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Examining Strategic Information Technology in Relationship to the Need for Technology Modernization

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EXAMINING STRATEGIC INFORMATION TECHNOLOGY IN RELATIONSHIP TO THE NEED FOR TECHNOLOGY MODERNIZATION

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EXAMINING STRATEGIC INFORMATION TECHNOLOGY IN RELATIONSHIP TO THE NEED FOR TECHNOLOGY MODERNIZATION

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Strategic planning can be a critical business process for today's organizations, especially for IT organizations that are facing continually changes in technology. This research was designed to investigate IT organizations' use of strategic planning and determine if the organization uses their strategic plan to set project priorities. The second part of this research was to determine if the IT strategic plans are aligned with the overall organization's strategic plan.

This research was conducted using a mail-type survey to IT Executives from organizations with sales/revenues under 100 million dollars, a maximum of 5000 employees, and SIC codes of 201 thru 399. The selected organizations were mailed a survey packet followed by a phone call for all non-responding organizations.

The findings that resulted from this research showed that there is statistical evidence to support that organizations do perform the business process of developing a strategic plan. This research also showed that IT organizations do develop an IT strategic plan. However, there is not a high correlation between the organization's strategic plan and the IT strategic planning process. If the IT organization has a

strategic plan, then the plan is reviewed on a regular basis, referenced for project prioritization, and the IT employees are familiar with the plan.

Chapter 1

INTRODUCTION

In February 2008, Gartner, Inc (2008, ¶ 1) released a study published by Business Wire stating that by 2010, one-third of all Information Technology (IT) application projects will be driven by the need to upgrade technology or skills because of obsolescence. This article also recommended that IT organizations begin in 2008 to develop a modernization strategy. Along with this need to modernize current application systems, the user community continues to request application systems using the latest forms of technology.

Gartner, Inc (2008) uses the term *IT Modernization* to include market forces, strategies, and managing the changes in business processes. These changes in business processes are to support applications and technology changes for optimizing value and reducing costs. IT organizations are facing many challenges in the world of technology and application development. Many IT organizations are trying to manage a diversity of systems on various architectural platforms. This diversity is a result of organizations supporting legacy systems while developing new applications in a web-based server technology. The skills required for this variety of application systems are quite different. Many older IT professionals with legacy skills have not maintained their skills in the latest generation of application development tools such as Visual Basic. Likewise, the older application development tools such as COBOL are no longer taught in general academia environments. Many organizations are facing the reality that 25% to 30% of their legacy support developers are within 3-5 years of eligible retirement. In many cases, these legacy systems are the mission critical systems that

are the backbone to the organization. Therefore, the need to modernize these legacy systems is becoming even more apparent. Agility in software applications have become a critical requirement for today's applications. In many cases, these legacy systems do not have the built-in flexibility required for this rapid change in today's business needs. Thus, the IT organization has an ever-growing backlog of enhancements for these legacy systems.

Purpose

The purpose of this thesis was two-fold. The main purpose was to determine if IT organizations have a strategic business planning process and if this process is being used to manage the ever-changing technologies of today. The second purpose was to provide IT management with the results so that they can evaluate their business planning process to determine if a strategic plan would benefit their organization.

Significance of Research

Upper management is generally the key resource in the strategic planning process. However, IT managers and IT staff execute these plans at the grass-root level (Chew & Gottschalk, 2009). Thus, all levels in the IT organization were the focus for this survey research. Both business strategy and planning are key functions in businesses today. In order for organizations to be competitive and reach for new market growth, strategic planning is critical. Information technology is part of this strategic plan. How the IT organization handles their planning impacts the overall organization's ability to achieve their strategic goals and objectives (Chew & Gottschalk, 2009).

Creswell (2009) described philosophical ideas as an influence in the practice of research. In other words, research is knowledge gained by looking through a lens at the facts or results of research and developing a conclusion.

The knowledge obtained in the research for this thesis is based on a pragmatic worldview. Characteristics of a pragmatic worldview are practical, matter-of-fact, and realistic. The strategy of inquiry for this pragmatic thesis was a concurrent mixed method. A concurrent mixed method consists of procedures that use both quantitative and qualitative methods at the same time. The survey data provided quantitative and qualitative data. The third and final part of the research framework is the research method. The research method is the high-level process of collecting the data, data analysis, interpretation and reporting on the results of the research.

For this thesis, business strategies are solutions to problems that face IT organizations everyday. Thus, the use of both quantitative and qualitative methods resulting in a mixed method framework provided the flexibility to research business strategies.

A core part of the information services or IT business is planning. It is necessary to understand an organization's strategic plan before developing an IT strategic plan (Shupe & Behling, 2006). If the IT strategic plan does not fit with the overall organization's vision, the result will be constant conflict. The authors, Shupe and Behling (2006) discuss the process of developing an IT strategic plan. However, there is little research that examines IT organization's participation in IT strategic planning. This IT strategic plan research is important to demonstrate to IT executives the issues they could be facing. If progress toward elimination of legacy systems is

behind, organizations could struggle keeping their experienced IT staff. This could be similar to many remediation projects completed during the late 1990s. During that time, experienced legacy contract developers were hard to locate and their rates were quite expensive. IT organizations must stay ahead in order to allow the overall organization to stay competitive in today's business environments. This research should assist IT organizations in benchmarking their current strategic planning process.

Limitations

This research is limited to the following items:

1. Determine whether IT organizations have a strategic plan.
2. Determine if IT organizations are using their strategic plan to assist in prioritizing their projects.

Assumptions

1. Quantitative and qualitative information will be available.
2. This study was useful for IT executives to assist them in benchmarking their current strategic planning and balancing of resources between legacy systems and new development.
3. An adequate level of survey responses was returned.

Hypothesis

1. IT organizations have a strategic plan that is connected to the overall organizational strategic plan and that plan is used to assist in defining project priorities.

2. IT organizations do not have a strategic plan that is connected to an overall organizational strategic plan. Therefore, IT does not have a strategic plan to assist in defining project priorities.

Definitions of Terms

For the purpose of this research thesis, the general business terms are defined as follows:

Agility: The ability to cope in an environment of continuous changes to respond quickly to those changes (Oosterhout, Waarts, & Hillegersberg, 2006).

IT legacy systems: IT infrastructure assets including both hardware and software that represent a significant amount of value to a business (Sutor, 2004).

Strategic planning: A process that organizations use to identify perceived opportunities and threats by understanding their strengths and weaknesses (Boar, 1993).

Plan-Do-Check-Act (PDCA): A fundamental four-step strategic process made popular by W. Edwards Deming used to initiate continuous improvements (Jusko, 2007).

Visual Basic (VB): A modern developmental programming language that shares its syntax heritage with Beginners All-purpose Symbolic Instructional Code (BASIC) language. VB was one of the first products to provide a graphical programming environment that allow a paint metaphor for a user interface (Crews & Murphy, 2004).

COBOL: An acronym for common business oriented language, which uses English words and phrases in programming digital computers for various business applications (Morris, 1981)

Chapter 2

REVIEW OF LITERATURE

Information Technology Modernization

Gartner, Inc (2008) defined "*IT Modernization* as a movement that recognizes the strategies and approaches to managing the ongoing, coordinated evolution of the business process and application and supporting technology portfolios to achieve an optimized value, cost and risk objective" (¶ 4). IT modernization is not the replacement of all current applications and infrastructure with the latest technologies. However, as defined by Gartner, it is a process of establishing an IT strategic plan as a key driver for the planning of application development installation including a more modern infrastructure environment. Vecchio and Kyte (2008) further assert that development of best practices and strategies will assist in balancing the demand between business needs, application development, and budget constraints. Therefore, the overall goal for an organization's IT modernization project is to provide the business with better information in order to make faster decisions while maintaining business rules (Olmstead, 2005).

There are four main business drivers associated with the IT modernization movement. The first driver is the requirement for IT organizations to handle the increasing demand of integration among various aspects of the organization (Vecchio & Kyte, 2008). This integration of multiple system data can be business critical information developed using internally developed systems or other systems that were acquired through business acquisitions. According to Sutor (2004) "it has been estimated that are there over 200 billion lines of COBOL code in existence, 70 percent

of the world's business data is processed by COBOL applications" (¶ 3). Therefore, the integration of multiple systems environments, data structures, and infrastructure platforms requires an IT organization to have agile qualities.

The agility gap is the second driver of IT modernization. Business requirements on IT systems are becoming more complex. This complex business places a higher demand on the IT staff, IT systems, and the IT infrastructure (Vecchio & Kyte, 2008). In order for IT to respond to the demands for cost savings and competitive advantage, the need exists for the IT systems to be more service-oriented (Sutor, 2004; Gartner, 2008).

The third driver of IT modernization is the need for IT to replace legacy or obsolete infrastructure with more current technologies. However, IT organizations must balance the cost of these upgrades against the overall business strategy. Frequently organizations recognize that the current systems are meeting their business needs; however, the software vendors are no longer supporting the older systems. This forces IT to perform costly infrastructure and software upgrades (Vecchio & Kyte, 2008; Gartner, 2008). This can often lead into the final driver of IT modernization, which is a gap in skills.

There is a difference in the technical skills between the old and new technologies. This variety of skill sets can cause a crisis in an organization. Some IT organizations are placing their legacy systems in a support mode and opting to outsource these systems while the systems are being replaced by new technologies (Vecchio & Kyte, 2008).

Generally, IT personnel recognize legacy systems as the older mainframe systems that are executing billions of lines of code. Many organizations are still using these legacy systems to manage their critical business processes. The cost of maintaining these systems can be high and challenging for the IT organization to react quickly to business process changes. However, deployment to newer modernized systems can be expensive and time consuming (Sutor, 2004).

An overall goal of modernization is to provide information faster for critical business decisions. The modernization process includes a few key efforts such as assessment planning, well-defined objectives, and requirements. Defined objectives are beneficial to assist in defining the type of modernized application system that will best meet the requirements. These objectives, requirements, and business rules should tie into the overall organization's strategic plan (Olmstead, 2005).

Strategic Planning

Strategic planning can be an important process for an organization. It provides organizational direction and objectives that will assist in future growth. Boar (1993) defines "Strategy is the collective output of the strategic planning process, and is the definition of a desired future state for the business, objectives, and strategic moves to realize the objectives, a change management plan, and a commitment plan" (p. 2). Therefore, the strategic plan is a layout of the current opportunities and weakness of an organization. It determines the framework that assists the organization in accomplishing their futuristic goals. Strategic planning is a three-step process. The first step is to assess or evaluate the current state of an organization. The second step

in the process is to develop a strategy for the future. The third step in strategic planning is to execute and monitor the plan (Boar, 1993).

An organization may choose one or more components to define their strategic plan. A mission statement is a high-level clearly defined statement that describes the long-term purpose or reason an organization exists (Ward & Griffiths, 1996; Chew & Gottschalk, 2009). Many organizations develop a vision statement that provides a theme to the future of the business. This vision statement should be informative, shared, competitive, empowering, and worthy of extending personal commitment (Boar, 1993). The vision statement exists to bring objectives and visualizations to every stakeholder as a shared picture of the future (Chew & Gottschalk, 2009). An organization can set goals that are major objectives in their strategic planning process that define how to accomplish their vision (Ward & Griffiths, 1996). Objectives are targets set to meet the goals and the vision of the organization. They are quantified with values and deadlines. An objective should be result oriented, measurable, verifiable, relevant, encourage high performance, and should be consistent with other business objectives (Ward & Griffiths, 1996).

Strategic Deployment

Hoshin kanri is a common Japanese term, that when translated, means strategy deployment. Strategic deployment aims to create clear corporate objectives and goals through all levels of the organization (Jusko, 2007). Jusko described some of the characteristics of the hoshin process. The process begins with establishing goals and objectives that result in action plans. These action plans should assist in achieving the

organization's strategic goals. Hoshin is an organization's vision which defines their tangible goals with objectives that are measurable. Many organizations use the "Plan-Do-Check-Act" methodology as a core template in hoshin planning. Jusko used information from an Industry Week and MPI Group Census of Manufacturers that concluded that only 53% of U.S. manufacturing plants with more than 500 employees participate in a strategic deployment process.

Business Value of Information Technology

A critical resource in today's digital global economy is Information Technology (Huang & Hu, 2007). Chew & Gottschalk (2009) presented four categories of IT benefits for an organization. The first category is rationalization benefit, which is the replacement of people through automation processes. These benefits are generally justified as part of the initial investment. However, corporate culture may accept any unemployment that resulted from an automation process. Business information, the next benefit, provides an organization the ability to make better and possibly different decisions based on available information. IT provides management with more information faster than previous methods of data collection. The third benefit, business process improvement, occurs when IT provides work efficiencies for the employee and organization. For example, multiple employees can view an online document at the same time instead of someone having to make physical copies and distribute to all possible individuals. The final benefit of IT is competitive advantage in the marketplace. IT can make an organization look and feel different among competitors. For example, organizations can provide services to their

customers that other providers may not be able to provide. These services can be automated transactions, email notifications, or enhanced user interfaces such as a web applications.

IT/Business Alignment

An organization's IT strategy is part of the business strategy and understanding the organization's strategic plan is critical for the development of a successful IT strategic plan (Shupe & Behling, 2006). Chew and Gottschalk (2009) stated "the key to producing a high quality relevant IT strategy is by aligning every step of the IT strategy process with the business strategy process" (p. 133). Huang and Hu (2007) stated that "To make IT deliver business values beyond supporting daily operations, management needs to plan and execute; not from a technology end but based on business strategies" (p. 174).

Research that was completed by Huang and Hu (2007) defined four key elements that assist organizations in sustaining an IT strategy aligned to a business strategy. The first key element is that IT plans should reflect the organizations business objectives and strategies. A potential tool for integration of planning across an organization is a scorecard. The second key is to maintain effective communication channels between IT and business functional groups. The third key element is that IT should develop strong working relationships with business functional groups. The final key element is to institutionalize the culture of alignment. IT business is a continuous improvement process that continues to mature as product and processes flow though the various life cycles.

Therefore, alignment is a two-way street; The IT organization needs to be knowledgeable of business processes and business functional groups need to be knowledgeable of technologies.

IT Strategic Planning

Chew and Gottschalk (2009) referred to "IT as a means to a business end" (p. 132). IT strategy is part of the business strategy that sets a focus path for the IT organization, IT processes, and IT systems. In order to create an effective IT strategic plan, an understanding of the organization's overall strategic plan is a requirement. If the IT strategic plan does not align with the organization's strategic plan, conflict will be an issue (Shupe & Behling, 2006). Therefore, proper planning ensures that any technology deployment is based on core business plans and aligned with business strategies (Hayles, 2007).

Support from senior-level management is a critical aspect in developing a successful IT strategic plan. An IT strategic plan should be developed using a similar process model as the organization's strategic plan and should result in an easily understood IT strategic plan. In the process of developing a strategic plan, the IT organization should develop a mission statement and define their basic objectives. These objectives should be compared to the organization's strategic plan to ensure that no constraints or limitations have been overlooked and that any technology requirements by the organization can be fulfilled (Shupe & Behling, 2006).

An obstacle that could face an IT organization during their strategic planning process is their ability to align their strategic plan with the organization's strategic

plan. In order to understand IT and the business alignment process, one should focus on the high-level view of technology. The business should drive the IT processes and functions. The proper alignment between IT and the organization should result in clear technology decisions. Information technology organizations deliver two basic functions: application systems and services. Successful IT organizations use strategic planning to manage the rapid change of technology and align technology against business processes (Hayles, 2007).

The success of an IT strategic plan can be measured by the execution and support of the plan by the IT resources and other business strategic personnel (Chew & Gottschalk, 2009). Critical success factors are specific competencies, capabilities and process components that reflect an organization's success. Generally, these critical success factors focus on customer requirements and competition. Information technology is recognized as a critical business function because it is central to all business activities of modern enterprises (Boar, 1993).

Chew and Gottschalk (2009) defined an IT strategy in three levels. The first level is the IT business strategy, which is the mission, vision, objectives, e-business strategy, knowledge strategy, and use of information. This IT business strategy feeds the second level, which is the information systems strategy. The information systems strategy includes the application and interconnections between systems. This level of the information systems strategy plan should detail how the organization will meet user requirements, define how security is handled, define how resource requirements will be met, define salaries expectations, define employee benefits, and define the technical skills required to accomplish the strategy. The final level is the technology

infrastructure strategy. This level of the IT strategy includes the required hardware, basic software, networking, communication standards, and all the core infrastructure components that are required to fulfill the information systems strategy and business strategy.

Information Technology Agility

In order for IT organizations to be successful in this highly dynamic business environment, they must learn to be agile. Business agility requires that organizations quickly adapt to changing business processes. Agility also provides flexibility in managing the unpredictable changes that could occur in the business environment at all levels of the organization. Flexibility is the degree that an organization can change based on the organization's structure (Oosterhout, et al., 2006). Many software systems have built in flexibilities that allow the users to change parameters to address predictable changes. However, business agility is the ability to adapt to unpredictable business process changes. Oosterhout, Waarts, and Hillegersbery (2006) list a series of potential change factors that require agility. These change factors require the organization to make fundamental changes. One of the change factors is technology. Some organizations that have hard-coded embedded business processes and complex linkages between systems have placed themselves at risk of having inflexible systems. Other organizations have systems developed that are flexible and able to respond to business changes. Therefore, IT can be both an enabler and/or a disabler for agility in an organization.

Information Technology Skills

IT organizations are facing the potential collision of three trends; IT reliance on mainframe legacy systems, aging IT workers about to begin retirement, and the limited mainframe skills of younger workers. IT professionals that are entering the workforce today are skilled in programming languages such as Java, Linux, and XML; not COBOL. However, the mainframe technology does not appear to be going away. Due to the stability and reliability of the mainframe, organizations are continuing to use this technology platform. However, some organizations are restructuring their systems to a Linux based mainframe, which will work with current technologies such as web-services and other web application technologies (Koma, 2003).

Information technology and skill requirements are changing, causing a gap in skills for IT organizations (Agarwal & Ferratt, 2002). IT organizations are addressing this gap in skills by various methods. One of these methods is to involve younger IT personnel in the change management process of the legacy systems. This allows the younger IT members to be exposed to other technologies, learn those technologies, and acquire the business knowledge associated to those systems. The second option that IT organizations are using to handle the gap in skills is a technology solution. Technology solutions are modernization tools applied to a system that automatically assists in the redevelopment or re-engineering of the application. Therefore, this system transformation provides the organization with systems that are built with current business knowledge and maintained using current developmental technologies (Koma, 2003).

Chapter 3

METHODOLOGY

The research was conducted as a concurrent triangulation strategy approach. This approach is part of a mixed method model (Creswell, 2009). Using this approach, a survey provided concurrent quantitative and qualitative data. The survey population consisted of a group of professional IT executives and managers. A mail-type survey was administered because of the lack of available e-mail addresses. The survey population consisted of a minimum of 350 U.S. based organizations randomly selected with sales/revenues under 100 million dollars, a maximum of 5000 employees, and SIC codes of 201 thru 399. The LexisNexis Academic Company Profile search tool was used to select the initial organizations. The random selection process occurred by assigning each organization a number and using the random number generator function within Microsoft Excel©. The selected organizations were imported into a Microsoft Access© database that was used to generate the mailing of the survey packet.

Each survey packet contained an introductory letter that explained the purpose of the survey, a paper copy of the survey, and a stamped self-addressed return envelope. An example of the introductory letter is located in Appendix A. The survey packets were mailed to the selected organizations simultaneously and there was a 21-day waiting period for return responses. After the survey-waiting period expired, an attempt was made to contact all organizations that did not respond. If possible, any survey that was returned with an incorrect address was re-mailed with a new corrected address. A report was generated that listed all organizations that did not respond to the

mail-in survey. These organizations were contacted by telephone to participate in the survey. The results from the phone surveys were manually entered into the database prior to analysis.

The concept of validity in research is to ensure that the study is conducted following proper procedures. It is important as a researcher to develop a research instrument that has been validated and does not introduce bias into the research (Kumar, 1999). The validation process for this survey instrument consisted of two parts. Several IT professionals and two local executives conducted the first part by reviewing the survey questions. The second part of the validation process was conducted by a pre-test of the survey. This was accomplished by mailing a survey packet to twenty local industries to be completed by technology peers in the IT industry. The twelve returned surveys results were examined for consistency and validity.

The survey consisted of three main sections. The first section contained questions concerning the demographics of the organization. The second section gathered information concerning the IT portion of the organization. The final section consisted of questions that were directed toward the IT employee. The quantitative data was a result of closed-ended questions concerning the organization's and the IT organization's strategic initiatives. Each question was assigned a numerical value ranging from 1 to 5; with strongly disagree being assigned a value of 1 and strongly agree being assigned a value of 5. These numerical values were used to create tables for data analysis. The survey also consisted of two open-ended questions with the results being categorized for analysis.

A potential threat that could have invalidated the survey was an erroneous selection of population. The selection of the survey population was a random selection; however, the actual survey response population could have been slanted toward a particular size organization or characteristic.

Variables are entities that can take on characteristics or values that can be measured (Creswell, 2009). The identification of the independent and dependent variables was a significant part of this research. Independent variables are values that are controlled, whereas the dependent variables are measured with respect to the independent variables. The survey is in Appendix B. The following is the list of independent variables for this research:

- Size of organization
- Sales/revenue of organization

The following is the list of dependent variables:

- Existence of an IT strategic plan
- Average age of IT staff

The data was analyzed using a series of simple linear correlations. The correlation measurements were used to determine how the variables are proportional to each other.

Chapter 4

RESULTS

This research was designed to investigate an IT organization's use of strategic planning in the ever-changing technologies of today. This research was organized to determine if organizations use a strategic planning process to set project priorities and if the IT strategic plan is aligned with the overall organization's strategic plan. This chapter will introduce the results of the survey along with the analysis of the 71 responses.

Reasons for Non-Responses

The following is a list of possible reasons and explanations for organizations that did not respond to either the survey or phone calls:

1. Twenty-four out of 288 organizations were unable to complete a phone survey due to the organization having a policy to prevent survey participation.
2. Of the 288 phone calls made, 264 of them resulted in no response due to the inability to speak to a person directly. In most cases, voicemail messages were left with only one respondent returning a call.
3. Five phone surveys and two mail-in surveys were unable to respond since their organization had outsourced their IT department. Therefore, there were no IT executives at this location to participate in survey.
4. Initially there were 118 surveys that were returned due to an invalid address. Seventy-five of these surveys were re-issued to an alternate address.

This was a result of the NexisLexis database having inaccurate names and/or addresses. Therefore, these survey packets were undeliverable.

Presentation of Data

Questions 1, 5, and 6 of the survey data are the demographic information, which represents the population that participated in the survey. Table 1 displays the results from question 1, which is the approximate number of employees in the organization at this particular site. The organizational size is divided into four categorical groups. As shown by Table 1, 97% of the survey participants were from organizations that have less than 500 employees. Table 2 is a result from question 5, which denotes the size of the IT organization into one of six categorical groups. Table 3 shows the results from question 6, which places the approximate average age of the IT staff into one of five categorical groups. This table shows that 25% of the IT workers are greater than 41 years of age.

Table 1

Organization Size

Category	Count	Percentage
Less 100 Employees	38	53.52%
100 - 200 Employees	13	18.31%
201-500 Employees	18	25.35%
501-1000 Employees	2	2.82%

Table 2

IT Organization Size

Category	Count	Percentage
No Response	2	2.82%
1 IT Employee	21	29.58%
2-9 Employees	41	57.75%
10-15 IT Employees	4	5.63%
16-25 IT Employees	3	4.23%
25-50 IT Employees	0	0.00%

Table 3

Average Age of IT Organization

Category	Count	Percentage
No Response	2	2.82%
Less than 25 years old	1	1.41%
25 - 30 years old	11	15.49%
31 - 40 years of age	39	54.93%
41 - 50 years of age	15	21.13%
50+ years of age	3	4.23%

The descriptive statistics located in Appendix C provides a simple summary of the data in a tabularized presentation. Analysis of the data using the single variables determined the basic statistical values such as central tendency, dispersion values, mean, median, mode, and standard deviation. The basic definition of the mean is the average of the response values. The definition of median is the result value in the exact central position of the ordered values. The definition of mode is the value that occurs most frequently in the responses. The standard deviation calculation was used to show the measurement of dispersion. The data in Appendix C shows the statistical data that demonstrates that there is not a wide range of data points in the results. This is shown by the standard deviation's range of values from 1.0307 to 1.2821. All questions have the median and the mode as a value of 4. The mean or average values range from 3.2571 to 3.8592.

The next part of the survey data, shown in Appendix D, is the summarized data values that were converted from a rating score to a numeric value. These questions are analyzed in the next section of this chapter.

A correlation represented by *r*, describes the degree of linear relationship between two variables (Schumacker & Lomax, 1996). This statistical tool shows the strength of the relationships between the variables and demonstrates the existence of these relationships. Correlation is always a number between -1.0 and +1.0. If the correlation is positive, the relationship is positive. Likewise, a negative correlation represents a negative relationship. For positive correlations, the closer the number is to

1.0 the closer the two variables are related. Furthermore, for negative correlations, the smaller the r value, the less correlation exists between these variables. Appendix E shows the correlation values of the survey response data.

Question 13 is a list of the organization's top three strategic initiatives and question 14 is a list of the top three IT strategic initiatives. These open-ended questions have been analyzed as part of a qualitative interpretive method. The responses to these questions can be found in Appendix F. In qualitative interpretive research the researcher makes an interpretation of what they see, hear, or read in the study. Therefore, since interpretations can not be separated from the reader's background or knowledge, the interpretation of the same information can be interpreted differently (Creswell, 2009). These questions were reviewed and a category was assigned to each organization that supplied their top three strategic initiatives. Table 4 and Table 5 show the summarization of the categorized responses.

Table 4

Question 13 Summarized Categories

Category	Count
Technology	5
Cost Reduction/Increase Cash Flow	21
Employee Resources	3
Stability/Maintain Organization	9
Strategic Outreach	17

Table 5

Question 14 Summarized Categories

Category	Count
Upgrade Technologies	26
Maintain Technologies	24
Strategic Initiatives	2

Analysis of Survey Questions

This section will review the analysis of the survey data combining information from previously presented tables and appendixes. The demographic questions combined with results from other questions show some interesting results. In reviewing only the 37 responses that reported positively to having a need for IT modernization, the survey showed that 24.3% of the IT staff is at an age category of 41 years or greater. This is shown in Table 6.

Table 6

Average of Organizations in Need of IT Modernization

Category	Count	Percentage
No Response	1	2.70%
Less than 25 years old	0	0.00%
25 - 30 years old	8	21.62%
31 - 40 years of age	19	51.35%
41 - 50 years of age	6	16.22%
50+ years of age	3	8.11%

The survey results from question 2 indicate that 69.0% of the organizations are following the business practice of using a strategic plan in their organization. In response to question 3, 67.6% of the organizations review their strategic plan at appropriate time internals. The correlation between question 2 and 3 is .66 which is a medium to high value.

The survey responses showed for question 4 that there were 37 organizations or 52.1% of the organizations in need of modernization. There were 22 organizations or 31.0% of the organizations that disagreed they have a need for IT modernization. Eleven of the responses neither agreed nor disagreed that their organizations were in

need of modernization. The survey showed a negative correlation of -.10 between question 4 and 2.

The results from survey question 7, showed that 77.5% of the responses were in agreement that their organization has an effective IT strategic plan. Therefore, the remaining 16 responses either responded negatively or selected a neutral response. Thus 22.5% of them may or may not have an IT strategic plan. The results of question 8, showed that 62.0% of the survey responses review their strategic plan at an appropriate level. The correlation value between question 7 and 8 is .70 or medium to high correlation. The survey showed a low negative correlation of -.10 between questions 7 and 2.

Survey question 9 has almost the same response values as question 8. The survey showed that for question 9, 62.0% of the responses review their strategic plan when setting project priorities. Questions 8 and 9 had a medium to high correlation value of .76.

Responses from survey question 10 showed that 53.5% of the IT employees were familiar with their organizational strategic plan. Three responses showed a negative response to this survey question, leaving 19 that neither disagreed nor agreed.

The results of survey question 11 showed that 73.2% of the IT employees were familiar with their IT strategic plan. Two surveys did not respond to this question. The remaining 17 responses were either in disagreement or neither disagreed or agreed.

The responses from question 12 showed that 50.7% of the responses answered positively to the question concerning the IT employee developing a personal training plan that is aligned with their IT organization's strategic plan. Once again, two surveys

did not respond to this question. The remaining 33 responses were either in disagreement or neither disagreed or agreed. Questions 11 and 12 had a medium to high correlation value of .81. Note that this correlation between questions 11 and 12 was the highest resulting correlation on the survey.

There are some correlations between survey questions that should be noted. The first one is based on correlations related to question 4, which deals with the organization's need for modernization. The survey showed that all questions, 7, 8, 9, 10, 11, and 12 with correlations of -.16, -.26, -.23, -.23, -.05, and -.04, respectfully, all have small negative correlations. Question 7, which dealt with determining if the organization has an IT strategic plan had all medium positive correlations for questions 9, 10, 11, and 12. Their correlation values are .60, .55, .72, and .65. Question 9 inquired on whether the IT organization uses their strategic plan to determine project priorities. This question also resulted in medium positive correlations between questions 10, 11, and 12 with values as .60, .57, and .56. The survey showed a medium positive correlation between questions 10 and 11; and also a positive small to medium correlation between questions 10 and 12. The correlation value between question 10 and question 11 is .61 and the correlation value between question 10 and question 12 is .50.

Summarizing the correlation data analysis showed that there is a medium correlation between organizations having a strategic plan and reviewing that plan on a regular basis. However an interesting point existence that showed a negative correlation between the IT strategic plan and the organization's strategic plan. Likewise, the survey data showed that there are several variables with positive

medium correlations between the IT strategic plan that is aligned with the business strategic plan and the use of IT strategic plan in managing the IT organization. The survey data showed that there is a medium to high correlation between the IT organization use of the IT strategic plan to assist in setting project priorities and developing personal training plans for IT. Overall, the data showed that when an IT organization develops a strategic plan, they use this plan in their internal organization planning process.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Interpretation of Findings

The findings that resulted from this research showed that there is statistical evidence to support that organizations do perform the business process of developing a strategic plan. This research also showed that IT organizations do develop an IT strategic plan. However, there is not a high correlation between the organization's strategic plan and the IT strategic planning process. This refutes the first hypothesis of this survey which was IT organizations have a strategic plan that is connected to the organizational strategic plan and that plan is used in setting project priorities. However, if the IT organization has a strategic plan, then the plan is reviewed on a regular basis, referenced for project prioritization, and the IT employees are familiar with the plan.

The second hypothesis of this study was that IT organizations use their IT strategic plan to assist in defining project priorities. This was proven by the survey data that showed there is a good correlation between an employee knowing their IT strategic plan and developing personal training plans to meet the organization's strategic plan. IT organizations that are evolving to newer technologies whether they are technology changes, business changes, or personnel changes can benefit from an IT strategic plan.

Strategic planning is critical to survival. This was based on responses from open-ended questions 13 and 14. Several of the organization's top strategic initiatives were statements of survival. It can be critical for these organizations to practice

strategic planning to insure they are all working toward common goals and objectives. Boar (1993) explains that the ever-changing business demands are putting more pressure on organizations to address social and economic forces such as corporate volatility, cost control, environmental issues, quality, globalization, and market competition. Businesses must be ready and able to quickly react to changes in their business environments.

Implications on Information Technology

There are two main business concepts that IT executives can gather from the results of this survey. The first concept is that strategic planning can influence the IT organization. The survey data showed that 55 IT organizations have a strategic plan that is aligned with their overall organization's strategic plan. Thirty-eight of them or 69% of the IT organizations use their IT strategic plan in establishing their project priorities. In today's ever-changing environments, an organization cannot waste resources working on projects that do not align with the business. The second concept that IT can gain from this study is the importance of an IT strategic plan and the impact on the employee's personal developmental plan. Thirty-three of the fifty-five or 60% of the employees in organizations that have an IT strategic plan use them to plan their personal development. Training and development for IT can be costly. Therefore, personal development plans should be aligned against the IT strategic plan to ensure that the staff is adequately trained.

Recommendations for Action

There are two main recommendations for further study that have resulted from this research. The first recommendation for further research would be to see the impact of organizations that have outsourced or partially outsourced their IT to see if they are able to maintain their strategic goals and objectives within their outsourcing contract. The second recommendation for further research would be to investigate the ability for organizations to accurately develop a strategic plan for all areas of an IT organization. These three areas of IT include information services, infrastructure, and support functions.

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APPENDIX A

Sample Letter

Jill A. Brown
PO Box 1200
Russellville KY 42276

May 4, 2009

«Executive_Name»
«Executive_Position»
«Company_Name»
«Street_Address»
«City» «StateProvince» «Postal_Code»

Dear «Executive_Name»,

I am a graduate student at Western Kentucky University pursuing my Master of Science in Manufacturing Technology. I obtained your name and address from a LexisNexis company profile research database at the Western Kentucky University.

I would like to request that you participate in a brief fourteen-question survey that will assist me in researching IT Modernization as part of an organization's strategic plan. For the purpose of my thesis, I have defined IT modernization as the actions that are needed to plan, execute, and deploy the changes to incorporate newer technologies into an organization's business processes. The driving question of this research is to determine if IT organizations are using strategic business planning process to manage their ever-changing environment in today's fast pace of new technologies.

Confidentiality is very important. Any data received from this survey will be stored in a confidential location at Western Kentucky University. No specific survey information will be provided to any organization or person without a written consent of the surveyed organization.

I have enclosed a copy of the survey along with a self-addressed return envelope.

Thank-you for your time and participation.

Sincerely

Jill A. Brown

Enclosure

APPENDIX B

Survey Questions

Questions for the overall organization

1. **What is the approximate number of employees in this organization (your location only)? Please mark your response with an X in front of response.**

- o Less than 100 employee
- o 100 - 200 employees
- o 201 - 500 employees
- o 501 – 1000 employees
- o 1001 + employees

2. **The organization has an effective strategic plan that is aligned with defined business objectives.**

- o Strongly Disagree
- o Disagree
- o Neither Agree or Disagree
- o Agree
- o Strongly Agree

3. **The organization's strategic plan is reviewed at an appropriate time interval.**

- o Strongly Disagree
- o Disagree
- o Neither Agree or Disagree
- o Agree
- o Strongly Agree

Questions for the IT organization

4. **The organization has IT systems that are in need of modernization.**

- o Strongly Disagree
- o Disagree
- o Neither Agree or Disagree
- o Agree
- o Strongly Agree

5. **What is the approximate number of employees on staff in the IT organization?**

- 1 IT employee
- 2 – 9 IT employees
- 10-15 IT employees
- 16-25 IT employees
- 25-50 IT employees
- 50+ IT employees

6. **What is the approximate age of the employees on staff in the IT organization?**

- Less than 25
- 25 - 30
- 31 - 40
- 41 - 50
- 50+

7. The IT organization has an effective strategic plan that is aligned with the business strategic plan.

- Strongly Disagree
- Disagree
- Neither Agree or Disagree
- Agree
- Strongly Agree

8. **The IT organization's strategic plan is reviewed at the appropriate time interval.**

- Strongly Disagree
- Disagree
- Neither Agree or Disagree
- Agree
- Strongly Agree

9. **The IT organization references the IT strategic plan in determining what projects should receive the highest priority.**

- Strongly Disagree
- Disagree

- Neither Agree or Disagree
- Agree
- Strongly Agree

Questions at the EMPLOYEE level in IT organization

10. The employees in the IT organization are familiar with the organizations strategic plan.

- Strongly Disagree
- Disagree
- Neither Agree or Disagree
- Agree
- Strongly Agree

11. The employees in the IT organization are familiar with the IT strategic plan.

- Strongly Disagree
- Disagree
- Neither Agree or Disagree
- Agree
- Strongly Agree

12. The employees in the IT organization develop personal developmental plans that align with the IT organization strategic plan.

- Strongly Disagree
- Disagree
- Neither Agree or Disagree
- Agree
- Strongly Agree

13. List the top three objectives or strategic initiatives for the <u>organization</u> this year.

14. List the top three IT Business Objective or initiatives for the current year.

APPENDIX C

Descriptive Statistical Values from Survey Questions

Question	Mean	Median	Mode	Standard Deviation
2. The organization has an effective strategic plan that is aligned with defined business objectives.	3.697	4	4	1.0454
3. The organization's strategic plan is reviewed at an appropriate time interval.	3.6338	4	4	1.0722
4. The organization has IT systems that are in need of modernization.	3.2571	4	4	1.1633
7. The IT organization has an effective strategic plan that is aligned with the business strategic plan	3.8592	4	4	1.0862
8. The IT organization's strategic plan is reviewed at the appropriate time interval.	3.4648	4	4	1.1567
9. The IT organization references the IT strategic plan in determining what projects should receive the highest priority.	3.493	4	4	1.2821
10. The employees in the IT organization are familiar with the organizations strategic plan	3.3239	4	4	1.0389

Question	Mean	Median	Mode	Standard Deviation
11. The employees in the IT organization are familiar with the IT strategic plan	3.7183	4	4	1.0307
12. The employees in the IT organization develop personal developmental plans that align with the IT organization strategic plan.	3.3239	4	4	1.0525

APPENDIX D

Summarization of Data Results

	No Response		Strongly Disagree		Disagree		Neither Disagree or Agree		Agree		Strongly Agree	
	#	%	#	%	#	%	#	%	#	%	#	%
2. The organization has an effective strategic plan that is aligned with defined business objectives.	0	0	4	5.63	9	12.68	9	12.68	35	49.3	14	19.72
3. The organization's strategic plan is reviewed at an appropriate time interval.	0	0	3	4.23	10	14.08	10	14.08	35	49.3	13	18.31
4. The organization has IT systems that are in need of modernization.	1	1.41	5	7.04	17	23.94	11	15.49	29	40.85	8	11.27
7. The IT organization has an effective strategic plan that is aligned with the business strategic plan.	2	2.82	1	1.41	4	5.63	9	12.68	37	52.11	18	25.35
8. The IT organization's strategic plan is reviewed at the appropriate time interval.	2	2.82	3	4.23	8	11.27	14	19.72	35	49.3	9	12.68
9. The IT organization references the IT strategic plan in determining what projects should receive the highest priority.	2	2.82	3	4.23	6	8.45	16	22.54	35	49.3	9	12.68
10. The employees in the IT organization are familiar with the organizations strategic plan	2	2.82	1	1.41	11	15.49	19	26.76	35	49.3	3	4.23
11. The employees in the IT organization are familiar with the IT strategic plan.	2	2.82	1	1.41	4	5.63	12	16.9	41	57.75	11	15.49
12. The employees in the IT organization develop personal developmental plans that align with the IT organization strategic plan.	2	2.82	2	2.82	8	11.27	23	32.39	31	43.6	5	7.04

APPENDIX E

Correlation Values

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Q1	1											
Q2	0.14	1										
Q3	0.12	0.66	1									
Q4	-0.06	-0.1	0.05	1								
Q5	0.39	0.25	0.18	0.03	1							
Q6	0.14	0	0.08	0	0.27	1						
Q7	0.35	-0.1	0.02	-0.16	0.15	0.39	1					
Q8	0.34	0.12	0.25	-0.26	0.29	0.27	0.7	1				
Q9	0.3	0.2	0.24	-0.23	0.28	0.3	0.6	0.76	1			
Q10	0.11	0.1	0.25	-0.23	0.03	0.21	0.55	0.71	0.6	1		
Q11	0.19	0	0.06	-0.05	0.1	0.31	0.72	0.55	0.57	0.61	1	
Q12	0.22	-0.02	0.13	-0.04	0.19	0.31	0.65	0.54	0.56	0.5	0.81	1

APPENDIX F

Open-Ended Questions

Row	Question13a	Question13b	Question13c
3	transition email system to new platform	continue to develop web bases business process management process	insure business continuity and security
4	Global expansion (Belgium and Malaysia)	Strategic Alliance with supply chain	Develop knowledge base to grow business
5	More effective use of ERP system	Respond making options more transparent	Speed reporting to decision making
6	Survive	Reorganization financially	Stabilize and regroup
7	Increase sales dollars in the power product line by 10%	Develop and introduce one new product to the power product line	Capture one new engineer development program
8	Launch new drive	Increase sales of existing products	Manage cash flow
10	Land larger	Hire quality employees	
12	Setup manufacturing infrastructure	Product acquisition	Licensing partner selection

Row	Question13a	Question13b	Question13c
15	Fundamental focus on margin management	Diversity ethanol platform with upstream and down stream assets	Purdue 2nd generation Bolton technologies/bio-refineries
16	Evolve the company's development projects to the meet time lines	Build new R & D area for future product line	Enterprise Risk Management
18	Strong field support	Design and innovate new product	Good quality control
19	Revise business plan so we are more organized	Increase retail volume	Increase contract manufacturing
20	Expense reduction		
22	SOX compliance		
23	Launching a new product	Increase manufacturing capacity	Driving to profitability and increasing revenue
24	International Market Share	Broaden product line	Reduce cost by leveraging additional vendors
25	Increase sales	Develop new product lines	Improve overall business performance
26	ISO 900Certification	Positive cash flow each quarter	Six product evaluation at new customers

Row	Question13a	Question13b	Question13c
27	Complete phase 2 clinical trials	Partner clinical antibodies	Increase biologics manufacturing revenue
28	Survival	Partner with strategic businesses within our industry	increase marketing campaigns
29	Survive	Find new opportunities	Invest wisely
31	File NDA for specific product	Advance development plan for specific product	Achieve certain cash balance at end of year
33	Reduce cost and expenses of the overall organization to position itself to weather the economic downturn	Strengthen the marketing efforts to attain a reasonable label of sales during the economic downturn	Utilize the internet to reach more potential customers
34	Administrative cost reduction	Overall production efficiency gains	Increase brand/product recognition
35	Reduce costs	Eliminate backlog	Regulatory compliance
37	Increase sales	Cut costs	increase product awareness

Row	Question13a	Question13b	Question13c
39	Develop infrastructure to execute strategic realignment from medical device supplier toward specialty developer	implement management reporting and accountability	reduce operating cost via contract renegotiations, changes
40	Increase market share	consolidate processes	streamline departments
41	successfully introduce and build market share in the urethane product market	recruit, hire, and train service technicians to adequately meet the needs of the developing ware infrastructure market	expand manufacturing capacity to address new product lines being introduced
43	increase cost efficiencies and productivity	reduction of manual processes	improve real-time data access on the production floor
45	core system conversion	commission plan change	global expansion
46	explore develop other markets	maintain liquidity	upgrade labor force
47	profitable growth	improved on-time delivery	improved first pass yield

Row	Question13a	Question13b	Question13c
48	Find and contact potential customers in 2 new industries	develop 2 new products for international markets	reduce marketing cost while increasing customer contacts
49	improve product distribution	increase market share	prepare for government regulations
51	cost reduction	increase in sales	continual improvement
52	stay in business	continue to pay's employee's health insurance	make small profit
53	budget control	new process development	training
54	Food safety/quality	maintain store brand advantage	development of people
55	complete clinical POC on 2 new candidates	advance 2 candidates into POC trials	advance 2 new drugs to candidate stage
56	Sales tracking/pipeline	standardization (operations)	system implementation
57	revenue	cost control	
58	successful clinical trials	successful regulatory events	successful business develop events
59	improve manufacturing technology	improve product quality	eliminate waste

Row	Question13a	Question13b	Question13c
60	reduce and cut operational costs	more aggressive sales strategy	enlarge sales territory
62	make out budget	launch a clinical trial	get more cost efficient
64	bring biotech compounds to phase II - diabetics	sell KRN5500 neuropathies pain to third party	Obtain investment money
65	Nominate one drug to the IND stage	close a partnership	raise money
67	acquisition of over-seas meeting facility	approval of our new drug appreciation w/FDA	Marketing partner
68	employee very good project/design engineers	leverage our R & D in areas of competencies	make contacts, discussions with customers needs to improve management capabilities
69	survive	improve internal controls	cut costs
70	2009 income from operations per budget	2009 sales revenue per budget	increase brand awareness
71	develop website www.inhibitex.com	form 10K	

Row	Question13a	Question13b	Question13c
72	Increase source of supply	Enter 1 new market	improve quality
73	Increase gross margins to 50%	Drive higher contact rate w/customers	Secure design wins with household name accounts

Row	Question14a	Question14b	Question14c
3	expand electronic information sharing with sales reps	work with engineer to facilitate electronic product registration and activation	Information sharing with business partners and vendors
4	Search engine optimization	Improve web analysis	Update website
5	Revamp backup system	Update Response	
6	Improve efficiency	Modernize accounting system	Reduce systems failures (email)
8	Increase effectiveness of sales force	Modernize business systems and processes	Expand use of corporate intranet
10	Facilitate growth	Increase automation	

Row	Question14a	Question14b	Question14c
15	Continue to mange growth and integration of new assets	Finalize virtual server platforms and testing environment	Integrate and automate program data transfers
16	Implement new account process and software	Implement new project management process and software	Implement software/hardware for enterprise risk management
18	Implement new software for better communication	Inventory control	Supplier database
19	Help Management organize business plan		
20	Expense reduction	Disaster recovery	Redundancy/uptime
22	Email archiving		
23	SAP rollout to new manufacturing locations	CRM - Customer relation management	Implementing Sap document management system
24	IP Telephone	Intranet	Mobility
25	Improve reporting methods and protocols	Expand abilities of data collection and analysis	Replace accounting software
26	Sharepoint restructure	Implement CRM	

Row	Question14a	Question14b	Question14c
27	React to problems	Implement policies and procedures	Keep expenses as low as possible
28	Maintain system integrity	Manage system without case expenditures or as few as possible	
29	Status quo	Keep it running	No spending
31	Support filings for NDA	Maintain document management system that supports regulatory documents	
33	Expand the functionality of the company's website	Reduce the cost of the computer network and services	Exchange the accessibility of computer functionality to the employees of the company
34	Automate quoting and order entry systems	Computer design - increase implementation	Customer extranet
35	Improve data backups	SOX IT Compliance	Exchange control policies
37	cut costs	increase technology	

Row	Question14a	Question14b	Question14c
39	stabilize ERP implementation and improve deficiencies in areas	support implementation of mgr reporting and accountability improvements	improve IT operations to insure stability, provide for disaster recovery, provide user access controls and provide users with reporting costs
40	consolidate companies	build database (Customers)	support engineering documentation
41	upgrade ERP system to current release and address business units needs	finalize core user training programs and effectively deliver to all new hires, enabling them to become productive more quickly	refresh disaster recovery plan and process to ensure it meets current business requirements
43	network infrastructure upgrade	outsource several support functions	begin preparation, needs analysis for migration to ERP application
45	same as org	QED	

Row	Question14a	Question14b	Question14c
46	leverage existing resources	expand internet marketing	continued integration of systems
48	add three new languages to the website	develop new or improve existing contact database	continue working on interface between customer contact database and manufacturing /accounting/engineering database
49	provide new CRM systems	update infrastructure	meet new corporate IT standards
51	cost reduction	dash board (MIS)	re-evaluate of the infrastructure
54	develop system for safety quality	infrastructure to maintain product	knowledge of development and opportunities for development
55	complete interactive decision support tool for clinical	move all content from file system to database	shorten disaster recovery time for business critical data or context
56	CMMS / inventory	timesheet system	backups

Row	Question14a	Question14b	Question14c
57	cost control	upgrade to new system	
58	system integration efforts	scientific system development	system availability performance
59	improve planning	complete advance software integration	eliminate waste
62	Maintain server levels	hold down costs	maintain security levels for IT apps
65	pass sox testing	uptime at 99%	bring email in house
67	Document management - company work, procedures, scope and solution	integration of a recently acquired over-seas facility	business continuity or Disaster recover planning - internally supported
68	develop new strategies for distinctive advance in key markets	develop new strategies for distinctive advance in internal capabilities	develop new strategies for distinctive advance in clarifying strategies objectives
69	update technology	improve communication between IT and field	Help Desk
70	create simple intranet	provide BI tool	standardize business process globally

Row	Question14a	Question14b	Question14c
72	Install CRM software	Enhance remote capability	Tie business planning to product planning
73	Outsource tape backup services	Improve connection speed and reliability between offices	Outsource enterprise servers