ASSESSING THE RELATIONSHIP BETWEEN THE INTERNET, RADIO FREQUENCY IDENTIFIER (RFID), AND INFORMATION TECHNOLOGY (IT) FLEXIBILITY: A CORRELATIONAL STUDY AND FINDINGS

by

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Abstract

The issue of strategically aligning IT with the business has been the subject of numerous studies and research efforts both in the IT and business fields. Recent studies and research efforts on the issue of aligning IT with the business strategically have provided empirical evidence that IT flexibility is the main factor, rather than strategic alignment, in any organizational efforts aimed at achieving a successful alignment between IT and the business. One of the dimensions of IT flexibility is modularity which encompasses the tools and technologies that IT provides that aid organizations in accomplishing their organizational goals. As such, the goal of this study was to focus on these two IT tools, the Internet and RFID, in an effort to discover whether or not they correlate positively or otherwise with IT flexibility. This study was also aimed at discovering which of these two tools has stronger correlation with IT flexibility. Statistical tests conducted on the data collected for this study were Pearson's correlation coefficient, computational analysis using chi-square crosstabs (2 *x* 2). Based on these tests, the findings of this study present empirical evidence that support the hypotheses that a positive correlation exists between INTERNET and ITF ($r = 0.437$, $p < .001$), RIFD and ITF ($r = .401$, $p <. 001$), with no significant correlations between INTERNET and RFID ($r = .266$, $p = 0.790$). These finding also show that the correlation between RFID and IT flexibility is stronger than that of the Internet and IT flexibility. Finally, the results of this study show that when combining both the Internet and RFID, the strength of the correlation between these two IT tools and IT flexibility becomes significantly higher correlation ($r2 = .663$, $F(1,176) = 118.655$, $p < .001$).

Dedication

I dedicate this research effort to my parents who, through their encouragement and support, have enabled me to reach this stage in my academic journey. May God bless their souls and accept them with kindness and mercy. I also dedicate this research effort to my children who, for few years, have put up with my study and work schedules which deprived them of paying my full attention to their fun activities. I also dedicate this research effort to current and future IT professionals who can use the results and findings of this study to further improve the relationship between IT and the business.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

According to Wang and Zionts (1997), organizational leaders today are increasingly investing time and resources in an effort to implement and develop information systems (IS) that can help them in their efforts to manage and plan strategically. Federal Express and Citibank are examples of such organizations whose information technology (IT) budgets exceed $1 billion (Lucas, 1999). Lucas further indicated that such companies have made the determination that such high budgets are justified in order for them to keep up with demands of fierce competition and the new challenges a global economy. To such companies, IT has become a strategic partner that has been utilized as an effective competitive weapon. Such utilization of IT by the business has given rise to such critical issues as how to effectively align IT strategies with those of the business strategically.

According to Hill and Jones (1998), strategic planning is the "matching of organizational objectives and capabilities to the anticipated demands of the environment so as to produce a plan of action that will assure the achievement of objectives" (p. 35.) Drucker (1989) indicated that unlike tactical and operational planning, strategic planning assists organizational leaders in the effort to clarify future focus by involving key stakeholders in prioritizing activities and decision making. The need for organizational leaders to plan strategically does not deal with future decisions; but rather dealing with the effects and influence that present decisions will have on the future of the organization

(Drucker). Therefore, what organizational leaders do today must clarify their vision of the external and internal environments in order to be ready to deal with the uncertainty of the future.

The utilization of information in organizations has been considered by many organizational leaders to be a critical factor in assisting their organizations in gaining and sustaining a strategic competitive advantage by increasing the efficiency of their operations (Stowell, 1995). Information systems have helped organizational leaders achieve such efficiency by increasing the speed of information, enabling better and more effective decision making (Stowell). As a result, business executives can recognize the benefits that IT brings to the organization, which can be the foundation for a successful alignment effort between IT and the business (Haung & Hu, 2006).

Background of the Study

The goal of aligning IT with the business is to maximize the benefits that organizations can realize from their rather expensive investments in IT and its services. According to Ness (2005), such realization is based on IT's ability to substantially contribute to business success through its effectiveness. Ness further indicated that previous research efforts have widely considered the alignment between IT and the business as the way by which IT can demonstrate the value that it adds to the business. However, empirical evidence presented by Ness confirmed that IT flexibility is the factor to consider, rather than the IT alignment factor, when demonstrating the effectiveness of IT.

Statement of the Problem

According to Luftman (2000), the premise that IT and its services bring many values to the business has been established; however, many organizational leaders today still find it difficult to harness these values and services that IT brings to the business. Based on a recent survey by Bain & Company of top IT executives in 450 companies indicates that 80% of those executives believe that the IT operations at their companies were ineffective; therefore, their concern was more on how to make IT more effective rather than focusing on the strategic alignment between IT and the business. This is contradictory to the traditionally held belief that aligning IT with the business strategically was the means by which IT effectiveness can be realized. Ness (2005) indicated that IT flexibility (ITF) is the "potential cornerstone of business transformation, firm effectiveness, and ultimately sustained competitive advantage through increased IT effectiveness and strategic alignment between business and IT" (p. 7.)

According to Byrd and Turner (as cited in Ness, 2005), the dimensions of ITF consist of connectivity, modularity, and compatibility. This study was focused on the modularity dimension of ITF in the form of the use and utilization of two technologies in use today, namely the Internet and Radio Frequency Identifier (RFID) technology. The results of this study will provide feedback on which of these two technologies has stronger correlation with ITF, if either, in an effort to aid organizational leaders in focusing on the dimension of ITF which will maximize the effectiveness of their IT operations.

Purpose of the Study

This study, as well as its research and data collection processes, were subjected to the review and approval of Capella University's Institutional Review Board (IRB). This study was based on the work done by Ness (2005), who provided empirical evidence that showed a positive correlation between IT flexibility and IT effectiveness (ITE). To do so, this study took into consideration the Internet and RFID as two potential determining factors of ITF. Analysis of these two factors was performed in this study with relation to ITF in an effort to discover which of these factors is more strongly related to ITF. The findings of this study should aid organizational leaders in focusing on those elements of IT flexibility which will maximize the effectiveness of their IT operations.

Rationale

Investing in IT and its related tools can be a very expensive initiative for many organizational leaders today; yet, such an investment is inevitable due to the fact that IT has been proven to be an effective competitive weapon in today's global business environment. Organizational leaders, therefore, must maximize the return on such investments by focusing on increasing the effectiveness of their IT operations, rather than the traditionally held belief that aligning IT with the business will bring the most return on the organizations' investments in IT. IT flexibility (ITF) has been proven to have a positive correlation with IT effectiveness (ITE; Ness, 2005). However, in spite of correlation, many organizational leaders are still unable to determine the economic value of ITF (Kumar, 2004). Therefore, it would be beneficial for organizations to focus on the

IT tools and solutions, as a dimension of ITF, which will maximize the effectiveness of their IT operations. As such, an analysis was performed in this study on two such tools, namely the Internet and RFID (independent variables) in an effort to determine which of these two variables has stronger correlation to ITF (dependant variable). The findings of this study should be a significant contribution to the IT knowledge database since no such study has been conducted before on such important subject as the alignment between IT and the business.

Research Questions

1. To what extent, if any, does use of the Internet relate to ITF?
2. To what extent, if any, does use of RFID relate to ITF?
3. Which technology: the Internet or RFID, if either, is more strongly related to ITF towards improved ITE and sustained competitive advantage?

Hypotheses

H1o: The utilization of the Internet within organizations is not positively correlated to IT flexibility.

H1a: The utilization of the Internet within organizations is positively correlated to IT flexibility.

H2o: The utilization of RFID within organizations is not positively correlated to IT flexibility.

H2a: The utilization of RFID within organizations is positively correlated to IT flexibility.

H3o: The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID

H3a: The utilization of the Internet has a stronger correlation to IT flexibility than does RFID.

Significance of the Study

The significance of this study lies in three aspects:

1. Very few studies in the IT literature have dealt with the issue of IT flexibility and its positive correlation with IT effectiveness. Such studies are needed to shed more light on the importance of focusing on IT effectiveness as the factor to consider in order for the business to maximize the efficiency of its IT operations.
2. The IT literature lacks any studies that deal with determining which of these two relatively new technologies, the Internet and RFID technology, has stronger correlation with IT flexibility. The findings of this study should provide empirical evidence as to which of these tow technologies has stronger correlation with IT flexibility. Such findings should be important in helping organizations in focusing their expensive IT investments on the tools that will aid them in maximizing the efficiency of their IT operations.
3. Interest in RFID implementation is on the rise since the demand by such large retailers as Wal-Mart© and Target© as well as the Department of Defense, of their suppliers to integrate the RFID technology in their products.

The RFID market is expected to reach the $3.0 billion dollar mark by the year 2008 with an expected annual growth rate of 23% (Chen, 2004). In fact, Chen's forecast

for the growth in the RFID market was surpassed. According IDTechEx, a consulting firm that focuses on conducting research studies, reports, and annual updates dedicated the utilization and implementation of RFID technology, RFID market share reached the $4.93 billion in 2007 due mainly to China's national card project which utilized 300 million RFID tags in 2007 (Das, 2007). According to a survey conducted by researchers at the Aberdeen Group in 2005 of 250 top company executives to find out their organizations' RFID investment plans for the next three years (a) 29% indicated that their organizations see definite advantages and will increase investment in RFID, (b) 24% indicated that their organizations will do whatever is necessary to comply with customer and government mandates, (c) 23% will put pilots into production in the next 12 months, (d) 23% indicated that their organizations will make minimal investment until technology matures, (e) 1% will not invest in RFID. According to the same study conducted by the Aberdeen Group in 2007, 64% of the 120 retailers surveyed indicated that their organizations will increase investment in RFID in order to increase control over inventory and asset tracking, 45% of respondents indicated that the reason for implementing RFID was for compliance with government and other business partners mandates. Based on the same study conducted in 2008, most of the 150 organizations surveyed indicate that they plan to implement RFID in a timeframe that ranges between the current year and two years, while 36% indicated that that plan to implement RFID in the future beyond the two year frame.

Definition of Terms

eBusiness. Sawhney and Zabin (2001) defined eBusiness as the "use of electronic networks and associated technologies to enable, improve, enhance, transform or invent a business process or business system to create superior value for current or potential customers" (p. 15.)

eCommerce. Turban (2002) indicated that "there are two types of e-commerce: in B2C transactions, online transactions are made between businesses and individual consumers.... In B2B transactions, businesses make online transactions with other business" (p. 3.)

Internet. Neely (1996) defined the Internet as a "network of networks, linking hundreds of thousands of academic, government, military and public computer systems, enabling literally millions of people from diverse cultures to share information and their resources" (p. 10.)

IT Alignment. According to Luftman (2000), IT alignment with the business is defined as the appropriate, timely, and harmonious application of IT with business strategies, goals and needs.

IT Effectiveness. Brenner et al. (2002) defined IT effectiveness as the degree to which information technology processes bring into being the desired business goals.

IT Flexibility. Ness (2005) defined IT flexibility as "the potential cornerstone of business transformation, firm effectiveness, and ultimately sustained competitive

advantage through increased IT effectiveness and strategic alignment between business and IT" (p. 5.)

RFID. The *RFID Journal* (2008) defined RFID as the use of radio frequency waves to identify individual items using a tag and a receiver.

Assumptions and Limitations

The assumption made in this study that the correlation between IT flexibility and IT effectiveness has been established by the work of Ness (2005). Such assumption is important in directing this study towards expanding the IT flexibility as the factor to consider when attempting to achieve a higher level of IT effectiveness. Such expansion is based on studying and analyzing the tools and technologies that IT provides such as the Internet and the RFID technology, in an effort to determine which of these tools and technologies has stronger correlation to ITF. Towards that effort, this study is limited to taking into consideration the Internet and RFID as two technologies that are reliable predictors of ITF. Future studies and research on the subject of ITF should take into consideration other technologies in an effort to determine which of these technologies has stronger correlation to ITF.

Conceptual Framework and nature of the study

The finding of this study was based on analyzing data that was collected from sampling and surveying IT managers and executives in the USA. The conceptual framework for this study was based on the findings presented by Ness (2005) study. In his study, Ness provided empirical evidence that showed a positive correlation between ITF and ITE as compared to the relationship between strategic alignment (SA) and ITE

within the same regression equation. Such findings are important in the fact that they aid future research efforts, such as this one, in focusing on exploring further the strong relationship between ITF and ITE. As a result, the findings of this study should aid organizational efforts aimed at maximizing the effectiveness of IT operations.

Organization of the Remainder of the Study

The remainder of this study is focused on reviewing pertinent literature that deals with the utilization of the Internet as a business platform, RFID, and IT flexibility. Such review sets the direction as well as the theoretical framework for this study. A detailed discussion is presented which is focused on the role that the Internet has been playing as an effective business platform. This discussion also includes a brief review on the subject of ubiquitous computing in general with focus on RFID and its utilization as an effective tool utilized by organizations today. Chapter 3 is focused on discussing the methodology that was utilized throughout this study with focus on research design, sample, instrumentation, data collection and analysis methods. Chapter 4 is focused on discussing the findings and the results of this study based on the results of the data analysis conducted using SPSS®. Finally, Chapter 5 is focused on discussing the recommendations that were made based on the results and findings of this study. It also includes a discussion on the limitations of this study as well as recommendations for future studies that take into account the subject matter of this study.

CHAPTER 2. LITERATURE REVIEW

Introduction

Experts and researchers in the IT field agree that the ultimate goal of aligning IT with the business is to enable organizations to effectively compete in today's global and digital markets (Ness, 2005; Huang & Hu, 2006; Papp, 1999), which in turns maximizes organizational profitability (Luftman et al., 1999; Papp, 1999) and maximize the return on the hefty organizational investments in IT and its tools (Huang & Hu, 2007). Towards that effort of accomplishing such alignment, IT researchers have conducted numerous studies aimed at outlining strategies and providing models and frameworks by which such alignment can be accomplished successfully. Henderson and Venkatraman (1992) presented a conceptual model based on taking into consideration organizational strategy and processes on one side, and IT strategy and processes on the other side as the basis for a successful alignment model. In this model, Henderson and Venkatraman made a linkage between organizational transformation and the utilization of IT as a competitive weapon.

Burn (1996) presented a business/IT alignment framework based on combining organizational behavior theories with IS strategies, theories, and practices in one single methodology which he refers to as the organizational cultural audit (OCA). Burn recommended in his framework a recurring model that took into consideration the innovative nature of IT as an enabler of the organization's ability to successfully and

effectively cope the changes that IT brings about in the organization. Avison et al. (2004) suggested that organizations should monitor and track current IT projects based on the examination of previous projects in order to allocate project resources due to anticipated shift in strategy; therefore, applying a current alignment outlook. Baker (2004), in his survey of 1100 IT and business executives concluded that the alignment between IT and the business based on a strong organizational leadership and a collaborative corporate culture. Bleistein et al. (2006) indicate that the alignment efforts between IT and the business seem to ignore the impact that systems requirements have on the success of such alignment. Towards the accomplishment of such alignment, Bleistein et al. presented a structured method to requirements engineering based on the linkage between systems requirements and the goals of business strategy, as a model for alignment between IT and the business.

In spite of many studies and research efforts aimed at recommending different approaches and frameworks for the accomplishment of a successful IT/business alignment, organizational leaders still find it difficult to successfully accomplish such alignment (Luftman et al. 1999). A study by researchers at Bain & Company of 453 U.S. organizations indicates that 85% of respondents believed that their IT operations are ineffective. As a result, it was concluded in the study that in order for the alignment between IT and the business to be successful, organizational leaders ought to focus on making IT more effective prior to any alignment attempts. This conclusion seems to coincide with the stance that Ness (2005) has adopted in his study in that IT effectiveness ought to be considered as the factor that will enable organizations to realize the many

benefits that IT has to offer as a competitive weapon. For IT effectiveness to be realized, Ness presented empirical evidence that show a strong correlation between IT flexibility and IT effectiveness. Based on such correlation, Ness concluded that organizational leaders ought to focus on taking advantage of the flexible nature of IT in order to maximize the effectiveness of their IT operations.

Business/IT Strategic Alignment

The strategic alignment between IT and the business has been one of the most important issues that concern organizational leaders (Xia & King, 2002). Such issue has been the concern of organizational leaders since the early 1970's and continues to be a concern as organizational leaders consistently look for technology as an effective weapon to compete in a tough competitive market. The importance of such issue stems from the fact that the successful alignment between IT and the business will have a direct positive impact on organizational performance (Chan & Huff, 1993; Luftman, 1996) and capabilities to compete effectively (Papp, 2001). Efforts aimed at establishing a successful alignment between IT and the business are geared towards leveraging the capabilities of IT (Ness, 2005) and to enable organizations to compete effectively and efficiently in a diverse and market environment (Luftman, 1999; Henderson and Venkatraman, 1992). Papp considered the strategic alignment between IT and the business as the proper utilization of IT in the development of organizational goals and strategies. Chan and Huff indicated that the strategic alignment between IT and the business can be realized based on successfully accomplishing three distinct phases. These are:

1. Awareness level where organizational leaders recognize the benefits and importance of achieving a successful alignment effort.
2. Integration level where IT plans is integrated with those of the business.
3. Strategic alignment level where IT goals and plans are integrated into the fundamental strategies and competencies of the business.

Despite the realization of the importance of the successful alignment between IT and the business, the IT literature is consistent in considering such alignment an elusive organizational goal. According to Luftman (2003), the accomplishment of a successful alignment between IT and the business can be as elusive as drawing a line in the sand of desert dunes. Ciborra (1997) illustrated the complexity of successfully achieving such an alignment as trying to build a bridge between two persistently shifting shorelines with IT on one side and the business on the other side. Huang and Hu (2007) indicated that it is often the case that organizational executives distanced IT from the rest of the business due to the technical nature of IT. Huang and Hu further indicated that by doing so, management has added to the difficulties and complexities of an already complex and difficult issue as the accomplishment of a sustained and successful alignment between IT and the business. Such difficulties and complexities have prompted IT experts and researchers to develop and recommend different models and frameworks by which such alignment can be successfully realized and assessed.

The majority of the IT literature seems to adopt the strategic alignment model which was introduced by Henderson and Venkatraman (1993) as a model for organizations to follow in order to accomplish a successful IT/business alignment.

According to Henderson and Venkatraman, the Strategic Alignment Model (figure 1) consists of four domains, each of which consists of three sections or parts outlining a triad. The authors asserted the need to align the internal as well as the domains of IT in order to effectively integrate these domains with those of the business, resulting in an environment where the chances for a successful alignment between IT and the business are greater. Towards that effort, Henderson and Venkatraman suggested that organizations must seek to balance these four domains in effort to effectively manage IT as a business enabler driven by business plans and strategies.

Another alignment model that has strong presence in the IT literature is the alignment maturity model presented by Luftman (2000), which is considered as a reliable criterion for organizations to utilize in an effort to assess their alignment maturity. Luftman's alignment maturity model (Figure 2) consists of six levels as discussed briefly as follows:

1. The first level is characterized by the sharing of information, knowledge, and ideas between IT and the business. Such exchange will enable both the business and IT to have an unambiguous insight and comprehension of the business's plans, strategies, and priorities.
2. The second level is concerned with the utilization of different metrics and techniques for measuring the effectiveness of IT's role in the organization as well as IT's contributions to the organization.
3. The third level is concerned with measuring the extent of the authority among management for making decisions that impact IT and its operations.

4. The fourth level is concerned with leveraging the relationship between IT and the business by allowing IT to participate in the decision-making process that defines new strategies for the organization.
5. The fifth level is concerned with defining the degree and the extent of IT's flexibility through the creation of a flexible technical infrastructure, IT's ability to utilize new tools and technologies, and IT's ability to create customized solution to organizational needs and problems.
6. The sixth levels deals with managing and assessing IT's ability and creativeness through such practices as training, feedback, career planning, and innovation.

Huang and Hu (2007) recommended a model for IT/business alignment based on an enterprise-wide implementation of a scoreboard where relationships between IT and other business functions are managed through clear expectations and effective communications across the enterprise. Huang and Hu indicated that it is essential for IT to utilize its scorecard to update its performance results on a quarterly basis. Huang and Hu concluded that achieving and sustaining a successful alignment between IT and the business based on such management tool as scorecard, entails four important factors outlined as follows (p. 175):

1. Integrating IT planning with business planning.
2. Maintaining effective communication channels.
3. Developing strong relationships between IT and business.
4. Institutionalizing the culture of alignment.

IT Flexibility

Recently, the issue of IT flexibility has gained attention in the IT literature due to recent studies that focused on exploring this issue and its impact on the successful alignment between IT and the business. Duncan (1995) indicated IT flexibility can be illustrated in terms of connectivity, which he defined as the capability of the different technological elements or modules to connect to each other regardless of whether these elements or modules reside inside or outside the organization. Chung et al. (2003) presented a case study that took into consideration four previously defined components of IT flexibility and their impact on the success of the alignment between IT and the business. These four components are: Connectivity, compatibility, modularity, and IT personnel. Chung further indicated that these components have positive and significant impact on the organization's effectiveness to develop systems that meet the demands of today's dynamic and competitive environments, which organizations are forced to operate in. Tallon (2003) indicated that 70% of companies surveyed actually benefited from a strategic alignment between IT and the business, while 30% of those companies failed, or were even had negative results of such alignment. Tallon attributed such failure to these organizations locking themselves into a restrictive alignment paradox that incorporated the adaptation of inflexible technologies that hindered their ability to react to the changes in their competitive markets. Tallon concluded that achieving IT flexibility takes cautious investments by IT and business executives.

Ness (2005) presented a quantitative study where he sought to assess the relationship among IT flexibility, strategic alignment, and IT effectiveness. He concluded that IT flexibility has positive correlation with IT effectiveness while strategic alignment has little or no impact on IT effectiveness. Ness further indicated that IT flexibility can be measured using three distinct dimensions. These dimensions are:

1. Connectivity dimension, which represents the "number of platforms a firm (or entity) can connect to" (p. 4.)
2. Compatibility dimension, which represents the "degree to which technical components can seamlessly communicate with each other" (p. 4.)
3. Modularity dimension, which is represented, according to Sanchez (1997) as cited in Ness (2005), based on "a larger range of uses for each resource, lowered switching costs and difficulty, and lowered time required to switch from one resource to another" (p. 4.)

This study is an extension of the seminal work presented by Ness (2005) by focusing on the modularity dimension of IT flexibility. Towards that effort, this study is aimed at assessing the relationship among the utilization of the Internet as a business platform, RFID, and IT flexibility, in an effort to discover which has stronger correlation with IT flexibility: The Internet or RFID.

IT Effectiveness

Information technology (IT) effectiveness has gained more and more attention in the IT literature due to its strong impact on the success of business operations. According to Avison et al. (2004), the objective of aligning IT with business is to make the IT

function in the organization more effective. Based on a Bain's survey, organizations can grow faster while gaining a competitive advantage if their organizational efforts were focused on making their IT operations more effective. On a whole, the IT literature seems to consider that IT effectiveness is based on the results of the interaction between users and IT tools, capabilities, and readiness.

Experts and researchers in the field of IT have defined IT Effectiveness in different ways. Weill (1992) based his definition of IT effectiveness on the extent of how well organizational leaders are committed to IT and its operations. As a result, Weill asserted that such commitment will impact the extent of the investment that organizational leaders are welling to put through for IT. Weill indicated that such impact is based on four influencing factors: IT readiness, organizational culture, user satisfaction, and management commitment to IT. According to Baine’s survey, such commitment is manifested in making sure that IT projects are completed on time and on budget. Cooper and Quinn (1992) indicated that IT effectiveness should be defined in terms of IT's ability, potential, and technical capabilities that sustains organizational success and flexibility. Yuthas and Eining (1995) indicated that IT effectiveness can be assessed by taking into consideration three factors that aid in measuring such as effectiveness, user satisfaction, organizational decision-making process, and usage of IT tools and technologies. Luftman and McLean (2004) indicated that IT effectiveness is not just the daily support that IT provides for business operations through the utilization and implementations of hardware and software; rather, it is the extent of the successful integration of IT in the implementation and fulfillment of business strategies.

The Internet as a Business Platform

According to Apigian et al. (2005), many organizations are still struggling to discover the success factors that will achieve a successful utilization of the Internet as a business platform. Apigian et al. further indicated that the reason for such struggle is that these organizations make large investments in a technical Internet infrastructure without strategic planning that is based on sound business plans and direction. There seems to be an inconsistency in the IT literature reviewed for this study regarding the exact benefits or the impact of the utilization of the Internet as a business platform on organizational productivity and competitiveness. Apigian et al. indicated that the Internet has the potential to be an effective technology and an effective business platform, which in turn leads to a competitive edge, if organizations implement such technology based on a business-driven strategic approach. Apigian et al. further indicated that many organizations are still struggling to discover and outline the success factors that will achieve a successful utilization of the Internet as a business platform. Apigian et al. attributed such struggle to the predicament that these organizations make large investments in a technical Internet infrastructure without strategic planning that is based on sound business plans and direction. The technology that supports the utilization of the Internet as a business platform has a distinct relationship to the organization. According to Marsden and Littler (2000), such relationship is based on the successful alignment between the different business functions and the technologies that it will be required to launch a successful Internet-based business operation.

Much of the IT literature that deals with the issue of the Internet and its impact on business deals with such subjects as the impact of the Internet on the different aspects of running the business such as Marketing, advertising, value chain, supply chain, and so forth. The IT literature reviewed for this study also lacks any research efforts aimed at assessing the relationship between the utilization of the Internet as a business platform and IT flexibility.

Internet Utilization and Top Management Commitment

The Internet has become a fertile ground for many multimillion dollar organizations to effectively and successfully create business operations that are solely dependent on the Internet as a business platform. Such organizations are Amazon.com, ebay.com, dell.com, yahoo.com, google.com, among many others. The Internet has also given the opportunity for countless other organizations, large and small, to further the success of their businesses and to effectively compete in what we now refer to, thanks to the Internet, as the global markets. From sophisticated ticket-less airline reservation systems to the corner pizza delivery business, the utilization of the Internet as a business platform has become a very versatile, effective, and competitive weapon that can boost the competitiveness and profitability of businesses. However, as it is the case with other IT projects, such utilization requires the commitment and support of business and management executives. According to the Standish Group (2001), top management commitment ranks among the top 5 factors influencing the success or failure of IT projects. Steltzer and Mellis (1998) confirmed the importance of such commitment based on a survey of 56 organizations where the authors concluded that top management

commitment and support to IT and its projects was the number one factor that influence the success or failure of IT projects. Such commitment becomes even more important when utilizing the Internet as a business platform. The Internet and its founding technologies are constantly evolving; therefore, maintaining a successful Internet-based business operation will need the ongoing support and commitment of top management executives. Such commitment and support should be based on providing better and secured customer experience which are critical factor in the success or failure of an Internet based business operation.

Internet Utilization and Organizational Flexibility

Organizational flexibility is crucial to the success of the organization's Internet operation since the Internet and its related technologies are in a constant state of flux; therefore, organizations that utilize the Internet as a business platform must be ready to adopt to new technologies and new enhancements to existing technologies if they wish to stay competitive. Organizations today are faced with the fact that they must, not only manage the physical systems and their related hardware and software, but also new technologies, products, and new IT systems that extend beyond the internal organizational environment (Shi & Daniels, 2003). Therefore, Shi and Daniels asserted that the technical infrastructure that lend support to such management effort must be flexible enough to the point of being self-serving and self-sufficient which allow these systems to be autonomic in nature. Shi and Daniles further indicated that the extent of how well the organization is ready to deal with a dynamic and diverse business environment is dependent, in part, on the extent of the flexibility in its ebusiness

operations. Shi and Daniles concluded that such flexibility is a reflection of organizational readiness to “react to those environmental variables that are particularly associated with information technologies and new ways of doing business which are enabled by these technologies” (p. 415.)

Internet Utilization and Organizational Effectiveness

The utilization of the Internet as a business platform promotes organizational effectiveness which, in turns, improves organizational competitiveness (Porter, 2001). According to the Delphi Group (2000), the bulk of organizational investment in IT and its related technologies has traditionally been for the purpose of integrating information with business processes in an effort to promote and sustain the reliability and consistency of these processes. Due the intense competitive landscape that organizations are faced with today, organizations can no longer afford to push selective information to consumers; rather, organizational leaders must create a business models that are capable of swiftly and effectively react to consumer needs by providing product information that is well-matched with consumer needs and demands (Delphi Group, 2000). The technology underlying the utilization of the Internet as a business platform makes possible for the creation of such business models that are capable of providing consumers with the ability to easily and conveniently retrieve product information in order to make effective purchase decisions (Delphi Group, 2000). Furthermore, the utilization of the Internet as a business platform enables organizational leaders to create effective strategies to quickly respond to fast market shits by allowing them to integrate multiple value chains among

the different business processes with greater level of detail, which in turns allows for higher levels of *interchangeability* among these processes (Delphi Group, 2000).

The organization's Web site is also an effective and competitive technique for escalating customer service to a new level. The banking industry, for example, provides convenience and flexibility for their customers to manage their bank accounts, bill payments, and the transfer of funds. Utilities and credit cards companies also enhance customer service by providing their customers with secure and immediate bill-payment method through the company's Web site. It is worth mentioning that organizations that provide such services to their customers also benefit by reducing the cost of operations that result when having to rely on employees' time to handle such services. This also includes reducing or eliminating the costs that are incurred when having to rely on the traditional postal service to deliver customer bills and statements.

Ubiquitous Computing

Ubiquitous computing, also known as passive, pervasive, or ambient computing, is defined as an environment where computing provides immediate response to people's needs for services or information by connecting the functionalities that exist in the real world (Weiser, 1993.) In other words, ubiquitous computing is computing with having immediate access to a computer.

The concept of ubiquitous computing was first initiated by Mark Weiser of Xerox Palo Alto Research Center. Weiser (1991) used the term ubiquitous computing to illustrate a depiction of how technology will be utilized in the future where the functions of computing would be accessible anywhere at any time. Today, we can see Weiser's

vision of ubiquitous computing has prevailed in many aspects of our lives such as disaster administration, robots, smart automobiles, smart classrooms, Personal Digital Assistant (PDA), and traffic control systems, and Radio Frequency Identifier (RFID) technology.

Radio Frequency Identifier (RFID)

Radio Frequency Identifier (RFID) technology has been in existence for more 50 years. RFID was first implemented during World War II the allied forces used this technology to identify friendly aircraft fighters using a radar (Asif, 2005). It has been only recently that RFID has gained popularity both in the business as well as the academic worlds as a result of the demand by the world's number one retailer, Wal-Mart, and the U.S. Department of Defense who demanded that their suppliers must integrate the RFID technology in their products (Srivastava, 2004). Today, RFID technology has been hailed as a very impressive technology that promises to enhance business capabilities especially with relation to inventory control and supply chain management.

Even though RFID is a new technology, it has been the subject of interest for many IT researchers and experts who conducted studies on such technology from different perspectives such as RFID implementation (Reyes & Jaska, 2007), RFID infrastructure and components (White et al. 2007), impact of RFID on some aspects of running the business such inventory and supply chain management (Lee et al. 2004; Niederman et al. 2007), and ethical and privacy implications of RFID (Molnar et al. 2005). The RFID technology has been hailed as an effective and efficient tool for the enhancement and support of the management efforts dealing and supply chain and assets management (Gunasekaran and Ngai, 2005; Karkkainen, 2003; Singh, 2003). However,

many organizations utilizing RFID technology do not realize the benefits and the potential of such technology; they are simply doing so because they are required to do by their business partners (Asif & Mandviwalla, 2005). The position taken in this paper is that RFID technology is one of the most influential IT tools today that lends support and endorsement to the flexibility of IT. For the support of this position, a brief review of the IT literature is presented which focuses on one of the most critical business processes utilized by many organizations, namely the role of RFID in the management of the supply chain.

RFID Role in the Supply Chain

According to Niederman et al. (2007), the integration of the RFID technology within the supply chain is solely for the purpose of increasing the effectiveness and efficiency of these processes that are involved in the supply chain. This increase in effectiveness and efficiency is due to the fact that RFID provides comprehensive, accurate, and real-time inventory data at the item level (Niederman, et al.).

The sole purpose of the existence of the RFID technology, as its name indicates, is to identify things (sources of data) such inventory and assets, as well as people (i.e. employees). The majority of the studies reviewed for this research effort contained detailed discussions and description on the physical components that makeup the RFID technology, as well as discussions on the technical functions of these components. Therefore, and for the purposes of this study, the physical components of RFID and their functions were not part of the discussion in this study. Instead, the focus was on the data

itself and the life cycle that this data goes through from its inception and capture by RFID to its utilization as information used in the organizational decision making process.

Niederman et al. (2007) indicated that data collected by RFID goes through six distinct stages. They further indicated that as this data goes through these abstract stages, new challenges and opportunities as for the utilization of such data to enhance the supply chain activities become more apparent. The RFID data life-cycle stages, according to Niederman et al., are outlined follows:

1. Source data acquisition (reading data and integrating with other sources of data)
2. Integration within the enterprise systems and the supply chain processes
3. Integrating across organization (communication and coordination with EPC, global EDI and/or e-mail applications)
4. Data warehousing and analytic processing
5. Archive (backup and replication)
6. Deletion and disposal. (p. 96.)

According to Stevenson (2005), supply chain management is the set of inter-organizational services and tasks that are performed to produce or deliver a product or service. Such production and delivery of such products and services has become more complex than ever in today's competitive global markets. Such complexity is due to the influx of information that demands effective communications between the business and its external partners or suppliers (Brook, 2005). With so much information, Brook indicated that with such information has to be accurate to prevent the variation of such information as it travels through the supply chain. Therefore, such information must

travel fast through the supply chain to prevent delay and uselessness. The consensus among researchers and experts in RFID technology is that deploying RFID in the supply chain will certainly provide all the players across the supply chain with accurate and real-time information that is needed to make timely and accurate decisions.

The integration of RFID in the supply chain helps organizations in avoiding the direct loss of inventory due to such reasons as theft or damage, as well the indirect loss due to poor inventory replenishment which leads to loss of business and customer dissatisfaction (Young et al., 2004). Young et al. further indicated that the indirect loss in inventory has the greatest impact on the business since such indirect losses mount to 30 times the direct losses. Young et al. concluded that such indirect losses in inventory makes it difficult to asses the impact of RFID on the supply chain using the traditional ROI analysis methods. Consequently, Young et al. sought to quantify the indirect benefits that RFID has on the supply chain using a replication model that is based on supplier-retailer. The model covers such indirect benefits based on three different perspectives where RFID implementation had the most impact. These benefits are:

1. Inventory accuracy. Shrinkage or stock loss, transaction error, inaccessible inventory, and incorrect product identification are some of the commonly observed causes for inventory inaccuracy which leads to erroneous replenishment decisions.
2. Shelf replenishment policy. With the ability provided by RFID to track inventory continuously in real time, the inventory inaccuracy problem can be effectively controlled if not eliminated completely. RFID also offers the

opportunity to manage the shelf replenishment more efficiently. In particular, the capability to smartly replenish the store shelves from the backroom stock may reduce lost sales significantly in a retail environment.

3. Inventory visibility through out the entire supply chain. The improved inventory visibility will benefit every player of the system. (pp. 1-2)

RFID and Organizational Effectiveness and Productivity

Throughout the IT literature reviewed for this research study, it has been observed that different authors define organizational effectiveness in different ways depending on the research setting, motivation, and goals. In broad terms, some experts and researchers view organizational effectiveness as the extent of the organization's ability to meet its operational as well as its strategic goals (Travis et al., 1994; Cameron & Whitten, 1983). Other experts indicated that organizational effectiveness is impacted by organizational structure, leadership, and culture (Kimberly & Rottman, 1987). Hoy and Miskel (1996) defined organizational effectiveness as the extent with which the outcomes of organizational processes meet the expected results of these processes. For organizations with extensive utilization of IT tools and technologies, Mark (1985) indicated that there is a positive correlation between formalization and organizational effectiveness. For the purposes of this study, organizational effectiveness was viewed in light of the definition provided by Burke (1994) where he defined organizational effectiveness as the intended utilization of the processes, tools, and behaviors that lend support to and endorse most optimal efficiency of employees. The key attributes that derive the adaptation of this definition are:

1. Processes: such as the supply chain where the utilization of RFID technology has been proven to increase organizational effectiveness;
2. Tools: which in this case is the RFID technology;
3. People: employees and business partners, who are the major players in the supply chain.

The issue of organizational investments in IT and its tools with regards to organizational productivity has been discussed extensively in the IT literature. One of the major factors used in defining and assessing organizational productivity is the individual employee output which often measured by assigning dollar values to each hour of production by individual employees. Some of the objective measures used in the literature are organizational productivity, customer satisfaction, team/business performance, and firm profit (Ployhart, 2004).While some studies indicated that the utilization of IT and its tools has no positive impact on organizational productivity (Weil, 1992; Loveman, 1994), more recent studies have shown that investments in IT does have positive impact on organizational productivity (Shao, 2000; Shao & Lin, 2001). On a whole, studies aimed at quantifying the impact of IT on organizational productivity show disappointing results. This might be due to the fact that such studies have attempted at measuring hard-to-quantify variables such as systems responsiveness, employee performance, internal and external organizational coordination, and more effective communications. The mere spending on IT and its tools does not necessarily lead to increased organizational productivity (Roach, 1987). Instead, it is the integration of the

appropriate IT tools with the appropriate organizational processes that will show increased organizational productivity (Ness, 2005).

RFID Security and Privacy Issues

Even though the adaptation of the RFID technology is on the rise, so are concerns about the security and privacy issues surrounding the use and implementation of such technology. The consensus among experts and researchers in the field of IT is that the issues of security and privacy are among the major concerns impacting the utilization of RFID technology. Thos experts and researchers have conducted research studies in an effort to come up with frameworks and recommendations aimed at resolving the privacy and security issues brought about by the utilization of RFID. Weis et al. (2002) recommended the *kill tag* approach where and RFID tag is disabled, through the invocation of a command programmed within the tag, upon a customer's purchase of an item with such tag imbedded. Juels et al. (2003) recommended utilizing what they referred to as the "blocker tag" which is another tag inserted along with a *normal* tag. The *blocker tag* would be activated upon the purchase of item imbedded with a normal RFID tag. Its purpose is to jam the tag reader by sending conflicting signals when the reader attempts to read the normal tag. Garfinkel (2002) indicated the misuse of and the negligence in the handling of RFID and the data that it accumulates could very well happen at any point in the future. As a result, Garfinkel came up with what he refers to as the RFID bill of right in an effort to create a framework for businesses that utilize RFID technology should abide by to assure the privacy of consumers who buy RFID tagged products. Garfinkel's RFID bill of rights consists of the following:

1. The right to know whether products contain RFID tags.
2. The right to have RFID tags removed or deactivated when they purchase products.
3. The right to use RFID-enabled services without RFID tags.
4. The right to access an RFID tag's stored data.
5. The right to know when, where and why the tags are being read.

CHAPTER 3. METHODOLOGY

The results and findings of this study were based on the utilization of quantitative methods as the means by which the data was analyzed. Such data was collected using the survey questionnaire method of data collection which is an appropriate method utilized in such quantitative studies. Since the goal of this study to assess the relationships among use of RFID, use of the Internet, and ITF, the use of quantitative methods is most appropriate since such methods are well suited for "discovering associations between variables" (Cooper & Schindler, 2004, p. 161.)

Research Design

The fact that IT and its services bring many values to the business has been established (Luftman, 2000). However, many organizational leaders today still find it difficult to harness the values that IT brings to the business because, according to a recent survey by Bain & Company of top IT executives, those leaders believe that the IT operations at their companies were ineffective. To realize the effectiveness of their IT operations, organizational leaders ought to focus on ITF as the means to accomplish such effectiveness (Ness, 2005). According to Byrd and Turner (as cited in Ness, 2005), the dimensions of ITF consist of connectivity, modularity, and compatibility. The focus of this study was based on the modularity dimension of ITF in the form of the use and utilization of two technologies in use today, namely the Internet and Radio Frequency Identifier (RFID) technology. The results of the study provided feedback on which of

these two technologies has stronger correlation with ITF, if either, in an effort to aid organizational leaders in focusing on the dimension of ITF which will maximize the effectiveness of their IT operations. Towards that effort, the following questions are the basis for this study:

1. To what extent, if any, does the use of the Internet relate to ITF?
2. To what extent, if any, does the use of RFID relate to ITF?
3. Which technology, the Internet or RFID, if either, is more strongly related to ITF towards improved ITE and sustained competitive advantage?

To answer these questions, the following hypothesis are made:

H1o: The utilization of the Internet within organizations is not positively correlated to IT flexibility.

H1a: The utilization of the Internet within organizations is positively correlated to IT flexibility.

H2o: The utilization of RFID within organizations is not positively correlated to IT flexibility.

H2a: The utilization of RFID within organizations is positively correlated to IT flexibility.

H3o: The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID

H3a: The utilization of the Internet has a stronger correlation to IT flexibility than does RFID.

Correlation quantitative research methodology was used in this study for the purposes of gathering and analysis of data. The data collection method used was the online survey questionnaire method. The same questionnaire was also mailed to participants in the study where they were given the option to complete and return the survey via mail or complete the survey online. Participants were informed of the uncomplicated nature of the survey and purpose of the research. Participants were informed that participation in the study was strictly confidential and voluntary. Participants were informed that they were not required to reveal their identity in any shape or form. The privacy and safety of all participants in the survey was safeguarded.

Sample

Random selection of participants from a population that has an equal chance of participating was utilized in this study. The target number of participants in the survey was 3700 active IT managers and executives who work for large U.S.-based for-profit organizations. This number of participants seems to be consistent with previous similar studies such as the one by Ness (2005) who targeted 3080 participants. As utilized by Ness, the G*Power (source: http://www.psycho.uni-duesseldorf.de/aap/projects/gpower/) was utilized to determine the least number of participants acceptable for completing the survey. Ness indicated that a sample size of 42 was acceptable based on a significance level of .05, a power of .80, and a high effect of .80 (Cohen, 1988 in Ness 2005).

Participants were directed to completing an online survey, which is an effective method of data collection is an effective method since it would be easier to gather the data in a central repository where access to such data is secured and efficient. This data

was directly imported into Statistical Package for the Social Sciences (SPSS®) software package for analysis. The direct import of data from a database eliminates the chances of errors if data was to be recorded manually from paper-based surveys.

Instrumentation/Measures

Data used in this study was gathered using a two part survey questionnaire. The first part dealt with the utilization of the Internet as a business platform by large U.S.-based organizations. This part of the questionnaire was completed by all participants in the survey. The second part of the questionnaire dealt with the utilization of RFID technology by large U.S.-based organizations. This part of the questionnaire was completed only by those participants whose organizations utilize RFID. Both parts of the questionnaire are included in Appendix B.

The survey questionnaire was pretested on a pilot group of 30 store managers in the immediate Chicago area representing large organizations such as Wal-Mart, Target, Best Buy, Circuit City, Office Max, among others. Such pretest was required to assure validity since these questions were created by the researcher of this study and since no pre-existing questionnaires are available in the subject matter of this study.

Data Collection

Data for this study was collected using the survey questionnaire method, which was Web-based (Appendix B). Each participant in the survey was sent an e-mail and/or a letter (Appendix A) via mail directing him/her to the Web address (URL) of the online survey. In the e-mail and/or letter, an explanation of the purpose of the study was

provided as well as a request for participation. It was emphasized that participation in the survey is absolutely voluntary. Participants were assured that their participation was strictly confidential and that only the researcher would have access to the data. The data was stored in a secure SQL database where access can be granted through an authentication scheme that was applied to the database. The data collected was coded and analyzed using SPSS® 17.0 for windows.

Data Analysis

The data analysis in this study was based on the three hypotheses that guided this study using *t* tests respectively. A level of significance of .05 (Cohen, 1988) was utilized for each test to help the researcher assess the significance of the factors of interest. In addition to the statistical analysis of the hypotheses formulated, the calculated means of each system were tested to investigate if there is a significant difference between the two systems at 5% significant level. Furthermore, the data analysis used in this study was based on the methods and procedures utilized in the study presented by Ness (2005). The Statistical Package for Social Sciences SPSS® 17.0 software was used to perform Pearson's correlation coefficient in an effort to determine the relationship, if any, between the dependent (the Internet and RFID) and independent (IT flexibility) variables. Ness utilized a computational analysis using chi-square crosstabs (2x2) in an effort to "ensure that the hypothesized relationships exist between ITF, ITE, and SA as ordinal response sets (per the Likert-scale used)" (p. 55.) Survey results for this research was assessed using the chi-square (2 x 2) as well in an effort to ensure that the hypothesized relationships exist between the Internet, RFID, and ITF per the Likert-scale. To confirm

the results of the chi-square test results, Ness utilized multiple regression modeling using the equation, $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_1X_2 + \varepsilon$, "based on one target variable, IT effectiveness (*Y*), the predictor variables, IT flexibility (X_1) and strategic alignment (X_2) and their interaction term (X_1X_2)" (p. 55.) The same regression model and equation was utilized in this study based on the target variable ITF (*Y*), the predictor variables, the Internet (X1) and RFID (X_2). Multiple analysis methods including the stepwise regression technique was utilized to assess regression model was per Ness (2005).

Using SPSS, computational analysis using chi-square as utilized by Ness (2005) in an effort to "to ensure that the hypothesized relationships exist" (p. 55,) between the variables Internet, RFID, and IT flexibility per the Likert-scale.

Validity and Reliability

To ensure the reliability of the research instrument used in this study, a pretest pilot was conducted since no pre-existing similar studies were found. The test pilot included 30 participants who are business and IT managers who work for large organizations in the Chicago area as well as current and previous executive leaders and faculty members.

The population for this study consisted of IT and business managers and executives with broad knowledge of the relation between IT and the business who currently work for large U.S.-based for-profit organizations. Limiting the participants to for-profit organizations was to aid in the validity of the study since non-for-profit organizations might not be concerned with being competitive (Ness, 2005) which is mandatory for this study.

Bias

According to Mowshowitz (1981), avoiding bias and achieving neutrality in computing related research is almost impossible since such research is often based on questions related to policies related to technology implementation and utilization. Mowshowitz further indicated that to reduce the chances for bias, a researcher ought to avoid taking too many positions or stands. It is hypothesized in this study that the utilization of the Internet as a business platform and the RFID technology by organizations are examples that lend support to the stance that IT flexibility, as it has strong correlation with IT effectiveness (Ness, 2005), ought to be harnessed by organizational leaders who seek to accomplish a strategic alignment between IT and the business. No position as to which of these two technologies has stronger correlation with IT flexibility is taken in this study. This is in an effort to reduce or eliminate any chances of bias in the results and conclusion of this study. Furthermore, the researcher has elected to utilize quantitative methods for the analysis and manipulation of data collected. An online survey questionnaire has been chosen as the instrument for data collection. Such instrument has the tendency to drastically reduce the chances for bias since there is no direct contact between the researcher and the participants (Neuman, 2000). Data collected was immediately stored in a secure database. The online survey was accessible for a 1 month period after which it was taken offline and data collected was then migrated to an Excel spreadsheet which was fed to SPSS for analysis. Finally, the results and conclusions of this study is open for discussion and debate among those who interested in both the academic as well as the business fields.

Ethical Considerations

Participants were mailed invitations to participate in this study to their business addresses. These invitations explained in detail who is conducting this research, why and how they have been chosen to participate, and the anticipated length of their participation. The invitations also covered in detail such important issues as anonymity of each participant. Participants were made aware that their participation in the survey questionnaire was strictly voluntary and that their withdrawal at any time would be understood. Finally, participants were provided with instructions on how to obtain the research findings and conclusions if they wish to do so.

CHAPTER 4. RESULTS

Introduction

In light of the methodology described in Chapter 3, a detailed discussion of the results of the analysis that has been done on the data collected using SPSS® is presented in this chapter. Discussions, as well as statistics about each question used in the survey for the purposes of collecting the data, are also presented in this chapter. Statistics about each of these questions are presented in a table that shows the question text, answer options, response percent, response count, answered question (total count of the respondents who answered the question), and skipped question (total count of the respondents who skipped the question)

Finally, a detailed discussion on the findings of the data analysis is presented. This detailed discussion contain tables, charts, and graphs that are the results of the analysis done on the data using SPSS®.

Reliability and validity of the Data Analysis

The tests and the analysis conducted on the data collected are based on the same tests and analysis used by Ness (2005). In his study, Ness sought to discover the relationships between IT flexibility, IT effectiveness, and/or strategic alignment in an effort to evaluate the support for the claim that IT flexibility has greater influence on IT effectiveness than does strategic alignment. As such, this study builds on the work done

by Ness by taking into consideration ITF as having a positive correlation to IT effectiveness (ITE). To do so, this study was focused on taking into consideration the Internet and RFID as two potential determining factors of ITF. Analysis, based on the tests used by Ness (2005), of these two factors was conducted in this study with relation to ITF in an effort to discover which of these factors is more strongly related to ITF. To achieve such discovery, this study was aimed at answering the following questions:

1. To what extent, if any, does use of the Internet relate to ITF?
2. To what extent, if any, does use of RFID relate to ITF?
3. Which technology: the Internet or RFID, if either, is more strongly related to ITF towards improved ITE and sustained competitive advantage?

Survey Responses

Towards the goal of discovering the degree of correlation, if any, between the Internet and RFID with IT flexibility, a survey was developed in an effort to gather data that, upon analysis, would provide information that will aid in making accurate and reliable recommendations as to whether there is a correlation among the Internet, RFID, and IT flexibility and which, the Internet or RFID, has stronger correlation with IT flexibility. The survey was divided in two parts where the first part deals with the utilization of the Internet as a business platform by organizations. Questions were designed to gage the impact that the Internet has had on organizational abilities to accomplish their strategic as well as their operational goals. The second part of the survey deals with the utilization and implementation of RFID technology by organizations. Questions were designed to discover how organizations utilize RFID technology and how

such technology has impacted organizational abilities to meet their strategic as well as their operational goals. More specifically, questions were designed to gage how RFID has impacted organizational profitability, productivity, efficiency, and competitiveness.

The survey was placed online utilizing the services of www.surveymonkey.com. This Web site is dedicated to providing survey services for those who conduct studies aimed at gathering data for research efforts. The Web site provides secure SSL access to collection and downloading of data. Only the researcher has such access via a login and password provided by the Web site. Data can be downloadable in spreadsheet format for easy upload to such analytical tools as SPSS®.

A survey population of 3700 IT and business executives in large U.S. organizations were sent invitations via U.S. Postal Service to participate in this study. The total number of respondents was 244 or 6.59%. The invitations included the Web address for the survey as well as assurances that participants' feedback will be treated with strict confidentiality to assure privacy and protection of these participants. Participants were assured that only the researcher would have access to any data that the survey provides and such data would not be shared, distributed, or sold to anyone.

The selection criteria for the organizations that participated in this study was based on the belief that the nature of their business, such as retail, manufacturing, transportation, and healthcare utilizes and implements RFID technology. It would be hard to imagine a large organization that does not utilize the Internet for business purposes. This was confirmed by the findings of this study in which 100% of participants indicated that their organizations utilize the Internet for either eBusiness, eCommerce, or both. Of

the 244 participants, 44 or 18% indicated that their organizations did not utilize or implement RFID technology. The remainder of this chapter is focused on discussing in detail the findings and the results of this study based on the analysis of data that was collected as they relate to answering the research questions and hypothesis that motivated this study.

Of all respondents to the survey, 54 or 22% did not indicate their job titles. The total number of respondents who responded to this question was 190 or 78% as shown in Table 1. It is assumed that such senior organizational positions require a substantial number of years of experience that range between 10 years (Ness, 2005) and 13.6 years (Pierce, 2002 as cited in Ness, 2005); therefore, such information as the length of period that the respondent has been with the organization was deemed irrelevant and was not collected.

Table 1: Survey Question 1- Job title

Job Title	*Total number of respondents*	*Percentage*
CEO	15	7.89%
CFO	16	8.42%
Chief Analytics Officer	1	.52%
CIO	67	35.26%
COO (Chief Operations Officer)	15	7.89%
CTO (Chief Technology Officer)	45	23.68%
Technical Director	7	3.68%
Senior Technical Director	15	7.89%

Director (non-technical)	5	2.63%
Partner	3	1.57%
Operations Manager	1	.52%

Towards maximizing the validity and reliability of the data to be collected, the survey population was equally divided among technical and non-technical senior positions. Such senior IT and business positions provide deeper insights into organizational decision making as well the current and future use and implementations of the different technical tools that provide strategic benefits to the organization (Ness, 2005). Such tools are the utilization of the Internet as a business platform and the use and implementation of the RFID technology. The majority of the respondents to the survey held senior and executive IT positions (CIO, CTO, technical director, senior technical director) with a total of 134 responses or 70.52%.

The majority of the organizations selected to participate in this study were chosen from the retail, manufacturing, healthcare, and transportation sectors were the use and implementation of RFID technology is most likely (See Table 2). According to a Federal Trade Commission (FTC) workshop report (2005), the much noted applications of RFID can be seen in improving the warehouse and supply chain management which are critical operations in the retail, manufacturing, and transportation industries.

Table 2: Survey Question 2- Please Indicate the Type of Business your Organization is in

Answer Options	*Response Percent*	*Response Count*
Advertising	5.0%	12

Banking	5.0%	12
Consulting	4.5%	11
Education	2.9%	7
Engineering	7.9%	19
Healthcare	9.9%	24
Insurance	4.1%	10
Manufacturing	19.4%	47
Marketing	6.6%	16
Retail	19.0%	46
Telecommunications	7.0%	17
Transportation	8.7%	21
	Other	2
answered question		242
Skipped question		2

Survey results showed that 100% of respondents indicated that their organizations utilize the Internet for either eBusiness operation, eCommerce operation, or both as shown in Table 3. The Internet has been hailed as a vibrant and effective way for organizations to utilize as a method for product distribution and extended market reach (Alba et al., 1997). Utilizing the Internet as a business platform allows the organization to offer its customers convenience and effective means of price comparison (Chiang and Dholakia, 2003), while the technologies underlying the Internet offer online shoppers a

user friendly interface that allows them to shop around while saving time and money (Bitner, Brown, & Meuter, 2000).

Table 3: Survey Question 3- My Organization Utilizes Internet in the form of an

Answer Options	*Response Percent*	*Response Count*
eCommerce operation (Selling products and/or services via the Internet)	6.9%	17
eBusiness operation (Utilizing the Internet as a tool to communicate with customers and business partners)	58.4%	142
Both	34.5%	84
answered question		243
Skipped question		1

The majority of respondents (90.6%), as shown in Table 4, indicated that the utilization of the Internet by their organizations as a business platform has made these organizations more profitable. This is not surprising since the Internet has expanded the market reach on local as well as global levels for many organizations. According to a report by Forrester Research, projected online sales will reach 329 billion dollars in the year 2010 due to organizations becoming more innovative and competitive in offering their products and services to consumers via the Internet (Forrester Research, 2005).

Table 4: Survey Question 4- Utilizing the Internet as a Business Platform has Made my Organization More Profitable

Answer Options	*Response Percent*	*Response Count*

Strongly Agree	24.3%	59
Agree	66.3%	161
Neutral	7.4%	18
Disagree	2.1%	5
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		243
Skipped question		1

The majority of respondents (92.2%), as shown in Table 5, indicated that the Internet has made their organizations more competitive. Such high percentage might be due to the fact that the influence of the Internet can be seen in all business activities. According to Porter (2001), the Internet is the most influential of all the IT tools and technologies, especially when it comes to achieving and sustaining organizational competitive advantage. The integration of the Internet into the traditional business processes such the value and supply chains, for example, has given organizations a strengthened competitive advantage (Porter, 2001).

Table 5: Survey Question 5- Utilizing the Internet as a Business Platform has Enabled my Organization to be Competitive

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	31.3%	76
Agree	60.9%	148
Neutral	6.2%	15

Disagree	1.6%	4
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		243
Skipped question		1

The majority of respondents (88.4%) indicated that the Internet has helped their organizations in becoming more efficient and more effective. In fact, the effective utilization of the Internet as a business platform has become a major determinant of the organization's ability to compete effectively in today's markets and its ability to manage the business and its relationships (Torkzadeh & Dhillon, 2002). Extranets, as a mean for data sources connection, have been utilized by businesses as a collaboration and communication tool that aid in the effective management of the value and supply chains in a real-time environment; therefore, boosting customer as well as external partners service and relationships.

Table 6: Survey Question 6- Utilizing the Internet as a Business Platform has Enabled my Organization to Manage its External Business Relations More Efficiently and More Effectively

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	21.7%	52
Agree	66.7%	160
Neutral	8.8%	21
Disagree	2.9%	7

Strongly Disagree	0.0%	0
N/A	0.0%	0
Answered question		240
Skipped question		4

Throughout the IT literature, many researchers have linked the success of organizational flexibility to the extent of IT flexibility. According to Hitt and Keats (1998) organizations that seek to be competitive in the 21st century and beyond must be able to establish strategic flexibility which enables them to quickly react to market and customer shifts and trends. Hitt and Keats further indicated that such flexibility is largely dependent on IT and its tools one of which is the Internet which has become the most influential of all the IT tools that lend impressive support to organizational flexibility.

Table 7: Survey Question 7- Utilizing the Internet as a Business Platform h1as Enabled My Organization to be Dynamic and Flexible

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	25.3%	61
Agree	61.0%	147
Neutral	10.0%	24
Disagree	3.7%	9
Strongly Disagree	0.0%	0
N/A	0.0%	0
Answered question		241
Skipped question		3

The majority of respondents (75.1%) indicated that their organizations have benefited from utilizing the Internet by managing and optimizing the process of managing customer relations more efficiently. With millions of online merchants and eBusinesses, acquiring and retaining the attention and the trust of millions of current and potential customers is one of the most impressive challenges that online businesses will always have to struggle with. According to Huizingh (2002), such struggle stems from the fact that customers can easily switch suppliers for such reasons as value, trust, and convenience. Huizingh further indicated that for organizations to maintain effective CRM process, they should utilize the Internet as a medium for community building, image and brand building, and offering services that boost the quality of the lives of their customers.

Table 8: Survey Question 8- Utilizing The Internet as a Business Platform Enables my Organization to Maintain an Optimum Customer Relations Management Process

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	10.4%	25
Agree	64.7%	156
Neutral	17.8%	43
Disagree	7.1%	17
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		241
Skipped question		3

According to Power (2004), top management commitment to its Internet-based operations is a critical factor that enables these organizations to actualize their investments in such operations. The lack of such commitment can seriously hinder the organization's ability to maintain and sustain a successful Internet operation (Kao & Durocher, 2007). Kao and Durocher, in their research concerning the success factors of eBusiness in China, further indicated that China has surpassed North America in Internet utilization; however, Chinese businesses are struggling to maintain successful Internet-based operations due to a variety of factors. Chief among these factors is the lack of leadership that provides continued commitment and support to the utilization of the Internet as a business platform.

Table 9: Survey Question 9- The Management at my Company is Committed to the Success of the Company's Internet Operations

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	9.1%	22
Agree	76.4%	185
Neutral	7.4%	18
Disagree	6.2%	15
Strongly Disagree	0.0%	0
N/A	0.8%	2
answered question		242
Skipped question		2

Table 10: Survey Question 10 - My Company's Business and Internet Strategies are Well Integrated

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	7.8%	19
Agree	78.6%	191
Neutral	7.0%	17
Disagree	5.8%	14
Strongly Disagree	0.0%	0
N/A	0.8%	2
answered question		243
Skipped question		1

The majority of respondents (86.7%), indicated that the technical infrastructure that lends support to the utilization of the Internet as a business platform at their organizations is flexible enough to contain future changes and enhancements. According to Shi and Daniels (2003), a flexible ebusiness infrastructure is crucial since such flexibility lends impressive support to the organization's ability to quickly and swiftly create new business models in response its fluctuating environment. Shi and Daniels further indicated that flexibility is one of the main factors that contribute to the success of ebusiness as effective and efficient mean of communications between businesses.

Table 11: Survey Question 11 - The Technology Underlying my Company's Internet Operations is Flexible Enough to Accommodate Future Changes

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	8.3%	20

Agree	78.4%	189
Neutral	8.7%	21
Disagree	4.6%	11
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		241
Skipped question		3

According to Shen et al. (2006), utilizing the internet as a business platform significantly increases organizational efficiency, effectiveness, and competitive sourcing opportunities by "reducing procurement cost, identifying new business opportunities, and supporting collaboration and cooperation among all supply chain partners" (p. 1.) Shen et al. further indicated that U.S. utilization of the Internet as a business platform will grow from $336 billion in 2000 to $6.3 trillion in 2005 with a share of 42% of the total business-to-business (B2B) transactions, specifically the supply chain, that take place among U.S. organizations. Shen et al. cited another research study by the Boston Consulting Group which concluded that "69% of the U.S. buyers and 75% of the U.S. sellers are already engaged in or plan to undertake on-line collaboration" (p. 2.) According to Shen et al., such Collaborative activities include on-line product design and project management, real -time information product sharing, and coordination of supply schedules in build-to-order initiatives. The results of the survey conducted for this study seem to confirm these impressive statistics cited by Shen et al. as shown in Table 12.

Table 12: Survey Question 12 - My Company has Benefited from Utilizing the Internet for the Following Processes

Answer Options	*Response Percent*	*Response Count*
Advertising company profile	97.9%	238
Advertise company products and services	99.6%	242
Increased sales	88.9%	216
Improved supplier transactions (Extranet)	28.8%	70
Improved value chain	58.8%	143
Improved supply chain management process	43.2%	105
Improving supplier relationships	58.0%	141
Improving customer relationships	76.5%	186
Improved internal processes and communications (Intranet)	88.9%	216
Flexibility/convenience	47.3%	115
answered question		243
Skipped question		1

Of the 243 survey respondents, 200 (82.3%) of those respondents indicated that there organizations utilize RFID technology. As mentioned before, survey participants

were selected based on the type of business their organizations are in where the utilization and implementation of RFID technology is most likely. According to Das (2007), the implementation of RFID technology is most prevalent in the retailing, manufacturing, healthcare, logistics, transportation, and engineering industries. A survey by Larstan Business Reports indicated that the manufacturing, retailing, and transportation and logistics industries are the most among other industries in the use and implementation of RFID technology.

Table 13: Survey Question 13 - Does your Organization Implement Radio Frequency Identifier (RFID) Technology?

Answer Options	*Response Percent*	*Response Count*
Yes	82.3%	200
No	17.7%	43
answered question		243
Skipped question		1

According IDTechEx, a consulting firm that focuses on conducting research studies, reports, and annual updates dedicated the utilization and implementation of RFID technology, investments in RFID tags in the year 2006 reached $1484 million (Das, 2007). Most of these investments were spent on such applications as security, retail merchandise, product and asset tracking, warehousing and pallets, and vehicles. In the year 2007, IDTechEx indicated that RFID investments among the RFID applications mentioned above reached $1740.65 million with an expansion of RFID applications in libraries, animal tracking, and air baggage. The 2008 IDTechEx forecast shows that the

implementation of RFID technology will increase in the security, transportation, manufacturing, retail, and automotive industries with a total of $2357 million for the year 2008.

Table 14: Survey Question 14 - Utilizing the RFID Technology at my Organization is for the Purpose of (Please Choose all that Apply)

Answer Options	*Response Percent*	*Response Count*
Merchandising, retailing	48.2%	95
Security, anti-theft	92.4%	182
Product ID/tracking	72.6%	143
Asset tracking	99.0%	195
Automotive, vehicle access control	11.2%	22
Inventory tracking	88.8%	175
Manufacturing and Distribution	40.1%	79
Warehouse management	97.0%	191
Healthcare	11.2%	22
Transportation and logistics	42.6%	84
	Other	0
answered question		197
Skipped question		47

According to a Deloitte & Touche (2005) 3 year study of the utilization of RFID technology in the retail, manufacturing, transportation and logistics industries, 75% of the 90 organizations studied indicated that the utilization of RFID will significantly reduce

human operational errors during the first 5 years of implementation which drastically improve the effectiveness of such critical organizational process as the supply chain. The results of the survey conducted for this study confirm these findings where 24% of those respondents strongly agreed while 64.5% agreed that their organizational effectiveness has increased due to the utilization of RFID technology in their organizations. According to the Aberdeen Group (2008), 47% of survey respondents of 135 large U.S. organizations that implement RFID technology indicated that the driving force behind such implementation is for the goal of increasing employee efficiency and productivity. The same respondents also indicated that RFID did in fact has had positive impact on the achievement of such goal.

Table 15: Survey Question 15 - The Utilization of RFID Technology has Increased my Organization's Effectiveness

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	24.0%	48
Agree	64.5%	129
Neutral	8.5%	17
Disagree	3.0%	6
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		200
Skipped question		44

Business leaders as well as researchers consider RFID technology as one of the most comprehensive form of IT tools in the history of computing (Roberts, 2006). The pervasiveness of RFID is due to the fact the RFID has proven to be an effective tool in one of the most all-encompassing business process which is the supply chain. The integration of RFID within the supply chain is an effective example of utilizing the appropriate IT tool for the appropriate business process.

Table 16: Survey Question 16- The Utilization Of RFID Technology has Increased my Organization's Productivity

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	22.5%	45
Agree	62.5%	125
Neutral	12.0%	24
Disagree	3.0%	6
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		200
Skipped question		44

According to the Aberdeen Group (2005), the utilization and implementation of RFID will increase rapidly; therefore, organizations that make a head start in the implementation of RFID will gain a competitive advantage since these organizations will acquire the expertise and the skills needed to effectively implement RFID. On the other hand, a late start in the utilization and implementation of RFID will put organizations at a

competitive disadvantage. Niederman et al. (2007), the integration of RFID in the supply chain increases increase organizational responsiveness to customer needs and demands which increases organizational competitiveness. According to Deloitte & Touche (2004), "Anyone who is still uncertain about the wisdom of launching an RFID project should keep in mind that Wal-Mart caught the industry by surprise in 2004, creating an inevitable lag in competitive response" (p. 9.)

Table 17: Survey Question 17 - The Utilization of RFID Technology has Enabled my Organization to be more Competitive

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	18.3%	36
Agree	62.9%	124
Neutral	14.7%	29
Disagree	4.1%	8
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		197
Skipped question		47

The extent of the reduction in the operations and labor costs, in most cases, are the major determining factors in studies aimed at determining the return on RFID investments (Lee et al., 2004). Lee et al. further concluded that the utilization of RFID in the supply chain process goes beyond the mere automation of such process; such utilization has a major positive impact on the reduction of operations and labor costs.

According to Barua et al. (2006), the utilization of RFID technology has mounted to an impressive $40 billion global reduction in operations and labor costs in the retail and healthcare sectors alone. Barua et al. further asserted that, compared to the $2.7 billion global RFID investments in these two sectors, the return on such investments is a remarkable 500%.

Table 18: Survey Question 18- The Utilization Of RFID Technology has Made my Organization More Efficient by Reducing Operations and Labor Costs

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	15.6%	31
Agree	63.8%	127
Neutral	17.1%	34
Disagree	3.5%	7
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		199
Skipped question		45

According to Deloitte & Touche (2004) 3 year study on the utilization of RFID technology in the retail, manufacturing, transportation and logistics industries, the majority of the organizations studied indicated that the integration of RFID in the supply chain is important. Such indication is clearly expected since one of the major utilizations of RFID technology is for the purpose of asset and inventory tracking which is a major activity in the supply chains of these industries. In an effort to discover the impact of

RFID on the supply chain management and performance, Lee et al. (2004) developed a simulation model that was based on the replication of a manufacturer-retailer supply chain situation. Their model was focused on these supply chain activities that deal with inventory reduction and service level enhancements. Based on their quantitative analysis of this model, Lee et al. indicated that RFID allowed for effective inventory tracking with accurate and timely information which resulted in the reduction of the amount of time and money that it takes to effectively manage the supply chain.

Table 19: Survey Question 19- The Utilization of RFID Technology has Enabled my Organization to Manage its Supply Chain more Efficiently

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	15.1%	30
Agree	69.3%	138
Neutral	13.1%	26
Disagree	2.5%	5
Strongly Disagree	0.0%	0
N/A	0.0%	0
answered question		199
Skipped question		45

According to Lee et al. (2004) the utilization of RFID in the supply chain provides more accurate inventory related information which, in turns, provides the opportunity to make effective inventory replenishment decisions. Lee et al. further indicate that such decisions improve customer service and experience since inventory

will always be available. Koh et al. (2006) concluded that RFID brings about two major benefits to the business: Swiftness of the supply chain cycle and more effective and efficient inventory and shelf replenishment management process.

Table 20: Survey Question 20 - The Utilization of RFID Technology has Enabled my Organization to Effectively Manage and Control Inventory and Shelf Replenishment

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	13.1%	26
Agree	53.5%	106
Neutral	11.6%	23
Disagree	3.5%	7
Strongly Disagree	0.0%	0
N/A	18.2%	36
answered question		198
Skipped question		46

According to Lee et al. (2004), poor or inaccurate inventory information can lead to ineffective business decisions related to shelf replenishment which leads to customer dissatisfaction which, in turn, could have negative impact on the business's ability to compete effectively. Lee et al. asserted that due the fact that RFID makes possible the availability constant real-time inventory information, the issue of the inaccuracy in such information will be completely eliminated. For example, considering the retail giant Wal-Mart as a model for the extent of the impact of RFID in the retail industry, Asif and Mandviwalla (2005), indicated that by adopting the RFID technology, Wal-Mart has been

able to accumulate annual saving of up to $600 million due to the decrease in the cost of out-of-stock supply chain, $300 million due to the improved inventory tracking at the item level in its vast warehouse and distribution centers, and $180 million due to better inventory planning and forecasting.

Table 21: Survey Question 21- The Utilization of RFID Technology has Improved my Organization's Ability to Accurately Forecast and Plan Inventory

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	13.1%	26
Agree	59.8%	119
Neutral	11.1%	22
Disagree	4.0%	8
Strongly Disagree	0.0%	0
N/A	12.1%	24
answered question		199
Skipped question		45

There is a consensuses among the literature reviewed for this study in that the integration of RFID in the supply chain drastically improves inventory management, which in turn leads to better customer service (Lee et al., 2004, 2005; Aisf & Mandviwalla, 2005; Koh et al., 2006). According to a survey conducted by Larstan Business reports in 2005 of 669 business executives on the utilization of RFID in the retail, manufacturing, transportation and logistics industries, the majority of respondents

agreed that the utilization at their organizations comes in response to the need for improving customer service through better pricing, product availability, and delivery.

Table 22: Survey Question 22 - The Utilization of RFID Technology has Improved Customer Satisfaction and Experience

Answer Options	*Response Percent*	*Response Count*
Strongly Agree	8.5%	17
Agree	70.4%	140
Neutral	15.1%	30
Disagree	3.5%	7
Strongly Disagree	0.0%	0
N/A	2.5%	5
answered question		199
Skipped question		45

The utilization and implementation of RFID technology is by no means a cost justified investment. Based on the literature reviewed for this study, one of the major inhabitants that prevents the utilization and implementation of RFID technology at many organizations is cost. According Forrester research and AMR Research in Asif and Mandviwalla (2005), a typical food packaging business would have to incur an average expense between $13 and $23 million in an RFID investment broken down as follows:

According to the Aberdeen Group (2005), 70% of survey respondents indicated that the major obstacle in the utilization of RFID technology at their organizations is cost: Cost of RFID tags (34% of respondents) and cost of RFID infrastructure (36% of

respondents). However, the Aberdeen Group report, the following years will show an increase in the investments in the deployment of RFID technology with 42% of companies surveyed indicated that their investments in RFID technology in the next 12 months will increase up to 30% of their current RFID investments. The results of this study seem to confirm the outlook that the Aberdeen Group have indicated with regards to cost as being an obstacle that hinders investments in RFID technology. Of the 200 respondents to survey provided with this study, only 24.9% indicated that funding for RFID technology was a primary challenge for the utilization of RFID technology at their organizations.

The increase in the investment in RFID technology seems to indicate that management support and commitment is also becoming a non-issue as far as investing in RFID technology. This could be due to the fact that the demand for the utilization of RFID by large corporations, such as Wal-Mart, and government agencies such as the Department of Defense (DOD), has forced many organizations to consider the utilization of RFID technology. Organizations that are utilizing or considering to utilize RFID technology are becoming more aware of the likelihood that the utilizations of RFID technology will make them more attractive for other organizations to do business with. The Aberdeen Group (2007) indicated that 42% of survey respondents indicated that the utilization of RFID technology will make their organizations more attractive to do business with, while 25% of respondents believe that the utilization of RFID technology will be required of their organizations in the next 2 years.

According to Janecka (2006) survey study of RFID utilization in the trucking, manufacturing, and retail industries, the main reason why these industries are implement RFID technology is to fulfill the mandates made to them by their customers to start using RFID. The responses were broken down as follows:

1. 3PL/Logistics: 85% in 2006 as opposed to 80% in 2005,
2. Trucking: 92% in 2006 as opposed to 62% in 2005,
3. air, rail and sea carriage: 76% in 2006 as opposed to 62% in 2005.

According to Janecka (2006) survey study, 35% of respondents, as opposed to 42% in 2005, indicated that cost was a major factor when deciding if and when to. The application of RFID as a business application is still relatively new. The decrease in the cost of implementing RFID could be due to the fact that new technologies must go through stages of interest, inquisitiveness, and commitment before such technologies can be accepted as mainstream tools and applications among their potential users (Deloitte & Touche, 2005). As for the question of the major benefits of utilizing RFID technology, Janecka indicated that 63% of respondents specified that enhancing productivity and data-accuracy are the major benefits of utilizing RFID technology. As for the question of the potential that RFID has in increasing sales and profitability, Janecka indicated that 63% of respondents indicated that RFID has the potential to increase sales and profitability.

According to a Federal Trade Commission (FTC) (2004) survey, the number issue for consumers with regards to the utilization of RFID is privacy. Such privacy concerns stem from the fact that the RFID technology, by its nature, is made to identify,

track, and transmit information about objects such as goods that customers purchase (Reyes & Jaska, 2007). Privacy and security of the information made available by RFID become an issue based on a) The extent, or the lack of the security measures taken by the organization to protect the integrity, confidentiality, and availability of such information (Avizienis et al., 2004), and b) the extent, or the lack of, the measures taken by the organization to protect the privacy of the people (customers) associated with such information. Violating customers privacy happens due to the negligence or the misuse of such information such as utilizing it in any shape or form without the knowledge and/or the consent of the people who are associated with this information (Garfinkel & Rosenberg, 2005).

Table 23: Survey Question 23- The Primary Challenge to Effective RFID Implementation within my Organization is (Please Choose All That Apply)

Answer Options	*Response Percent*	*Response Count*
Lack of funding	24.9%	42
Lack of management support and commitment	27.8%	47
Lack of technical skills and expertise regarding RFID and its potential impact on our existing technical infrastructure	27.2%	46
Security and privacy concerns surrounding the use of RFID	78.1%	132
RFID requires substantial re-engineering of our technical infrastructure	48.5%	82
Other		30

answered question	169
Skipped question	75

Data Analysis

The tests conducted on the data collected for this study are based on the same tests conducted by Ness (2005, pp. 73-88.) This has been done due to the fact that Ness's study and this study are very similar in the fact that both studies attempt to discover, through correlation research methods, the relationships between three variables. In the case of Ness's study, the goal was to discover the relationships among the three variables IT Effectiveness (ITE) as being the independent variable, Strategic Alignment (SA) and IT Flexibility (ITF) as being the dependant variables. Furthermore, Ness's study also was aimed at discovering which of the two dependant variables, SA or ITF, has stronger correlation with the independent variable ITE. Similarly, the goal of this study is to discover the relationships among the three variables ITF as being the independent variable, RFID and the Internet as being the dependant variables. Furthermore, this study is also aimed at discovering which of the two dependant variables, RFID or the Internet, has stronger correlation with the independent variable ITF. Ness provided empirical and reliable results through the utilization of statistical tests and data analysis techniques suitable for correlation research methods which are deemed reliable to be used as the road map for the statistical tests and the data analysis techniques that are used in this study.

Paired Factor Analysis

Chi-square and multiple regression analysis were performed in order to evaluate of each of the paired factor relationships, correlations, and/or significance among the three variables utilized in this study. Chi-square results are depicted in Table 24 indicate that Pearson's chi-square is significant for all paired factors at $\chi 2(1, n = 191) = 474.158$, $p < .001$ for INTERNET-ITF; $\chi 2(1, n = 191) = 463.841$, $p < .001$ for RFID-ITF; and $\chi 2(1, n = 191) = 178.902$, $p = .351$ for INTERNET -RFID. These results validate the existence of a statistically relationship between INTERNET -ITF and RFID-ITF. Furthermore, Pearson's R, or Phi, provided evidence of the existence of a positive correlation between INTERNET and ITF ($r = .0.437$, $p < .001$), RIFD and ITF ($r = .401$, $p < .001$), with no significant correlations between INTERNET and RFID ($r = .266$, $p = 0.790$).

Each pair also shows some degree of explanatory value at r2 = .0.191 for the pair INTERNET-ITF, r2 = 0.161 for the pair INTERNET -RFID, and r2 = 0.071 for the pair INTERNET - RFID.

Table 24: Chi-Square Crosstabs Analysis Results (n = 191)

	INTERNET-ITF	RFID-ITF	INTERNET -RFID
Pearson's chi-square1	474.158	463.841	178.902
Phi/Pearson's R	0.437	. 401	.266
R-Square (calculated)	0.191	0.161	0.071
Approx. Sig.2	.000	.000	0.790

Based on the chi-square results that confirmed the existence of relationships between the paired factors, further analysis were then carried out with ITF as the target (dependent) variable and INTERNET, RFID, as the predictor (independent) variables. Individual paired correlations were then performed for each of the primary constructs, ITF, INTERNET, and RFID, and further validated that each of the paired groupings between the target, predictor, and interaction variables were in fact positively correlated as shown in Table 25. Based on the results, INTERNET and ITF were positively correlated at $r = .508$ ($p < .001$, r2=.258), and RFID and ITF were also positively correlated at $r = .616$, $p < .001$ while the strength of this relationship was evidently higher (r2 = .379). However, there was no significant correlation between the two predictor factors the INTERNET and RFID.

Table 25: Inter-scale Correlation Results (n = 191)

	INTERNET-ITF	RFID-ITF	INTERNET -RFID
Pearson's Correlation (r)	.501	.616	.067
R-Square (r^2)	..251	.379	.0045
Sig. (p)	<.001	<.001	.351

To graphically illustrate the results obtained, scatter plots for the primary paired factors, INTERNET-ITF and RFID-ITF, were created for the entire response set (*n = 191*) as shown in Figures 3 and 4, respectively. *Figure 1*, INTERNET vs. ITF, reveals a linear relationship between ITF and INTERNET. In this study, the Inter-Quartile (IQR) 1.5 was used as the basis for determining outliers. Based on this IQR, it can be seen that a high degree of unevenness as can be observed through the number and relative distance of points away from the regression line, and having a higher probability of being outside of the 1.5 IQR. *Figure 2*, RFID vs. ITF, demonstrates a lower level of variability and reflects the reason for having the higher r-squared value.

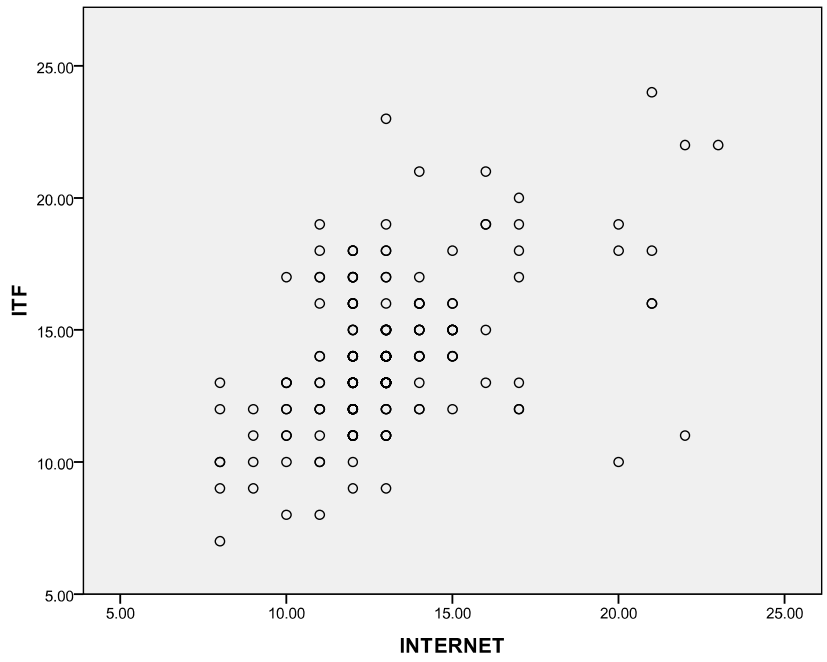

Figure 1. INTERNET vs. ITF Scatter plot (n = 191)

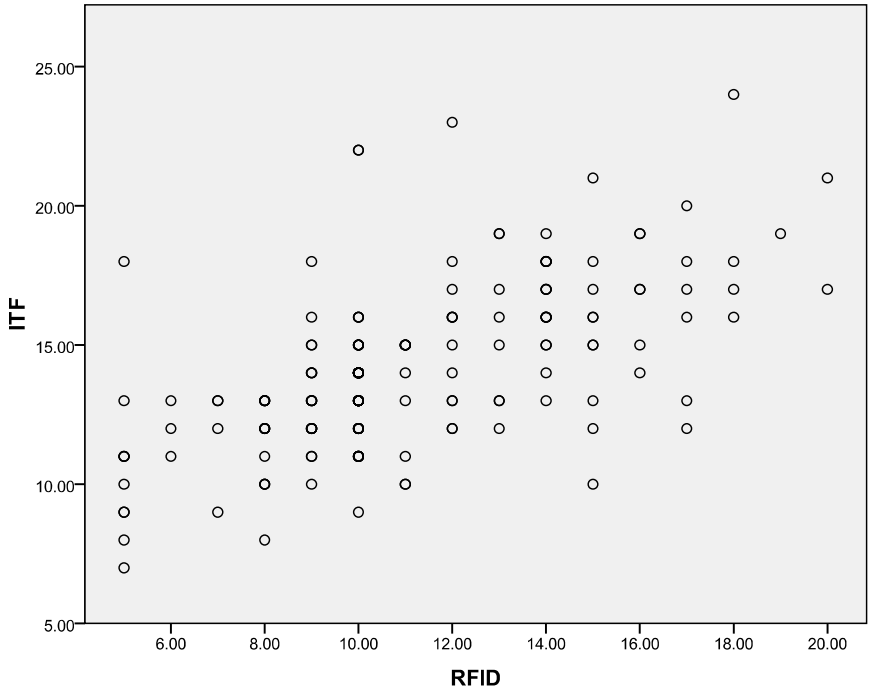

Figure 2. RFID vs. ITF Scatter plot (n = 191)

Figures 1 and 2 above indicate that there seems to be several outliers that are noteworthy in terms of their potential impact on the regression results obtained. Therefore, box and whisker plots (see Figures 3, 4, 5) were completed in an effort to independently verify the existence of outliers within the variables INTERNET, RFID, and ITF. Further analysis was performed by removing all responses outside of 1.5IQR from the entire response set (*n = 191*).

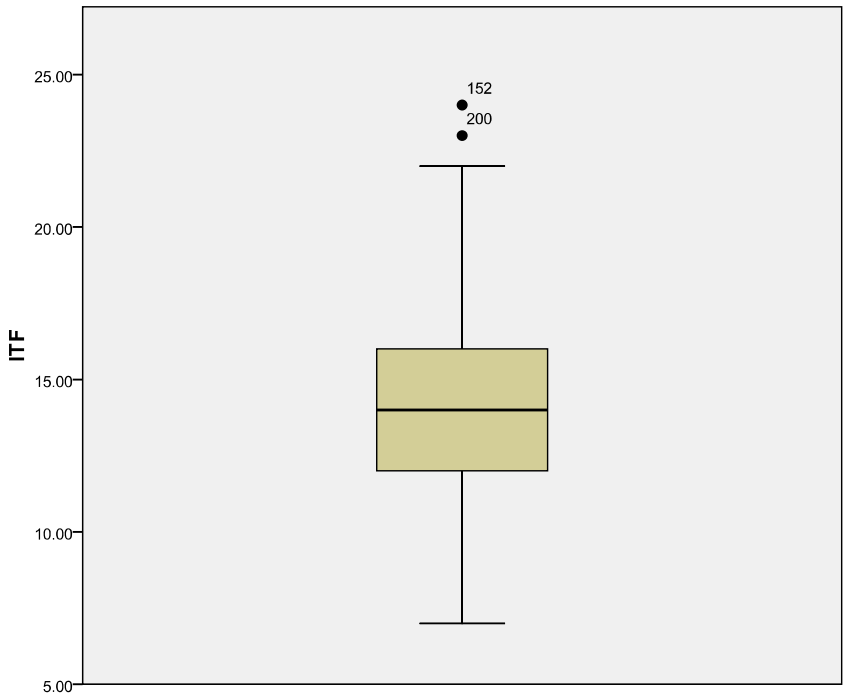

Figure 3. ITF Box and Whisker Plot (n = 191)

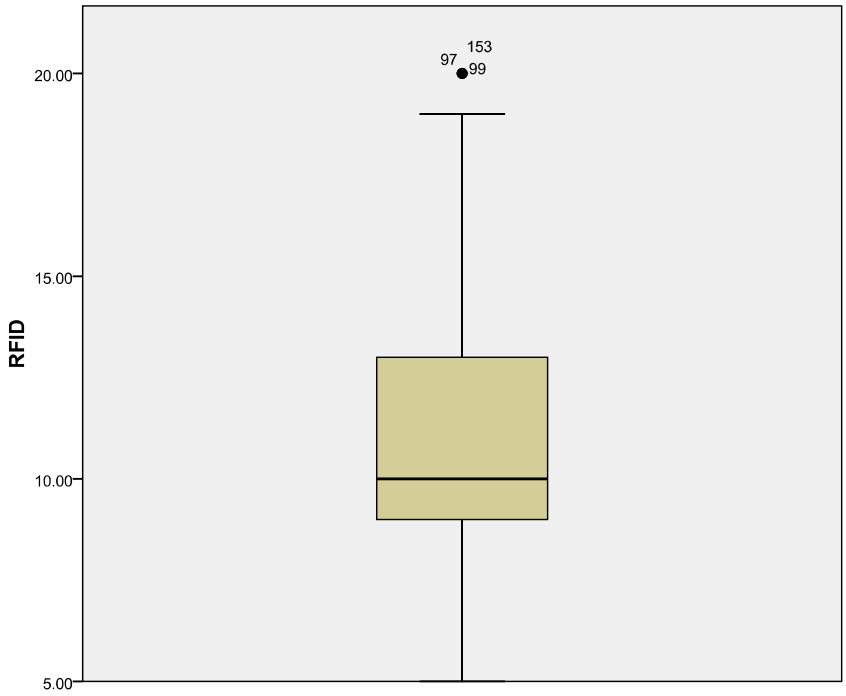

Figure 4. RFID Box and Whisker Plot (n = 191)

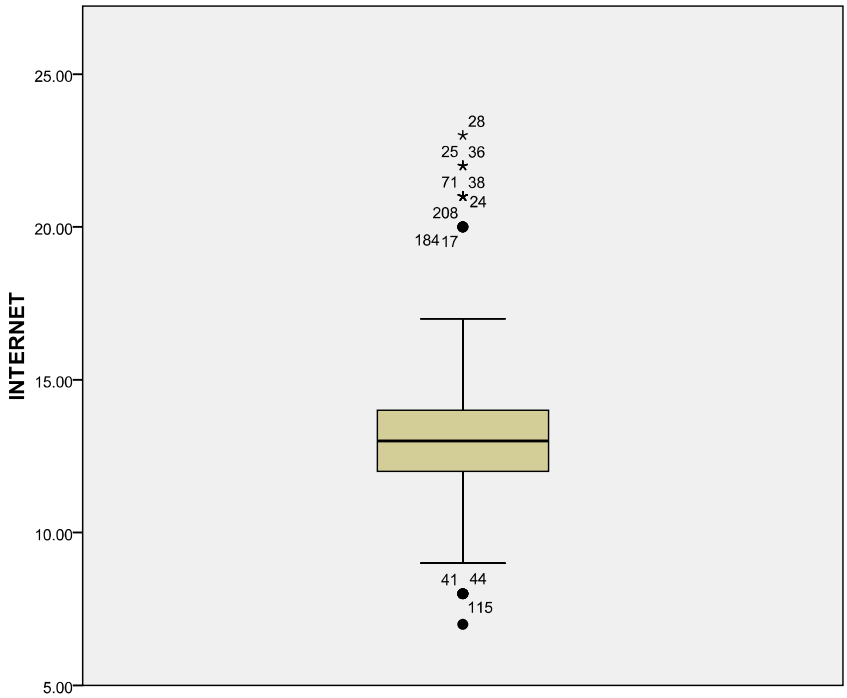

Figure 5. INTERNET Box and Whisker Plot (n = 191)

The results indicated that 17 response sets (set numbers 17, 24, 25, 28, 36, 38, 41,44, 71, 97, 99, 115, 152, 153, 184, 200, and 208) fell outside of the 1.5IQR criteria and were therefore removed, leaving a total of 174 responses for analysis.

Even with a reduced response set of 174, the results obtained by conducting chi-square tests were still significant for two paired factors at $\chi 2(1, n = 174) = 448.66$, $p < .001$ for INTERNET-ITF; $\chi 2$ (1, $n = 174$) = 353.89, $p < .001$or ITF-RFID. The associated Pearson's *R*, or *Phi*, also continued to provide evidence that no significant correlation between the two predictor factors the INTERNET and RFID ($r = .475$, $p < .001$), RFID and ITF ($r = .373$, $p < .001$), and INTRNET and RFID ($r = .067$, $P = .887$). These paired factors still illustrate some degree of explanatory value at $r^2 = .226$ for the pair INTERNET-ITF, $r^2 = .139$ for the pair RFID-ITF, and $r^2 = .0067$ for the pair INTERNET-FRID. Taking into consideration the reduced sample response set ($n = 174$), inter-scale correlations had to be recalculated as can be seen in Table 26. Once again, individual paired correlations were reproduced for each of the primary constructs INTERNET, RFID, and ITF. The results still confirm the positive correlation among the same paired groups. Furthermore, the results show that INTERNET and ITF were positively correlated at $r = .518$ ($p < .001$, $r^2 = .268$), and RFID and ITF were also positively correlated at $r = .632$, ($p < .001$, $r^2 = .399$). The two predictor factors of INTERNET and RFID were not significantly correlated at $r = .022$, ($p = .771$, $r^2 = .0005$). What follows are the results after excluding the out layer and extreme value (responses).

Table 26: Inter-scale Correlation Results (n = 174)

	INTERNET-ITF	RFID-ITF	INTERNET -RFID
Pearson's Correlation (*r*)	.518	.632	.022
R-Square (r^2)	.268	.399	.0005
Sig. (*p*)	< .001	< .001	*P* = .771

Examination of hypotheses

In this section, examinations of each of the hypothesis and its null value presented in terms of whether it has been accepted or rejected based on the findings and data collected. Cohen's Rule of Thumb (Cohen, 1988) was applied in order to demonstrate that the effect size of these correlations is insignificant. Cohen indicated that effect size of 0.08 as being substantially significant, 0.05 as being significant, and 0.02 as being insignificant. Table 26 will be used as the basis for examining each hypothesis and whether it has been accepted or rejected based on the established significance level of 0.05 per Cohen's Rule of Thumb.

Hypothesis 1: INTERNET correlation with ITF

H1o: The utilization of the Internet within organizations is not positively correlated to IT flexibility.

H1: The utilization of the Internet within organizations is positively correlated to IT flexibility.

Finding 1: H1 accepted. The utilization of the Internet within organizations is

positively correlated to IT flexibility.

Research findings confirm that a positive, but weak, correlation exists between utilization of the Internet and IT flexibility as identified through correlation analysis, and having values equal to $r = .518$, $r^2 = .268$, $p < 0.001$, which is well below the established significance level of .05 (Cohen, 1988). As a result, the null hypothesis is rejected. This finding seems consistent with assertions made by researchers in previous studies such as the one by Apigian et al. (2005) who indicated that many organizations are still struggling to discover the success factors that will achieve a successful utilization of the Internet as a business platform Apigian et al. further indicated that such struggle is to due to the fact that many organizations make large investments in rigid Internet infrastructures without having sound strategic planning in place. As a result, these organizations will find it difficult to discover the many strategic benefits the Internet provides as a business platform. Shi and Daniels (2003) asserted that the lack of flexibility in the technical infrastructure that lend support to the utilization of the Internet as a business platform is a major hindrance that stand in the way of discovering the strategic benefits that the Internet provides as a business platform.

Hypothesis 2: RFID correlation with ITF

H20: The utilization of RFID within organizations is not positively correlated to IT flexibility.

H2: The utilization of RFID within organizations is positively correlated to IT flexibility.

Finding 2: H2 accepted. The utilization of RFID within organizations is

positively correlated to IT flexibility.

Research findings indicate that a positive correlation exists between RFID and IT flexibility as identified through correlation analysis, and having values equal to r = .632, r^2 = .399, $p < 0.001$, which is well below the established significance level of .05 (Cohen, 1988). As a result, the null hypothesis is rejected. Such positive but rather weak correlation confirms the current state of RFID utilization in organizations today. Even though RFID acceptance is on the rise, there are still issues that must be overcome before realizing the potential benefits that RFID offers to organizations. According to the Aberdeen Group (2005), 34% of survey respondents indicated the cost associated with the reengineering of their organizations' technical infrastructure is a major factor in the implementation of RFID. The findings of this study seem consistent with the Aberdeen Group study where 48% of respondents indicated that RFID requires a substantial reengineering of the their organizations' technical infrastructures. Another issue that is considered by many previous studies a major issue with the implementation of RFID is security and privacy. According to the results of this study, 78% of survey respondents indicated that security and privacy concerns are a major factor in the effective implementation of RFID. This finding is consistent with the Federal Trade Commission (FTC) (2004) survey which indicated that the number issue with regards to the utilization of RFID is privacy.

Hypothesis 3: INTERNET and RFID correlations with IT flexibility.

H3o: The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID

H3a: The utilization of the Internet has a stronger correlation to IT flexibility than does RFID

Finding 3: H3o accepted. The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID.

Research findings confirm that the correlation between RFID and IT flexibility is stronger than that between the INTERNET and IT flexibility. As noted in the discussions for hypotheses findings 1 and 2, the correlation strength between RFID and ITF is r^2 = .399, $p < .001$, while it is only r^2 = .268, $p < .001$ between INTERNET and ITF. As a result, the null hypothesis is accepted since RFID has shown to have stronger correlation with IT flexibility.

Using the reduced response set (n = 174), stepwise regression analysis was performed, r^2 = .663, $F(1,176) = 118.655$, $p < .001$, with the model regression equation being ITF =.523(RFID) + .615 (INTERNET)+ .340. Applying the stepwise regression method, it can be seen, as shown in Table 29, that RFID and INTERNET were statistically significant predictor variables within the regression model. Based on the regression model analysis, RFID explained 40% of the variance and the INTERNET explained 26% of the variance. Therefore, both variables explained approximately 66% of the variance in ITF.

Table 27: Stepwise Regression Analysis Result -Model Summary (n = 174)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.634a	.401	.398	1.99622	.401	118.655	1	177	.000
2	.814b	.663	.659	1.50159	.262	136.815	1	176	.000

a. Predictors: (Constant), RIFD

b. Predictors: (Constant), RIFD, INTERNET

Table 28: Stepwise Regression Analysis Result (n = 174)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	8.018	.552		14.531	.000			
	RIFD	.534	.049	.634	10.893	.000	.634	.634	.634
2	(Constant)	.340	.777		.438	.662			
	RIFD	.523	.037	.620	14.168	.000	.634	.730	.620
	INTERNET	.615	.053	.512	11.697	.000	.528	.661	.512

a. Dependant Variable ITF

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Introduction and Summary

The issue of aligning IT with the business has been the subject of many studies and research efforts aimed at creating blueprints and recommendations as to the methods or means by such alignment can be accomplished successfully. Historically, these research efforts and studies often focused on considering the strategic alignment between IT and the business as the method by which organizational leaders can crop the capabilities of IT and its tools in an effort to boost organizational productivity (Ness, 2005). However, recent research studies have provided empirical evidence that in order to leverage the capabilities of IT the focus should be on taking into consideration the flexibility of IT and its tools as the way to leveraging IT effectiveness.

As such, this study was motivated by the seminal work presented by Ness (2005) in which he provided empirical evidence related to the alignment between IT and the business in that efforts aimed at successfully accomplishing such alignment should focus on IT flexibility rather than strategic alignment**.** According to Byrd and Turner (as cited in Ness, 2005), one of the dimensions of IT flexibility is modularity which encompasses the utilization of the different IT tools and capabilities, such as software and/or hardware, in order to serve the different organizational needs. Two of the most influential IT tools that ever emerged are the Internet and Radio Frequency Identifier (RFID). The goal of this study was to focus on these two tools in an effort to discover which of these two tools

has stronger correlation with IT flexibility. The goal of such discovery is provide statistical evidence and recommendations as to which of these two tools organizational leaders should focus on utilizing in an effort achieve greater IT effectiveness. Surprisingly, the findings of this study indicate that both the Internet and RFID have positive correlation with IT flexibility as it will be summarized next.

Discussion and implications

This study was motivated by three research questions. These are:

1. To what extent, if any, does use of the Internet relate to ITF?
2. To what extent, if any, does use of RFID relate to ITF?
3. Which technology, the Internet or RFID, if either, is more strongly related to ITF towards improved ITE and sustained competitive advantage?

The following hypotheses were made based on the research questions:

H1o: The utilization of the Internet within organizations is not positively correlated to IT flexibility.

H1a: The utilization of the Internet within organizations is positively correlated to IT flexibility.

H2o: The utilization of RFID within organizations is not positively correlated to IT flexibility.

H2a: The utilization of RFID within organizations is positively correlated to IT flexibility.

H3o: The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID

H3a: The utilization of the Internet has a stronger correlation to IT flexibility than does RFID.

The method used for the data collection in this study was the survey/questionnaire method. Survey questions were created by the researcher conducting this study; therefore, a pilot study was conducted by the researcher to insure the validity and reliability of the questions used in this survey. Participants in the pilot study were former as well as current organizational leaders and directors from the business as well as the IT sides. Participants of the pilot study also included IT and business faculty colleagues from the University of Phoenix as well as former professors with whom the researcher has association with. A total of 30 participants were selected out of which 12 agreed to participate.

Data collected for this study was done through the utilization of an online survey where potential participants were sent 3700 invitation to participate out of which 244 responded. This number presents a sufficient sampling size since it has exceeded the number of respondents in previous similar studies such as 72 and 81 respondents in Pierce (2002) and Ness (2005) respectively. Participants were selected to be IT and business executives in selected large U.S.-based for-profit organizations.

Utilizing the Internet as a business platform (dependant variable)

Based on the data collected for this study, 100% of survey participants have indicated that their organizations utilize the Internet in the form of either eBusiness, eCommerce, or both. This is not surprising since the Internet has become a necessary and imperative initiative for all organizations of different types and sizes. This is due to the

fact that the Internet has become the most influential of all the tools that IT brought about so far (Porter, 2001). The Internet has become a strategic tool that aids organizations in becoming more effective, more efficient, more competitive, and more profitable (Shen, 2006). More specifically, and based on the finding of this study, organizations seek many benefits from utilizing the Internet for strategic purposes as well. Such benefits are:

1. Advertising company profile: 238 out of 244 respondents (97.9%) agreeing
2. Advertise company products and services: 242 out of 244 respondents (99.6%) agreeing
3. Increased sales: 216 out of 244 respondents (88.9%) agreeing
4. Improved value chain: 143 out of 244 respondents (58.8%) agreeing
5. Improved supply chain management process: 105 out of 244 respondents (43.2%) agreeing
6. Improving supplier relationships: 141 out of 244 respondents (58.0%) agreeing
7. Improving customer relationships: 186 out of 244 respondents (76.5%) agreeing
8. Improved internal processes and communications (Intranet): 216 out of 244 respondents (88.9%) agreeing
9. Flexibility/convenience: 115 out of 244 respondents (47.3%) agreeing

These results are in accordance with previous studies conducted on utilizing the Internet as a business platform. Such study is the one conducted by Shen et al. (2006) who concluded that:

1. 88.9% of survey respondents indicated that utilizing the Internet as a business platform has increased company sales
2. 58% of survey respondents indicated that utilizing the Internet as a business platform has improved value chain
3. 43.2% of survey respondents indicated that utilizing the Internet as a business platform has improved supply chain management process
4. 58% of survey respondents indicated that utilizing the Internet as a business platform has improving supplier relationships
5. 76.5% of survey respondents indicated that utilizing the Internet as a business platform has improving customer relationships.

The findings of this study, with relation to the strategic benefits of utilizing the Internet as a business platform, are also consistent with the findings of Torkzadeh and Dhillon (2002) who concluded that the utilization of the Internet as a business platform has become a major factor in assessing the organization's capacity and to effectively compete in today's markets. Torkzadeh and Dhillon further indicated that the Internet has also has allowed organizations to be flexible in managing the business by quickly reacting to market shifts as well as providing these organizations the ability to easily and efficiently manage their internal and external business relationships.

Radio Frequency Identifier (RFID)

RFID has been claimed to be one of the most pervasive technologies to ever emerge in the history of computing. Such claim is due to the fact that the utilization and implementation of RFID has been gaining more and more acceptance due to such factors

as lower cost, the wide range of different applications where RFID can effectively streamline business operations such as the supply chain process, and the mandates made by many organizations of their business partners to start implementing RFID technology. The findings and the results of this study show that RFID has become a key strategic tool for many organizations to utilize in an effort to boost organizational efficiency and productivity which leads to more profitable and competitive organizations. These findings are consistent with previous studies and research efforts aimed at assessing the value and the strategic benefits of RFID utilization. Such study is a three-year study conducted by Deloitte & Touche Consulting on the adaptation and investment in RFID in the retail, manufacturing, transportation and logistics industries. According to the study, 75% of the 90 organizations studied indicated that the utilization of RFID significantly increased their efficiency due to the reduction in human operational errors during the first 5 years of their RFID. The results of the survey conducted for this study confirm these findings where 24% of those respondents strongly agreed while 64.5% agreed that their organizational effectiveness has increased due to the utilization of RFID technology in their organizations. According to the Aberdeen Group (2008), 47% of survey respondents of 135 large U.S. organizations that implement RFID technology indicated that the driving force behind such implementation is for the goal of increasing employee efficiency and productivity. The same respondents also indicated that RFID did in fact has had positive impact on the achievement of such goal.

Conclusion and recommendations

The literature contains numerous studies aimed at evaluating the benefits that such IT tools as RFID and the utilization of the Internet as a business platform bring to organizations. However, the literature lacks any studies aimed at or assessing these two tools with relation to IT flexibility which has been determined to be the factor for organizations to focus on in order to successfully achieve the much sought after organizational goal of aligning the IT strategies and goals with those of the business. Therefore, this study was founded on the goal of providing empirical evidences, utilizing correlation research methods, as to which of these two tools has stronger correlation with IT flexibility. The findings of this study provided empirical evidence supporting the hypotheses upon which this research study was aimed at as follows:

H1: The utilization of the Internet within organizations is positively correlated to IT flexibility (accepted).

H2: The utilization of RFID within organizations is positively correlated to IT flexibility (accepted).

H3: The utilization of the Internet does not have a stronger correlation to IT flexibility than does RFID (accepted).

Findings based on the data analysis performed in this study indicated that both variables, the Internet ($r = .518$, $r2 = .268$, $p < 0.001$) and RFID ($r = .632$, $r2 = .399$, $p < 0.001$) have positive, but rather weak correlation with IT flexibility. Both variables show to be predictors of IT flexibility. However, when both combined, the Internet and RFID show strong correlation ($r2 = .663$, $F(1,176) = 118.655$, $p < .001$) with IT flexibility as

well as becoming statistically more significant as predictors of IT flexibility, where RFID explained 40% of the variance and the INTERNET explained 26% of the variance. Therefore, both variables explained approximately 66% of the variance in IT flexibility.

The findings presented as the results of this study confirm that, as IT tools and modules, the utilization of the Internet as a business platform and RFID are strategically important tools for organizations to utilize in an effort to achieve and sustain a competitive advantage. The findings of this study also demonstrated the strength of the relationship between these two tools and IT flexibility which has been determined to be a reliable predictor of IT effectiveness. The findings also show that when combining the utilizations of both Internet as a business platform and RFID, the strength of this relationship becomes significantly stronger. One of the results of the survey utilized for this study showed that all participants indicated that their organizations utilize the Internet in the form of eBusiness and/or eCommerce operations. These results also show that the majority of respondents indicated that their organizations were able to improve their value and supply chains processes due to the utilization of the Internet as a business platform. The same results can be seen for those respondents who completed the RFID part of the survey where the majority indicated that RFID has enabled their organizations manage their supply chain processes more efficiently. Therefore, it is the recommendation of the researcher of this study that for those organizations that utilize and implement RFID technology to integrate RFID in their Internet operations in an effort to achieve a higher degree of the effectiveness of their IT operations. According to Bendavid et al. (2006), such integration is feasible from both the technical as well as the

business sides. The accurate and timely information that RFID provides can be utilized in the business's B2B operations in an effort to swiftly and effectively make more effective and more intelligent business decisions. It is also the recommendation of this researcher that the subject of such integration be further investigated in an effort to provide more precise assessment as well as quantify the benefits that such integration can bring to the business.

This study was limited to collecting data from U.S.-based organizations; however, as it has been observed through the literature reviewed for this study, Internet and RFID utilization by organizations extends well beyond the U.S. especially to Europe, Southeast Asia, China, Japan, as well as other parts of the world. Future studies aimed at assessing the business values that the Internet and RFID bring about to organizations, should take into consideration the implementation of these two rather important IT tools in other parts of the World especially in Europe, China, and Japan where many organizations play important part in the global economy. These studies should focus on further assessing the linkage or the relationship between these two IT tools and IT flexibility as it has been proven in previous studies as a major factor related to the realization of IT effectiveness.

This study was also limited in that it covered only a population of 3700 large U.S.-based organizations with a 6.59% response rate or 244 organizations responded. Future studies related to the subject matter of this study should take into consideration extending the research to other large as well as medium sized organizations, both in the U.S. and abroad, where the Internet and RFID are used as enabling business tools.

Finally, it was observed through the literature reviewed for this study that organizations are still struggling at realizing the many benefits that the utilization of the Internet as a business platform bring about to the organization. One potential factor for such struggle is the fact that the IT literature lacks substantial studies aimed at assessing the business values that the utilization of the Internet as a business platform brings to organizations. As the results of this study have shown, organizations can utilize the Internet to improve their value chain, supply chain, and customer relations management (CRM) processes more effectively. Therefore, it is the recommendation of the researcher of this study that future studies should focus on outlining and assessing the benefits that the utilization of the Internet as a business platform bring to organizations while focusing on the linkage of such utilization to IT flexibility.

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APPENDIX A. SURVEY COVER LETTER

Dear participant,

My name is Abdel Ismail, a graduate student at Capella University. I am conducting a research study that assesses the relationship between the utilization of the Internet as a business platform, Radio Frequency Identifier (RFID), and Information Technology (IT) flexibility.

Purpose of the study

The goal of the research is to discover which has stronger correlation with IT flexibility: RFID or the Internet. Recent research efforts have determined that IT flexibility is the main factor in any organizational efforts aimed at achieving a successful alignment between IT and the business. The findings of this research effort will aid organizations in focusing their efforts and resources on those aspects of IT flexibility that will yield optimum return on their IT investments. Therefore, your participation in this survey is extremely important in gathering the data I need to make accurate and comprehensive assessment.

Survey procedures and instructions

Enclosed with this letter are two brief questionnaires regarding:

1. The use of the Internet as a business platform
2. The use and implementation of RFID

Both questionnaires ask an assortment of questions about your organization's use and implementations of the Internet and RFID. If your organization does not implement RFID technology, then please discard the RFID questionnaire. Upon completion of the questionnaire(s), please send them back to me in the enclosed pre-stamped envelope.

The completion of both questionnaires should not take more that few minutes. Therefore, I sure hope that you will participate in this survey, for it is with the help of people like you that makes such research efforts a success.

Statement of confidentiality

If you elect to participate in this survey, *please do not write your name on the questionnaire.* Such information is not required by this research study. This is in an effort on my part to disassociate the participants from their responses and to assure you that your responses will be treated with the maximum degree of confidentiality. Your participation will not reveal any information regarding you or the organization you are associated with. I assure you that your participation is voluntary, confidential, and will not impact you or your organization in any negative way.

Contact information

If you have any concerns or questions about participating in this study, you can reach me at my mobile telephone at: (708)-969-0460, or you can e-mail me at: aismail77@yahoo.com.

Thank you in advance for your time, efforts, and contributions to this important research study. I look forward to receiving your feedback.

Sincerely,

Abdel Ismail

APPENDIX B. SURVEY QUESTIONNAIRE

Questions 1 through 3 are intended to gather demographic data to ensure a representative sample of the survey's population, as well as to understand how the different segments of the population respond differently to questions.

1. Your Title: _____

2. Please indicate the type of business your organization is in

   □ Advertising
   □ Banking
   □ Consulting
   □ Education
   □ Engineering
   □ Healthcare
   □ Insurance
   □ Manufacturing
   □ Marketing
   □ Retail
   □ Telecommunications
   □Transportation
   □ Other (please specify) _____

3. My organization utilizes Internet in the form of an:

   O eCommerce operation (Selling products and/or services via the Internet)
   O eBusiness operation (Utilizing the Internet as a tool to communicate with customers and business partners)
   O Both

Questions 4 through 12 are intended to gather data related to utilizing the Internet as a business platform. Please answer these by choosing one of the options below each question.

4. Utilizing the Internet as a business platform has made my organization more profitable

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

5. Utilizing the Internet as a business platform has enabled my organization to be competitive

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

6. Utilizing the Internet as a business platform has enabled my organization to manage its external business relations more efficiently and more effectively

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

7. Utilizing the Internet as a business platform has enabled my organization to be dynamic and flexible

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

8. Utilizing the Internet as a business platform has enabled my organization to expand its market and customer reach

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

9. Utilizing the Internet as a business platform enables my organization to maintain an optimum customer relations management process

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

10. The management at my company is committed to the success of the company's Internet operations

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

11. My company's business and Internet strategies are well integrated

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

12. The technology underlying my company's Internet operations is flexible enough to accommodate future changes

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

13. My company has benefited from utilizing the Internet for the following processes
    - □ Advertise company products and services
    - □ Advertise company profile
    - □ Flexibility/convenience
    - □ Improved internal processes and communications (Intranet)

□ Improved supplier transactions (Extranet)
□ Improved supply chain management process
□ Improved value chain
□ Improving customer relationships
□ Improving supplier relationships
□ Increased sales

14. Does your organization implement Radio Frequency Identifier (RFID) technology?

O Yes
O No

RFID Survey

1. Utilizing the RFID technology at my organization is for the purpose of (Please choose all that apply)

□Asset tracking
□Automotive, vehicle access control
□Healthcare
□Inventory tracking
□Manufacturing and Distribution
□Merchandising, retailing
□Product ID/tracking
□Security, anti-theft
□Transportation and logistics
□Warehouse management

Other (please specify

Questions 2 through 9 are intended to gather data as to the extent of RFID's role in extending organizational effectiveness. Please answer these questions by choosing an option below each question

2. The utilization of RFID technology has Increased my organization's effectiveness

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

3. The utilization of RFID technology has Increased my organization's productivity

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

4. The utilization of RFID technology has Enabled my organization to be more competitive

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

5. The utilization of RFID technology has made my organization more efficient by reducing operations and labor costs

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

6. The utilization of RFID technology has enabled my organization to manage its supply chain more efficiently

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

7. The utilization of RFID technology has Enabled my organization to effectively manage and control inventory and shelf replenishment

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

8. The utilization of RFID technology has improved my organization's ability to accurately forecast and plan inventory

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

9. The utilization of RFID technology has improved customer satisfaction and experience

O Strongly Agree O Agree O Neutral O Disagree O Strongly DisagreeO N/A

10. The primary challenge to effective RFID implementation within my organization is (Please choose all that apply):

□Lack of funding
□Lack of management support and commitment
□Lack of technical skills and expertise regarding RFID and its potential impact on our existing technical infrastructure
□Security and privacy concerns surrounding the use of RFID
□RFID requires substantial re-engineering of our technical infrastructure
□Other (please specify)