technology. The results of this study attempt to show which factors impact systems integration success.

Utilizing secondary data sources, measures were gathered for US companies that have experienced M&A between 2008 and 2012. Data points at the time of merger were collected for both the target company and the acquirer, and then transformed into proxy measures for competencies, processes, capabilities, and technology. Each pair was regressed against the measure of systems integration success to measure fit and impact. With statistical outputs, the hypothesis related to technology was found to be partially supported. The study extends the current knowledge on factors impacting M&A success. Determining the most significant variables provides valuable insight to practitioners, as to what factors to focus on for successful integration.

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CHAPTER I

INTRODUCTION

As companies look to grow, they often turn to mergers or acquisitions. Mergers and acquisitions (M&A) offer a quick expansion of product offering and customer base. Mergers are one of the most researched areas in Finance, but they do not guarantee future success. Even with such rich information readily available, market studies conducted in the 2000's indicated that 50% to 70% of mergers and acquisitions fail to create value for shareholders (Bruner, 2002, Howard, 2007). While M&A activities have subsided in recent years due to poor economy, a 2013 KPMG survey found that U.S. executives expect the M&A market to recover. About 60% of respondents identified that their companies have large cash reserves, which can be used for acquisitions, to take advantage of low prices. This confirms that the need to identify concrete factors that bring M&A success is still a viable area of study.

M&A literature has extensive studies of organizational success factors, but little focus has been placed on how systems integration brings success (Markus, 2001). According to Deloitte Consulting, Information Technology (IT) integration plays an essential role in M&A activities and, if performed correctly, can increase M&A's success rate (Blatman, Bussey, & Benesch, 2008). Sarrazin and West (2011) showed that more than half of the synergies that are available in a merger and acquisition are related to IT. They urged professionals to build system architectures that are well suited for merging in new companies. With no empirical data available to prove that this direction is correct, this study plans to fill that gap.

Existing academic research on IT in M&A is often contradictory. No study exists where data was gathered from both the buyer and the target to understand the fit between organizational factors and system factors of the two companies. Several integration models have been developed (Giacomazzi et al., 1997, Chu and Huynh, 2010, Dao, 2010), but the most comprehensive model developed by Henningsson and Carlsson (2011) was not empirically tested. Completed quantitative studies have conflicting results. Chu and Huynh (2010) found a small positive correlation between the alignment of the firm's strategy and IT with IT performance, but this alignment had no significant correlation with M&A performance. Yet, Hagedoorn and Duysters (2002) showed a positive impact of strategic and organizational fit on technical performance of high-tech companies and overall M&A performance. Similar link between business strategy and IT integration tasks was found by Kovela and Skok (2012).

The Strategic Alignment Model introduced by Henderson and Venkatraman (1993) explains how business and information technology must be aligned in terms of strategy and infrastructure. Following this model's concept of integration and prior research, the focus of this study is on the alignment between the organizational and systems factors joined after an M&A. By analyzing the fit of systems factors and the fit of organizational factors, the results show which factors have significance in leading to systems integration success. The research aims to answer the question: ***Does the fit between organizational factors and the fit between systems factors have a positive impact on systems integration success after M&A?***

The completed research measures fit between integration success factors at both organizational and systems levels. The variables are analyzed individually to measure fit and impact on systems integration success. The study gathered pre- and post-merger data about merging organizations, and statistical analysis was performed to determine which measures have significant impact on the success variable. The findings of this study expand the current knowledge on organizational and IT factors in M&A. Defining the most significant variables enriches current literature with additional measures for determining M&A success. This valuable insight can guide business practitioners on what factors to focus on for successful integration.

Chapter II of this paper provides a literature review on topics of mergers and acquisitions, enterprise architecture, infrastructure, IT business value, and fit. It reviews the findings and drawbacks of existing studies of IT in M&A. The problem statement with proposed model is presented in Chapter III. Each variable is defined, followed by hypothesis for its fit’s relationship with the dependent variable. Chapter IV introduces the research method. It defines the sample size and data gathering approach. Chapter V reports the statistical results for each variable and Chapter VI discusses which hypotheses were proven and their limitations. At the end, the conclusion in Chapter VII summarizes the findings and explores future research options.

CHAPTER II

LITERATURE REVIEW

Mergers and Acquisitions

Companies worldwide continue to use mergers and acquisitions as a strategy to grow their business and revenues. Rather than building a new capability from scratch, the acquiring company makes the decision to buy it. After a slowdown caused by the recession in the last decade, small and middle size companies are now experiencing a new wave of mergers, acquisitions, and consolidations. These examples of inorganic growth provide the acquiring company with access to new products, customers, and locations (Sherman, 2011). While the terms ‘merger’ and ‘acquisition’ are often used interchangeably, it is critical to define the difference between them, as well as their types.

A merger is the act of combining two or more companies. The decision to merge is made and agreed to mutually by the companies. Assets and liabilities of the purchased firms are absorbed into the buying firm. The purchasing company retains its identity. In a merger of equals, two same size companies merge to form a new single company. An acquisition, on the other hand, is a purchase of an asset, division, or whole company. The decision is made by the purchasing firm, which assumes control of the target firm by buying ownership’s majority share. In a friendly acquisition, the target company gives approval and wants to be acquired. A research study by Hitt et al. (1998) determined that friendly acquisitions are more likely to be successful. At times, the acquiring firm is seen as a hero coming to the rescue of the failing target. In a hostile acquisition or takeover, the acquired firm does not want to be purchased and the buyer must act quickly to gain control before the target company can react. For an effective acquisition, the stronger company purchases the assets of an inefficient firm and puts the acquired resources to better use (Hackbarth & Morellec, 2008).

Mergers and acquisitions are cyclical and depend on where the buyers or sellers are in the company’s life cycle. Acquiring companies just starting out are looking to build the company through large acquisitions. On the other side of the spectrum are more mature companies, who have digested many purchases and now, are turning into sellers as they divest assets that are not performing (Sherman, 2011). As a company makes purchases, it builds the adaptation skills required to make integration after M&A successful. Firms that are active acquirers are able to quickly and smoothly integrate the two firms. Prior acquisition experience gives the company valuable knowledge on how to select the best target, negotiate, and integrate effectively (Hitt et al., 1998). Many large companies have departments dedicated to acquiring and integrating smaller firms. They have standard routines and plans that are followed with each new acquisition (Haspeslagh & Jemison, 1991). Ellis et al. (2011) found that acquirers that had prior experience with large mergers had a positive transfer effect to future large acquisitions with the ability to apply standards and improve performance. Companies that build long-term shareholder value are frequent and steady acquirers. They learned from small deals before moving to the big ones (Rovit et al., 2004).

New M&A trend caused by the quickly changing technology of our times is to acquire a company to access its intellectual property. Many technology companies make buys to get the skilled employees or unique inventions. The need to keep up with competitors is the main reason why companies look to buy and stay current (Sherman, 2011). Hitt et al.'s (1998) study found that firms that focused on innovation with investments in research and development were effective in M&A's executions. Haspeslagh and Jemison (1991) call the act of buying a company for its skills, acquiring a capability. A firm makes a quick purchase to acquire a specific function that allows it to move forward with a business strategy or to meet ever-changing customer needs. Functional and management skill transfer allows the acquiring firm to create value by bringing in knowledge that can help it be more competitive.

The company's motive behind the acquisition will guide the company to either explore new expertise when entering a new business, or exploit existing capabilities that compliment current business line (Phene et al., 2012). Haspeslagh and Jemison (1991) developed a model that links M&A implementation to autonomy of the acquired firm, thus defining four types of organizational integration approaches. The level of autonomy originates in the nature of resources and capabilities of the firm. With low autonomy and low strategic interdependence, the purchased company is held as a subsidiary. This integration approach is called holding. With a subsidiary acquisition, the newly purchased company operates as a separate entity reporting into the parent company. When the acquired company has high autonomy and low strategic interdependence, the company goes through preservation as its own separate company. The buyer will nurture the company's separate existence. With high autonomy and high strategic interdependence, the purchased company is slowly integrated into the purchasing company with a strong focus to not lose its core competency. This is called symbiosis. The companies will join areas with obvious economies of scale and look for opportunities to retain the best assets from each company. Finally, with low autonomy and high strategic interdependence, the company is absorbed into the acquiring firm as in a take-over. This is absorption.

The question of M&A's success has been studied from various angles in academic literature. From the Finance perspective, research has found that, on average, M&A transactions are profitable for target company's shareholders, but the buyer's shareholders earn zero returns. However, when combining the two sides, returns are positive (Bruner, 2002). By reviewing NYSE acquirers over a 30+ year period, Agrawal, Jeffe, and Mandelker (1992) determined that stockholders of acquiring firms lost 10% of their stock value in a five-year period after a merger. They were not able to identify a clear reason for this loss. How to prevent such financial losses remains a key question for researchers.

Research shows that relatedness of the companies involved in an M&A impacts the rate of success. Conglomerate deals (mergers between firms of unrelated lines of business) tend to be associates with worse performance than mergers of related businesses (Bruner, 2002). Savings and synergies come from economies of scale. Firms that acquire their competitors are able to leverage core businesses and bring value to the M&A quickly. On the other hand, firms that diversify are unsuccessful (Hitt et al., 1998).

Resource sharing is possible when the firms perform the same functions and thus result in cost improvements (Haspeslagh & Jemison, 1991). Sharing of distribution channels or sales force is not possible in conglomerate mergers.

Speed is another success factor. Impact of speed of integration on M&A success was studied by Homburg and Bucerius (2006). Speed was defined as the time period required to complete integration of systems, structures, activities, and process of the two merging companies. Researchers found that the interaction of speed with internal relatedness factors (strategic orientation, management style, and performance) has a positive impact on predicting M&A success. Since each month of delay results in a loss of potential savings, developing a quick integration strategy is critical. Speed of M&A integration can be accelerated with early planning. While negotiations are still taking place, a third party should start to review information about the perspective merging companies, thus giving the integration effort a head start (Chanmugam et al., 2005).

From a financial perspective, lack of success is often the outcome of payment method used during the M&A. Paying with stock often leads to negative returns, as the purchase is made at the time when shares are overpriced. During negotiations, as the deal becomes more likely, the target firm’s value will increase as does the risk (Hackbarth & Morellec, 2008). On the other hand, cash transactions are more likely to be neutral or slightly positive (Bruner, 2002). Companies that have large amounts of available cash or favorable debt positions are better poised for a successful integration (Hitt et al., 1998). It is difficult to reinvest in the company, when shareholders would rather have their money back, and diversifying acquisitions do not raise profits (Mamdani & Noah, 2004).

The objective of every M&A is to bring value to the buyer. While the M&A process is in a mature state, companies continue to struggle with how to best achieve this goal. Haspeslagh and Jemison (1991) differentiated between value capture and value creation. Value capture is a one-time transaction, while value creation is a long-term event that results from managerial actions. The value creation process builds and sustains competitive advantage for the buyer. According to Bruner (2002), value is created for shareholders when managers and employees have an invested interest in the transaction. Differences between the two companies need to be identified as early as the bidding process and addressed by incorporating elements that best support the final organization.

Retaining employees that fit with the desired outcome creates value. Structural reorganization to better manage resources is another tool to create value after M&A (Chanmugam et al., 2005). Target management retention has a positive effect on the purchaser's return on assets (Ellis et al., 2011). Hitt et al. (1998) found that in an unsuccessful M&A, loss of key executives shortly after the acquisition caused a loss of control. Rovit, Harding, & Lemire (2004) suggest that the best practice is to bring the line managers into the merger process very early, since they will be the ones running the purchased company. Their early engagement will result in buy-in from the business units and ownership of the integration process, as well as its success. A positive organizational environment brings future productivity.

Information Systems in M&A

All businesses are dependent on information technology, at some level, to maintain their day to day operations. After any M&A, a critical integration of two information systems is required. Synergies and savings in M&A are frequently derived from information systems (McKiernan & Merali, 1995). Existing literature focuses on five aspects surrounding IS in M&A (Table I). First is the importance of IS involvement in planning stages of the merger. The second aspect addresses the different ways IT environments can be integrated, while the third presents different models of IS integration success and validates success factors through case or empirical studies. The fourth area of research explores the critical success factor of employee retention. Finally, the fifth is a set of articles that focus on mergers of high-tech companies.

Table I: Information Systems in M&A Literature

Title/Author	Focus	Findings
"Managing Risks: Post-Merger Integration of Information Systems" (Alaranta and Mathiassen, 2014)	Retention of Knowledgeable Employees	Three types of risks need to considered in M&As: 1)Process risks, 2)Content risks, 3)Context risks
"Managing the Strategic Dynamics of Acquisition Integration: Lessons from HP and Compaq" (Burgelman and McKinney, 2006)	High-tech Companies	Four Acquisition Integration processes: 1)Formulating the Integration Logic and Performance Goals, 2)Creating the Integration Plan, 3)Executing Operational Integration, 4)Executing Strategic Integration
"The Importance of Human Needs Analysis in the Due Diligence Process." (Carpenter, 2005)	Retention of Knowledgeable Employees	Review of failed mergers showed that human needs analysis should be part of requirements definition
"Effective Use of Information Systems/Technologies in the Mergers and Acquisitions Environment: A Resource-Based Theory Perspective." (Chu and Huynh, 2010)	Integration Model	Model based on Resource-Based theory; Found negative correlation between IS/IT performance and M&A performance, positive correlation between strategic objectives and IS/IT contribution with IS/IT performance, and no correlation between IS/IT contribution and M&A performance
"Impacts of IT Resources on Business Performance Within the Context of Mergers and Acquisitions." (Dao, 2010)	Integration Model	Model based on Transaction Cost Economics theory; Not tested
"Information systems integration in mergers and acquisitions: A normative model." (Giacomazzi et al., 1997)	Integration Model	Descriptive model and Decision Support model; Significant factors are Simplicity of integration and Differences in management needs

Title/Author	Focus	Findings
"The Effect of Mergers and Acquisitions on the Technological Performance of Companies in a High-tech Environment." (Hagedoorn and Duysters, 2002)	High-tech Companies	Strategic and organizational fit, Relatedness, R&D intensity, and Size of companies had a positive impact on technological performance
"IS integration: Your most critical M&A challenge?" (Harrel and Higgins, 2002)	Integration Approach	Key success factors: internal and external staffing, communicate with end-users, do not modify commercial software, management support, retain team members with knowledge
"The DySIIM model for managing IS integration in mergers and acquisitions." (Henningsson and Carlsson, 2011)	Integration Model	Integrated Framework with the following dimensions of IS integration: synergistic potential, organizational integration, intensions and reactions, IS ecology, integration architecture, IS integration role
"Mergers and Acquisitions in Banking: Understanding the IT Integration Perspective." (Kovela and Skok, 2012)	Integration Approach / Retention of Knowledgeable Employees	Based on Grounded theory; Found link between business strategy and IT integration tasks
"Integrating Information Systems After a Merger." (McKiernan and Merali, 1995)	Acquisition Planning	Examined reactive versus proactive role of IS/IT; When IS/IT was not considered until Planning for post-acquisition integration phase, only 60% achieved full integration
"Strategic Alignment In Mergers And Acquisitions: Theorizing IS Integration Decision making." (Mehta and Hirschheim, 2007)	Acquisition Planning	Framework based on Post-Merger Business-IS Alignment Profile for Horizontal Integrations; Does not address IS infrastructure and process
"When Do Acquisitions Facilitate Technological Exploration and Exploitation?" (Phene et al., 2012)	High-tech Companies	Common technological knowledge had a positive impact on both exploration and exploitation; Mode of acquisition had a positive impact on exploration
"What they know vs. what they do: how acquirers leverage technology acquisitions." (Puranam and Srikanth, 2007)	High-tech Companies	Structural integration had a positive effect on acquirer's success of leveraging existing knowledge and a negative effect on acquirer's success of leveraging innovative capabilities
"Acquiring New Knowledge: The Role of Retaining Human Capital in Acquisitions of High-Tech Firms." (Ranft and Lord, 2000)	Retention of Knowledgeable Employees	Used Theory of Relative standing; Retention is critical to gaining new technological capabilities

Title/Author	Focus	Findings
"Acquiring New Technologies and Capabilities: A Grounded Model of Acquisition Implementation." (Ranft and Lord, 2002)	Retention of Knowledgeable Employees	Expanded Model of Acquisition Implementation based on Grounded theory; Dilemma of rather to preserve knowledge or integrate resources
"Understanding the strategic value of IT in M&A." (Sarrazin and West, 2011)	Acquisition Planning	Three things to do to get integration on the right track: 1)Get own IT in best possible shape, 2)IT leaders have a seat at the due-diligence table, 3)Plan post-merger integration including the role of IT
"Corporate mergers and problems of IS integration." (Stylianou et al., 1996)	Acquisition Planning	IS participation in merger planning, quality of merger planning, criteria used for setting IS integration priorities, and high level of data sharing across application have a positive impact on IS integration success
"Ramp new enterprise information systems in a merger & acquisition environment: a case study." (Sumi and Tsuruoka , 2002)	Integration Approach	Key success factors: subsystems distributed functionally and physically, adoption of standard package software, and combination of internal work and outsourcing
"Post-merger IT integration strategies: An IT alignment perspective." (Wijnhoven et al., 2006)	Acquisition Planning	Developed Causal Model for post-merger IT integration; Standardization of software and hardware was easy with collaboration, but integration of IT policy required a lot of socialization
"Information Technology Strategies in Mergers and Acquisitions - An Empirical Survey." (Wirz and Lusti, 2004)	Integration Approach / Retention of Knowledgeable Employees	Key success factors: communication, network, consultants, system choice, management, administration of obsolete systems, and no parity

With the critical functions performed by IS in all businesses, the merging of these functions needs to be a key topic in the initial stages of acquisition planning. Information systems integration should be aligned with the business objectives of the merger and considered in the context of the merger (Wijnhoven et al., 2006, Mehta & Hirschheim, 2007, Sarrazin & West, 2011). Unfortunately, integration of technology is often an afterthought for businesses. Strategic Alignment Model (Figure 1) developed by Henderson and Venkatraman (1993) stresses that a strategic fit must exist between business strategy and organizational infrastructure, as well as between IT strategy and IS infrastructure. In addition, strategic functional integration is the link between business and IT strategies. Operational integration is the link between organizational and IS infrastructures. The model stresses that IT is an external source of strategic competencies.

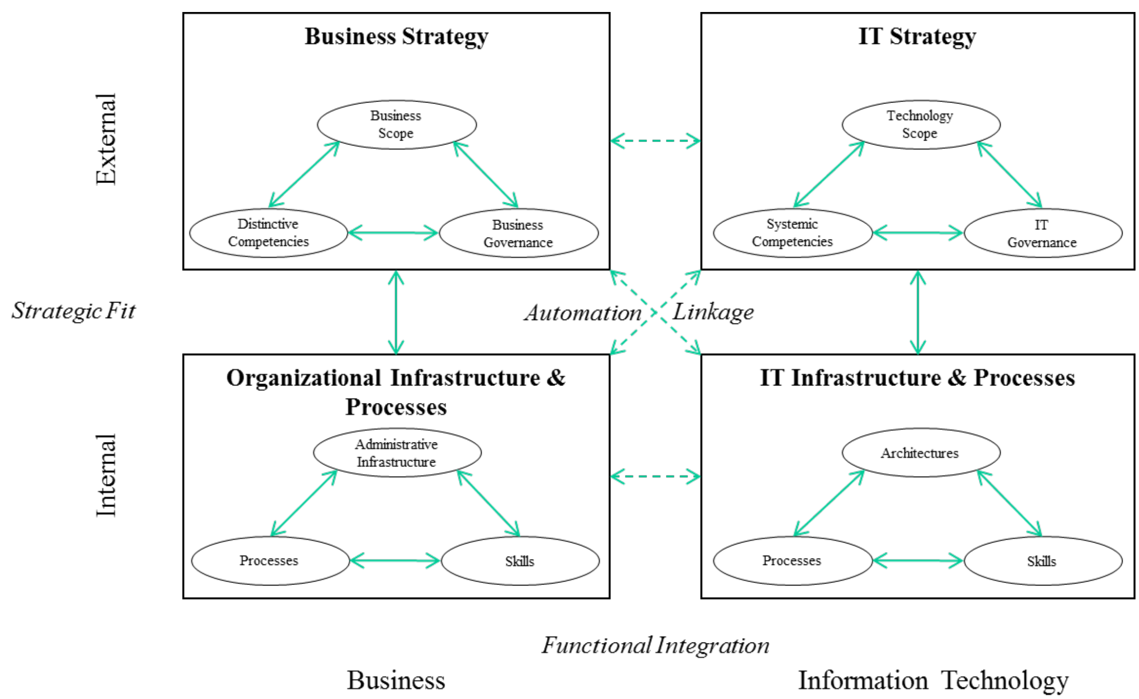

Figure 1: Strategic Alignment Model (Henderson and Venkatraman, 1993)

Information Technology has a broad role and scope within the organization. The key is to introduce the IS integration topic into the decision making process before the merger deal is signed. Merged companies that do not fully address their information technology functions upfront could end up with fragmented systems (McKiernan & Merali, 1995). Sarrazin and West (2011) suggest an even earlier step that will ensure smooth integration. The company should standardize IT and get it in best possible shape, before considering any acquisitions. Having a Service-oriented architecture and an

Enterprise Resource Planning (ERP) system makes it easier to adopt additional applications or businesses.

Past literature has identified four types of integrations commonly executed when joining IT environments: take-over, standardization, disconnection, and renewal (Harrel & Higgins, 2002, Wirz & Lusti, 2004). Most common integrations are take-overs and standardizations. Take-over is the shutdown of the purchased IT environment and the moving of the acquired company's functions to the buyer's systems. Standardization or 'best-of-breed' is using the best components (applications or infrastructure) from both IT environments. Often this means adopting the newer system from either company. After analyzing eight case studies, Kovela and Skok (2012) based their integration model on 'best-of-breed' approach to guide banks in future M&A transactions. With banking being a very standard business model, this integration type was most applicable. Disconnection, also known as periodic approach, calls for leaving both systems in place and periodically synchronizing some functions as needed. Finally, renewal is the acquisition of a new IT infrastructure while abolishing existing systems at both companies. Buyers have to be careful with renewal, as it is the most invasive type of change with impacts to both entities. Case study by Sumi and Tsuruoka (2002) presented a case where a company was successful with renewal after M&A by very quickly implementing a new integrated system with full utilization of a standard package. Harrel and Higgins (2002) agreed that a key success factor when it comes to IT is to not modify commercial software.

Various models have been presented in literature for IS integration in M&A. Giacomazzi et al.(1997)'s descriptive model showed that the integration strategies are impacted by not only the company structure and M&A situation variables, but more importantly by IS requirements like economies of scale, standardization, and data integration. They found that simplicity of integration and differences in management were the most significant when deciding the integration direction. Thus, IS integration depends on both technical and organizational factors. A model built on resource-based theory was evaluated by Chu and Huynh (2010) to understand the influence of IT contribution on financial performance after M&A. Contrary to common belief, their results showed that IT performance has a negative impact on M&A performance and found no correlation between IT contribution and M&A performance. The authors explain these findings as the effect of possible disruptions that take place when the resources and capabilities of merging companies are different. Dao's (2010) framework focused on IT resources (tangible and intangible) and predicted their impact on firm performance in relationship to type of merger. This model has not been tested. The latest model developed by Henningsson and Carlsson (2011), shows the constant interaction between synergy, organizational integration, IS ecology, integration architecture, and IS integration role. These variables work together in a dynamic manner to bring integration success. While the model was not empirically tested, several case studies showed how the different components affect each other during the integration process.

A common success factor of IS integration after M&A is the retention of knowledgeable employees. To improve the probability of IT integration success, priorities of an IT merger should be to complete the merger quickly and to retain the resources that have core knowledge of each system (Wijnhoven et al., 2006). These goals work hand in hand, as long projects result in loss of motivation and cause employees to leave. Best resources can easily find positions elsewhere and often choose to escape the insecurities of keeping a job after M&A (Alaranta & Mathiassen, 2014). Not all researchers agree that fast execution is the best way to approach systems integration. Ranft & Lord (2002) found that slower acquisitions were more successful at retaining knowledge, as they took the time to learn about the acquired firm's technologies. While there is debate on how to best apply these resources, the fact remains that they are critical. Kovela and Skok's (2012) exploratory study discovered that IT-related advantage in banking M&A's gains is achievable only if the staff is experienced and motivated.

Managing IT resources after a merger is difficult because of conflicting priorities. Often these same resources are responsible for day-to-day operations and have little time to do integration work (Wirz & Lusti, 2004). This resource constraint often prolongs that integration period. Ranft and Lord (2000) studied the importance of human capital in high-tech firm acquisitions. Their study showed that autonomy, status of acquired firm, and acquirer's commitment had a positive impact on employee retention. However, financial incentives did not convince employees to stay with the company. Carpenter (2005) stressed that human needs of IT professionals have to be considered. Employees need to be able to achieve results, build relationships, have a sense of security, and receive recognition to be successful. These organizational factors cannot be overlooked after M&A.

Several articles have focused on integration of two high-tech companies after M&A. Phene, Tallman, and Almeida (2012) identified how the reason for the acquisition defined the direction of IS integration in the semiconductor industry. Acquisitions can be made to explore (develop new areas of expertise) or to exploit (reinforce existing capabilities). Technological uniqueness in explorations means that the purchaser will retain the purchased IT system because the purchase was made to acquire this asset. Surprisingly, the researchers found that level of control after the M&A is more critical in explorations than in exploitations, indicating that it is essential for the purchaser to manage the target company so as not to lose the newly acquired expertise. Puranam and Srikanth (2007) showed that the high level of structural integration is beneficial in leveraging existing knowledge, but it extinguishes future innovative capabilities of the acquired firm. Relatedness, defined as operating in the same product-market, was the focus of Hagedoorn and Duysters (2002) research of M&A in a high-tech sector, an area full of distinct abilities. When analyzing technical relatedness and research intensity, their analysis showed that these factors displayed a positive effect on post-merger technical performance.

The above research has either focused on organizational factors or on technical factors related to IS integration. None of the above studies addresses how the two companies fit together from both an organizational and systems perspective, which is a key component of this research. In addition, the true value of IS integration and the right level of integration is unclear. Only 60% of companies that do not include IS in pre-acquisition planning achieve full integration (McKiernan & Merali, 1995). At the same time, full integration can impede innovative capabilities of the acquired firm (Puranam & Srikanth, 2007). With a comprehensive model that measures both organizational and systems values, along with a control variables found in prior research, the results of this study show which organizational and/or systems fit leads to systems integration success.

Integration

The complex topic of integration has been extensively researched in IS literature from different perspectives. Businesses strive for integration as it results in efficiencies, increased productivity, and reduced maintenance. However, making integration a reality is difficult. From a business point of view, Wainwright & Waring (2004) determined that organizational domain of the integration concept is often overlooked, as companies focus on the technical and strategic domains. They proposed a framework that covers all three domains. Other contributions are in the IT-enabled change management area, like Hsiao and Ormerod's (1998) framework that calls for integration of strategy, human actors, structure, management processes, and technology.

IS-centric literature has approached the topic of integration from two perspectives. The high level focus is on systems integration, defined as joining company's information systems and databases to improve process flow and customer service (Markus, 2000). The unification makes systems consistent and information is displayed the same across systems, providing one version of the truth. The other, more specific perspective, is on data integration defined as integration achieved with standardization of data definitions and structures. This ensures that data has the same meaning across time and users, making data compatible in different systems and databases (Martin & Finkelstein, 1981).

For systems integration, Markus (2000) identified three approaches to achieve systems efficiencies. The first is data warehousing, where the company extracts data from different applications' database into one central reporting repository. Second is the adoption of an ERP system, an integrated software package, where all functions share a common database. The third approach is to re-architect the whole systems solution to add a middle layer between applications and their databases. This approach uses middleware software which establishes one interface to each database and application. Depending on the size of the company and resources available, one of the above solutions is chosen to reap the rewards of integration.

Systems integration is often overlooked when new systems are developed for companies. To build a consolidated systems' infrastructure, integration of each new application is critical. Mendoza, Perez, and Griman (2006) identified critical success factors that should be used in managing IS integration projects. The factors are dependent on the integration maturity level that is currently in place at the company. The levels proposed by Schmidt (2000) start with point-to-point integration with a basic link between just two applications to share data. The next level is structural, where a company uses middleware tools to join multiple applications. Process integration goes to the next level, managing the flow of data between several applications, where each system enriches the data. Finally, at the highest level of external integration, the business uses real-time applications that transform the business process and creates a direct link to the supplier and/or customer. The goal of every company should be to gradually evolve with each project to the highest level, which delivers the highest customer satisfaction.

Similarly, Bygstad, Neilsen, and Munkvold (2008) analyzed four integration patterns used in IS development projects to bring system integration to the forefront as a key deliverable. Projects must align their solution to the organization and the technical environment that is in place. The first pattern is big bang, where the integration of stakeholders and technology is done at the end of the project. With stakeholder integration pattern, stakeholders are integrated stepwise, while technology is done at the end. The opposite is true with technical integration, where technical integration is done stepwise and stakeholders are done at the end. The last pattern, social-technical integration has both stakeholders and the technology integrate stepwise during the life of the project. While the last pattern greatly reduces integration problems when the project is completed, project control is very difficult as stakeholders and technology experts have two very different lists of priorities. Since most projects are faced with extreme time pressures, this pattern of integration is rarely attempted. However, it shows that an integration that includes both the organization and systems brings the most value.

Key piece of literature on the topic of data integration is the article by Goodhue, Wybo, and Kirsch (1992) published in MIS Quarterly. While other articles focus on the benefits derived from data integration, the authors address the losses and costs incurred with such implementations and that benefits of integration will outweigh the costs only in certain situations. True data integrations require that everyone has the same common language for the same data. This means utilizing the same identifiers for products and executing the same calculations in aggregations. Costs increase when the subunits being integrated are significantly different. Once in place, high levels of integration make changes difficult as they impact several business units. With high number of heterogeneous subunits, the costs of creating an acceptable design that meets everyone's requirements gets out of hand, so firms choose not to integrate. To keep costs down, alternative data integration has been proposed for the financial sector. The proposed model places an integration layer between the data sources and users' access interfaces. This middle layer breaks down the query into smaller sub-queries that are executed against the multiple data sources, and then integrates the results in real-time to create one global answer (Pan & Vina, 2004).

Specifically for M&A caused integrations, Deloitte Consulting defined four systems integration models of preservation, combination, consolidation, and transformation (Blatman, Bussey, & Benesch, 2008). Giacomazzi, Panella, Pernici, and Sansoni (1997) organized their integration model into three integration strategies of total integration, partial integration, and no integration. With total integration or consolidation, the plan is to use the same software packages and applications at both companies. Best of breed systems are often selected from each company. In partial integration or combination, only software that supports the same business processes is shared. Finally, with no integration or preservation, the buyer does not require any integration of IS, as the acquired systems remain in place. Wirz and Lusti (2004) added an additional level of new system procurement, which equates to transformation. With this type of integration, brand new systems are acquired and technical operations for both companies are transferred to them.

Enterprise Architecture

Each business that goes through a merger or acquisition understands how critical technology is to their operations. IT supports their existing processes, but also allows for future growth and new abilities. IS architecture is a portfolio of technology and data that aligns with internal business strategy (Henderson & Venkatraman, 1993). Enterprise architecture (EA) gathers data in one place, makes hardware, software, and resources accessible, and ensures that staff is productive in processing and producing information for outward communication (Richardson et al., 1990). Similarly, in early literature, information architecture was defined as a “set of policies and rules that govern an organization’s actual and planned arrangements of computers, data, human resources, communication facilities, software, and management responsibilities” (Allen & Boynton, 1991). With each company having their own EA, the two need to be integrated after M&A to create one comprehensive IT solution.

Ross, Weill, and Robertson (2006) define enterprise architecture as “the organizing logic for business processes and IT infrastructure, reflecting the integration and standardization requirements of the company’s operating model.” To build a strong base, they presented architecture development as a three step process. First, the company must have an operating model which establishes the level of business process integration. Second, enterprise architecture is established based on the operating model. It is critical that this architecture has a long-term view of processes, systems, and technologies. Finally, constant IT engagement guarantees the company objectives are met in all business and IT projects. At this last step, architecture is maintained into the future. Building on the idea of critical enterprise architecture maturity, Bradley et al. (2012) proved in their study that increased maturity improves IT alignment and effectiveness, which in turn increases enterprise agility.

As the concept of enterprise architecture developed, three most popular models have been established and evaluated: TOGAF, Zachman, and FEAF. Simon, Fischbach, and Schoder’s (2013) EA literature review has also found them to be the most cited frameworks. TOGAF was created in mid-1990s by The Open Group’s Architecture Forum, which is currently composed of more than two hundred organizations from all over the world. Its Architecture Development Methods provide step by step instruction for developing enterprise architecture. The flexible framework allows for parts or phases to be used independently, thus a company can slowly build its architecture (Meaden, 2012).

Before TOGAF, the most referenced framework was the Zachman's Framework for Enterprise Architecture (Simon et al., 2013). Zachman's framework is a classification based matrix with abstractions in columns labeled What, How, When, Who, Where, and Why, while the rows show perspectives representing a progressive growth in establishing the architecture. The framework, which was released in 1987, progresses from identifying parts or resources, through representing them in an information system, to presentation of the final product to the customer. Each cell is a representation of a different perspective and thus, explicitly different from every other piece. Cells on different rows can be combined to establish a relationship or show a business process. Thus, the entire framework does not need to be completely filled out in order to derive its benefits (Meaden, 2012). Most recently, Kappelman and Zachman (2013) argued that Zachman's framework is an ontology or a specification that brings common understanding and continues to have value in today's IT architecture.

Developed by The Chief Information Officers Council and released in 1999, FEAF (Federal Enterprise Architecture Framework) met the need to develop, maintain and facilitate top-level enterprise architecture for the government. The architecture provides a direction on IT development and allows for information and resources to be easily shared across federal agencies. The framework is a guide on how to reach the target architecture from current state. To make this possible, standards and transitional process are established. Next Zachman's framework is used to show the "How to" or the planning phase of enterprise architecture development. The architectural segments are interconnected with models related to three architectures: data, application, and technology. The models that are built with this process are shared across federal agencies, enforced and modified as needed.

The benefits of EA are wide ranged and determined by the level of IT and business involvement. Researchers have found that the establishment of EA is usually spearheaded by the IT organization not the business. As a result, system components are well represented in the model but business elements like distribution channels are often omitted (Simon et al., 2013). Because EA affects information systems' day-to-day operations, Boh and Yellin (2007) studied effectiveness of EA standards in IS. Such standards identify how IT structure, enterprise data, and corporate applications are organized to support the business. They are used to guide management, like a road map, when faced with technology alternatives. Standards are used to manage technology (physical data infrastructure), people (human IT infrastructure), applications systems (integrating business applications), and data (integrating enterprise data). Researchers found that standards have a most significant impact on managing physical and human IT resources. Sharing and integration of applications and data is also improved. Interestingly, business involvement had a negative impact on use and conformance to EA standards. Thus, information systems and IT resources have the most impact on EA success.

Organizations continue to struggle in understanding EA benefits and its value, causing business to not be actively involved. In one of the early cases of documented enterprise architecture development, Texaco and Star Enterprises learned that users do not consider architecture to be important initially, and have to be educated to understand its real value and importance in meeting company goals (Richardson et al., 1990). Recent study by Hazen et al. (2014) showed that training the business enhances use of EA. Architecture must be efficient and flexible, to allow for timely response to changing conditions in the market place and in technology. These are seen as two extremes, which are difficult to achieve at the same time, and the right solution depends on the organization (Allen & Boynton, 1991).

By reviewing EA literature, Tamm et al. (2011) grouped possible benefits of EA into four enablers: organizational alignment, information availability, resource portfolio optimization, and resource complementarity. With organizational alignment, sub units of the company share a common goal, which encourages cooperation and consensus. Information availability gives dependable information to company's decision makers with a single source of data that allows for faster decisions. Resource portfolio optimization defines how well a company leverages its current resources. By having full visibility to the portfolio, a company can eliminate redundancies with standardization of applications and business process, resulting in cost savings. Finally, resource complementarity ensures that resources continually work towards achieving strategic goals. IT expertise is reused across many business-units, thus increasing responsiveness and agility.

Proposed enterprise architecture is often articulated in an enterprise model. Per McGinnis (2007), enterprise modeling is defined as a discipline focused on creating models that guide "designing and implementing software systems that support enterprise operations." Modeling is used to document IT architectures and enterprise. It allows for requirements to be mapped to functionality of the technical solution. Unfortunately, software vendors have their own preferred modeling solutions which work with their developed enterprise transformation approach. User communities have been formed for each model presented above and no common modeling framework exists.

IT Infrastructure

Enterprise architecture models become reality when information systems infrastructure is established at a company. Dependable infrastructure brings reliability and flexibility. These factors allow for ease of integration when merging in additional business units or purchased companies. IT infrastructure is composed of hardware, software, data, and network. A key success factor of IT infrastructure is accessibility to data. While companies may share the same hardware with same applications and network, what makes them different is data (Rusu & Smeu, 2010). Reliable infrastructure makes data available to the business at all times. Management understands the importance of infrastructure, as a CIOinsight (2004) survey found that 80% of 561 IT executives saw the benefit in infrastructure spending.

To create business-driven IT infrastructure, its direction must be guided by the firm's strategy. IT components, along with human IT resources and services provided, create a foundation for supporting business processes. IS management balances investment costs with future options and flexibility to support long term goals. Business unit synergies allow for future system reusability. At the same time, business units must not lose their autonomy. According to Broadbent and Weill (1997) there are four possible stances on how to approach IT infrastructure. The first approach ignores the synergies among business units and allows each one to have its own systems. Second, the utility view sees IT expenses as a way to reduce costs through sharing. Third, the dependent view focuses on only current strategies and ignores existing systems. Finally, the enabling view is an overinvestment to provide flexibility for the future. Companies that have high IT expenditures offered a high level of service and focus on flexibility. High spending is not always the right answer. Rusu & Smeu (2010) created an algorithm for a reliable enterprise IT infrastructure and found that investing large amounts of money results in marginal rise in reliability. Companies must find the “sweet-spot”.

True value of an IT infrastructure and its development comes from its flexibility. Allen and Boynton (1991) stated that flexibility is the most critical factor in selecting any IT application or system. Defined as the ability of a resource to be used for more than one end product, flexibility gives a company a competitive edge to quickly take advantage of new opportunities. Flexible organizations have the ability to control the outside forces effectively and thus achieve a favorable competitive position (Byrd & Turner, 2000). “Firm’s infrastructure can make strategic innovations in business process feasible, while the characteristics of competitors’ infrastructure may likewise cause their inability to imitate innovation rapidly enough to mitigate the first mover’s advantage,” as stated by Duncan (1995). These characteristics, that make quick adoption possible, depict infrastructure flexibility.

To measure flexibility, one must understand the degree to which resources are shareable and reusable. Connectivity of IT platforms defines the availability or reach of systems on a network. Range or capacity to share different IT services depends on the configuration of infrastructure components. But, to work together, the systems must also be compatible. The three factors that define total IT capabilities are alignment of IS to business objectives, IT architecture, and skills of IT resources. Thus, the framework for evaluating Infrastructure Flexibility presented by Duncan (1995) has three elements: technological components, flexibility characteristics, and types of flexibility indicators. Components are platform, network, data, and applications. Flexibility characteristics are compatibility, connectivity, and modularity. Modularity is the level of ease at which any component of the infrastructure can be added, modified, or removed. Indicators of flexibility are component characteristics, IS resource management practices, and IT capabilities.

Byrd and Turner (2000) analyzed IT flexibility from two perspectives, technical IT infrastructure and human IT infrastructure, without looking at their impacts on any dependent variables. Their initial factor analysis had some legitimacy. But more importantly, their second-order analysis showed that their factors can be consolidated to three dimensions of integration, modularity, and IT personnel flexibility. The integration factor merges connectivity and compatibility. Modularity merges application functionality and database functionality, as all applications need data. Finally, all dimensions of human infrastructure loaded on one factor, thus showing that IT employees need to be well-rounded and well managed. These findings present another reason to evaluate not only the technical components of infrastructure integration, but also the personnel side of integration in this study.

Utilizing the above defined factors of flexibility and measurement approach, researchers have had mixed results. Chung, Rainer, and Lewis (2003) studied the relationship between the factors of compatibility, modularity, connectivity, and IT personnel on strategic IT-business alignment and extent of IT implementation. Level of

IT implementation was the number of key business applications implemented at an organization. A significant positive relationship was found for all dimensions of IT infrastructure flexibility and the dependent variables, except between compatibility and strategic IT-business alignment. Fink and Neumann (2009) included the same factors in their study, but only connectivity had a significant impact on the range of physical capabilities (IT flexibility). The more disappointing outcome was that IT physical capabilities did not have a significant relationship with neither strategic alignment nor IT-based competitive advantage. They were only significant with human integration elements, again stressing the importance of IT resources. However, another research model that measured infrastructure flexibility mediated with organizational responsiveness showed a positive significant effect on competitive advantage (Bhatt et al., 2010).

A significant positive impact of IT infrastructure flexibility on process-oriented dynamic capabilities (PDC), which is defined as firm's ability to change a business process better than its competition, was documented by Kim et al. (2011). PDC were shown to have a positive relationship with firm's financial performance. This study also confirmed the importance of IT infrastructure flexibility. IT personnel skill level was not included in the flexibility measure; instead it was measured as a separate construct. It also had a positive impact on PDC. Confirming earlier findings, for IT personnel expertise to have a positive impact on IT infrastructure flexibility, it needs to be mediated through IT management capabilities. Without proper guidance, IT skills are not used to their full potential.

IT infrastructure is a key enabler of transformation in enterprise architecture. The El Sawy et al. (1999) case-based article stated that for companies to build value they need to differentiate themselves with enterprise architectures and flexible IT infrastructures. In an electronic economy, companies must allow for constant transformation as conditions change. Alignment of business strategy and IT infrastructure is a critical success factor for future flexibility. Their case study showed that with the right IT infrastructure solution, employee productivity goes up while the number of employees decreases. Authors believed that to achieve mutual benefits, business and IT strategies have to be developed at the same time. Flexibility originates in IT-business alignment and common strategic direction.

IT Business Value

IT investments are meant to provide economic returns. Research is inconsistent in proving that these investments are profitable. Brynjolfsson (1993) called this phenomenon a *productivity paradox*: discrepancy between measures of investment in information technology and measures of output at the national level. While United States was increasing IT spending, the national productivity was not increasing at the same time. To disprove this early finding, resource-based view (RBV) theory has been adopted. In 1991, Barney proposed that firms could obtain competitive advantage with resources that are firm specific, valuable, rare, imperfectly imitable, and not substitutable by other resources. While companies can imitate investments in IT resources like hardware and software, it is the way firms apply these IT investments that creates a unique capability and improves firm’s performance (Mata et al., 1995). In addition, IT investments are expensive and made with long term goals. A time lag exists between the time of investment and when benefits are realized (Brynjolfsson & Hitt, 1998).

Several studies have revealed that unique IT skills improve financial results. Bharadwaj (2000) showed that on average, companies with superior IT capabilities had significant superior performance. Financial results of IT leaders were compared to similar size firms on a matched set, and the economic performance of the leaders was better on several measures. Expanding on this research, Santhanam and Hartono (2003) repeated the test but focused on sustained effects. Their results showed that IT leaders had the most pronounced effect of improved financial performance three years after being identified a leader in IT industry area.

Fit

The most basic definition of ‘fit’ is a match between two or more factors. Fit as matching perspective explained by Venkatraman (1989) reduces two compared measures to one index but has no reference to the dependent variable. Its center of attention is on the independent variables and ignores the performance results. Using the value of difference between the two matching variables, one can only identify level of fit. To overcome the issues related to exclusion of the outcome and individual contribution of each variable, Edwards (1994) introduced a three-dimensional approach to measure congruence between a pair of measures and their result. This approach was utilized in the analysis performed by study.

Contingency theory with its basis in behavioral science has been applied in various IS empirical works on fit. The theory states that there is no one, best way of performing and action, as the action depends on internal and external restrictions. Thus, fit is dependent on other factors, not just the joining of two variables. Weill and Olsen (1989) have summarized the use of contingency theory in IS literature. They found that concepts of performance and fit were poorly defined and measured. The definition that takes these restrictions into consideration states that “fit” is an interaction effect between context and structure on performance (Drazin & Van de Ven, 1985). Better fit results in better performance. Performance is the effect of the interaction of independent variable and moderator, where fit is defined as adherence to a linear relationship between two variables. The prediction is that deviation from the line in any direction results in lower performance (Umanath, 2003). In this study, structure is represented by the various independent variables, with context being the M&A.

CHAPTER III

PROBLEM STATEMENT

The above literature review provides the background on the concepts, theory, and constructs found in this study. It illustrates the importance of both the technical (systems) and human (organizational) components in an M&A event. The research model (Figure 1) is based on the Strategic Alignment Model developed by Henderson and Venkatraman (1993) where business and information technology are aligned in terms of strategy and infrastructure. Similarly, this study aligns the two merging companies in terms of organizational and systems components. The focus of this research is on the alignment between two separate entities joined after an M&A. On the organizational side, the fit between competencies and processes was measured and analyzed. Same was done on the systems side, for the fit between capabilities and technology measures. The model is supplemented with control variables of attitude, merger experience, and industry match. The final impact of the fit or alignment is measured against the dependent variable of systems integration success.

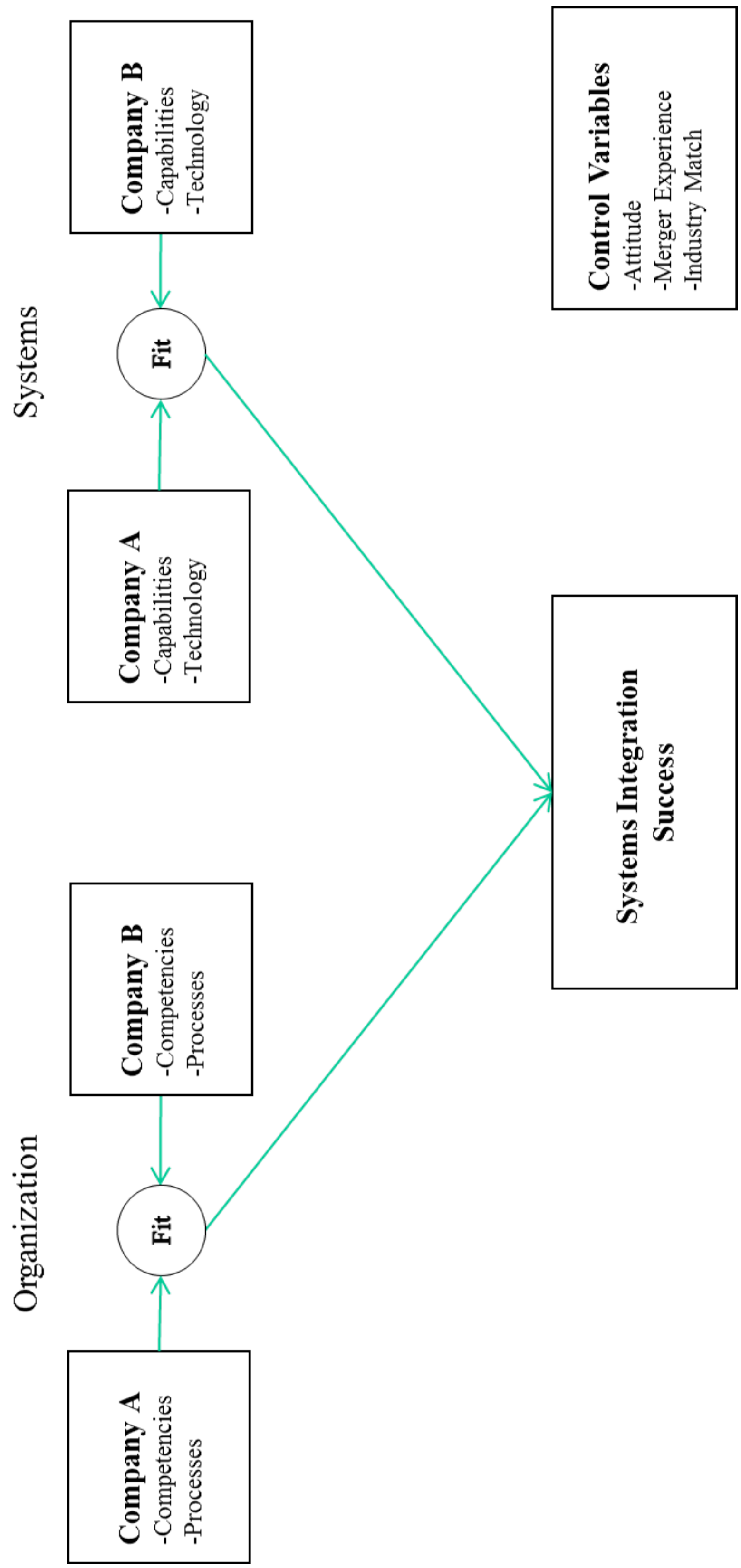

Figure 2: Research Model

Organizational Variables

Competencies

A unique competency or skill has the potential of providing a competitive advantage for a company and set it apart from the competition. Competency, the ability to do something efficiently, is often the reason why a company becomes a target of an acquisition. The buyer has a desire to own this competency. The unique ability can be intellectual property, skilled employees, or the latest innovation. Rather than developing the new function, a firm may purchase another company with that capability to stay competitive and current (Haspeslagh & Jemison, 1991, Sherman, 2011). When it comes to unique technological opportunities, successful acquisitions explore and develop these abilities further (Phene et al., 2012). The purchaser acquires the skill with the plan to integrate it into its current set of competencies.

Emphasis on innovation with research and development is important in sustaining competitive advantage. All companies should invest in R&D to maintain market leadership (Hitt et al., 1998). Contrary to popular belief that firms with low research intensity seek out high intensity targets, MacDonald (1985) found that companies look for synergies in research effort. Thus, merged companies desire to improve their research abilities via a union of similar resources. When the goal of the acquisition is to exploit or reinforce existing technological capabilities, unique technologies at either firm detract from strengthening shared technologies (Phene et al., 2012). Similarities make integration easier.

Therefore, when it comes to skills and research efforts, the fit between organizational competencies will improve integration success as proposed by the following:

Hypothesis 1: The fit between the two organizations' competencies is positively associated with systems integration success.

Processes

To design, produce, and market a product or service, every company has a defined set of processes that have been perfected over the years and are strictly followed. These processes or methodologies become the standard way of conducting business. Hitt et al. (1998) found that one of the attributes of successful acquisitions was focus on core business processes. The right level of integration retains strong processes to achieve long-term financial success. Value creation comes from processes that are unique to the business and that will continue to reap rewards (Haspeslagh & Jemison, 1991).

Operating efficiencies come from controlling costs and managing inventory levels. Having enough inventory to fulfill customers' orders often results in holding safety-stock above and beyond expected demand. Companies can incur substantial costs to hold adequate inventory. Ideally the company understands the demand levels and produces only what is required. With effective processes in place, a producer keeps inventory levels at a minimum, but customer's orders are always met on time. Company's productivity is measured by cost-effective management of inventory (Rabinovich et al., 2003).

Each company involved in a merger will have their own processes to support core business function such as finance, operations, inventory management, etc. During integration efforts, the buyer decides which processes are duplicates and need to be removed to save on overhead costs. Therefore, cost savings are realized through process consolidation. The positive relationship can be proven with the following hypothesis:

Hypothesis 2: The fit between the two organizations' processes is positively associated with systems integration success.

Systems Variables

Capabilities

Organization's systems capabilities are defined by their ability to support current and future business policy. Systems are procured and implemented based on the direction set by the business. When two companies have set forth similar plans for the future, their systems' capabilities are likely to be similar. Hagedoorn and Duysters (2002) proved hypotheses that both 'breath' and 'depth' of technological capabilities improve technological performance of combined companies. Systems' capabilities can be quantified by the reliability and flexibility of its components. A reliable system makes data available to business functions at all times. Sarrazin and West (2011) advised professionals to get their company's IT to its best level of performance before considering any type of acquisition. Having a deep understanding of the buyer's own systems' strengths will make it very clear as to which systems should be retained after the merger.

With flexibility, systems' resources can be used for more than one purpose. A flexible system is compatible to handle different business structure, able to be easily connected to other standalone systems to share data, and finally, can be expanded with additional modules. IT infrastructure flexibility was shown to have a positive impact on firm's financial performance (Kim et al., 2011). An ERP system is a popular, flexible system designed to be easily expandable. Most mergers will retain this asset and convert the other company's data and business processes onto the standard platform. Kovela and Skok's (2012) model based on literature review and business reports stresses that the end systems' portfolio after M&A should be comprised of 'best of breed' from the two companies.

Numerous studies have shown that human assets represent a key competency for a company, especially in the service sector. Preservation of IT skills is critical, as these members of personnel are essential to successful systems integration. Experienced and motivated IT staff members are key pieces in a post-merger integration (Kovela & Skok, 2012). Management is often faced with the dilemma of knowledge preservation versus resource reduction. Skilled managers must know which resources are required to identifying the right level of integration, without the loss of key competencies (Ranft & Lord, 2002). Retention of key employees has a positive impact on transfer of technological capabilities to the new firm (Ranft & Lord, 2000).

When merged companies have equally flexible systems and employees, either system can support future business operations. Integration is very straightforward. To prove this positive relationship between the similar systems' capabilities on integration, the proposed hypothesis follows:

Hypothesis 3: The fit between the two systems' capabilities is positively associated with systems integration success.

Technology

Technology is the physical backbone or information systems infrastructure that supports business operations. Hardware and software work together to gather and deliver data to business users and operations. Companies can approach the IT solution in a variety of ways, deciding on the right level of integration and expandability of each system. From the one extreme of allowing each department to have its own IT, to the other, where company overspends to create a completely integrated infrastructure for the future, each company has the challenge of finding the right level of elasticity and spending (Broadbent & Weill, 1997).

In past research, IS applications and systems standardization was recognized as a category that was often overlooked in IS integration decisions (Mehta & Hirschheim, 2007). With decentralized hardware and completely different development languages, it is difficult to integrate systems after M&A. In the long run, Stylianou, Jeffries, and Robbins (1996) saw a negative impact on user satisfaction when distribution of hardware was high in the combined company. On the other hand, success of IS merger was high when level of data sharing was high. Picking the right IT infrastructure is critical to M&A success. When technology components are similar at the two merging firms, integration is very straight forward as data is moved and duplicated software and hardware components are removed. Similarities in the two systems' technologies allow for an easy consolidation leading to the following hypothesis:

Hypothesis 4: The fit between the two systems' technologies is positively associated with systems integration success.

Research Question

The research question: Does the fit between organizational factors and the fit between systems factors have a positive impact on systems integration success after M&A, will be answered by the results of the hypotheses proposed above. Bringing organizations together is critical to all integrations that happen after M&A, not just those related to systems. At the same time, importance of systems in business operations cannot be under stressed. Most companies cannot continue operations if their systems are not functioning. Therefore, the fit between organizational factors and the fit between systems factors has the potential of impacting systems integration success after M&A.

Dependent Variable

To measure the success of systems integration, researchers have identified several methods in IS literature. Stylianou, Jeffries, and Robbins (1996) presented the following components of IS integration success: ability to exploit opportunities and avoid problems resulting from M&A, end-user satisfaction with and assessment of the success of the integration process and integrated system. Tamm et al. (2011) listed the four values that are commonly derived from a standardized system: organizational alignment, information availability, resource portfolio optimization, and resource complementarity. Standardized applications with high level of data sharing encourage future integration. Synergies are easily identified (Robbins & Stylianou, 1999). Since standardized systems are believed to be cost efficient and ideal for integration, this study will measure buyer's cost savings several years after the merger's completion to determine if systems integration was successful.

Control Variables

Since past research has identified additional variables as having a significant impact on M&A success, this study cannot overlook them. Attitude of the merger, merger experience, and industry match will be treated as control variables. These control variables will be held constant when testing the relative impact of above independent variables. Hitt et al. (1998) placed friendly acquisitions on the list of attributes associated with successful mergers. Integration is faster and more effective when companies are rescued by their buyer, cooperate with consolidation efforts, and are often allowed to maintain some independence.

Another attribute that has shown positive impact on M&A success is prior experience with acquisitions and/or change management. With each merger, organizations gain a deeper understanding of the business and systems processes, plus how to integrate the purchased company into them. With this close insight, the company achieves quicker integration each time around (Hitt et al., 1998). With prior M&A experience, key process skills have already been identified by the buyer and just need to be matched to determine duplicates.

Mergers often take place between firms that are competitors and have the same product offering. Because they are competing in the same industry, they have a very close understanding of each other's tactics and share business market similarities. Past studies consistently report that relatedness between the two joined firms is positively associated with increased returns after the transaction (Bruner, 2002). Economies of scale allow the acquiring firm to merge overlapping functions, share resources, and bring value to the company (Haspeslagh & Jemison, 1991, Hitt et al., 1998).

CHAPTER IV

RESEARCH METHOD

The core measures used in this research fall into five categories aligned with defined variables: organizational competencies, organizational processes, systems capabilities, systems technology, and systems integration success. The first four will be matched between the two merging companies to understand their fit's effects on the dependent variable of systems integration success. In addition, three control variables of attitude, merger experience, and industry match are measured and included in each analysis. All relationships are illustrated in the Research Model (Figure 2). The organizational variables define the efficiency of the business operations in terms of profit and cost. The systems variables show how IT capabilities are manifested through their contribution to financial results and established IT infrastructure. The table below defines each variable and the measures applied in the study.

Table II: List of Independent Variables

Variable	Definition	Measure
Competencies	Organization's developed ability to do something proficiently or a skill that has the potential to provide a competitive advantage	Profitability
Processes	Steps or actions taken by an organization to create a product or service for a customer	Operating efficiency
Capabilities	Systems' ability to support current and future business functions	IT productivity
Technology	Established systems' infrastructure which supports daily operations of the business	IT assets availability

Data Collection

Data used in this study was gathered from three secondary sources: Mergerstat M&A Database, Ci Technology Database, and Compustat Database. List of mergers was created with data from Mergerstat M&A Database based on SEC filings. A search asking for public and private acquisitions in the United States was executed individually for each year from 2008 to 2012. In addition, all resulting transactions were valued at more than $100 million. Each year's results were saved into separate rich text files. These files were copied into Microsoft Excel, and after a cleanup of extra rows and characters, the data was transformed from vertical records to horizontal columns. Finally, the formatted data was saved into a text file that could be imported into a Microsoft Access database. This produced 1,187 unique mergers which were further filtered to 609 completed, non-financial mergers that took place between a buyer and a target that both had United States addresses.

Each company's IT expenses and infrastructure counts were sourced from the Ci Technology Database (CiTDB), owned by Aberdeen Market Intelligence, formerly Harte

Hanks Market Intelligence. This database has been in existence for over 40 years and has served as a trusted source to provide insights on technology spending patterns. CiTDB has been used as a source in several articles in Economics based journals (e.g. Bresnahan et al., 2002, Forman et al., 2012, Kretschmer et al., 2012). A list of 1,591 unique company names and address, composed of both targets and buyers, was shared with Aberdeen who matched it to their database. They provided individual files for each year from 2007 to 2014, which contained that year's data on IT infrastructure components and IT spending. The records were matched back to the original list of mergers, which resulted in 177 mergers with available data for both buyer and the target.

Financial performance measures for the merging companies were extracted from S&P Global Market Intelligence's Compustat database. The extract was based on the last financial filing year of the target company and matched to the same year's data for the buyer. For the dependent variable of integration success measure, additional data on total Assets was pulled for the buyer for three additional years. Since financial data on Compustat is only available for public companies, the list of mergers had to be further reduced to only public buyers and sellers. This resulted in a final data set of 114 mergers. A priori power calculation requires sample size of 94 with 5 predictors, .05 probability, anticipated effect size f^2 of .15, and desired statistical power level of 0.80. The final sample of 114 exceeds the requirement.

In addition, industry averages were extracted from Compustat for Operating income, Revenue, Research & Development (R&D) spending, and value of total Assets. These were gathered by year for every North American Industry Classification System (NAICS) code that the individual companies in the final data set fell under for years 2007 to 2012. The values will be used to adjust organizational competencies to show competitive advantage.

Organizational Competencies

To measure competencies or skills of the organization behind each company, the focus is placed on the financial measure of Return on Sales and the measure of Research & Development (R&D) Intensity. They quantify the company's ability to be profitable and gain competitive advantage. Profitability is business's ability to earn a profit or to realize positive revenue after it pays all expenses. Return on Sales or operating margin is a measure of company's profitability. The measure shows how effective the company is at making money and allows for comparison of internal relatedness of the two merging companies by measuring their individual performance (Homburg & Bucerius, 2006). New technologies or inventions that come from R&D spending also lead to improved profitability (Hagedoorn & Duyster, 2002). By taking the ratio of R&D spending to total Assets, R&D Intensity measure provides a means to compare target firm's emphasis on bringing about new innovations to the buyer firm's focus. The value measures firm's commitment to innovative activity (Hitt et al., 1998).

To quantify the level of competitive advantage held by each company, their individual measures need to be compared to or adjusted with industry averages. Therefore, the same ratios are calculated for each industry as average Return on sales divided by average Operating income and average R&D spending divided by average total value of Assets. Each individual ratio is then divided by the measure's industry average.

Table III: Definitions of Organizational Competencies Measures

Measure	Description	Definition	Source	Prior Research
ROS	Return on Sales or Operating Margin	It is calculated by dividing Operating Income by Revenue, and adjusted by Industry average. It measures the competitive advantage of profit realized from business's operations.	Compustat	Capron, 1999; Datta, 1991, Bharadwaj, 2000, Santhanam & Hartono, 2003
RDA	R&D Intensity	It is calculated by dividing R&D Spending by the total value of Assets, and adjusted by Industry average. It measures company's competitive advantage in bringing about new innovations.	Compustat	Hitt et al., 1998, Hagedoorn & Duyster, 2002

Organizational Processes

Processes are steps followed to design, produce, and market a product or service. The measures for this variable are centered on the operating efficiency of each firm in terms of tangible inputs and outputs. Cost of Goods Sold (COGS) is the direct costs attributable to the production of the goods sold by a company. It is a widely used accounting measure to show the cost side of operations (Mukhopadhay et al., 1995, Santhanam & Hartono, 2003). The COGS per Employee measure allows for comparison of the two firms by taking the size of the company into consideration and creating a comparable costs ratio (Zhu, 2004). The second measure of Inventory Turnover quantifies firm's productivity or transformational efficiency, where inventory is turned into output (Rabinovich et al., 2003). It is an indicator of firm's operational efficiency along its supply chain (Zhu, 2004). Having a low inventory turnover is a sign of ineffectiveness as product is not sold as soon as it is produced.

Table IV: Definitions of Organizational Processes Measures

Measure	Description	Definition	Source	Prior Research
COE	Cost of Goods Sold (COGS) per Employee	It is calculated by dividing COGS by the total Number of Employees. It measures the total costs allocated by the company per employee (including production, including direct materials, supplies, direct labor, and overhead).	Compustat	Mukhopadhay et al., 1995, Santhanam & Hartono, 2003, Zhu, 2004
INV	Inventory Turnover	It is calculated by dividing Total Inventory by Revenue. It represents the number of times inventory is sold or used in a year.	Compustat	Rabinovich et al., 2003, Zhu, 2004

Systems Capabilities

Capabilities of IT or its ability to support current and future business policy is measured with two ratios found in IT business value literature. These measures quantify the company’s capacity to apply IT to operational and management processes in order to affect desired firm's performance. First, Return on Assets, also called the allocative efficiency ratio, is modified to only consider IT related assets. Return on IT Assets reflects the company’s capacity to use IT hardware in automating the product and service development process. Second, Revenue per IT Employee ratio quantifies the labor efficiency of these specific resources. It measures the amount of revenue generated per IT employee (Santhanam & Hartono, 2003, Radhakrishnan et al., 2008). With highly skilled, effective employees, productivity increases and revenue grows.

Table V: Definitions of Systems Capabilities Measures

Measure	Description	Definition	Source	Prior Research
ROT	Return on IT Assets	It is calculated by dividing Operating Income by the Total of IT Assets (PCs, Servers, and Network Lines). It measures how well management is employing the company's IT assets to make a profit.	Compustat and CiTDB	Santhanam & Hartono, 2003, Radhakrishnan et al., 2008
REM	Revenue per IT Employee	It is calculated by dividing Revenue by Total IT Employees. It measures IT personnel's productivity.	Compustat and CiTDB	Santhanam & Hartono, 2003, Radhakrishnan et al., 2008

Systems Technology

Technology utilized by a company is defined by the established information systems infrastructure. Each component of technology supports daily business operations. The measures below cover two levels of computing architecture; servers /personal computing and networking. The count of PCs has been used in early IT productivity literature, and more recently, mini-systems and networking have been added as they are an important part of the IT infrastructure (Zhu, 2004). To measure flexibility, one must understand the degree to which resources are connected, shareable, and reusable. Network connectivity measured by number of network lines defines the availability or reach of systems on a network. Storage is a new measure introduced in this study. Due to the growing importance of storing large amounts of data, the amount of available storage is a critical component in raising efficiency of systems and business intelligence analysis. More specifically, the data residing in this storage will need to be integrated after the merger. By taking the number of employees at the company into consideration, comparable technology intensity ratios are developed.

Table VI: Definitions of Systems Technology Measures

Measure	Description	Definition	Source	Prior Research
PCS	PCs Intensity	It is calculated by dividing Number of PCs by the total Number of Employees. It measures the prevalence of personal computers (including desktops and laptops) at the company.	Compustat and CiTDB	Mukhopadhay et al., 1995, Hitt & Brynjolfsson, 1997, Zhu, 2004
SER	Servers Intensity	It is calculated by dividing Number of Servers by the total Number of Employees. It measures the prevalence of servers at the company.		
PRI	Printers Intensity	It is calculated by dividing Number of Printers by the total Number of Employees. It measures the prevalence of printers at the company.		
STO	Storage Intensity	It is calculated by dividing Number of Storage by the total Number of Employees. It measures the size of available storage at company.		
NET	Network Lines Intensity	It is calculated by dividing Number of Network Lines by the total Number of Employees. It measures the prevalence of network lines at the company.		

Systems Integration Success

The dependent variable of Systems Integration Success is meant to show that buyer's systems operations are the same or better after the merger. One way to quantify systems operations effectiveness is with IS spending. IT expenditures must be managed by companies, as large IT investments do not always result in high returns (Rusu & Smeu, 2010). From a financial perspective, decrease in spending is a measure of operating efficiency success. Drawing from IT value literature, success will be measured as IT intensity or IT spending of the firm divided by total Assets (Masli et al., 2014).

After the merger, the buyer acquires additional assets, and IT spending could increase with this additional demand. The defined ratio allows for a truer comparison in terms of spending and the amount of assets utilizing this spending. If two systems are joined and integration efficiencies are realized with improved systems operations, the buyer's IT spending should decrease over time. Since systems integration activities after a merger can take a long time, most firms do not see benefits immediately. Recommendation is to focus on results three years after merger (Ellis et al., 2011, Homburg & Bucerius, 2006). Therefore, analysis in this research will look at results at one year, two years, and three years after the merger.

To create the difference measure for the dependent variable, the buyer's IT intensity ratio for the last year the two firms existed as separate entities is subtracted from the IT intensity ratio for the first year the target no longer existed. This creates a percent difference measure with a negative value identifying a decrease in IT spending, while a positive value is an increase. Same calculation is performed for years two and three.

Table VII: Definition of Systems Integration Success Measures

Variable	Description	Definition	Source	Prior Research
DYR1	IT Spending Difference Year 1	Percent difference between Buyer's IT Intensity (IT Expenses/Total Assets) at Year 0 and Buyer's IT Intensity at Year 1	CiTDB and Compustat	Masli et al., 2014
DYR2	IT Spending Difference Year 2	Percent difference between Buyer's IT Intensity (IT Expenses/Total Assets) at Year 0 and Buyer's IT Intensity at Year 2.		
DYR3	IT Spending Difference Year 3	Percent difference between Buyer's IT Intensity (IT Expenses/Total Assets) at Year 0 and Buyer's IT Intensity at Year 3.		

Control Variables

Three control variables are included in the research model. While this study is not interested in their impact, prior research has shown them to influence M&A success. First, the attitude of the transaction is identified. With the belief that friendly transactions have the highest level of support from both companies (Hitt et al., 1998), the positive transactions are coded as 1 and hostile ones as 0. When buyer has M&A experience, integration activities are performed faster and more effectively. Therefore, merger experience is coded as the number of mergers the buyer has completed between 2008 and 2012, but only counting those that were completed prior to the merger in question. Finally, industry match measures how similar the two companies are in terms of the NAICS code. Just as similar control measures have been derived for the Standard Industrial Classification (SIC) code (Hagedoorn & Duyster, 2002, Ellis et al., 2011), this measure was created by comparing each of the three sections of the code. The first 2 digits identify the largest business sector, the second two designate the subsector and the industry group, and finally, the last two digits are the individual industries. If the code matches on all three levels, the variable has the value of 3. If it matches on the first two levels, it has the value of 2, and if only on the business sector, the value is 1. When no match exists, the value is 0.

Table VIII: Definitions of Control Variables Measures

Variable	Description	Definition	Source	Prior Research
ATTI	Attitude	1 for Friendly 0 for Hostile	Mergerstat	Hitt et al, 1998
MEXP	Merger Experience	Utilizing the list of mergers completed by the Buyer between 2008 and 2012, it is the number of mergers completed before the merger in question	Mergerstat	Rovit et al., 2004, Ellis et al., 2011
MNAI	Industry Match	0 no match 1 for match of first two digits 2 for match for first four digits 3 for match for all six digits	Compustat	Ellis et al., 2011,

After the information was gathered from secondary data sources into one data set, there were instances of missing values for R&D Spending (103 out of 228 records) and Inventory (56 out of 228 records) because companies are not required to report this information to SEC. In addition, 5 companies did not report their number of Employees. SAS multiple imputations procedure was used to generate the missing records based on information in three other Compustat data fields (Assets, Revenue, and Operating Income). The missing values were created through 10 imputations and constant seed of 54321, with the mean conditional on observed values of the other variables. This approach treats missing values as if they were known in the complete-data analysis and the 10 generated datasets are fully populated. Average of the generated 10 dataset values for each missing data point was used as the final value.

The ratios for each measure were calculated as defined above. To distinguish between the two merging companies, the target's measures are prefixed with a T and buyer's measures have a B. In addition, Organizational Competencies ratios were further divided by the industry average ratio to quantify the competitive advantage possessed by each company in the merger.

CHAPTER V

RESULTS

Before reviewing the results of this research, a list of industries covered by the analyzed data set is presented in Table IX. Based on the first two digits of the NAICS code, it defines the number of companies under each industry that were part of the 114 mergers in the analyzed data set, also listing their percentage of total. If a company was part of multiple mergers, each merger is counted individually. Also, if a company was first a buyer and later a target, each event is counted separately. Manufacturing sector has the highest number of companies, followed by the Finance and Insurance sector which includes banking and investment services. Information sector is number three, while the largest US industry of Health Care and Social Services follows in the fourth spot. These top four sectors represent 77.2% of all data.

Table IX: Industry Coverage

Industry	Count	Percentage
Manufacturing	95	41.7%
Finance and Insurance	42	18.4%
Information	28	12.3%
Health Care and Social Assistance	11	4.8%
Professional, Scientific, and Technical Services	10	4.4%
Mining	7	3.1%
Retail Trade	7	3.1%
Transportation and Warehousing	6	2.6%
Utilities	5	2.2%
Administrative and Support and Waste Management and Remediation Services	5	2.2%
Real Estate Rental and Leasing	4	1.8%
Construction	3	1.3%
Wholesale Trade	2	0.9%
Accommodation and Food Services	1	0.4%
Unknown	2	0.9%

Descriptive statistics (Table X) and the correlations matrix (Table XI) for all the variables are included below. Since each ratio will be analyzed via its own individual model, the relevant correlations are between the target and buyer values for each ratio. Also, the correlations between the independent variables and the control variables should be reviewed. No high significant correlations are found between the values in each measure's group.

Table X: Descriptive Statistics

Variable	N	Mean	Std Dev	Sum	Min	Max
TROS	114	12.204	2.407	1391.000	0.010	23.245
BROS	114	3.067	1.974	349.656	0.010	16.849
TRDA	114	9.850	38.609	1123.000	0.001	381.435
BRDA	114	8.018	35.263	914.075	0.025	314.631
TCOE	114	0.204	0.189	23.212	0.003	0.819
BCOE	114	0.327	0.506	37.313	0.001	3.268
TINV	114	11.583	17.492	1320.000	0.000	92.800
BINV	114	28.675	49.615	3269.000	0.015	258.228
TROT	114	10.007	3.648	1141.000	0.010	27.580
BROT	114	17.406	14.312	1984.000	0.010	94.714
TREM	114	54.434	52.331	6205.000	0.000	193.429
BREM	114	209.558	175.654	23890.000	6.767	839.086
TPCS	114	0.387	0.587	44.154	0.002	2.451
BPCS	114	62.984	105.112	7180.000	0.078	553.921
TSER	114	29.454	41.910	3358.000	0.127	262.712
BSER	114	18.991	48.366	2165.000	0.000	304.804
TPRI	114	40.124	57.357	4574.000	0.129	384.615
BPRI	114	9.033	14.928	1030.000	0.059	79.316
TSTO	114	212.322	262.146	24205.000	0.198	946.970
BSTO	114	94.079	169.197	10725.000	0.118	886.525
TNET	114	14.638	31.878	1669.000	0.099	307.692
BNET	114	2.914	5.226	332.186	0.033	27.994
ATTI	114	0.482	0.502	55.000	0.000	1.000
MEXP	114	0.412	0.738	47.000	0.000	4.000
MNAI	114	0.737	0.596	84.000	0.000	3.000
DYR1	114	-5.576	176.822	-635.634	-498.750	594.594
DYR2	114	59.663	178.052	6802.000	-484.353	503.809
DYR3	114	91.470	189.410	10428.000	-480.533	609.019

KEY

T	Target	PCS	PCs Intensity	DYR1	IT Spending Difference Yr 1
B	Buyer	SER	Servers Intensity		
ROS	Return on Sales	PRI	Printers Intensity	DYR2	IT Spending Difference Yr 2
RDA	R&D Intensity	STO	Storage Intensity		
COE	COGS per Employee	NET	Network Lines Intensity	DYR3	IT Spending Difference Yr 3
INV	Inventory Turnover	ATTI	Attitude		
ROT	Return on IT Assets	MEXP	Merger Experience		
REM	Revenue per IT Employee	MNAI	Industry Match		

Table XI: Correlation Matrix

Pearson Correlation Coefficients, N = 114 Prob > |r| under H0: Rho=0														
	TROS	BROS	TRDA	BRDA	TCOE	BCOE	TINV	BINV	TROT	BROT	TREM	BREM	TPCS	BPCS
TROS	1.000													
BROS	0.175	1.000												
	0.063													
TRDA	0.024	-0.065	1.000											
	0.799	0.493												
BRDA	0.032	-0.058	0.296	1.000										
	0.734	0.538	0.001											
TCOE	-0.066	0.006	0.216	-0.008	1.000									
	0.485	0.951	0.021	0.934										
BCOE	0.149	-0.069	0.036	-0.010	0.424	1.000								
	0.113	0.468	0.705	0.915	<.0001									
TINV	-0.078	0.102	-0.108	-0.008	-0.064	-0.063	1.000							
	0.407	0.281	0.254	0.930	0.497	0.506								
BINV	0.027	0.013	0.039	-0.102	-0.011	0.056	-0.003	1.000						
	0.774	0.893	0.680	0.279	0.909	0.556	0.979							
TROT	0.465	0.022	0.017	0.071	0.107	0.345	-0.053	0.160	1.000					
	<.0001	0.816	0.856	0.453	0.257	0.000	0.573	0.090						
BROT	-0.053	-0.033	-0.071	-0.099	-0.124	-0.060	0.060	-0.031	-0.030	1.000				
	0.576	0.728	0.455	0.295	0.188	0.525	0.524	0.745	0.748					
TREM	0.093	-0.001	0.054	-0.045	0.192	0.167	0.128	0.200	0.295	0.029	1.000			
	0.325	0.988	0.571	0.634	0.041	0.076	0.173	0.033	0.002	0.760				
BREM	0.003	-0.110	-0.073	-0.194	0.075	0.139	0.085	-0.053	-0.027	0.277	0.057	1.000		
	0.977	0.242	0.440	0.039	0.426	0.141	0.369	0.574	0.772	0.003	0.546			
TPCS	-0.036	-0.010	-0.109	-0.107	-0.217	-0.196	0.031	-0.158	-0.196	0.141	-0.424	0.210	1.000	
	0.703	0.920	0.248	0.257	0.020	0.036	0.741	0.094	0.037	0.134	<.0001	0.025		
BPCS	0.041	-0.017	0.365	0.192	0.055	0.008	0.039	-0.067	0.007	-0.278	-0.019	-0.444	-0.089	1.000
	0.663	0.860	<.0001	0.041	0.558	0.929	0.680	0.481	0.942	0.003	0.842	<.0001	0.347	
TSER	-0.091	0.125	-0.070	-0.077	0.023	-0.162	-0.080	-0.165	-0.201	0.038	-0.441	-0.026	0.570	-0.013
	0.337	0.184	0.460	0.417	0.806	0.084	0.399	0.080	0.032	0.685	<.0001	0.785	<.0001	0.889
BSER	0.058	-0.004	0.015	-0.005	-0.044	-0.040	-0.052	-0.028	-0.077	-0.190	-0.103	-0.308	-0.061	0.669
	0.541	0.964	0.873	0.954	0.641	0.672	0.586	0.770	0.414	0.043	0.277	0.001	0.517	<.0001
TPRI	-0.156	0.139	-0.038	-0.030	0.182	-0.167	-0.069	-0.159	-0.214	0.013	-0.427	-0.026	0.273	-0.077
	0.098	0.140	0.690	0.749	0.052	0.075	0.468	0.091	0.023	0.889	<.0001	0.786	0.003	0.413
BPRI	-0.033	-0.047	0.398	0.481	0.068	0.094	-0.008	-0.135	0.036	-0.268	0.001	-0.433	-0.154	0.761
	0.725	0.619	<.0001	<.0001	0.474	0.318	0.934	0.151	0.701	0.004	0.989	<.0001	0.101	<.0001
TSTO	-0.070	-0.056	-0.078	-0.076	0.060	-0.162	-0.119	-0.095	-0.234	0.028	-0.374	-0.037	0.297	-0.086
	0.456	0.552	0.412	0.423	0.523	0.085	0.206	0.314	0.012	0.770	<.0001	0.692	0.001	0.361
BSTO	0.042	0.016	0.003	0.028	-0.133	-0.068	-0.123	-0.094	-0.083	-0.247	-0.169	-0.349	0.040	0.493
	0.660	0.868	0.973	0.764	0.158	0.472	0.192	0.322	0.379	0.008	0.072	0.000	0.671	<.0001
TNET	-0.058	0.254	-0.005	-0.001	0.235	-0.123	-0.113	-0.107	-0.116	-0.049	-0.279	-0.077	0.048	-0.046
	0.539	0.006	0.956	0.989	0.012	0.192	0.233	0.257	0.218	0.606	0.003	0.415	0.613	0.624
BNET	-0.009	-0.090	0.421	0.532	0.066	0.127	-0.102	-0.140	0.036	-0.246	-0.032	-0.403	-0.172	0.614
	0.920	0.343	<.0001	<.0001	0.488	0.177	0.279	0.137	0.703	0.008	0.736	<.0001	0.067	<.0001
ATTI	-0.030	0.142	-0.137	-0.124	-0.073	-0.059	0.122	-0.005	-0.108	0.077	-0.146	0.063	0.090	0.002
	0.755	0.133	0.145	0.188	0.441	0.536	0.198	0.960	0.254	0.413	0.120	0.509	0.341	0.983
MEXP	-0.135	-0.091	-0.101	-0.101	-0.142	-0.153	-0.026	-0.010	-0.179	0.217	-0.069	0.082	0.202	-0.044
	0.152	0.335	0.286	0.287	0.132	0.104	0.784	0.919	0.057	0.021	0.463	0.387	0.031	0.643
MNAI	0.405	-0.002	0.089	0.007	0.117	0.055	-0.017	0.130	0.322	-0.070	0.229	-0.118	0.009	0.024
	<.0001	0.987	0.348	0.942	0.213	0.558	0.855	0.169	0.001	0.459	0.014	0.212	0.923	0.801
DYR1	0.033	0.048	-0.070	-0.128	0.062	-0.016	0.003	-0.063	-0.030	0.104	0.061	0.114	-0.033	-0.149
	0.725	0.611	0.461	0.176	0.510	0.863	0.972	0.508	0.749	0.271	0.519	0.227	0.727	0.114
DYR2	0.107	0.057	0.060	-0.021	0.082	-0.003	-0.010	-0.117	0.092	0.000	0.073	-0.047	-0.014	0.154
	0.256	0.549	0.523	0.821	0.384	0.975	0.920	0.214	0.331	0.996	0.442	0.621	0.883	0.101
DYR3	0.241	0.115	-0.007	-0.060	0.064	-0.012	-0.058	-0.080	0.089	-0.016	0.076	-0.096	-0.031	0.161
	0.010	0.224	0.941	0.527	0.501	0.898	0.539	0.399	0.344	0.865	0.424	0.309	0.744	0.088

Table XII: Correlation Matrix continued

Pearson Correlation Coefficients, N = 114 Prob > |r| under H0: Rho=0														
	TSER	BSER	TPRI	BPRI	TSTO	BSTO	TNET	BNET	ATTI	MEXP	MNAI	DYR1	DYR2	DYR3
TSER	1.000													
BSER	-0.024	1.000												
	0.799													
TPRI	0.770	-0.083	1.000											
	<.0001	0.379												
BPRI	-0.014	0.320	-0.003	1.000										
	0.884	0.001	0.975											
TSTO	0.434	0.129	0.408	-0.181	1.000									
	<.0001	0.170	<.0001	0.054										
BSTO	0.064	0.211	0.007	0.511	-0.072	1.000								
	0.496	0.024	0.943	<.0001	0.444									
TNET	0.549	-0.056	0.874	-0.002	0.251	-0.006	1.000							
	<.0001	0.556	<.0001	0.982	0.007	0.952								
BNET	-0.051	0.183	0.001	0.927	-0.145	0.444	0.017	1.000						
	0.589	0.052	0.995	<.0001	0.123	<.0001	0.860							
ATTI	0.149	-0.008	0.147	-0.039	-0.054	0.144	0.117	-0.057	1.000					
	0.114	0.932	0.119	0.682	0.565	0.127	0.215	0.546						
MEXP	0.109	0.122	0.005	0.017	0.314	0.086	-0.053	-0.012	0.032	1.000				
	0.247	0.198	0.961	0.855	0.001	0.366	0.575	0.897	0.738					
MNAI	-0.114	-0.030	-0.151	-0.082	-0.112	0.002	-0.088	-0.064	-0.075	-0.154	1.000			
	0.226	0.749	0.108	0.383	0.236	0.981	0.351	0.502	0.429	0.103				
DYR1	-0.229	0.002	-0.047	-0.146	0.010	-0.108	0.052	-0.126	-0.059	0.110	-0.038	1.000		
	0.014	0.981	0.620	0.121	0.916	0.255	0.586	0.181	0.531	0.245	0.689			
DYR2	-0.143	0.203	-0.040	0.144	-0.079	0.099	0.056	0.138	0.106	0.056	0.122	0.583	1.000	
	0.128	0.030	0.669	0.125	0.401	0.294	0.554	0.144	0.260	0.556	0.197	<.0001		
DYR3	-0.207	0.282	-0.123	0.075	-0.088	0.111	-0.004	0.066	0.081	-0.018	0.124	0.347	0.804	1.000
	0.028	0.002	0.192	0.428	0.351	0.238	0.962	0.484	0.389	0.852	0.188	0.000	<.0001	

Since this study is evaluating target's and buyer's datasets that will be fitted together, a t-test was performed to measure if the two sets are in fact different (Table XIII). All variables, except R&D Intensity, show a significant difference between the target's and buyer's values. Lack of differentiation in the RDA variables is also evident in the Descriptive Statistics table (Table X), as their means and standard deviations are very close in size. The lack of differentiation can be attributed to the fact that 45% of the R&D Spending values were missing from the original dataset and were systematically generated. When such a high number of values are created based on averages, the final values are bound to be close to the average for both the buyer and the target.

Table XIII: T-test Results

Measure	N	Mean	t
TROS - BROS	114	9.137	34.43***
TRDA - BRDA	114	1.832	0.45
TCOE - BCOE	114	-0.124	-2.88***
TINV - BINV	114	-17.09	-3.47***
TROT - BROT	114	-7.399	-5.31***
TREM - BREM	114	-155.1	-9.18***
TPCS - BPCS	114	-62.6	-6.36***
TSER - BSER	114	10.463	1.73*
TPRI - BPRI	114	31.092	5.60***
TSTO - BSTO	114	118.24	3.92***
TNET - BNET	114	11.724	3.89***

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

KEY

T	Target	REM	Revenue per IT Employee
B	Buyer	PCS	PCs Intensity
ROS	Return on Sales	SER	Servers Intensity
RDA	R&D Intensity	PRI	Printers Intensity
COE	COGS per Employee	STO	Storage Intensity
INV	Inventory Turnover	NET	Network Lines Intensity
ROT	Return on IT Assets		

Algebraic difference is the most commonly used index to measure congruence or fit between two conceptually different constructs. However, by collapsing the two values into one value, the difference primarily represents the measure with the larger variance. This also conceals the individual contribution of each value. Edwards (1994) recommended that each measure be used as a separate predictor, with the constraint that coefficient of each component is opposite in sign and not significantly different in absolute magnitude. Utilizing Edwards' approach to evaluate the results of the SAS regression function, each pair of target and buyer measures plus control variables were regressed against the dependent variable for year one, two, and three, one at a time. To identify fit in each model, the coefficients of same measure from the target and the buyer must have opposite signs and be close in absolute value. Shaded areas in the result tables below identify matched variables that meet this criterion.

Organizational Competencies Model

The first two statistical models focus on the Organizational Competencies measures of Return on sales and R&D intensity.

$$Y = \alpha + \beta_1 TROS + \beta_2 BROS + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XIV: Return on Sales Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TROS	4.121			5.077			16.938	**
BROS	5.319			3.340			6.520	
ATTI	-25.836			38.682			30.531	
MEXP	28.169			19.917			5.693	
MNAI	-14.243			34.307			14.792	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TRDA + \beta_2 BRDA + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XV: R&D Intensity Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TRDA	-0.157			0.369			0.041	
BRDA	-0.594			-0.116			-0.285	
ATTI	-29.454			43.306			32.376	
MEXP	22.263			18.935			-1.278	
MNAI	-7.730			40.634			41.149	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

Neither measure has significant results, but fit exists for R&D intensity in years two and three. The coefficients have opposite signs and the negative value of the buyer's R&D intensity is decreasing IT intensity percent difference overall. No significant impacts for Return on sales on the dependent variable are identified in any year, plus no fit.

Organizational Processes Model

The next two models review the Organizational Processes with measures of Cost of goods sold per employee and Inventory turnover.

$$Y = \alpha + \beta_1 TCOE + \beta_2 BCOE + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XVI: COGS per Employee Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TCOE	89.350			95.498			75.455	
BCOE	-14.378			-11.901			-16.875	
ATTI	-21.442			42.236			35.293	
MEXP	27.221			19.693			0.617	
MNAI	-10.078			39.788			39.802	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TINV + \beta_2 BINV + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XVII: Inventory Turnover Regression Results

	Year 1			Year 2			Year 3	
	Beta			**Beta**			**Beta**	
TINV	0.139			-0.199			-0.738	
BINV	-0.212			-0.491			-0.374	
ATTI	-23.265			41.702			37.718	
MEXP	26.046			18.011			-0.408	
MNAI	-5.405			47.632	*		45.442	

* $0.05 < p \le 0.10$
** $0.01 < p \le 0.05$
*** $p \le 0.01$

The models have no significant results in any year, but exhibit fit in some instances. COGS per employee variable has fit in all three years. Buyer’s COGS per employee has a negative coefficient in all three years, which means that this variable is decreasing the IT intensity percent difference. Inventory turnover has fit in first year, but no significant relationships with the dependent variable.

Systems Capabilities Model

Turning focus to the systems variables, the following models test impact of Return on IT assets and Revenue per IT employee.

$$Y = \alpha + \beta_1 TROT + \beta_2 BROT + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XVIII: Return on IT Assets Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TROT	-0.653			4.046			3.421	
BROT	1.097			-0.229			-0.218	
ATTI	-25.297			43.474			36.866	
MEXP	20.914			21.364			2.981	
MNAI	-5.740			34.818			35.256	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TREM + \beta_2 BREM + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XIX: Revenue per IT Employee Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TREM	0.201			0.245			0.264	
BREM	0.103			-0.052			-0.103	
ATTI	-21.965			44.890			39.862	
MEXP	24.677			19.171			2.059	
MNAI	-8.409			36.122			33.510	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

Again, the above variables have no significant model in any of the three years, but fit is identified in all three years for Return on IT assets. The target's ROT coefficient is negative in year one, then the positive impact on the IT intensity percent difference shifts to the buyer in year two and three. Similarly, Revenue per employee exhibits fit in years two and three with the buyer having a positive impact on the dependent variable with a negative coefficient.

Systems Technology Model

Last set of statistical models shows the match between individual components of IT infrastructure and their impact on IT intensity. The order of presented components is PCs, servers, printers, storage, and network lines.

$$Y = \alpha + \beta_1 TPCS + \beta_2 BPCS + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XX: PCs Intensity Regression Results

	Year 1			**Year 2**			**Year 3**	
	Beta			**Beta**			**Beta**	
TPCS	-19.327			-9.019			-9.388	
BPCS	-0.251			0.257	*		0.280	*
ATTI	-20.562			41.297			35.096	
MEXP	27.498			20.813			3.074	
MNAI	-6.093			41.937			41.181	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TSER + \beta_2 BSER + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XXI: Servers Intensity Regression Results

	Year 1			**Year 2**			**Year 3**	
	Beta			**Beta**			**Beta**	
TSER	-1.035	***		-0.643	*		-0.917	**
BSER	-0.079			0.724	**		1.111	***
ATTI	-10.844			48.991			46.441	
MEXP	31.764			15.448			-4.103	
MNAI	-14.415			39.017			36.983	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TPRI + \beta_2 BPRI + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XXII: Printers Intensity Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TPRI	-0.140			-0.112			-0.400	
BPRI	-1.829	*		1.912	*		1.129	
ATTI	-23.062			44.963			42.172	
MEXP	25.767			17.408			-0.921	
MNAI	-13.618			44.828			38.463	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TSTO + \beta_2 BSTO + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XXIII: Storage Intensity Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TSTO	-0.030			-0.056			-0.049	
BSTO	-0.120			0.074			0.106	
ATTI	-18.093			34.999			27.531	
MEXP	31.422			22.486			3.089	
MNAI	-7.844			40.028			39.333	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

$$Y = \alpha + \beta_1 TNET + \beta_2 BNET + \beta_3 ATTI + \beta_4 MEXP + \beta_5 MNAI + \mathcal{E}$$

Table XXIV: Network Lines Intensity Regression Results

	Year 1			Year 2			Year 3	
	Beta			Beta			Beta	
TNET	0.368			0.324			-0.030	
BNET	-4.485			5.269	*		2.917	
ATTI	-28.288			41.715			36.509	
MEXP	26.239			19.595			0.234	
MNAI	-8.811			47.196	*		43.303	

* 0.05 < p <= 0.10
** 0.01 < p <= 0.05
*** p <= 0.01

The above models exhibit partially significant results. PCs intensity has some significance and fit in years two and three. Servers intensity results are significant in the same years, plus they have with the opposite sign coefficients required for fit. While the results measuring the relationship between buyer's Printers intensity and the dependent variable are significant only in year two, the variable shows fit in both years two and three. Storage intensity results are not significant, but the measure has fit in years two and three. Finally, Network lines intensity has some significance in year two. Unlike the other variables, this measure exhibits fit in years one and three. Consistently, the results across all systems technology variables have fit in year three and a negative coefficient for the buyer. The buyer's measures have a positive impact on the IT intensity percent difference, leading to IT spending reduction. Same results are true in year two for all variables except Network lines intensity.

CHAPTER VI

DISCUSSION

While the overall results of the regression models presented above are not as significant as one would desire, several important conclusions can be drawn for the statistics and data patterns. First, from a high level perspective, the above results confirmed findings in prior research that M&A impacts are not realized immediately. The models show only two measures with slight significance in year one. The positive impacts increase from year two to year three, with the greatest negative coefficients in year three. Therefore, IT savings from systems integration peak three years after the merger. Second, there is a noticeable pattern of fit across 10 out of 11 measures. These measures have opposite sign coefficients with close absolute values in one or more of the three years. Additionally, 8 out of the 11 measures have fit in both year two and three. As this constraint of congruence is met, fit exists, but the coefficients are not consistently significant except for Servers intensity.

Hypotheses

Four hypotheses were proposed for this research and statistically tested. The findings are summarized in Table XXV, with fit and support details behind each measure. The overall support for the relationship between each independent variable and systems integration success is presented in the last column.

Table XXV: Hypotheses Testing Results

Hypotheses	Measures	Fit Years	Measure Results	Variable Results
Hypothesis 1: The fit between the two organizations' competencies is positively associated with systems integration success.	ROS		Partially supported	Not supported
	RDA	2,3	Not supported	
Hypothesis 2: The fit between the two organizations' processes is positively associated with systems integration success.	COE	1,2,3	Not supported	Not supported
	INV	1	Not supported	
Hypothesis 3: The fit between the two systems' capabilities is positively associated with systems integration success.	ROT	1,2,3	Not supported	Not supported
	REM	2,3	Not supported	
Hypothesis 4: The fit between the two systems' technologies is positively associated with systems integration success.	PCS	2,3	Partially supported	Partially supported
	SER	2,3	Supported	
	PRI	2,3	Partially supported	
	STO	2,3	Not supported	
	NET	1,3	Partially supported	

KEY				
	ROS	Return on Sales	PCS	PCs Intensity
	RDA	R&D Intensity	SER	Servers Intensity
	COE	COGS per Employee	PRI	Printers Intensity
	INV	Inventory Turnover	STO	Storage Intensity
	ROT	Return on IT Assets	NET	Network Lines Intensity
	REM	Revenue per IT Employee		

Hypothesis 1, analyzing Organizational Competencies, is rejected as the neither Return on sales variable nor R&D intensity variable had significant results. Fit was not found in any year of the three years of analysis for Return on Sales, but target's coefficient did show significance in year 3. Since Return on Sales is a measure of profitability, the positive coefficients for both the target and the buyer have a negative impact on buyers' financial performance after the merger by increasing IT spending. Interestingly, it is the financial performance of the target that has the greater negative impact on the measure of success in years two and three. Since most acquiring firms' stock values decrease after a merger while the target's value increases (Agrawal, Jeffe, & Mandelker, 1992), profitability of the target at the time of merger may be the reason for this pattern. Companies looking to merge with or acquire another company should analyze the financial performance of the target, as the measure impacts future IT spending.

While not significant, R&D intensity variable shows a fit relationship in both year two and three, which aligns with prior research that states that impacts of mergers and acquisitions are not realized immediately. In addition, the negative coefficient for the buyer's R&D efforts leads one to believe that mergers are not performed to acquire target's innovations, as they have a negative impact causing IT spending to increase after a merger. As MacDonald (1985) confirmed, purchasers look for synergies in research effort and do not acquire targets with higher R&D intensity.

Fit of Organizational Processes positively impacting systems integration success under Hypothesis 2 is not supported and therefore rejected. While COGS per Employee measure is not significant in any year, its coefficients have fit between the buyer and the target in all three years. Since this is a measure of operating efficiency, the buyer's negative coefficient means that the buyer's cost structure has a positive impact on IT intensity ratio and brings IT spending down each year following the merger. Prior research has shown that acquirers with large cash reserves, which are increased with effective cost management, are better equipped for a successful integration (Hitt et al., 1998, Bruner, 2002). As a buyer, the company making the purchase has the power to determine how operations will continue after the merger, thus its effectiveness in managing all costs can transfer to managing costs of IT operations.

Results for Inventory Turnover are also not significant. Interestingly, fit relationship exists only in year one, unlike any other measure in the study. The negative coefficient for the buyer means that purchaser's effective inventory management process already in place at the time of the merger will positively impact the dependent variable right away and decrease IT spending in year one. An effective business keeps inventory levels at a minimum, but always meets customer's demand on time (Rabinovich et al., 2003). By having low inventory at the time of merger, the acquired inventory is easily absorbed without negative impact on spending.

The third hypothesis focused on Systems Capabilities is not supported and rejected. Return on IT assets measures and Revenue per IT employee measures for either company are not significant in any year. However, fit relationship between Return on IT assets of the buyer and the target exists in all three years. It is important to note that target's Return on IT assets has the negative coefficient in year one, and the negative coefficient shifts to the buyer in years two and three. Initially, IT spending is reduced by the effectiveness of the systems operating at the target company. Later, two and three years after the merger, the buyer's IT assets that remain and are integrated into have the positive impact on IT spending.

Revenue per IT employee variable, while not significant, shows fit in years two and three. With negative coefficients, labor efficiencies of buyer's IT resources have a positive impact on IT intensity ratio. While the above finding may appear contrary to prior research that confirmed target's IT resources being critical to M&A success (Ranft & Lord, 2000, Wijnhoven et al., 2006, Alaranta & Mathiassen, 2014), the earlier studies did not evaluate both target's and buyer's resources together. The results show that buyers must train and retain their own employees that understand internal systems in order to realize system integration success. The knowledge possessed by these employees allows for efficient integration and builds valuable experience for future M&A's (Hitt et al., 1998).

The final, fourth hypothesis utilized five different infrastructure measures for Systems Technology to evaluate their impact on integration success. Since the results are inconsistent between the measures, the hypothesis is only partially supported. PCs intensity variable shows significant impact for the buyer in years two and three. In the same years, the results meet the opposite sign constraint between the two coefficients to identify fit. Since target's PCs intensity has the negative coefficient, high level of PCs availability to target's employees has a positive impact on the integration success measure.

The most significant results of this research are found in the Servers intensity model. Both target's and buyer's coefficients are significant in year two and three. In addition, each year's coefficients have opposite signs to identify fit. Based on the strong effects of this variable on reducing IT spending, merging companies must look for similarities specific to this ratio. As a measure of data sharing level, prevalence of servers per employee should be the same between the purchaser and the target. This ensures that server infrastructure is roughly the same between the two companies with similar level of data flow between the servers. Thus, after the merger, the buyers will not need to change the target's server management processes since they have similar data availability. For example, a target company that has a centralized server structure with low levels of data sharing will match a buyer with the same set up. On the other hand, fit will also exist when both target and buyer have a departmentalized structure with a large number of servers set up specifically for one function and requiring high level of data sharing. Since the target's coefficient is negative in these results, its Servers intensity has a positive impact on the dependent variables and reduces IT spending two and three years after the merger. This can be attributed to the fact that, in most systems integrations, buyer's servers absorb the target's data while the target's servers are eliminated. As stated above, the same level of data sharing at the two companies makes this absorption straight forward.

With only slight significance, Printers intensity coefficients have fit in years two and three. Target's coefficient is negative with positive impact on IT intensity, but only the buyer's coefficient in year two is significant. Similarly, Storage intensity coefficients show fit in years two and three with negative values for the target, but are not significant. Since all the above technology measures have negative coefficients for target variables, conclusion can be made that it is the target's systems configuration that has a positive impact on IT intensity and reduces IT spending in years two and three.

The last variable under Systems Technology, Network lines intensity shows different results for each year. In year one, fit exists between the two measures with opposite sign coefficients but is not significant. Buyer's coefficient is negative, so this measure has a positive impact on IT intensity. In year two, fit does not exist and the buyer's coefficient is now positive. Finally, fit between the measures reappears in year three, but is still not significant. Plus, the negative coefficient shifts to the target. This means that the buyer's network setup improves integration immediately after the merger, but in later years, the target's network has the positive impact on system integration success. Since network is critical to connecting systems and bringing flexibility (Duncan, 1995), both buyer's and target's network infrastructures are important, former in the first year and the latter three years after the merger. The year one results agree with the fact that most common integration approach is take-over, where the purchased company is integrated into the infrastructure that is already in place with the buyer (Kovela & Skok, 2012).

The above results answer the research question proposed at the beginning of this paper: ***Does the fit between organizational factors and the fit between systems factors have a positive impact on systems integration success after M&A?*** With no significant fit results for organization factors, the answer is No to the first part of the question. Since several systems factors' measures had significant fit, the answer to the second part of the question is Yes, but it depends on the factor. Systems Technology factors fit had some significant impact on systems integration success, unlike the fit between Systems Capabilities factors.

Limitations

Since most of the measures show fit, the insignificant statistical output of this study must be attributed to other limitations. The power of the results is low because of the small sample size of mergers assembled with data retrieved from three different data sources. With each additional source, the number of records with available data decreased. While the original list of completed mergers from 2008 to 2012 identified in Mergerstat was 609, the N dropped to a 114 when data was merged with two additional sources. Expending the year span of this study may increase the sample size, thus increasing the power of the results and improving significance of measures in the individual models. Another way to improve significance would be to introduce additional control variables and to lower the variance in the independent variable measures. Literature review coverage would need to be expanded to find additional M&A success factors that can be quantified with information available in the three secondary source files. If the current sources do not have the required values, the data retrieval would need to be expanded to additional sources. The drawback of joining another data source is that it could again decrease the sample size.

The research is also limited by the proxy financial measures utilized to quantify the independent variables. They only identify the monetary impact of systems integration success. The economics' based ratios were derived from IT business value literature and generated with available values in secondary data sources. As a result, social measures that prior research found to be significant in M&A transactions are not included. Items like managerial style, culture, and strategy could not be quantified. To gather this type of data, a survey instrument would need to be administered with data gathered from representatives from each merging company to measure both sides of the transaction. Just as was done in this study, the fit between social measures could be analyzed, along with their impact on systems integration success.

CHAPTER VII

CONCLUSION

As the United States economy continues to improve, the frequency of M&A transactions is growing. Companies continue to struggle to understand how to make mergers profitable. Prior research has identified that integration of systems is critical to M&A success, but delivered inconsistent results in determining what brings about this success. The completed research was intended to bring clarity. It also fills a gap in existing literature by providing a more holistic view of factors that impact systems integration success. By including both the fit between organizational factors and the fit between systems factors, the research model represents the synergies that must exist between merging business functions and merging systems. With organizational factors of competencies and processes, the study measures the fit between merging business operations. On the other side, the systems factors of capabilities and technology quantify the fit between IT operations and components. Both of these areas impact systems integration success.

From an organizational perspective, variables of competencies and processes were quantified with financial measures and statistically tested against the success measure of

IT spending reduction. For competencies, the profitability measure was not significant and showed no fit between the target and the buyer. R&D measure was not significant but showed fit in years two and three. Operating efficiency measures for buyer's processes showed some fit, but were not significant.

On the systems side, variables of capabilities and technology were tested to understand their impacts on systems integration success. IT profitability was quantified with returns realized on IT assets which showed fit, but were not significant. IT productivity was quantified with IT employee's impact on revenue growth. IT employee's productivity results had fit in years two and three, but again were not significant. Individual IT assets intensity measured the technology impact on IT spending after the merger. Several buyer's infrastructure components; PCs, printers, storage, and network lines showed fit in one or more years after the merger, but only few were significant. On the other hand, servers had fit and showed significant positive impacts on IT spending reduction in years two and three. This critical finding shows that fit between buyer's and target's server infrastructures leads to systems integration success.

While the first three hypotheses were rejected and only the last one was partially supported, the models still showed a pattern of fit between the measures over the span of three years. Several options were presented on how to improve the power of the study and decrease variance. Future research can focus on these identified improvements, such as adding additional variables, expanding the time coverage, or performing a survey based study. Additionally, the gathered data can be expanded to include international mergers with additional variables that measure location and cultural differences.

Available data can be further broken down into groupings, like industry, or years in existence, to see if the subgroups generate more significant results.

The contribution of this study is in confirming results of prior research on importance of several success factors in M&A. The fit between several variables, that were found to be significant two years after the merger, strengthens the latency effect of not immediately realizing merger efficiencies. The research area of IS in M&A is expanded with a new empirically tested model and the significant finding that fit in server infrastructures leads to systems integration success. For practitioners, the results of this study show that companies should look more closely at systems factors before entering into a merger, as these measures were more significant than organizational factors. More specifically, server infrastructures are a key component to compare. Importance of IT infrastructure components on systems integration success is evident. IT leaders should gather systems figures prior to a merger to understand similarities and to determine if the two infrastructures can be integrated successfully. This information needs to be shared with the decision makers before the decision to acquire a company or merge two companies is finalized.

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