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THE RELATIONSHIP OF CIO INDIVIDUAL VARIABLES TO THE ALIGNMENT EXTENT OF BUSINESS STRATEGIES AND INFORMATION SYSTEM STRATEGIES

A Dissertation

Submitted to the
Faculty of the University of Sarasota
In partial fulfillment of
The requirements for the degree of
Doctor of Business Administration

By

Michael L. Young

University of Sarasota

Sarasota, Florida

June 2001

Dissertation Committee Approval:

6/26/01
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Dr. Q. Rehmani date

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Chair Person: Dr. Pete R. Simmons
Committee: Dr. Prosper M. Bernard
Dr. Qamar Rehmani

Department : Business Administration

Abstract

The purpose of this study was to examine the relationship between CIO individual variables and Business Strategic Planning—Information Systems Strategic Planning (BSP—ISSP) alignment extent. The independent variable was BSP—ISSP alignment extent of the firm, operationalized into four stages (administrative, sequential, reciprocal, full). The dependent variables included: CIO self-perceived leadership style (transaction, transformational), role (attributes that successful IS leaders should possess), rank (number of reporting levels separating the CEO from the CIO), hiring status (internal, external), education level, and education type. Self-report survey data was used. In all, 152 responses were received from 1,033 randomly selected top IS leaders from the states of Michigan and Illinois. (14.7 % return rate.)

A statistically significant effect was noted (F value of 3.435, p value of 0.020) using the ANOVA technique between BSP—ISSP alignment extent and CIO role, with role scores becoming higher as alignment increases. A statistically significant effect was also noted (F value of 5.007, p value of 0.003) using the ANOVA technique between BSP—ISSP alignment extent and CIO self-perceived transactional leadership score, with transactional scores tending to increase as alignment increases but dropping off at the full alignment level. No such effect was noted for CIO self-perceived transformational leadership.

A stepwise regression was also conducted to study the interrelationship between CIO role, transactional and transformational self-perceived leadership scores. Transformational leadership was a significant predictor of role scores, but transactional leadership was not.

The demographic data suggested that the respondents were typically male, possessed a Bachelor's in Business, were between 41-50 years of age, evenly split with respect to external and internal hiring, and were also evenly split between the first and second ranks (levels) from the CEO. No other statistically significant relationships were found between alignment extent and the remaining CIO individual variables (transformational self-perceived leadership, rank, hiring status, education level, education type) were noted.

Suggestions were offered as to why CIO's tend to be more transactional as alignment levels increase, and why that leadership score might drop off after the reciprocal alignment level.

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Acknowledgements

In completing my studies at the University of Sarasota, I learned much more than additional information about business administration. As expected, I learned the course content as outlined in the university catalog, but in the process of finishing the program of study, I began to understand so much more. I learned that my opinions should be based upon research, and not how I feel. I learned to write in a much more rigorous way. I also learned to do the work when it needed to be done, and not when I felt like it.

There are a number of people whose support and guidance have been vital to this process. My Committee members, Dr. Pete Simmons, Dr. Prosper Bernard, and Dr. Qamar Rehmani have required a very high level of effort. This requirement has vastly improved the quality of the study. I was greatly encoraged by the expertise, encouragement, and gracesousness I experienced form the faculty of the University. It was much appceiated.

I also want to thank my wife Sherrie, for her encouragement, patience, and forbearance in allowing me to pursue my dream of earning a doctorate. My daughters Rachael and Michelle have been a source of encouragement, delight and concern during the process of writing this dissertation. Both were married between chapters two and five.

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CHAPTER ONE

The Problem

Introduction

Brynjolfsson (1993) suggests that the relationship between IT[1] and productivity is like the weather, much talked about, but little understood. While operational computing power in the US economy has increased by more then two orders of magnitude since 1970, productivity seems to have stagnated. In addition, organizations have vastly increased their spending in recent years on Information Technology (IT). For example, Brynjolfsson, Malone, Gurbazani, and Kambil (1994) reported a tenfold increase in IT investments between 1971 and 1990. Writing in 1994, Due (1994) cited investment in IT of over $1 trillion over the previous ten years. Roach (1996) says that between 1982 and 1995, the IT investment doubled compared to an increase in non-IT capital equipment of only 25 percent.

It would be reasonable to assume an accompanying increase in productivity with this large capital investment. In contrast to this assumption, (Brown & Gatian, 1995; Brynjolfsson & Hitt, 1995; Due, 1994; Strassmann, 1999b, Loveman, 1994) there is little empirical evidence that increased spending on IT results in long-term competitive advantage or benefits the bottom-line. This apparent disconnect between investment in IT and economy-wide productivity (gross national product) has been termed the "Productivity Paradox" (Brynjolfsson, 1993; Chan, 1998; Due, 1993; Strassmann,

[1] Information Systems (IS) and Information Technology (IT) often refer to the same department. IT emphasizes technology while IS focuses on systems. In this paper the terms are used interchangeably.

1999a). It has only been recently that any empirical research has shown otherwise (Brynjolfsson, 1996).

The productivity paradox creates confusion as to whether it is beneficial to continue additional IT capital investment. It is suggested (Bryan, 1999; Henderson & Venkatraman, 1999a) that the inability to realize value from these investments is due in part to the lack of alignment between the Business Strategy Planning (BSP) and IS Strategic Planning (ISSP) of organizations.

The Problem Background

Productivity Defined

Due (1993) defines productivity as the ability to produce more for less, better for less, faster for less or different for less. It is measured by the ratio of the output of a process to the input used (e.g., land, labor, capital, management, time, materials, machinery, tools, creativity and information). By removing, minimizing or substituting the input components of a good or service, productivity can be increased. In the short term, productivity can also be increased by paying less for the labor component of a good or service. This can be done by finding sources of low cost labor; moving the work or moving the workers. By using overtime, costs associated with hiring, training, managing, and providing benefits for new workers can be reduced. In addition, short-term productivity can be increased by providing new tools or processes, or finding workers with skills more appropriate to the work, substituting lower cost materials for existing

components, introducing simplified product designs and manufacturing processes, and finding more productive uses for existing products.

Long-term productivity can be increased by employees working in concert with management to find how relatively expensive labor can be trained and used in less costly ways in the work process. Often, productivity is incorrectly associated with low-wage workers, poor quality, imports and the like (Due, 1993). Instead, the real purpose of a productivity emphasis is to raise wages and profits, and provide funds to research and develop future increases in productivity. Barriers to increased productivity might include: bureaucratic or authoritarian management, command economies, restrictive work practices and protectionist legislation.

With respect to productivity and IT, Due (1994) cited Brynjolfsson in regards to productivity issues and IT investments in three areas: (1) measures of IT productivity at the macro level do not yield a fair comparison because of the masking effect of other factors, (2) the data used as a foundation for many studies are not reliable because they measure input and output in dollars; not reflecting changes in quality or the competitive structure of the specific industries and (3) the productivity paradox, which is especially pronounced in the service sector, is based on unreliable data because traditional accounting systems poorly measure increased variety, customer service and responsiveness. All of which emphasizes the need to more closely examine the relationship between IT investments and productivity issues.

The IT Productivity Paradox

Strassmann (1999a) says that some very profitable firms have low per-capita spending on computerization. Conversely, other firms with low profitability have high per-capita spending on IT. Therefore, there is no solid evidence that greater spending on computers will necessarily increase the productivity of the firm. In his failed attempt to find correlations between IT spending and increased productivity, Strassmann (Strassmann, 1990; Strassmann, 1999a; Strassmann, 1999b; Strassmann, 1997) has empirically examined variables, which include: revenue, assets, stock market prices and shareholder equity. Similarly, Due (1993) cited Loveman's (1994) assessment which showed that although the price and availability of computing power has dropped dramatically over the past 40 years, there was no evidence of any positive relationship between IT investment and business performance. Berndt and Morrison (1995) studied the investment of US manufacturers in computerization from 1968 through 1986. Their findings suggest that based on almost all indicators of economic performance, most companies have over invested in high-tech capital. They found the incremental ROI to be only 80 percent. They conclude, it appears, that increases in high-tech capital causes decreases in multifactor and average productivity growth.

In a separate empirical study, Morrison (1997) concluded significant over-investment in "high-tech" office and information technology equipment (O capital) appears prevalent by the mid-1980s, but then is attenuated somewhat by both decreasing prices and relatively strong marginal products of O capital. She found the marginal product of IT capital was invariably significant, however, the net returns varied considerably across industries and over time.

Roach (1998) reported IT capital spending on hardware alone of $213 billion in 1996. Adding in the cost of software, networks, and human capital development related to IT brings the bill to $500 billion in the U.S. and $1 trillion worldwide. In return, however, productivity growth measured in the seven richest nations has fallen from 4.5 percent a year in 1960 to 1.5 percent in the late 1990s. Again, although the per capita IT investment has been reported higher for the U.S. than for foreign investment, the tie between capital investments and productivity is not a straight line.

Explanations for the Apparent Paradox

Brynjolfsson (1993) suggests explanations for the apparent paradox which include: mismeasurement of inputs and outputs, lags due to learning and adjustment, redistribution and dissipation of profits and possible mismanagement of information and technology. Chan (1999) citing Hildebrand (1994), added additional reasons including: inadequate traditional accounting systems, IT capital spent primarily to take market share away from competing firms and not to increase the market size, and a lack of significant competitive pressures.

Mahmood and Mann (1993) cited three typical types of studies that have been conducted in the area of IT investment and organizational productivity: (1) key ratios, (2) competitive interaction approach and (3) microeconomic approach. Examples of key ratios include: IT expense to total operating expense and annual IT budget as a percentage of revenue. Mahmood illustrates the competitive interaction approach by citing Banker and Kauffman's (1988) finding of great potential in a banks' ATM network on the bottom line, while actually contributing very little. The microeconomic approach,

on the other hand, uses microeconomic theory to formulate models of the IT organization with variables such as: capital costs, labor costs, and the total cost of doing business.

Chan (1999) says that while this paradox is commonly studied from the "hard evidence" viewpoint (quantitative), other researchers have used a softer approach (qualitative). For example, Kaplan and Norton's (1992) Balanced Scorecard approach uses additional softer measures in addition to the traditional financial measures of the performance of the firm. These key indications of performance include: customers, internal business processes, and organizational learning and growth. Chan wonders even if IT impact can be accurately assessed when only using organizational-level measures? Can any single number (ROI or NPV) capture the effectiveness of an IT investment? She also raises the question of how the boundaries of IT investment are determined. Can the time of the investment end when the project is completed or perhaps as long as the system is being maintained? Because IT investments are not made in a vacuum, the interrelations of hardware, software, personnel, and organizational structures and external environments require consideration of the entire sociotechnical system. Because research limitations exist, Chan suggests that apparent paradoxes may be the result.

Brynjolfsson and Hitt (1998) say that while productivity is a simple concept and easy to define, it is notoriously difficult to measure, especially in the modern economy. A more accurate measure of outputs depend increasingly on product quality, timeliness, customization, convenience, variety, and other intangibles. In a like manner, input measures should include quantity and quality of capital equipment, materials and other resources consumed, worker training and education, and perhaps the amount of organizational capital required, such as investments in new business processes. Violino

(1997) suggests that these "soft" approaches to ROI are so new, that there are no measures of how many companies use it as the basis for their decisions for IT capital spending. He provides a list of ROI soft or intangible techniques which firms are transitioning to. These methods blend several ideas, and include: (1) real-options theory-timing of the technology purchase, (2) workflow improvements, (3) technological speeds-MIPS (Millions of Instruction Sets- a measure of microprocessor power), response times and system availability, (4) IT output related to shareholder value, (5) risk analysis and (6) economic value added (EVA)- cash-adjusted operating profit minus the cost of capital used to produce earnings.

Ives (1994) presents counter-arguments to the productivity paradox which include: (1) the paradox is only a problem in services, (2) the measures are faulty, (3) dissimilar items are being compared, (4) productivity may not mean profitability, (5) it is too soon to tell, and (6) its not ITs' fault. He says the service sector spent over $750 billion on IT hardware in the 1980's and another $862 billion in the first half of the 1990s. In return, the average productivity growth for this time period was 0.7 percent, a rate significantly lower than in the 1970's and much below the manufacturing sector during the 1980's. Ives (1994) goes further in suggesting that the line between manufacturing and services is fuzzy. Manufacturers are increasingly electing to outsource many services, thus pushing less productive activities outside of their organizations. Service industries, on the other hand, can significantly impact the productivity of other firms, while not necessarily improving their own. For example, a consulting firm may deliver an analysis to a customer which will produce strong gains while being relatively internally inefficient.

Panko (1991) argues that the measures are faulty. For example, much of the productivity data produced by the U.S. Bureau of Labor Statistics (BLS) is often used in claims by both sides of the issue. Panko says that government productivity data are not available for 58 percent of service industries and suspect in others. For example, a traditional measure of productivity is the ratio of output units to input units. The BLS when measuring productivity in education, health care, government and some areas of financial services, sets the ratio arbitrarily to one. In addition, Panko says that service industries not characterized by these measurement errors and with high IT spending, show significant productivity growth.

The National Research Council (1993) even suggests that dissimilar or incomparable services are being compared. For example 911-type emergency phone service, computer-aided dispatch and emergency vehicle location systems have improved the speed, safety, and quality of emergency service. While many of these enhancements were not available in the 1970's, can anyone suggest going back to the manual systems because of reduced productivity? Order entry in the early 1970's is much different than an automatic computer system today. Again, the much richer service including: improved quality, convenience, reliability, timeliness, flexibility and variety are much improved, but perhaps not more productive.

In addition, Ives (1994) suggests that reaching higher productivity levels may not mean the same thing as being profitable. He says that productivity data is often calculated by dividing hours worked into a standard measure of output; for instance, sales or profits. Some industries such as transportation, deregulation and competition have shrunk profit margins at the same time technology improvements have increased reliability, and service

quality. Productivity may, perhaps, be up, but not if it is measured based upon profitability.

Some researchers say that it is too soon to know if there is a paradox. They say that much of the evidence concerning ROI on IT investments is old. In addition, much of IT investments in the 70's and 80's were small in comparison to revenues of most firms, (averaging l percent). It may be difficult for a negligible investment to produce measurable productivity improvements. For example, Brynjolfsson and Hitt (1993) found that IT was a contributor to productivity in contrast to previous studies using older data. A similar variation may be, as suggested by Ives (1994), the reluctance by management to capture productivity gains by laying people off. The downsizing and restructuring in the 80's and 90's may well have forced some of the same issues regarding the associated benefits. Another variation is tied to the notion that it may be too soon to know if a paradox exists because the learning curve for such a general industrial tool such as IT may be longer than anticipated.

Causes of the Paradox

Due (1993) accepts that the productivity paradox exists and suggests five major causes which include: (1) competitive versus comparative advantage, (2) lack of productivity metrics, (3) lack of project management, (4) increased software complexity and (5) lack of strategic planning.

Firms can choose to invest capital in systems which attempt to create competitive advantage or those which optimize comparative advantage. Competitive advantage systems are designed to attract the customers of other organizations. Examples include

frequent flyer programs, direct-mail programs, or attempts to attract consumers to long distance telephone firms. Organizations using this approach, assume that there is a fixed size market. Any gain in sales and market share must come at the expense of their competitors. In the long run, all competitors in a given market end up paying more, because they bid up prices to increase market share in a zero-sum game. Those firms with the least luck, skill or resources go bankrupt.

In comparison, the comparative advantage approach assumes that wealth can be created, the size of the market can be increased, and that there is not a zero sum game. These firms understand which of their products are uniquely capable of producing at a lower cost than competitors. In the decision between competitive and comparative advantage systems, is the implicit choice to use information as a competitive weapon or as a productivity tool. Investment in competitive advantage instead of comparative advantage systems results in wasting resources in the pursuit of temporary market advantage. Although some organizations may appear to be more successful than their competitors, the overall productivity of the economy declines.

Another cause of the Productivity Paradox according to Due, (1993) is the lack of measurement metrics. Many organizations do not use objective standards to measure the productivity resulting from their investment in IT. Those that do may use metrics that are inappropriate or counterproductive. An example is the common standard of measuring the productivity of a programmer by the number of lines of code produced over a given time. Spending two hours to add three additional lines of code to improve the product makes little sense in relation to the existing one million lines, if the programmer is evaluated on this metric.

Due (1993) says this difficulty in IT productivity measurement is comprised of several components. The first is the time lag between the development and implementation of a system and its affect on the organization. Many other intervening events over the same period of time make it difficult to calculate the benefit of the system. In addition, the result of much of IT investment is intangible benefits (improved quality, faster time-to-market, reduced waste, and improved customer relations). These benefits have little affect on the overall increase in productivity. Because so much of the investment is made for the purpose of competitive advantage, little reason exists to attempt to measure it. After all, if the system is developed and implemented because their competitor has one, the firm may be unaware of the overall decrease in productivity they experience because of the waste of resources. Investment made without regard to effective feedback may well lead to misallocation of resources.

The lack of project management relates to the notion that the IT systems which increases the efficiency of the organization, may itself be built and/or operated inefficiently. Due cites resources wasted during the construction phase of projects, systems that are maintenance nightmares, and MIS (management information systems) which provide misinformation.

Increasing software complexity may result in resources being used to create and operate IS systems which provide little or no positive impact on firm productivity. An example is word processing software which results in additional time spent to fine-tune document appearance, which may not improve the actual quality of the information within the document. Due also nominates computer games, bulletin boards, email, and the Internet as excellent ways to expend resources with little increased productivity.

Strategic plans are often so short-term focused, and built for current conditions, they often waste resources. Due suggests that funds spent on static IT plans do not recognize the pace of change, and thereby are often in advanced stages of their life cycles before they are fully implemented. He suggest the use of "rich, dynamic organizational simulation models" to test the effectiveness of alternative investment decisions and policies (Due, 1993, p. 78).

A Dissenting Opinion

Brynjolfsson and Yang (1997) dispute the existence of the productivity paradox. They suggest that executives commonly invest for five reasons: labor savings, improved quality, greater product variety, better customer service, and faster responses. The problem is, they believe, that most organizational metrics measure only the first of these directly. And even the measurement of improved labor productivity may be suspect because of the lag in learning to use new computer systems. Their disputation rests on three points: (1) measurement of IT productivity at the macro level of the economy is suspect because of the possible masking effect of other factors, (2) the notion that productivity metrics which measure units denominated in dollars may not capture changes in quality or the competitive structure of markets and (3) the possibility of unreliable data used as the foundation of other studies which examine service sector productivity. Brynjolfsson and Hitt (1996) say that with research in decades beyond the 1980s, data supports the notion of increased productivity with IT increased investment.

Brynjolfsson and Hit suggest that: (1) there is a positive association between computer investments and increased productivity, (2) customer focus is a predictor of IT

value (increased customer-focused-strategy resulted in higher productivity and (3) the quality of the technology strategy is related to productivity. These authors suggest that if ever there was a paradox, it disappeared by the late 1980s. Brynjolfsson (1996) suggests, based on his research, that major corporations average 54 to 68 percent annual returns on IT investments. In his empirical study of 380 Fortune 500 manufacturers, banks and utilities, a 50 percent ROI in Information Technology was found in comparison to 6.9 percent on all other forms of capital investment. This translated to 67 percent after allowing for depreciation on the investments in IT.

Data reliability is an issue with respect to how IT capital was invested between 1970-80. For example, the government productivity data provided by the U.S. Bureau of Labor Statistics is not available for 58 percent of service industries. In addition, traditional accounting systems do not directly measure customer responsiveness and service, increased quality, decreased time-to-market, and other strategically important "soft" performance indicators. Perhaps an even more important factor is how the IT investment is implemented. All of these factors support Brynjolfsson's suggestion that the productivity paradox is an illusion.

Problem Summary

While operational computing power has increased by several orders of magnitude since 1970 and multi-trillions of dollars are spent yearly on worldwide Information Technology (IT), productivity seems to have resulted in general stagnation as relates to increased IT investment.

There is mixed empirical evidence that increased spending on IT results in long-term competitive advantage or actual benefits to the bottom-line (the productivity paradox). The current status of the IT productivity paradox is unclear. Reputable researchers such as Strassmann (1999a) and Roach (1998) continue to say that there is no significant correlation between IT capital investment and firm performance. On the macro economic level, Shaw (1997) cites Strassmann, saying the results of large positive impact on productivity by IT should be showing up in broader economic indicators. He continues that real-income, per-capita growth, and the standard of living in America have not comparatively increased. Conversely, our international competitiveness has declined, the trade balance is negative, and more has been spent on IT than on energy and natural resources for the last 15 years.

Others such as Brynjolfsson and Hitt (1996) counter that with research in the decades beyond the 1980s, the data shows that the paradox disappears. They suggest concerning IT capital investment that: (1) there is a positive association between computer investments and increased productivity, (2) customer focus is a predictor of IT value (increased customer-focus resulted in higher productivity) and (3) the quality of the technology strategy is related to productivity.

It has been suggested (Bryan, 1999; Chan, 1999a; Henderson & Venkatraman, 1999b) that the inability to realize value from these investments is due in part to the lack of alignment between the Business Strategy Planning (BSP) and IS Strategic Planning (ISSP) of organizations. Luftman (1996) defines BSP—ISSP alignment as "the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure" (p. 4). Chan (1993) refers to BSP—ISSP strategic

alignment as the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation. Chan went on to say that "there are both strategic and structural dimensions of IS alignment. And that the two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other." (Chan, 1999b, p. 18).

Some empirical research has found a correlation between BSP—ISSP alignment and the financial outcomes of the firm (Bryan, 1999; Chan, 1999a; Chan, Huff, Barclay, & Copeland, 1997). Variables such as industry type and strategic orientation, however, seem to impact the correlation. The somewhat mixed results may be the result of difficulty in measuring intangible benefits to the firm resulting from increased IS investment. The timeframe used to measure those benefits may also be part of the paradox problem.

Research has also shown that both business and IS top management can affect the degree to which BSP—ISSP is aligned (King, 2000; King & Teo, 1996; Luftman & Brier, 1999; Reich & Benbasat, 1996). The dimensions that may facilitate the extent of alignment include: top management guidance, IS understanding of the business, the extent of the business and IS partnership, the type of IS Planning methodologies (reactive or proactive) and the IS leadership. The correlation of BSP—ISSP alignment to so many of the productivity and profitability outcomes of the firm emphasizes the importance of such alignment. The problem therefore, given this relationship, is how IS top management can positively impact BSP—ISSP alignment.

Literature Review

According to Quinn, (1980a, p. 3) strategy is "the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A strategy that is well-formulated, marshals and allocates resources of the organization into a unique and viable posture based on its competencies and shortcomings, changes in the environment, and contingent moves by intelligent opponents." Quinn (1980a) goes on to suggest that Business Strategy Planning (BSP) is the strategic planning process related to the business organization as a whole. It is the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole.

Miles and Snow (1978; 1994) believe that firms over time relate to the market and the broader environment with a consistent approach (pattern of behavior) that builds on their competencies and differentiates them from their peers. These organizational characteristics can be categorized into three groups; prospectors, analyzers and defenders. Miles and Snow concluded that prospectors push an industry into new territory, defenders help an industry to remain efficient and cost conscious, and analyzers keep both prospectors and defenders honest by forcing prospectors to innovate and forcing defenders to make additional investments in efficient process. Healthy industries are said to be populated by all three categories.

Miles and Snow (1978) also wrote about a fourth category: reactors. Reactors are those organizations that are unable to respond to the change and uncertainty perceived in their organizational environments. These firms lack a consistent strategy-structure relationship and seldom makes adjustments of any sort until forced to do so by outside

environmental stressors. Therefore, reactors are residual organizations. they are unable to pursue one of the three stable strategies of defender, analyzer or prospector. Snow and Hambrick (1980) found that firms classified as analyzers (in most environments) were generally most effective. However, those firms operating in highly regulated environments and who used the reactor strategy were more effective than prospectors and defenders.

Business Strategic Planning (BSP) then, is an attempt by organizations to use their resources and organizational capabilities to somehow differentiate themselves from their competitors. Typically this is done by choosing the product-market mix to best maximize organizational strengths and minimize organizational weaknesses. To do this well over a long period of time requires the ability to see both the firm and competitors of the firm clearly, scan the internal and external environments to take advantage of opportunities, sidestep threats, and evaluate conditions that may change in the future. Information Systems may be a resource that can be added to the other capabilities of the organization to enable this differentiation. For this to happen, the organization must believe that IS is more than a department offering file and print services. If an Information System is to be effective, it must also "marshal and allocate their resources into a unique and viable posture" by the process of Information Systems Strategic Planning (Quinn, 1980a, p. 3).

Weill and Broadbent (1998) define Information Technology (IT) as "a firm's total investment in computing and communications technology. This includes hardware, software, telecommunications, the myriad of devices for collecting and representing data, all electronically stored data, and the people dedicated to providing these services" (p. 6).

IT then, becomes the sum total of the investment in these specific parts and may be referred to as the IT portfolio. This portfolio should be managed in a similar fashion as a financial portfolio; risk must be balanced, strategies enacted to build and maintain customer and shareholder value, and Return on Investment (ROI) maintained in regard to goals set by management.

Luftman (1996) defines BSP—ISSP alignment as "the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure" (p. 4). Chan (1993) refers to strategic alignment as the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation. Chan went on to say that "there are both strategic and structural dimensions of IS alignment. The two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other" (Chan, 1999b, p. 18).

ISSP evolves through three stages (Resource Control, IT Architecture, and Strategic Alignment) according to Henderson, Venkatraman, and Oldach (1996). They go on to suggest a model of alignment built around the twin axis of Strategic Fit and Functional Integration across both external and internal domains. They suggest effective IT management achieves a balance among all choices. In fact, fit between the domains is suggested as a critical moderating variable in the economic performance of the organization.

Bensaou and Earl (1998) suggest that misalignment is prevalent when organizations discover that existing IS systems do not support the business strategies being implemented. King and Teo (1996) conceptualized BSP—ISSP alignment as an evolution through four stages (administrative, sequential, reciprocal and full). Luftman and Brier (1999) specify, however, that IT can change from being a cost center to being a competitive weapon of the firm under the right conditions. They present this change as an ongoing process and not particularly a destination.

Some empirical research has found a correlation between BSP—ISSP alignment and financial outcomes of the firm (Bryan, 1999; Chan, 1999a; Chan et al., 1997). As was mentioned previously, variables such as industry type and strategic orientation seem to impact this correlation. In contrast, Reich and Benbasat (1996) found that at least some organizations can operate without high levels of short- and/or long-term linkage between the business and IS objectives. Luftman and Brier (1999) noted that the importance of BSP—ISSP alignment is well known and has been documented since the late 1970s. Alignment will continue to grow in importance, even, as firms evolve from viewing IT as a service center in a supporting role to one of serving in a competitive role, one that will enable the furtherance of the firms' mission. What is not known is how to achieve and sustain this alignment and what impact misalignment may have on the firm. Luftman goes on to say that up to thirty percent of IT projects are canceled before completion, fifty to one hundred percent are over budget, and are often completed an average of six to twelve months late. Results such as these may in fact contribute to the lack of strategic integration

Research has shown that both business top management and IS top management can affect the degree to which BSP—ISSP is aligned. King and Teo, (1996) suggested that dimensions which can facilitate the extent of alignment include: (1) innovative needs, (2) competitive position, (3) environment, (4) economies of scale and (5) top management guidance. Similarly, Luftman and Brier (1999) include the following enablers: (1) IT understanding of the business, (2) extent of the business and IS partnership, and (3) the IS leadership. In contrast, inhibitors listed by King and Teo consist of: lack of IT support from top business managers, lack of economies of scale and the lack of innovative needs. Luftman and Brier also suggested that the opposites of several enablers acted as inhibitors. These include: (1) lack of close business/IT relationships, (2) IT not prioritizing well, (3) IT not meeting commitments and (4) lack of business knowledge by IT top managers.

Laud and Thies, (1997) say that while IT managers tend to be competent in the technical area, business strategy is a challenge for many. Research shows that IS top managers' business competence, their relationship with top business unit managers, planning ability, and even their skills in communication can effect the extent of BSP—ISSP alignment.

Teo and King (1997) empirically tested the notion of an evolutionary pattern that moves organizations through the four stages (type 1-4) of BSP-ISSP alignment: administrative alignment to sequential alignment to reciprocal alignment to full alignment. In the same study, they also empirically tested the individual variables that may influence this evolution. Teo and King found that organizations generally progress through an evolutionary path moving sequentially from administrative alignment to

sequential alignment to reciprocal alignment to full alignment. They also found only two individual variables that influenced the extent of BSP-ISSP integration; the perception of top management of IS importance and the business competence of the IS executive. They suggest that this implies that the business competence of the IS executive may be more important than technical competence. Thus, those IS top executives who wish to play an active role in business planning should, then, be well versed in the business of the firm.

Karimi and Gupta (1996) are even more specific about the importance of the competence of the Chief Information Officer (CIO). They suggest that the CIO has a major impact on how the Chief Executive Officer (CEO) views the competence of IT. CIO's are no longer just required to be capable in technology management, but they must also be aware of corporate business strategies. In addition to rising expectations, conflicting skill sets, and tough challenges, Markus and Benjamin (1997) suggest that these pressures are taking their toll on CIO positions. There seems to be higher than average corporate dismissal rate and shorter tenures for IT leaders when compared with other top executives (Lovelace, 2000; Nylan, 1990; Rothfeder, 1990; Violino, 2000).

With respect to the power of IT to improve its effectiveness in the organization, Karimi and Gupta (1996) say that research has shown (1) that the competitive strategy of a firm has a significant impact on the IT strategic orientation and its use of IT (Boynton & Zmud, 1994; Floyd & Wooldridge, 1990), (2) the role and qualifications of the IT leader should reflect the IT strategic orientation and use (Earl, 1989), (3) the hierarchical rank of the IT leaders has a significant bearing on the orientation of the firm's IT strategy (Raghunathan & Raghunathan, 1989), and (4) IT management decision-making strategies

should align with the business strategy in order for the firm to be effective (Earl, 1989). All of which emphasizes the importance of the IT top management personnel.

Karimi and Gupta (1996) took the concept further and empirically studied the relationship between CIO individual variables (role, rank, hiring status) and the competitive strategy of the firm. They concluded that firms with different strategic types (Miles and Snow typology: Defender, Prospector, Analyzer or Reactor) differ with respect to the role of the IT leaders. They found a significant difference among the means ($p < 0.05$) for the role of the leader as relates to at least one of the four strategic types (Defender). They explained this finding by saying that firms more heavily reliant on IT for conducting their value-chain activities would be more likely to accord higher rank and a more influential role to their IT leaders. Further, while the IT leader rank was not significantly related to the competitive strategy of the firm, they found that strategy was significantly related to their rank and hiring status combined. Hiring status was operationalized as internal or external. CIOs were classified as internal hires if they had been with the firm for more than five years at the time they had assumed the IT leadership position. Individuals were classified as external hires if they had been with the firm for five years or less. Therefore, they suggest that the strategic orientation of the firm (Defender, Prospector, Analyzer or Reactor) is related to the rank (levels of management separating the CIO and the CEO) and hiring status of the CIO (external or internal hire).

Grover and Jeong (1993) also empirically studied the managerial roles as applied to the Chief Information Officer. Their study used six of the ten roles of Mintzberg's classic managerial model for roles (leader, spokesman, monitor, liaison, entrepreneur,

and resource allocator). The other four roles (figurehead, disseminator, disturbance handler, and negotiator) were not used because the activities constituting these roles were correlated with the activities of the other six roles. They found that finance senior managers and IS middle managers were significantly ($p < 0.05$) similar to IS CIOs in terms of the relative importance of managerial roles. No significant similarity was found for manufacturing or sales managers. One possible reason for the similarity between IS and finance may be their common history as organizational information support functions.

Grover and Jeong also found that the liaison and spokesman roles were significantly correlated ($p < 0.05$) with the two IS maturity factors (end-user computing and IS management). However, leader, monitor, entrepreneur and resource allocator roles were not found to significantly correlate with the IS maturity factors.

While managerial aspects of top IS managers have been empirically studied, CIO leadership is a topic with limited empirical research. Hackman and Johnson (2000) suggest that the difference between managing and leading lies in the area of focus of each. Managers are problem solvers who focus on physical resources, are absorbed in the status quo, planning, budgeting, organizing, staffing, controlling, and seek to produce a degree of predictability and order. Leaders on the other hand, are more concerned with the ultimate direction of the group by developing a vision, communicating the direction by words and deeds, motivating, inspiring to followers, and seeking to product change.

> "Leading does not mean managing; the difference between the two is crucial. There are many institutions that are very well managed and very poorly led. They may excel in the ability to handle all the routine inputs every day, yet they may never ask whether the routine should be preserved at all" (Bennis, 1976, P. 154).

The need for effective IS leadership is thought to be imperative. As a part of this mix, top IS leadership style may also play a part in BSP—ISSP alignment. Empirical studies of leadership in general, have generated mixed results regarding the validity and utility of major leadership theories, leader effectiveness, differences between leaders and managers, and gender differences in leadership styles. Klenke (1993) says that such conflicting results are characteristic of leadership research. As an example she offers the observation that some research on leader traits indicate that personality characteristics are not predictive of leadership effectiveness (Stogdill, 1974). Yet Kirkpatrick and Locke (1985) have found that in studying personality traits relating to leadership effectiveness does matter. Klenke concludes that while leadership has been defined, constructed and researched from a bewildering number of conceptual perspectives, with a large amount of empirical evidence, each model has failed to serve as the basis of a generally accepted knowledge base.

Burns (1978) suggests the process of leadership as being either transformational or transactional. Transformational leaders are able to define and articulate a vision for their organizations which the followers accept. Similarly, Bass and Avolio (1995) propose a definition of transformational leadership with four dimensions: (1) idealized influence which results in follower admiration, respect and trust, (2) inspirational motivation- this articulates clear expectations and demonstrates commitment to organizational goals, (3) intellectual stimulation demonstrates leaders who solicit new ideas and creative solutions to problems, and (4) individualized consideration is evidenced by leaders who listen attentively and pay special attention to follower achievement and growth needs. Burns (1978) says that transactional leadership is rooted

in bureaucratic authority and legitimacy with the organization. These leaders tend to focus on task completion and employee compliance. Typically leaders rely on organizational rewards and punishments to influence employee performance.

DeJarnett, (1994) writing in 1994, echoed the notion that IS leadership is in crisis, and suggested that recent surveys were again reporting the shrinking tenure of CIOs. These involuntary separations are often the result of a lack of confidence in the CIO by top business managers (DeJarnett, 1994; Morrissey, 1997; Rothfeder, 1990; Violino, 2000). Rothfeder (1990), in a Business Week article suggested that the acronym CIO stood for "career is over" as relates to this shrinking tenure. As we have seen, top IS managerial roles, rank, hiring status, leadership style, and CEO perception of CIO competence may be related to the facilitation or inhibition of BSP—ISSP alignment and may also play a role in the this shrinking tenure.

Purpose of the Study

Return on investment (ROI) of IT capital investments has been mixed or low in comparison to other capital projects since the early 1970s. The large amounts of capital invested in IT in recent years, in tandem with the possible lack of ROI, point to a lack of measurable results. An abundance of factors are offered by researchers as drivers for this low ROI. Examples of these drivers include: measurement metrics, lags due to learning, IT mismanagement, a focus on profitability vs. productivity, quality of the data collected in the 1970s and 1980s, accounting systems that are not designed to measure the outcomes of business strategies focus in part on customer responsiveness, and product quality and/or marketing timeliness.

The productivity paradox may be due to: 1) mismeasurement of inputs and outputs, lags due to learning and adjustment, redistribution and dissipation of profits and possible mismanagement of IT (Brynjolfsson, 1993), 2) a concentration solely on quantitative vs. qualitative measures (Chan, 1999c; Violino, 1997), 3) service sector effect (Ives, 1994), and 4) faulty data (Panko, 1991). It may also be due in part (Bryan, 1999; Chan, 1999a; Henderson and Venkatraman, 1999) to a lack of alignment between the Business Strategy Planning (BSP) and IS Strategic Planning (ISSP) of organizations.

Research, however, has shown a correlation between BSP—ISSP alignment and financial outcomes of the firm (Bryan, 1999; Chan, 1999a; Chan et al., 1997). The correlation of BSP—ISSP alignment to so many of the productivity and profitability outcomes of the firm shows the importance of such alignment. The problem therefore, given this relationship, is how IS top management can positively impact BSP—ISSP alignment.

Little empirical research has been done to test how the Chief Information Officer (CIO) of the firm may affect the alignment extent between BSSP and ISSP. The purpose of this study is to examine the relationship between CIO individual variables (CIO self-perceived leadership style, role, rank, hiring status, education level, education type) on the BSP—ISSP alignment extent. The dependent variable is the BSP—ISSP alignment extent of the firm, and has been operationalized into four stages (administrative, sequential, reciprocal and full) as modeled by Teo and King (1996). The CIO individual variables are the independent variables of the study and include: CIO self-perceived leadership style (transaction, transformational), role, rank, hiring status (internal, external), education level (certificate, no college degree, undergraduate degree, masters'

degree, doctorate), and education type (business emphasis, computer emphasis, other emphasis. The variables of the study are summarized in Table 2.

Research Questions/Hypotheses

The question this study seeks to answer is how CIO individual variables relate to the extent the extent of BSP—ISSP alignment. CIO individual variables were operationalized into six areas; self-perceived leadership style, role, rank, hiring status, education type and education level.

Seven hypotheses were proposed.

$H1_a$ Those CIO managers showing full BSP—ISSP alignment extent will report more transformational CIO self-perceived leadership styles.

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership style.

$H2_o$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership style.

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

H3o There is no statistical difference for BSP—ISSP alignment extent and CIO role.

$H4_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

$H5_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

CIO Self-perceived Leadership Style – BSP—ISSP Alignment

No empirical research could be located directly examining the relationship of CIO leadership style and BSP—ISSP alignment extent levels. However, research does show a positive correlation between all components of the transformational style: inspirational motivation (IM), intellectual stimulation (IS), and individual consideration (IC) on measures of performance of the organization (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson, Fuller, Kester, & Stringer, 1995). (See Figure 1 and Table 1). This improved performance led this researcher to suggest that full BSP—ISSP alignment extent may be associated with the transformational leadership style because this improved performance within IS may be related to a leader who can set a course of direction, motivate others and who thinks of the individual desires in achieving those objectives.

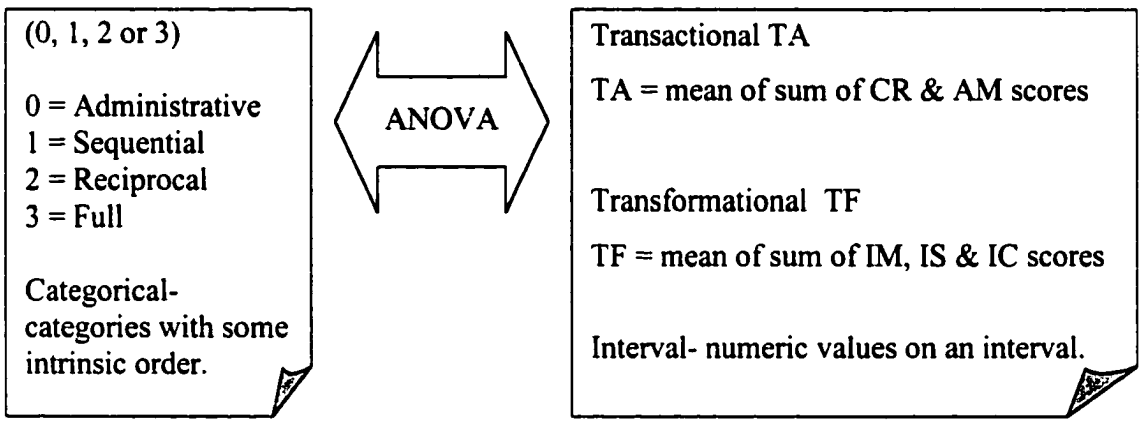
This led to the first research hypothesis:

$H1_a$ Those CIO managers showing full BSP—ISSP alignment extent types will report more transformational CIO self-perceived leadership styles.

Presented as a null hypothesis:

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership styles.

Figure 1: CIO Self-perceived Leadership Style Variable



Research shows a slight positive correlation between the contingent reward (CR) component of the transactional style on the performance of the organization (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson et al., 1995). However, the active management-by-exception (AM) component is negatively correlated with measures of performance. This possible poor organizational performance lead this researcher to suggest that full BSP—ISSP alignment extent will not vary significantly with the transactional leadership style because of the implied improved possible poor performance within IS. It is thought that good performance and good alignment requires leadership that is based on more than just transactions with employees. Vision and encouragement are needed for greater alignment and better performance.

This led to the second research hypothesis expressed as a null hypothesis:

$H2_o$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership styles.

Table 1: Components of Two-Factor Model of Leadership Style

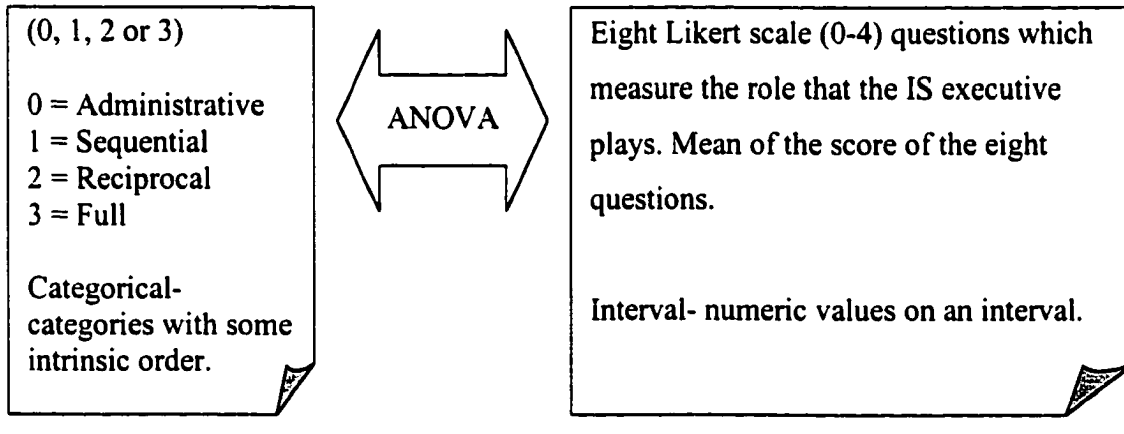
Transactional	(CR) Contingent Reward	Leaders make assignments or consult with followers abut what is to be done in exchange for implicit or explicit rewards and desired allocation of resources.
	(AM) Active Management-by-exception	Leaders monitor follower performance and correct followers' mistakes.
Transformational	(IM) Inspirational Motivation	IM provides followers with: a clear sense of purpose, a role model for ethical conduct, and builds identification with leaders and their vision.
	(IS) Intellectual Stimulation	IS gets followers to question methods and improve on them.
	(IC) Individual Consideration	Leaders focus on understanding the needs of each follower and works to et them to develop to their full potential.

Adapted from: Avolio, B. J., & Bass, B. M. (1999). Re-examining the components of transformational and transactional leadership using the multifactor leadership questionnaire. *Journal of Occupational & Organizational Psychology*, 72(4), 441-463.

CIO Role– BSP—ISSP Alignment

No empirical research could be located directly examining the relationship of CIO role status and BSP—ISSP alignment extent. Empirical research does show a significant correlation between the role of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). (See Figure 2). This significant correlation between CIO role status and strategic orientation leads this researcher to think that full BSP—ISSP alignment will be related to greater CIO role clarity because of the increased business orientations within IS and the implied focus on strategic and organizational aspects of IS.

Figure 2: CIO Role Variable



This led to the third research hypothesis:

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

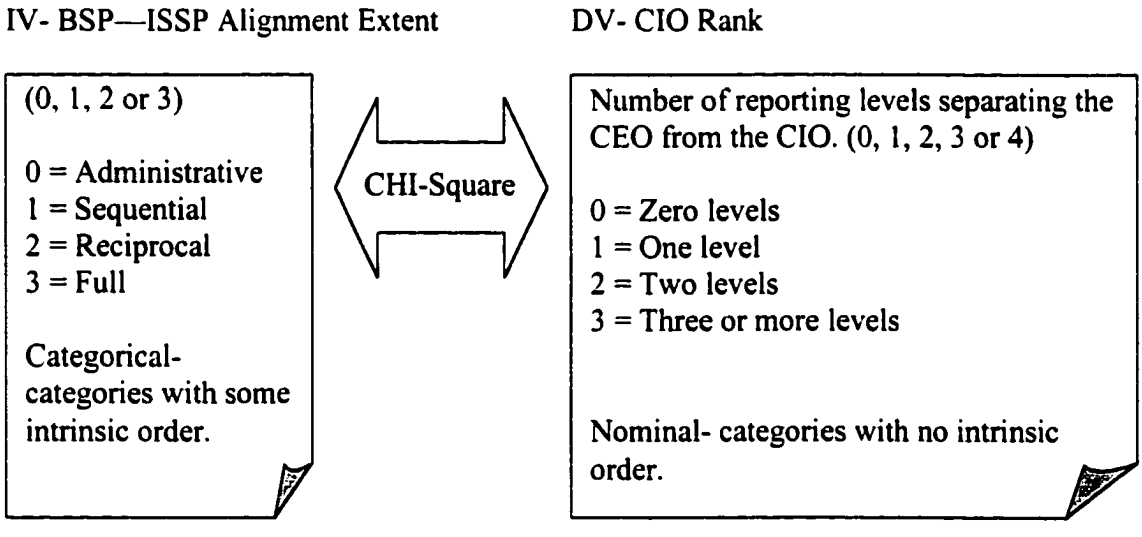
Presented as a null hypothesis:

H3o There is no statistical difference for BSP—ISSP alignment extent and CIO role.

CIO Rank– BSP—ISSP Alignment

No empirical research could be located directly examining the relationship of CIO rank and BSP—ISSP alignment extent. Empirical research does not show a significant correlation between the rank of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). (See Figure 3). This lack of a significant correlation between CIO rank and strategic orientation led this researcher to suggest that the BSP—ISSP alignment extent will not vary significantly with the CIO rank.

Figure 3: CIO Rank Variable



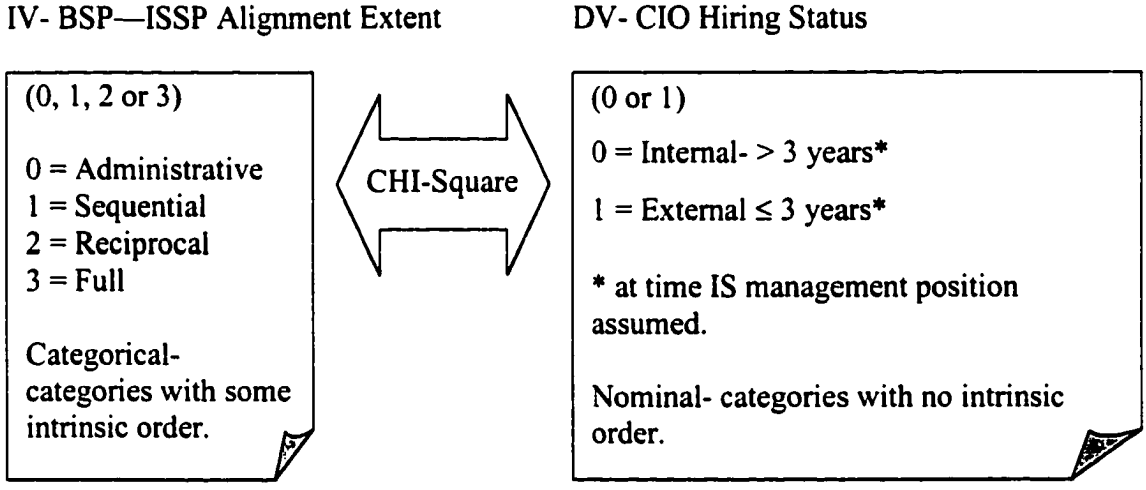
This leads to the fourth research hypothesis:

$H4_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

CIO Hiring Status – BSP—ISSP Alignment

No empirical research could be found directly examining the relationship of CIO hiring status (external, internal) and BSP—ISSP alignment extent. Empirical research does not show a significant correlation between the hiring status of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). (See Figure 4). Consequently there was no reason to suspect a relationship here between BSP—ISSP alignment extent and hiring status.

Figure 4: CIO Hiring Status Variable



This led to the fifth research hypothesis:

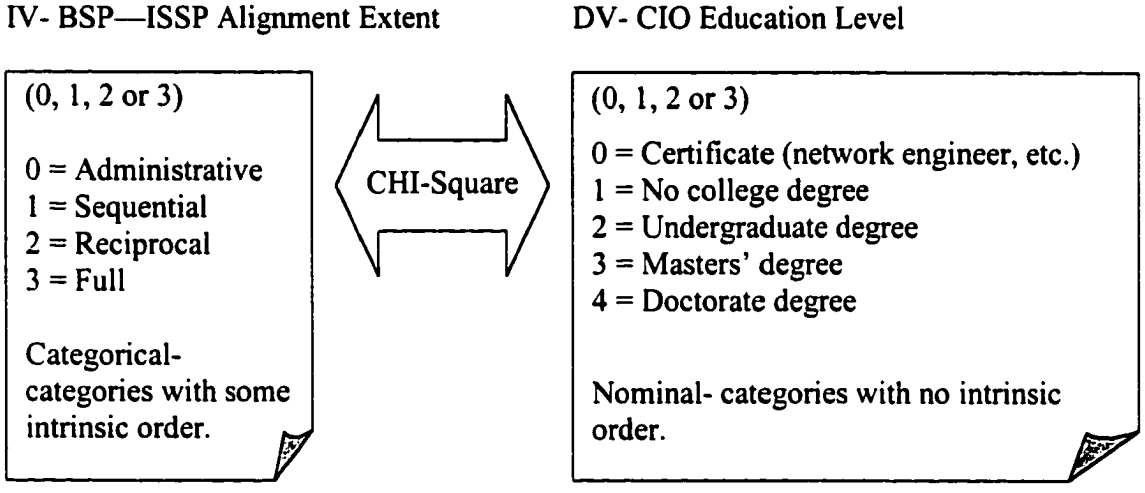
$H5_0$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

CIO Education Level – BSP—ISSP Alignment

No empirical research could be located directly examining the relationship of CIO education level (certificate, no degree, undergraduate degree, masters' degree, or

doctorate degree) and BSP—ISSP alignment extent. Nor does the literature directly address the relationship. (See Figure 5).

Figure 5: CIO Education Level Variable



This led to the sixth research hypothesis:

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

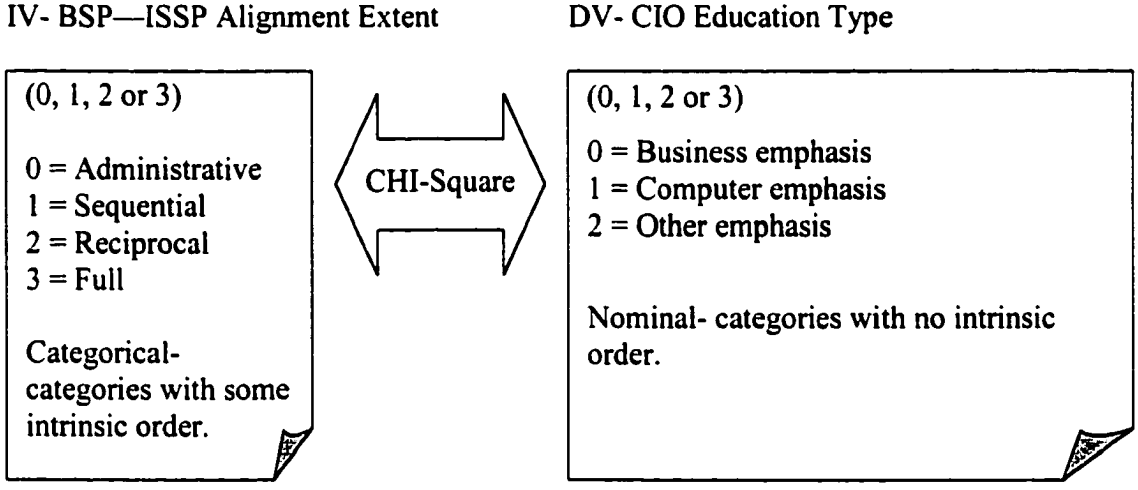
CIO Education Type – BSP—ISSP Alignment

No empirical research could be located directly examining the relationship of CIO education type (business, computer, or other emphasis) and BSP—ISSP alignment extent. The literature does suggest that the CIO executive has a major impact on how the CEO views the competence of IS (Karimi & Gupta, 1996). King and Teo (1996) found five key dimensions for facilitating BSP—ISSP alignment and concluded that firms wishing to enhance their ability to develop strategic use of IS should focus on communicating the need for innovation and change, develop economies of scale, build a strong competitive

position, and ensure that top management integrates IS as a key element of the business strategy. The authors suggest in the short run, communications may be the most controllable element. (See Figure 6).

In addition, top IS positions are increasingly being filled with people who have business backgrounds as compared to just computer backgrounds (Strassmann, 1994). It is thought that these trends will lead to broader educational backgrounds to integrate the IS function with the total organization.

Figure 6: CIO Education Type Variable



This led to the seventh research hypothesis:

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

Presented as a null hypothesis:

$H7_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education type.

Table 2: Dependent and Independent Variable Operationalization

Independent Variable	Operationalization		Numeric Type
BSP—ISSP Alignment Extent of organization.	Teo & Kings Model of BSP—ISSP Alignment Administrative alignment Sequential alignment Reciprocal alignment Full alignment	0, 1, 2 or 3	Categorical

Dependent Variables	Operationalization		Numeric Type	Analysis
CIO self-perceived leadership style	Twenty Likert scale (0-4) questions from Bass & Avolio's MLQ Leader 5X-Short inventory. TF= AVG of IM, IS & IC. TA = AVG of CR & AM.	Mean	Interval	ANOVA
CIO Role	Eight Likert scale (0-4) questions from Karimi & Gupta's inventory which measure the role that the IS executive plays.	Mean	Interval	ANOVA
CIO Rank	Number of reporting levels separating the CEO from the CIO. Zero levels, one, two, three or more levels	0, 1, 2, 3	Nominal	CHI-Square
CIO Hiring Status	Internal or External	0 or 1	Nominal	CHI-Square
CIO Education Level	Certificate No degree Undergraduate degree Masters' degree Doctorate	0, 1, 2, 3, or 4	Nominal	CHI-Square
CIO Education Type Of last degree completed	Business emphasis Computer emphasis Other emphasis	0, 1 or 3	Nominal	CHI-Square

- **Interval** Data values are numeric values on an interval or ration scale (e.g., age, income). Interval variables must be numeric.
- **Categorical** Data values represent categories with some intrinsic order (e.g., low, medium, high; strongly agree, disagree, strongly disagree). Ordinal variables can be dither string (alphanumeric) or is numeric values that represent distinct categories (e.g., 1=low, 2-medium, 3=high).
- **Nominal** Data values represent categories with no intrinsic order (e.g., job categories or company division). Nominal variables can be either string (alphanumeric or numeric values that represent distinct categories (e.g., 1=male, 2=female).

Limitations/Delimitations

Several possible limitations to this study were identified. The first potential threat is the ability to generalize to other settings or situations. This threat is reduced by surveying a cross section of firms as found in the "Directory of Top Computer Executives". While there is no specific firm size to qualify for placement into this directory, organizations qualify by meeting the following criteria: (1) the ownership of a mainframe computer, minicomputer or 100 or more PCs, (2) a formal MIS staff, and (3) gross annual sales volume of annual sales volume of $50 million or more and (4) annual IS budget greater than $250,000. Thus a wide variety of firm types and sizes will be included. The firm location however, is limited to the states of Michigan and Illinois to create geographic homogeneity.

Second, while this study gathered data from currently operating firms, the design is cross-sectional. This limits the data collection to a single time period. This design may result in discovering tentative relationships. Variables not in the design of the study may cause variations in the performance measures that are not or probably not accounted for. In addition, multi-year variations may be reflected in the data that a cross-sectional study will not be aware of.

A third limitation is that much of the data will be gathered through self-reports of the respondents. Thus, the respondents may inflate some of the variables due to the need to provide logically consistent information. For example, BSP—ISSP alignment may be poor, which may be embarrassing to report. However limiting the use of self-reporting may be, the survey design may have limited negative impact on the results. First, the Karimi and Gupta instrument has multiple questions in the survey capture the

measurement of the CIO role. Also, many of the questions on the CIO survey are relatively objective, such as the CIO: rank, age, gender, education level, and education type. A fourth limitation is that the sample population response may be considered low in terms of absolute numbers.

Top-level executives of the IS departments were asked to respond to the survey. The use of a single respondent might create information bias. However, since the hoped-for target respondents were top-level IS executives, and since no other executives in the organization were thought to have the broad view necessary to respond to the questions of the survey, other approaches were not found to be feasible. Originally, it was deemed important to have multiple respondents to classify the firm based on its BSP-ISSP alignment extent (administrative, sequential, reciprocal and full). However, the limited research budget restricted the researcher from identifying other top executives in the firms to participate in the survey.

A final limitation within any field study which involves the use of survey data are generalizability and concerns. For this study, data was obtained from a variety of firms in terms of employees, annual sales and organizational IS computer systems. Thus the findings may be generalizable to similar organization, under similar selection conditions, in the United States.

Definitions

The following is a list of terms that are used throughout this dissertation. The definitions are provided to aid the reader in the understanding of these key terms.

Alignment: the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure. (Luftman, 1996, p. 4) Chan, (1993) refers to IS strategic alignment as the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation. Chan went on to say that "there are both strategic and structural dimensions of IS alignment. The two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other." (Chan, 1999b, p. 18).

Business Strategy Planning (BSP): the strategic planning process related to the organization as a whole. "the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A strategy that is well-formulated marshals and allocates resources of the organization into a unique and viable posture based on its competencies and shortcoming, changes in the environment, and contingent moves by opponents". (Quinn, 1980b, p. 3)

Chief Information Officer (CIO): used to describe a "senior executive responsible for establishing policy and controlling information resources"." (Grover & Jeong, 1993, p. 109). The term has been somewhat loosely defined and is often used interchangeably with various titles such as Information Technology (IT) Director, Vice president of IS, Director of Information Resources, and Director of IS.

Goals : Specific measurable performance targets that an organization seeks to produce through its activities and the competitive position the enterprise wishes to

occupy in the market. Example: Increase market share by 9 percent by the end of the next three-year plan. (Reich & Benbasat, 1994, p. 44) Quinn, (1980a) adds that goals state what and when results are to be accomplished, but not how.

Information Technology (IT): as "a firm's total investment in computing and communications technology. This includes hardware, software, telecommunications, the myriad of devices for collecting and representing data, all electronically stored data, and the people dedicated to providing these services" (Weill & Broadbent, 1998, p. 6).

Information Systems/ Technology (IS or IT): the process of managing the processing, storage and distribution of computer based information within the organization. The department responsible for providing these services is often called Information Technology (IT), Information Services (IS), Information Systems (IS), or some variation based on the words "Information" or "Technology". IS and IT will be used interchangeably in this paper. (Chan, Gallupe, & Glew, 1998, p. 18)

Intended strategy: the strategy for which plans are developed for the future which often evolve from patterns of past behavior. (Mintzberg, 1994, p. 24)

IS Strategy Planning (ISSP): the strategic planning process related to the Information Systems department. "Planning the essentials for the effective conduct of business as it relates to IT". (Atkinson, 1991, p. 58)

Mission : long-term visions of what an organization seeks to do and what kind of an organization it intends to become. Example: Become the predominant U.S. manufacturer of office furniture. (Reich & Benbasat, 1994, p. 44)

Plans: Detailed roadmaps of the direction and course the organization intends to follow conclude its activities. Example: Have the Human Resource department write requisitions for two additional PC support staff. (Reich & Benbasat, 1994, p. 44)

Productivity: the ability to produce more for less, better for less, faster for less or different for less. It is measured by the ratio of the output of a process to the input used (e.g., land, labor, capital, management, time, materials, machinery, tools, creativity and information.) (Due, 1993, p. 69).

Realized strategy : the strategy that actually happens as the firm adjusts to the market, competitors and economic changes along the way. (Mintzberg, 1994, p. 24)

Strategies Vs. Goals : Strategies are the approaches which will be used to pursue the goals. Example: IT Goal- reduce Helpdesk work order backlog by 20 percent. IT Strategy- increase IT work capacity in the PC support area. (Reich & Benbasat, 1994, p. 44)

Strategy formulation: the set of processes involved in creating or determining the strategies of the organization. It focuses on the content of the strategy. (Griffin, 1999, p. 233)

Strategy implementation: the methods by which strategies are operationalized or executed within the organizations. It focuses on the processes through which strategies are achieved. (Griffin, 1999, p. 233)

The Importance of the Study

Mahmood and Mann (1993) indicate that because of the lack of understanding of what measures are significant to the relationship between BSP—ISSP alignment and IT

capital investment, many IT managers make decisions based on hunch or intuition, with the assumption that real returns will follow additional IT spending. These managers may believe that further IT investments will significantly improve the performance of the firm, or at least that the investment will make their business activities easier. The problem is the difficulty in choosing the one project from among many, which will give the best return.

For example, Mulqueen (1997) cited a survey done by A.T. Kearney of 213 CEOs in North America and Western Europe. The survey reported that 87 percent of the CEOs rejected the idea that IT had only a minimal impact on their bottom line. While nearly 40 percent said that they have a difficult time evaluating the impact of technology on their business with any precision, 68 percent said that they expect to increase their investments in technology over the next three years. Only eight percent would be cutting back.

According to Prospect Theory, (Kahnerman & Lovallo, 1993) the evaluative weights placed on potential losses are typically twice as great as the weighting of potential gains. Therefore, an aversion to losses strongly "favors the avoidance of risks" and "favors inaction over action, and the status quo over any alternatives" (Kahnerman & Lovallo, 1993, p. 18). Bukszar (1999) suggests that this loss aversion in highly uncertain environments may lead, however, to extreme timidity in decision-making at a time when IT management may well need to make bold decisions.

Systematic over- or under-capital investment in IT based on intuition, in the belief that organization profitability or productivity will increase, may well lead to an under-investment in flexibility or an over-investment in infrastructure. In addition, given the proven outcomes BSP—ISSP alignment to firm performance (Bryan, 1999; Chan, 1999a;

Chan et al., 1997), it is not surprising that such alignment has been given significant attention in recent years (Luftman, 1996; Reich & Benbasat, 1996; Teo & King, 1996) and has been ranked among the top issues facing IS executives (Brancheau & Janz, 1996; Watson, Kelly, Galliers, & Brancheau, 1991). An improved understanding of the relationship of BSP—ISSP alignment to how CIO individual variables affect such alignment will allow organizations to improve business and IS strategic planning.

The Organization of the Study

The remaining chapters of this study are organized as follows: Chapter Two contains the review of the relevant research literature. In Chapter Three, the plan for conducting this research is set forth. In Chapter Four the statistical analysis of the actual data is presented and explained. Chapter Five contains the conclusions, limitations and recommendations for further study.

CHAPTER TWO

Review of the Literature

Introduction

Information Technology (IT) is evolving from the traditional orientation of an administration support tool to that of playing a more strategic role within the organization. Many firms have chosen to make IT a competitive core competency. However, there is a concern that Return on Investment (ROI) from the capital expenditure necessary to achieve this goal has been far less than expected. The question arises of reconciling the dramatic increase in the role and capability of IT in organizations with the evidence of minimal productivity gains within the firm and from a perspective of minimal aggregate levels in the economy.

Organizations have vastly increased their spending in the last few years on Information Technology. For example, Brynjolfsson, Malone, Gurbazani, and Kambil, (1994) reported a tenfold increase in IT investments between 1971 and 1990. It would be reasonable to assume an accompanying increase in productivity with this large capital investment. In contrast to this assumption, (Brown & Gatian, 1995; Brynjolfsson & Hitt, 1995) there is still mixed empirical evidence that increased spending on IT results in long-term competitive advantage or that it benefits the bottom-line. This may be due to the difficulty of isolating the direct economic benefits.

This apparent disconnect between investment in IT and a lack of increased white-collar productivity has been termed the "Productivity Paradox" (Brynjolfsson, & Hitt, 1998). This paradox, then, creates confusion regarding how beneficial it is to continue

additional investment. For example, Mulqueen (1997) cited a survey done by A.T. Kearney of two hundred thirteen CEOs in North America and Western Europe. The report showed that eighty seven percent of the CEOs rejected the idea that IT had only a minimal impact on their bottom line. While nearly forty percent said that they have a difficult time evaluating the impact of technology on their business with any precision, at the same time sixty eight percent said that they expect to increase their investments in technology over the next three years. Only eight percent would be cutting back.

It has been suggested (Bryan, 1999; Henderson & Venkatraman, 1999a) that the inability to realize value from these investments is due in part to the lack of alignment between the Business Strategy Planning (BSP) and IS Strategic Planning (ISSP) of organizations. Chan (1993) refers to strategic alignment as the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation. Chan went on to say that "there are both strategic and structural dimensions of IS alignment. The two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other" (Chan, 1999b, p. 18).

This review of the literature will examine strategy as broadly defined, business Strategic Planning (BSP), Information Systems Strategic Planning (ISSP), the alignment of BSP and ISSP, productivity and profitability outcomes of the alignment, the role of IS management in the alignment, and the relationship of IS top management (CIO) individual variables to alignment.

Strategy Defined

Many writers have tried their hand at defining strategy, with widely varying results. Mintzberg, (1988, p. 14) cited the following approaches to defining strategy: (1) military: "strategy is concerned with drafting the plan of war, shaping the individual campaigns and within these, deciding on the individual engagements" (Von Clausewitz, 1976, p. 177), (2) game theory: "strategy is a complete plan: a plan which specifies what choices the player will make in every possible situation" (Von Neumann & Morgenstern, 1944, p. 79) and (3) management: "strategy is a unified, comprehensive, and integrated plan designed to ensure that the basic objectives of the enterprise are achieved" (Glueck, 1980, p. 9).

According to Quinn, (1980a, p. 3) strategy is "the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A strategy that is well-formulated, marshals and allocates resources of the organization into a unique and viable posture based on its competencies and shortcomings, changes in the environment, and contingent moves by intelligent opponents." Ansoff (1965) defines strategy as "the decision rules and guidelines for orderly and profitable growth" (p. 11). These rules and guidelines are made up of four components; (1) product-market scope- specific industries which make up the product-market position, (2) growth vector- the direction in which the firm is moving with respect to the current product-market posture, (3) competitive advantage- particular properties of individual product-markets which match well with the specific capabilities of the firm, and (4) synergy- a measure of the ability of the firm to make good on a new product-market entry.

Mintzberg (1994) says that strategy is one of those words defined one way, but often used in another. He differentiates between intended strategy and realized strategy. The intended strategy is one in which plans are developed for the future which often evolve from patterns of past behavior. The realized strategy is the one that actually happened as the firm adjusts to market, competitor and economic changes along the way. Strategy is presented as five P's; plan, ploy, pattern, position, and perspective. For example, a strategy is a plan, a direction, or course of action into the future. As a ploy, it is a specific maneuver to outwit a competitor. It is also a pattern of behavior engendered in a stream of actions. By this, Mintzberg emphasizes that strategy is consistent in behavior, regardless of intentions. As a position, it may be a market position staked out by a firm to sell the most expensive products in its industry (high-end strategy), and as a strategic perspective, it is the organization's way of doing things.

Business Strategic Planning (BSP)

According to Quinn, (1980) Business Strategy Planning (BSP) is the strategic planning process related to the business organization as a whole. It is the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A strategy that is well formulated, marshals and allocates resources of the organization into a unique and viable posture based on its competencies and shortcomings, changes in the environment, and contingent moves by opponents.

According to Miles and Snow, (1978; 1994) firms over time relate to the market and the broader environment with a consistent approach (pattern of behavior) that builds

on their competencies and differentiates them from their peers. These organizational characteristics can be categorized into three groups; prospectors, analyzers and defenders.

Prospectors achieve success by being first into new markets through either research and development or anticipation of market changes. They seek to respond to and exploit market changes through new product innovation. As an example, Hewlett-Packard has demonstrated prospector behavior for much of its history. Analyzers succeed by being the second mover or fast follower. Most firms in this category have an established portfolio to which new additions are carefully chosen. They normally do not originate these products but use their process engineering and manufacturing competencies to improve the new product, establish a process to produce it in a more cost-efficient manner than prospectors and then use their marketing skills to sell it. Defender behavior is characterized by moving much less quickly. These firms are more concerned with protecting their existing product-market mix, than aggressively seeking to enhance their product-market mix. They are not at the forefront of developments in their industries and have a limited and stable selection of products. Finding a niche in a stable product area and then protecting it by offering higher quality, superior products and service is their chosen strategy. Miles and Snow summarize by saying that prospectors push an industry into new territory, defenders help an industry to remain efficient and cost conscious, and analyzers keep both prospectors and defenders honest by forcing prospectors to innovate and forcing defenders to make additional investments in efficient process. Healthy industries are populated by all three categories. (See Table 3).

Table 3: Business Strategies and Organizational Characteristics

Organizational Characteristics	Defenders	Prospectors	Analyzers
Product- Market strategy	Limited, stable product line	Broad, changing product line	Stable & changing product line
	Cost efficiency through scale economies	Product innovation & market responsiveness	Process adaptation, planned innovation
	Market penetration	First in to new markets	Second in with an improved product
Research & development	Process skills, product improvement	Product design, market research	Process & product adaptation
Production	High-volume,	Flexible, adaptive equipment & processes	Project development shifting to low-cost production
	Low-cost specialized processes		
Organizational structure	Functional	Divisional	Mixed project & functional matrix
Control process	Centralized, managed by plan	Decentralized, managed by performance	Stable units managed by plan; projects managed by performance
Planning process	Plan→ Act→ Evaluate	Act→ Evaluate→ Plan	Evaluate→ Act→ Plan

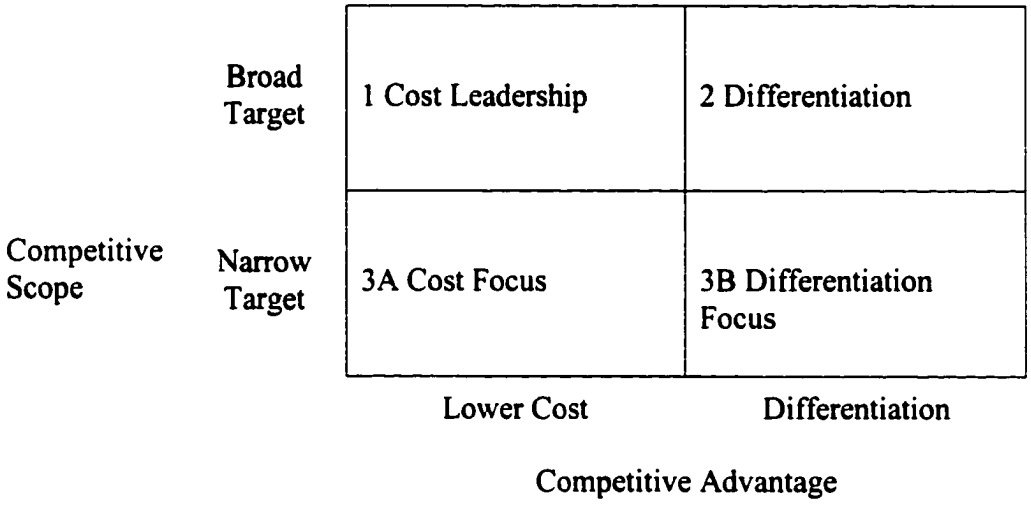
Adapted from: Miles, R. E., and Snow, C. C. (1994). *Fit, Failure, and the Hall of Fame.* New York: The Free Press.

Miles and Snow (1978) also wrote about a fourth category: Reactors. Reactors are those organizations that are unable to respond to the change and uncertainty perceived in their organizational environments. These firms lack a consistent strategy-structure relationship and seldom makes adjustments of any sort until forced to do so by outside environmental stressors. Therefore, reactors are residual organizations that are unable to pursue one of the three stable strategies of defender, analyzer or prospector. Three explanations account for why organizations become reactors: (1) a lack of a clearly articulated strategy, (2) the failure of management to shape the organizations' structure and processes to fit a chosen strategy and (3) simple inertia; the tendency of management to maintain the present strategy-structure relationship despite overwhelming pressures in the general environment.

Snow and Hambrick (1980) found that firms classified as analyzers (in most environments) were generally most effective. However, those firms operating in highly regulated environments and who used the reactor strategy were more effective than prospectors and defenders.

Similarly, Porter (1980; 1985) wrote about the notion of generic competitive strategies. Porter says the combination of the two basic types of competitive advantages (lower cost and differentiation), along with the scope of activities, lead to three generic strategies for achieving above-average performance in an industry: cost leadership, differentiation and focus. The focus strategy is broken into two variations: cost focus and differentiation focus (See Figure 7).

Figure 7: Porter's Three Generic Strategies



Adapted from Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.

Each of the generic strategies is a different path to competitive advantage and involves combining a choice about the type of advantage along with the scope of activities. For example, cost leadership and differentiation seek competitive advantage in a broad target market population. On the other hand, cost focus and differentiation focus relates to a much more narrowed market segment. Cost leadership involves a firm that sets out to become the low-cost producer in its industry. The scope is broad and comprises many industry segments; perhaps even related industries. This breadth of scope is important to the cost advantage. Sources of cost advantage may include economies of scale, proprietary technology, preferential access to raw materials, or other factors. Porter says that a cost leader must achieve parity or proximity in the bases of differentiation relative to those of its competitors to be an above-average performer.

Differentiation is Porter's second generic strategy. In it, a firm seeks the path of uniqueness along some dimension(s) valued by buyers. It will select one or more attributes important to the broad target market of choice and then positions itself to meet those needs. This uniqueness is rewarded with a premium price.

The third generic strategy is focus. With this strategy, the firm selects a market segment or group of segments and positions itself to serving them to the exclusion of others. The focus strategy is broken into two variations, cost focus and differentiation focus. Cost focus relates to seeking a cost advantage in the target segment of choice while a differentiation focus strategy seeks differentiation in the target segment. Both focus strategies rely on differences between a focusers' target segments and other segments in the industry. Porter says that the concept underlying the idea of generic strategies is that competitive advantage is the heart of any strategy. To achieve competitive advantages requires a firm to make a choice. To be all things to all people simply means strategic mediocrity and earning below-average returns.

Prahalad and Hamel (1990) say that a firm's competitiveness is derived from its core competencies and core products. The core competence is a combination of the collective learning of the members of the organization; capacity to coordinate diverse production skills and to integrate streams of technologies. In the process of setting business strategy, the firm must first identify core competencies which: (1) provide potential access to markets, (2) make up a part of the customer benefits from the product and (3) be difficult for competitors to imitate. As a second step, the firm must redesign their structure and provide a culture for learning from alliances and a focus on internal development. Grant (1998) for instance, cites core competencies of the following firms as

examples: NEC's integration of computer and telecommunication technology, Canon's integration of optical, microelectronic and precision-mechanical technologies which forms the basis of its success in cameras, copiers and facsimile machines and Black and Decker's competence in the design and manufacture of small electric motors.

In summary then, there are many different frameworks with which to specifically implement Quinn's notion of a "well-formulated strategy to marshal and allocate resources into a unique and viable posture" (1980a, p. 3). Miles and Snow's typology (prospector, analyzer, defender and reactor), Porter's generic model (cost leadership, differentiation and focus), and Prahalad and Hamel's model (core competencies and products) are often used frameworks.

Business Strategic Planning (BSP) then, is an attempt by organizations to use their resources and organizational capabilities to somehow differentiate themselves from their competitors. Typically this is done by choosing the product-market mix to best maximize organizational strengths and minimize organizational weaknesses. To do this well over a long period of time requires the ability to see both the firm and competitors of the firm clearly, scan the internal and external environments to take advantage of opportunities, sidestep threats, and evaluate conditions that may change in the future.

IS may be a resource that can be added to the other capabilities of the organization to enable this differentiation. For this to happen, the organization must believe that IS is more than a department offering file and print services. If an Information System is to be effective, it must also "marshal and allocate its resources into a unique and viable posture" by the process of Information Systems Strategic Planning (Quinn, 1980a, p. 3).

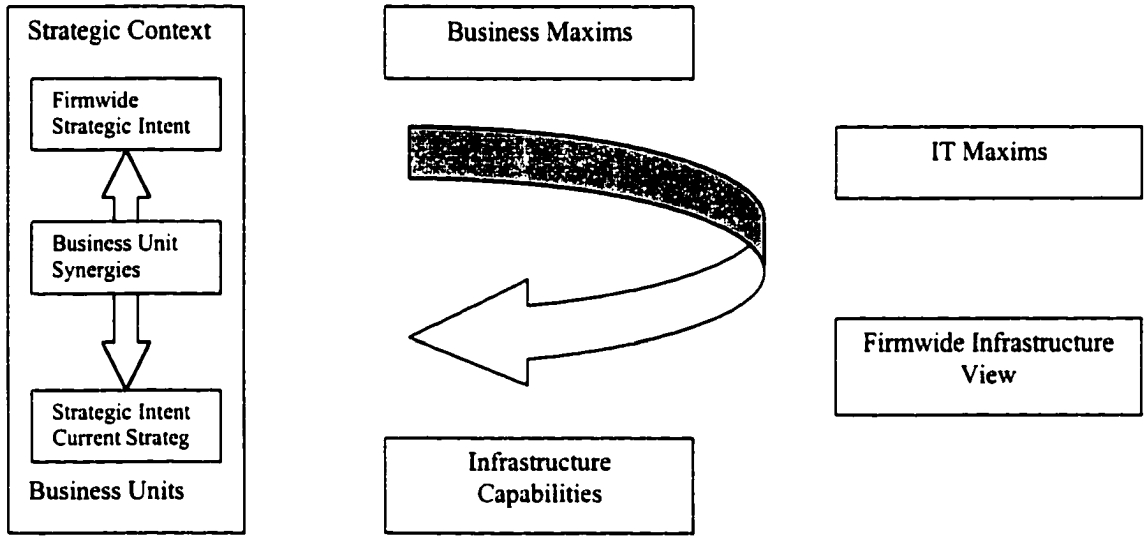
Information Systems Strategic Planning (ISSP)

Weill and Broadbent (1998) define Information Technology (IT) as "a firm's total investment in computing and communications technology. This includes hardware, software, telecommunications, the myriad of devices for collecting and representing data, all electronically stored data, and the people dedicated to providing these services" (p. 6). IT then, becomes the sum total of the investment in these specific parts and may be referred to as the IT portfolio. This portfolio should be managed in a similar fashion as a financial portfolio; risk must be balanced, strategies enacted to build and maintain customer and shareholder value, and Return on Investment (ROI) maintained in regard to goals set by management.

According to Weill and Broadbent, (1997) management of the IT portfolio is accomplished by short focused strategic statements referred to as business maxims by the authors. They say that many managers find it difficult to identify the implications to IT of the business strategy. While typical broad statements of strategic intent, mission statements and organizational values are good starting points, an informed action agenda requires joint review by business and IT managers. They suggest a model to manage IT by maxims in making organizational decisions. This model links IT strategy to organizational infrastructure. (See Figure 8). Managers begin to define the strategic context of the firm by asking questions such as: What is the firm's strategic intent and what are long-term goals?, What are the synergies among the business units?, Are the customer and supplier bases overlapping?. By defining the context, managers are able to create a series of short, focused strategic statements referred to by the authors as business

maxims. In turn, IT maxims can be crafted in response to the business maxims. Note that IT would now be working with short, focused strategic statements versus broad generalizations crafted for the organization as a whole. Both the business and IT maxims lead to identification of a consensus view of the IT infrastructure needed to support both the Business Strategic Plan (BSP) and the Information Systems Strategic Plan (ISSP).

Figure 8: Management by Maxim



Adapted from: Weill, P., & Broadbent, M. (1998). *Leveraging the New Infrastructure: How Market Leaders Capitalize on Information Technology.* Boston: Harvard Business School Press.

Venkatraman (1997) separates Weill and Broadbent's IT portfolio into two parts: the Information Technology infrastructure and the Information Systems administrative architecture. He suggests that many firms use an outmoded legacy technology infrastructure, utilizing centralized mainframe technology. More and more of these firms

are changing directions toward a more decentralized, distributed platform. The technology infrastructure is comprised of the hardware and software working together as Weill and Broadbent's IT portfolio. The Information Systems (IS) policies, procedures and organizational structures make up the IS administrative architectures.

While many recognize the problems associated with a legacy technology infrastructure, few recognize the potential weaknesses of legacy administrative architectures. These problems may include: outmoded IS organizational design and processes, misdirected IS resource allocation criteria and mismatched IS skills with business needs.

Venkatraman presents three major recent reasons for rethinking current IS administrative structures. The first is the evolution of hybrid systems which forces firms to standardize business processes and increased use of the Internet and intranets. These hybrid systems have both a centralized and a distributed component to the system design. The second major reason is that business executives now have increased business value expectations of IT. No longer is IT only held to the standard of increasing efficiency via computers on the desktop. IT is now expected to leverage the firms' unique knowledge, explore new ways to deliver service through the Internet, and use IT capabilities to develop new sources of revenues and margins. The third reason is that credible IT outsourcing options now tantalize top management with pictures of controlled IT related expenses.

Venkatraman also presented the concept of value centers made up of four sources of IT resources. These components of value allow management to evaluate the approaches needed to maximize the distinct value. The sources are: the cost center,

service center, investment center and the profit center. Firms have historically managed IS activities as a cost center. Resources are typically allocated on a quantitative payback criteria based on reduced operating costs or increased margins. This source has an operational focus that minimizes risk and emphasizes operational efficiency. Venkatraman (1997) says "...they operated the infrastructure, like the data center and telecommunications network, as a utility independent of business strategy; they designed the IS organization as a support unit with a reporting relationship to the finance function" (p. 54). Because of this view of IS as a cost, management tended to reduce the expense by controlling access and usage. (See Table 4).

The second source value is assessing IT from a service center view. Here, IT-enabled business capabilities are considered not with a focus on the lowest possible cost, but as drivers of competitive advantage. The service center still minimizes risk, but aims to create and sustain IT-enabled business capability that will be used to support current strategies. Examples of using IT as a Service Center include: (1) automatically collecting all the necessary information for the budgeting process accurately and on time, (2) in support of a new reward and incentive system based on key metrics, using IT to measure performance indicators, to collect reliable output information across plants and to assimilate, synthesize, and analyze the information or (3) for the Marketing Department, to collect up-to-the-minute information on products, pricing strategies, inventory levels, or promotional efforts on an ongoing basis (Laud & Thies, 1997).

The third source of administrative logic in assessing IT value is the investment center view. In this stage, IT now has a markedly strategic focus and seeks to maximize business opportunity from IT resources. The investment center has a long-term focus and

chooses to create new IT-based business capabilities. The fourth source in administrate logic in assessing IT value is the profit center view. Here, IT looks to deliver services to the external marketplace for incremental revenue and gain experience to become a best-in-class operation.

Blanton and Watson (1992) suggest that there is a relationship between the organizational structure of IT groups and the effectiveness of IT groups. They cite Lawrence and Lorsch's, (1967) study of the relationship of organizational structure and economic performance using the structural contingency model. Organizational structure was defined as two processes: (1) differentiation- the process of dividing the organization into groups that deal with different components of the organization's external environment, and (2) integration- the process of coordinating the interrelated activities of these groups in order to obtain unity of effort. Lawrence and Lorsch found that in a dynamic environment, the higher performing companies were those that developed organizational structures with higher states of differentiation and integration. Based on this, Blanton and Watson concluded that the IS needs of firms in dynamic environments were better satisfied by organizational structures with high states of differentiation and integration. In addition, this will lead to improved organizational performance.

Table 4: Summary of the Four Components of the Value Center

Characteristics	Objectives	Key Capabilities	Performance Metrics	Role of External Alliances & Partner
Cost Center	Deliver IT products and services at the lowest cost levels relative to an external referent.	Managing scale and scope for operational efficiency.	Cost/MIPS	Relationships with best-in-class outsourcers to improve cost levels.
Service Center	Deliver IT-enabled business capabilities to support current business strategy.	Understanding technology's role in the business strategy.	Client satisfaction; internal service guarantee levels.	Alliances for key capabilities such as help-desk, customer service, and market intelligence
Investment Center	Proactively create IT-enabled business capabilities that shape new business strategies.	Identifying and nurturing a portfolio of technology-enabled new business capabilities.	Investment payoff reflected in business capability creation.	Support for technology scanning, technology licensing, joint R&D, beta tests and joint ventures.
Profit Center	Deliver IT products and service in the external market to realize marketplace knowledge, credibility & additional profits.	Ability to compete successfully against best-in-class vendors.	Realized profit levels, market experience and credibility.	Partnering to combine complementary skills to serve the IT marketplace.

Adapted from: Venkatraman, N. (1997). Beyond outsourcing: Managing IT resources as a value center. *Sloan Management Review*, 38(3), 51-65.

Blanton and Watson's (1992) own study focused on organizations in an industry (banking) that contends with an external environment with a high degree of uncertainty, complexity, and change brought about by increased deregulation, competition and mergers. This type of environment requires increased information processing needs. The authors concluded: (1) IT organizational structure (structures with high states of differentiation and integration) may have a significant impact on the overall effectiveness of IT support quality, (2) Lawrence and Lorsch's (1967) findings were that IT structures with increased differentiating and integration may reap improved effectiveness was confirmed and (3) integrating mechanisms are those that promote feedback on IT performance, gain cross-functional participation in IT planning, and facilitate inter- and intra IT-customer communication. An example of this would be Lawrence and Lorsch's (1967) study of the chemical processing industry. The study found that higher performing organizations were those organizational structures with high differentiation and integration. The authors suggested that information processing demands in a high change (dynamic) environment were better satisfied by this type of structure, which led to increased organizational performance.

Allen and Boynton (1991) say that because the environment of Information Technology has such a rapid pace, structuring IT to be flexible and efficient is a strategy that can be used to support the goals of the firm. They suggest two architectures; the low road and the high road. While most organizations will choose one or the other, it is possible to combine elements of both. The authors say this will often be a result of reacting to operating problems versus a planned strategy. This would be an example of realized vs. intended strategy as suggested by Mintzberg (1994).

The low road strategy consists of dispersing IT technology and the accompanying management widely throughout the firm. Data, computers, networks, applications, programming and all the necessary supporting resources are pushed as far down in the organization as possible. IT becomes the responsibility of every operating manager. This architecture has advantages which include: (1) it provides a good fit with dispersed organizational structures, (2) speed- dispersed and networked IT allows quick implementation of new systems and technology, (3) innovative uses of current technology and the adoption of emerging technology, (4) effective use of locally developed systems to meet local needs, (5) efficient use of minis, micros, LANS and low-cost software versus mainframe based systems and applications, (6) strategic use of resources when management is forced to solve market challenges or opportunities with existing capabilities and (7) the result of pushing IT far down the organizational chain of command often results in creative business related applications.

Disadvantages for this approach include: (1) a somewhat higher cost due to lower utilization rates, more duplication, more support people, more technology, waste related to a lack of standards, (2) integration of IT activities with other units and sub-units of the firm are impeded, (3) data integrity and exchange is more difficult, (4) uneven levels of accomplishment throughout the firm as some units succeed and others do not and (5) planning typically becomes a short run affair.

The high road approach is the reverse of the low road. Here the core IT activities are centralized. IT capital investments in infrastructure are built around the idea of corporatewide networks, central data collections, common business processes and common application software and hardware. This approach is much more immune to

problems related to organizational restructuring because the IT systems are not owned by the local unit. The single biggest problem with this approach is the frequent failure of the development of large common systems which are able to adapt to organizations which need to change. The expense of changing IS systems of this size tends to reduce the likelihood of change. This dynamic may well freeze the organizations' structure, culture, and decision-making processes.

In summary, Weill and Broadbent (1998) say that ISSP is the management of the firms' investment in computing and communications technology. The purpose of the management is to balance risk, find ways to build customer and shareholder vale, and increase ROI. They suggest doing this by use of their Business Maxim model. Venkatraman, (1997) extends their argument by suggesting that many firms are moving the IS infrastructure and administrative architecture toward a more decentralized and distributed platform. He presents a model of IS as one which moves through four stages (cost-, service, investment-, and profit-centers). Allen and Boynton (1991) conversely say that IS has two viable choices, centralization or decentralization. Which choice is made, may depend on the current organizational external environment and the chosen strategy of the firm. Regardless, the ISSP strategy can be tailored to complement and enhance the BSP.

BSP—ISSP Alignment

Luftman (1996) defines BSP—ISSP alignment as "the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure" (p. 4). Chan (1993) refers to strategic alignment as the degree to which

resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation. Chan went on to say that "there are both strategic and structural dimensions of IS alignment. The two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other" (Chan, 1999b, p. 18).

Traditionally, IT has been viewed as a service organization to the rest of the organization. Typical services include file sharing, printing and software application hosting. And just as services can be cut in times of organizational distress, IT budgets are often used as a source to help balance the budget. How top management views the function of IT will impact the extent to which it is invited to the strategic planning table. Henderson, Venkatraman, and Oldach (1996) paint a picture of IT strategic planning evolving over a series of stages or eras. This evolution is summarized in Table 5 below. The evolution is a continuum that ranges from an internal function perspective to an external competitive perspective, and is comprised of three eras along the continuum: Resource Control, IT Architecture and Strategic Alignment.

The first era is that of Resource Control where IT planning is focused on the automation of business processes. The administrative role here is to provide for control of functional resources. The decisions, recommendations and policies focus on product development such as applications and the required resources (capital- both dollar and human) necessary to deliver and implement these products. The next step in the evolutionary process is the IT Architecture Era. Here the IT planning process extends its

scope to the enterprise and the focus is on cross-functional integration through defined architecture. The purpose here is to create architectures to support a wide range of system applications, many of which are cross-functional in nature.

The last era of IT strategic planning involves the Strategic Alignment era. Here, IT is not only a means of functional integration, but also as an opportunity to enhance the competitive capability of the organization. Here, IT provides projects that are driven by market needs articulated via a business-IT strategy process.

Based on this evolutionary strategic IT planning taxonomy, Henderson et al., (1996) suggest an model for Strategic Alignment built on the twin notions of strategic fit and functional integration.

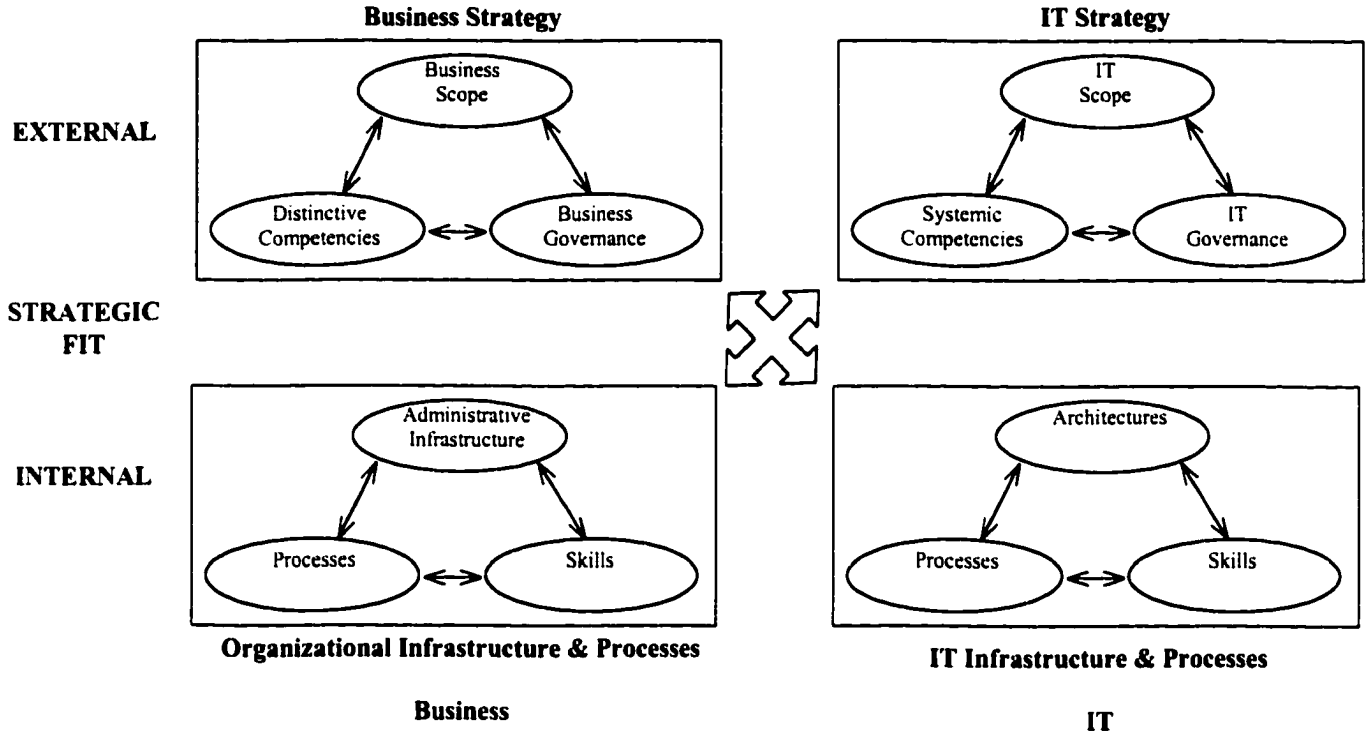
Each of these building blocks are placed on a separate axis. The strategic fit axis recognizes the need for strategies to address both the external and internal environmental domains. The business external domain is comprised of (1) business scope decisions, (2) distinctive competency decisions and (3) governance decisions. The business internal domain addresses (1) administrative infrastructure needs, (2) process criteria and (3) the acquisition and development of human resource skills (human capital issues). In a like manner, the IT strategy side of the model is faced with external and internal choices. The IT external domain is comprised of (1) technology scope decisions, (2) systemic competency decisions and (3) governance decisions. The IT internal domain addresses (1) IT architecture needs, (2) process criteria and (3) the acquisition and development of human resource skills (human capital issues). (See Figure 9).

Table 5: Evolution of Strategic IT Planning

	Era I Resource Control	Era II IT Architecture	Era III Strategic Alignment
Administrative perspective	Functional	Enterprise	Business network
Key planning product	Product portfolio	Defined architectures	External/internal strategic fit
Benefit	Efficiencies through automation	Product flexibility through architectures	Market-driven through dynamic alignment
Value management	Product management	Policy deployment	Strategy enabling

Adapted from: Henderson, J. C., Venkatraman, N., & Oldach, S. (1996). Aligning business and IT strategies. In J. Luftman (Ed.), *Competing in the Information Age: Strategic Alignment in Practice* (first ed., pp. 21-42). New York: Oxford University Press.

Figure 9: Strategic Alignment Model



Adapted from: Henderson, J. C., Venkatraman, N., & Oldach, S. (1996). Aligning business and IT strategies. In J. Luftman (Ed.), *Competing in the Information Age: Strategic Alignment in Practice* (first ed., pp. 21-42). New York: Oxford University Press.

Henderson et al. (1996) believe that effective IT management achieves a balance among the choices across the domains. At a minimum, they note that any given IT planning process must consider the interaction between both the dimensions of strategic fit and functional integration. Strategy was defined as formulation (decisions concerned with product/market choices) and implementation (choices pertaining to the structure and capabilities of the organization to execute its product/market choices).

Strategic fit encompassed the need for a strategy to address both external and internal domains. The external domain was concerned with the business area in which the firm operated and included: product-market mix, competitive advantages of members of the industry, the range of make-versus-buy decisions, horizontal and vertical market range, etc.

The internal domain was concerned with choices relating to the logic of the administrative structure (functional, divisional, centralized or decentralized) and the rationale for the status of critical business processes (product delivery, development, customer service, and product quality), as well as the acquisition and development of the human capital necessary for the accomplishment of organizational goals.

The addition of the external domain to the traditional internal domain, allows IT to use its capabilities to leverage outside opportunities to augment internal needs when formulating ISSP. This will allow the organization to position IS beyond being an expense center and move it into a more central place where it can better support the business model. For example, McGraw-Hill Inc. has created a custom publishing brand, Primis, for the textbook market. Using electronic imaging technology with a three-way joint venture between Eastman Kodak, R. R. Donnelley and Sons Co., and McGraw-Hill, Primis allows the individual instructor to choose individual modules to assemble a custom textbook that satisfies the needs of the customer. This focus on the external domain of IT allowed the technical expertise of the organization to be used to differentiate itself from its competitors.

It has been argued, that the fit between the external and internal domains, is a critical moderating variable in maximizing economic performance (Chandler Jr., 1998).

Henderson and Venkatraman (1999) extended that argument and say that the internal and external fit is equally relevant within the IT domain. They say that the IT strategy should be articulated in terms of how the firm is positioned in the marketplace concerning the external domain and how the infrastructure should be configured and managed regarding the internal domain. They suggest three sets of choices each, in both the external and internal domains.

The first of the external domain choices involve IT scope. This would be Information Technology that supports current or new strategy initiatives (electronic imaging, local- and wide-area networks, intranets and internets, expert systems). IT scope is similar to business scope. The second choice concerns systemic competencies. These are the system characteristics of IT strategy that contribute to the creation of new or improved support for existing business strategies. These may include system reliability, cost/performance levels, interconnectivity, and flexibility. Systemic competencies are similar to business distinctive competencies. The third choice relates to IT governance, which are the selection and implementation of mechanisms for obtaining the required IT competencies. Examples here could include: joint ventures with vendors, strategic alliances and joint research and development for new capabilities. IT governance is analogous to business governance.

The first of the internal domain choices involves IT architecture. These include the software applications, hardware, network operating systems and communications technology that together define the system structure. The IT architecture is similar to the administrative structure that deals with roles, responsibilities and authority structures. The second internal domain choice involves the IT processes making up the operational

work structure. These are the systems development, maintenance, monitoring and control mechanisms. These IT processes are analogous to the design of business processes that support and shape the capability to execute business strategies. The last of the internal IT domain choices are the IT skills relate to the acquisition, training and development of the individuals needed to manage and operate the IT infrastructure. These are similar to the skills necessary to execute a given strategy within the business domain.

Henderson and Venkatraman (1999) note that IT management often undervalues the importance of the external domain components. Their research suggests that an inadequate fit between the two domains is a major reason for the failure to derive benefits from IT investments. They then suggest their strategic alignment model (business strategy, information systems strategy, organizational infrastructure and processes and information technology infrastructures and processes) to better understand the fit. In addition, they derived four perspectives of alignment using the two strategies as drivers for IT organizational transformation.

Using business strategy as a driver, the first alignment perspective involves the notion that strategy execution is central to both organizational design choices and the design of the IT infrastructure. These authors suggest that top management take the role here of strategy formulator; articulating the logic and choices specific to the business strategy. The role of the IT manager here is that of strategy implementer; efficiently and effectively designing and implementing the required IT infrastructure and processes to support the chosen business strategy. In contrast to strategy execution, the second perspective is one of technology transformation. This perspective seeks to identify the

best IT competencies and infrastructure architecture through appropriate positioning in the marketplace.

Using IT strategy as a driver, the third alignment perspective involves competitive potential; which is concerned with the exploitation of emerging IT capabilities to impact new products and services, to influence strategy, and to develop new forms of relationships. These relationships concern both potential internal and external customers. This perspective can be summarized by how IT strategy impacts business scope, distinctive competencies and business governance. The fourth perspective involves the level of service and focuses on how to build a best-in-class IT service organization.

The model proposed by Henderson and Venkatraman requires a conception of the intrinsic dynamic nature of IT. Both the rate and scope of change in IT is legendary; with the typical job knowledge base becoming obsolete by 20 percent or more each year. This rapid rate of change may well produce timidity in IT management life. This may account for the large membership in Miles and Snow's (1978) category of "Reactors" by IT management. Bukszar (1999) suggests that retrospective sense-making produces the perception that the world is more orderly than it is. Outcomes may be recalled as more predictable than they seemed in prospect. Therefore, these inflated perceptions of order may, according to Bukszar, bias management towards strategies designed to take advantage of the expected orderliness. These biases may lead to systematic under-investment in flexibility because of a perception of non-change that does not match reality.

As an example, Bukszar cites IBM's problems with poor operational performance, in the 1990's as traceable to lack of foresight in the 1980s. Reid (1989)

concurs by saying "If the correct strategic choices were made in a timely fashion, IBM might not have earlier locked its product activities so tightly to mainframe development, and thus been more of a pioneer in PC hardware and applications software" (p. 564). The problem was that IBM expected the world to stay as it was. They did not expect computing power to explode as it did in the PC world. Bukszar suggests that organizations should learn to value flexibility and develop more adaptive strategies when previous strategies encounter difficulties due to a lack of strategic flexibility. He also believes that people are generally risk-adverse. According to Prospect Theory (Kahnerman & Lovallo, 1993), the evaluative weights placed on potential losses are typically twice as great as the weighting of potential gains. Therefore, an aversion to losses strongly "favors the avoidance of risks" and "favors inaction over action, and the status quo over any alternatives" (Kahnerman & Lovallo, 1993, p. 18). Bukszar suggests that this loss aversion in highly uncertain environments may lead, however, to extreme timidity in decision-making at a time when IT management may well need to make bold decisions.

As noted before, Brynjolfsson (1993) suggests that the relationship between IT and productivity is not fully understood. This apparent disconnect between investment in IT and a lack of increased white-collar productivity creates confusion as to whether it is beneficial to continue additional investment. Mahmood and Mann, (1993) indicate that because of the lack of understanding of what measures are significant to the relationship between BSP—ISSP alignment and IT capital investment, many IT managers make decisions based on hunch or intuition, with the assumption that real returns will follow additional IT spending. They may believe that further IT investments may significantly

improve the performance of the firm, or at least that the investment will make their business activities easier. The problem is the difficulty in choosing the one project among many which will give the best return. Measuring the amount of the return beyond direct cash flows can also present a problem.

Bensaou and Earl (1998) identify five typical IT related problems: (1) IT investments are unrelated to business strategy, (2) payoffs from IT investments is inadequate, (3) there is too much "technology for technology's' sake", (4) relations between IT users and IT specialists are poor and (5) system designers do not consider users' preferences and work habits. These problems are not new but they are prevalent. According to Bensaou and Earl, the strategic alignment problem becomes prevalent because many organizations began to discover that the IT systems being developed did not seem to support the business strategies being implemented. Projects are often being assigned priorities based on technical criteria as opposed to business needs. Further, funding often goes to units politically connected rather than projects with strategic importance. It would appear that the organizational solution would be strategic alignment, but the implementation of this solution often times is more difficult than anticipated. Business strategies also are often not as clear as expected and they change frequently. In addition, IT opportunities are often poorly communicated and not well understood, with different organizational units having different priorities. Finally, IT strategies often attempt to solve all organizational problems—a big mistake from the start.

Luftman and Brier (1999) even suggest the alignment of business and IT strategy to reverse the role of IT as being just "a cost center" to being a driver or enabler of

business strategy. These authors note that IT cannot be used as a competitive weapon for the firm, until IT management is present when corporate strategies are discussed. IT management must be able, at that time, to articulate the strengths and weaknesses of the technologies in question and to understand the corporate-wide implications of these strategies (Rockart & Earl, 1996).

Alternatively, Synnott (1987) conceptualized BP-ISP integration into the following categories:

1. No planning: No formal BP or ISP
2. Stand-alone planning: Presence of either the Business or IS plan, but not both.
3. Reactive planning: IS function reacts to Business Plans and has no input in the BP process.
4. Linked planning: BP is interfaced with ISP. Systems resources are matched against Business needs.
5. Integrated planning: BP is indistinguishable from ISP. They occur simultaneously and interactively.

To further investigate the impact of integrated strategies, Fiedler, Grover, and Teng, (1995) undertook an empirical study of top managers of IT from Information Week's list of the five hundred most progressive users of IT. Because an unplanned project change can be counterproductive and expensive, they suggested that organizations should allocate resources by aligning IT strategies with overall business strategies. Fiedler et al. developed a four-item instrument which measured awareness, specificity, participation and strategy formulation between business and IT groups. The items were: (1) our IT planners are aware of the firm's objectives, business strategies and long-term plans, (2) our firm's business plans provide clear directions for IT planning, (3) our IT managers participate in the strategic business planning exercises and (4) our IT and

business planners interact closely in the formulation of the IT plan. The instrument used a seven-point scale and was adapted from Premkuman and King's (1994) work.

Goldsmith (1991) also conceptualized integrated planning using Porter's value chain and competitive forces framework (Porter, 1985). Goldsmith argued that ISSP should not be separated from BSP. He went even further, in saying that for competitive advantage, ISSP needs to be developed in the same process and at the same time as the business strategy. Clearly, this notion fits with stage five of Synnott's ideas.

Teo and King (1996) even conceptualized BSP and ISSP integration into four distinct types. Type one is a firm that has separate BSP and ISSP planning with administrative integration. In type one there is a weak relationship between BSP and ISSP and there is little significant effort to use IT to support the business plan. Type two firms have one-way linked planning with sequential integration. Here, BSP provides directions for ISSP and IS functions primarily support the business plan. Type three firms operate with two-way linked planning with reciprocal integration. BSP and ISSP have a reciprocal and interdependent relationship (BSP communicates plans to ISSP. BSP will then gain from responding feedback from the IS planning process. The process of communication and feedback informs and influences both processes). In this type of firm, IS plays a role in supporting and influencing the business plan. Type four firms use integrated planning with full integration of BSP and ISSP. In this category, there is little distinction between the BSP and ISSP processes (both business and information systems strategies are developed concurrently in the same integrated planning process).

They suggested that different kinds of BSP—ISSP integration exist in various firms and also that firms may evolve from one level of integration to another. Generally,

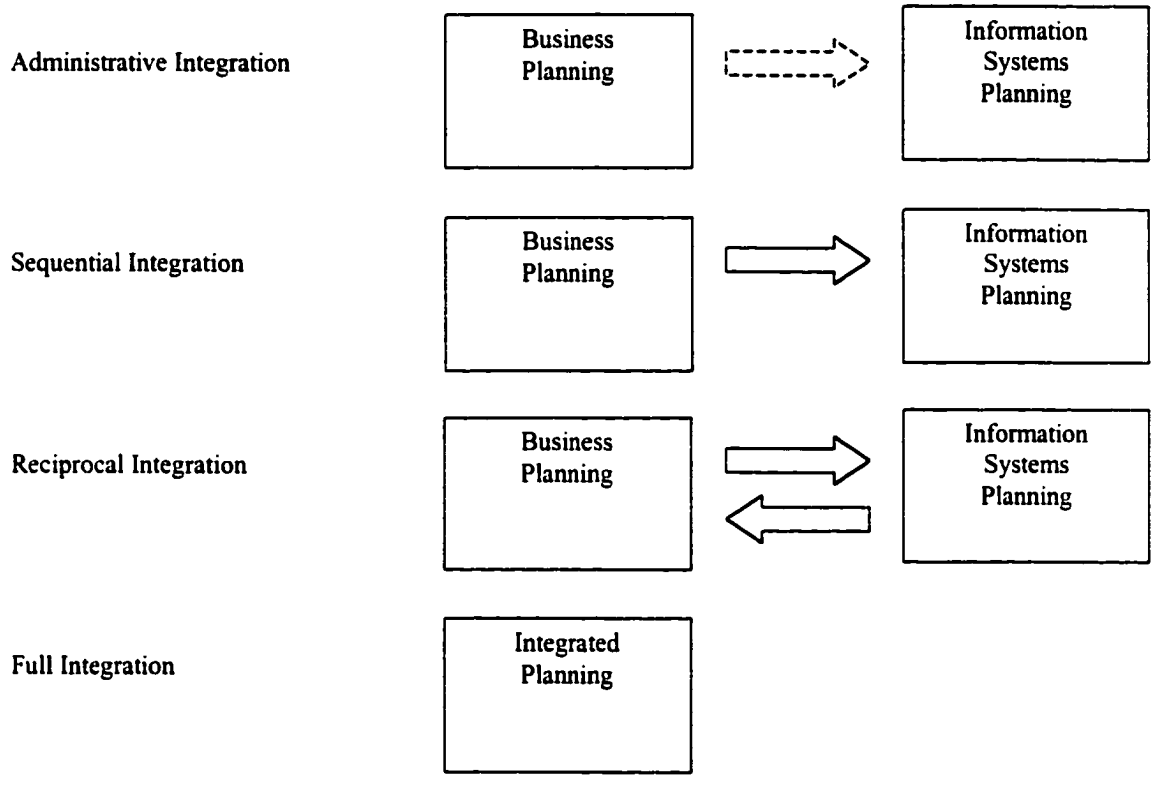
this evolution goes from lesser to greater levels of integration. This happens as planning abilities mature, they become more established and more important to the organization. As the firm progresses to each successive level, the strategic potential of IT increases and also enables more effective alignment between ISSP and BSP. The role of the IS function is primarily reactive in nature for types 1 and 2 because ISSP has a negligible influence on BSP. For types three and four, the planning becomes progressively proactive since the IS functions may play a role in both the support and influence of the business strategy.

In explaining their model, Teo and King suggest that type one, or administrative integration, shows a weak relationship between Business Planning (BSP) and Information Systems Strategic Planning (ISSP). This relationship is shown in Figure 10 by an arrow with a dotted line. Generally, in this stage there are little efforts to use Information Technology (computers, telecommunications, etc.) to support the business plan. Type two, sequential integration, also shows a weak relationship between Business Planning (BSP) and Information Systems Strategic Planning (ISSP). This is indicated by the arrow with a dotted line in the second set of boxes. Generally, in this stage there are little efforts to use Information Technology (computers, telecommunications, etc.) to support the business plan. (See Figure 10).

Type three, reciprocal integration, suggests a reciprocal and interdependent relationship between Business Planning (BSP) and Information Systems Strategic Planning (ISSP). This relationship is indicated by two arrows; one flowing from BSP to ISSP, and the other flowing from ISSP to BSP. In this stage, ISSP plays, as has been seen, both a role in supporting and influencing the business plan. Type four, full

integration, shows little distinction between BSP and ISSP. In this stage, business and IS strategies are developed concurrently in the same integrated planning process.

Figure 10: Stages of BSP—ISSP Integration



Adapted from: Teo, T. S. H., & King, W. R. (1997). Integration between business planning and Information Systems planning: An evolutionary-contingency perspective. *Journal of Management Information Systems*, 14(1), 185-215.

Note that as opposed to Synnott's (1987) five-stage taxonomy of BSP—ISSP integration, there is no stage with "no integration" in the Teo and King model. This was done because the authors found it difficult to distinguish between "no integration" and "weak integration" and since they espouse that IT grows in importance in the stages, it is

not likely that no degree of integration exists. Their four-stage model incorporates benchmark variables shown in Table 5.

Teo and King (1997) suggest that multiple paths of evolution exist rather than only one path. In addition, they say that it is possible for some organizations to bypass certain stages. They found 10.8 percent were type one firms, out of a total of one hundred fifty seven respondents, (administrative), 41.4 percent were type two (sequential integration), 41.4 percent were type three (reciprocal), and 6.4 percent type four (full). As was not unexpected, most organizations progressed from administrative integration to sequential to reciprocal to full (Type 1-4). Three firms reported (1.9 percent) reverse evolution (reciprocal to sequential). In addition, twenty-six firms indicated that they had evolved with bypassed phases.

To summarize, BSP—ISSP alignment is "the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure" (Luftman, 1996, p. 4) or the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation Chan (1993). ISSP evolves through three stages (Resource Control, IT Architecture, and Strategic Alignment according to Henderson, Venkatraman, and Oldach (1996). They go on to suggest a model of alignment built around the twin axis of Strategic Fit and Functional Integration across both external and internal domains. They suggest effective IT management achieves a balance among all choices. In fact, fit between the domains is suggested as a critical moderating variable in the economic performance of the organization. In bringing about such alignment, the business top

management is urged to take on the role of strategy formulator in contrast of the role of IS management doing strategy implementing to efficiently and effectively designing and implementing the IT infrastructure and process needed to support the chosen business strategy.

Bensaou and Earl (1998) suggest that misalignment is prevalent when organizations discover that existing IS systems do not support the business strategies being implemented. King and Teo (1996) conceptualized BSP—ISSP alignment as an evolution through four stages (administrative, sequential, reciprocal and full). Luftman and Brier (1999) specify, however, that IT can change from being a cost center to being a competitive weapon of the firm under the right conditions. They present this change as an ongoing process and not particularly a destination. The resulting productivity and profitability outcomes of such alignment is covered in detail in the next section.

Productivity and Profitability Outcomes of Strategic Alignment

Rational organizations acquire resources when the benefits of doing so exceed the costs. One problem potential with this idea is that many factors effectively conceal the full range of costs and benefits to organizations (West Jr., 1994). Interactions of a resource with other elements, time related streams of benefits and costs, and the difficulty of evaluating the true net worth of a resource make the decision processes even more problematic. In addition, many firms use the wrong framework in viewing the results of investment of capital in IT related projects.

Many firms use the Payback (PB) method as a guideline to evaluate the rank or to judge the worthiness of a project as opposed the more robust Net Present Value (NPV) or

Internal Rate of Return (IRR) methods. Using the one or two year payback methodology simply examines the cash flows of a project for the given time period. The advantage of this method is that managers with limited finance skills can understand the concept, and can run the analysis quickly. But by not using NPV or IRR, additional useful information is given up in making the decision regarding the project. NPV, for example, is a full examination of all cash flows for the life of the project. Payback correspondingly, will ignore any cash flows after the arbitrary cut-off period. In addition, NPV takes into account the time value of money. This is something PB also ignores.

Unfortunately, in setting strategy, both business and IT management often use a PB like analysis to examine the worthiness of a project. What management is not doing is looking at longer timeframes. As organizations continue to invest capital in IT infrastructures, the return on investment is becoming an increasing concern. Top management is now demanding that this investment advance the strategic goals of the organization. As a consequence, IT management is under increased pressure to justify the continued high levels of investment. They must show a resultant strategic competitive advantage as a function of their investments. The problem, often, has been that traditional measures of white-collar productivity have not had a direct correlation between increased productivity with increased investment.

Various other variables have been suggested which impact the ROI for IT capital investments. Barua, Kriebel, and Mukhopadhyay (1991) empirically found, for instance, that IT efficiency and customer switching costs are also important variables. They suggested that a firm with greater efficiency yields from IT may have a competitive advantage relative to another firm with lower yields. Porter, (1996) however, argues that

while it is necessary to improve operational effectiveness, this is not the final answer as relates to strategic success because of the ease of imitation. He says the essence of strategy is choosing a unique and valuable position rooted in a system of activities that are much more difficult to match. Operational effectiveness, then, is not strategy.

Amram, Kulatilaka, and Henderson (1999) say ROI-type measures are outcome-specific and are based on a single specific expected future with an accompanying investment plan. This approach, however, will not allow investment in areas (e-commerce, intranets, web-based interfaces for customer access to data, etc.) that management knows will create valuable future opportunities without certain near-term payoffs. They suggest that the additional expense to purchase flexibility will often buy time to allow new technologies to become firm. In essence, they say that this approach enables a longer time horizon.

Venkatraman (1997) suggests that assessing value from IT resources is a difficult task. Many firms have abandoned searching for the one universal measure of business performance that is valid under all conditions. These universal measurements have included return on investment, equity, assets, or market share. Instead organizations have recognized the need for multidimensional performance measures (MPM). These measures may include quantitative (return on equity), qualitative (corporate reputation, quality, etc.), internal (business growth rate), external (growth rate relative to market size), accounting (cash flow and liquidity) and financial market information (market value added).

Strassmann (1990) even nominated the type of IT application as a variable. He used two categories: embedded and mission critical. Embedded systems are integral to

the product or service provided by the firm, and mission critical systems are those which are essential for conducting business. He, (Strassmann, 1999b) went on to say that true comparisons of effectiveness, must consider all of the variables which influence the ability to create shareholder wealth. He suggests that productivity metrics which are based on any one measure will be misleading (such as simple ratios). Instead he prefers composite measures of productivity which reflect the ability of IT to impact the efficiency of the firm. Strassmann defines Information Productivity as being equal to Output/Inputs. He broadly sets Information Inputs as "all costs of managing, coordinating, training, communicating, planning, accounting, marketing and research" (p. 55). Outputs are the economic value-add of Information Technology. It is interesting that while Strassmann has staunchly maintained that investment in IT is often rewarded with a poor ROI in the aggregate economy, he suggests it can be a competitive advantage in well-run companies. "The key to obtaining business value from computers lies in linking the uses of the technology to business plans. The connection must be explicit by showing how it overcomes existing business problems and how it contributes to future gains." (p. 56).

A new school of thought led by Erik Brynjolfsson goes beyond the traditional measures of cost analysis and savings. This new way of measuring ROI focuses on product quality off the assembly line, customer satisfaction after an interaction, and faster time to market (Brynjolfsson, 1996). Brynjolfsson and Hitt, (1995) empirically found that firms which focused on an IT strategy of cost savings and improved management control had statistically significant reduced productivity compared to those firms which chose a

customer orientation (quality, customer service, flexibility, and speed). This was in spite of a productivity analysis methodology based on revenue, and labor and capital costs.

Relating to the relationship between the amount of investment in IT and firm organization, Hitt and Brynjolfsson, (1997) found that increased investment in IT was linked to a system of decentralized authority and related practices. They noted that: (1) because people are limited as information processors, (2) highly specific information will likely reside at lower levels of an organization, (3) therefore, knowledge is likely to be a complement to the use of technology, (4) knowledge work will likely have an intangible component, (5) resulting in a decentralized organizational structure. In other words, the IT organizational architecture must be matched to the use of Information Technology. One big part of the problem appears to be how well the capital is used to implement the technology. It is not so much if increased capital is spent on IT, but how effectively it is spent. For example, the authors describe how a consulting firm "Alpha Corp" installed Lotus Notes in an attempt to share specialized knowledge across the firm. The attempt effectively failed, however, because the incentive system in place stressed individual effort rather than group performance. The workers were not motivated because time spent sharing knowledge came at the expense of "billable hours". In contrast, another firm, "Infocorp", successfully installed Lotus Notes which led to substantial improvements in service levels without increasing staff levels. Infocorp workers had a history of collaborative work and the incentive system in place was team-based.

Bharadwaj and Konsynski (1997) conclude, however, that it is difficult to directly relate IT investment to increases in the bottom line. A major part of the problem involves the ease of measuring tangible returns in contrast to the difficulty of measuring

intangibles. However, they cite the growing evidence of increased investment resulting in substantial intangible value: quality improvements, increased flexibility, speed to market, and customer service. In their empirical study of publicly traded firms from 1989 to 1993, they noted that a one percent increase in IT investment was associated with a 0.37 percent increase in the value of q, after controlling for industry characteristics and other company specific factors. According to Bharadwaj, Bharadwaj, and Konsynski (1999), James Tobin, a Yale economist, created the *q* ratio to predict a firm's future investments . It is defined as: (market value of equity + book value of preferred stock + book value of debt)/(book value of assets). In instances where *q* significantly deviates from 1, is interpreted as signaling an unmeasured source of value. The source is generally attributed to a company's intangible value.

Reich and Benbasat (1996) take a somewhat different perspective, empirically studying the linkage between business and IT objectives in regards to short- and long-term goals. The term linkage as was used here equated to alignment, fit, or coordination. They found that, contrary to prescriptions of much of the literature, some organizations can operate satisfactorily without high levels of both short- and long-term linkage.

In an effort to address business strategy, Venkatraman (1985) developed an instrument called STROBE; STRategic Orientation of Business Enterprises. The STROBE measure was originally comprised of eight dimensions of business strategy. In 1992, Chan developed a corollary instrument, STROIS; STRategic Orientation of Information Systems. Later, Chan, Huff, Barclay, and Copeland, (1997) would rename the instrument STROPIS; STRategic Orientation of the existing Portfolio of Information Systems applications. Both instruments focused on operationalized strategy because the

authors understood that there could be differences between intended and implemented strategy (Mintzberg, 1994). Since the STROPIS instrument was modeled after STROBE, both instruments used the same dimensions of strategy: (1) aggressiveness, (2) analysis, (3) external defensiveness, (4) futurity, (5) innovativeness, (6) internal defensiveness, (7) proactiveness and (8) riskiness. The advantage of using both of these instruments is the ability to measure the alignment between Business strategy and IS strategy.

Chan et al., (1997) empirically tested both measures and their related levels of alignment to organizational outcomes. The sample was one hundred sixty four firms working in the pharmaceutical manufacturing, auto-parts manufacturing, banking and insurance industries in the US and Canada and. Firm performance criteria were: market growth, financial performance, product-service innovation and company reputation. A top business manager (CEO) completed the STROPE questionnaire and a top IS manager (CIO) from the same firm completed the STROPIS questionnaire. In five instances, respondent background information indicated that the same executive may have completed both of the questionnaires. These data were excluded from analyses. The BSP—ISSP alignment was captured by a calculation performed on the data received from the STROPE and STROPIS questionnaires. A priori, bivariate, difference and weighting measurement approaches were used.

Using bivariate model path coefficients and an alpha level of $p < 0.01$ (except where noted), Chan et al., found a correlation (0.370) between business and IT strategy alignment with product-service innovation. Strategic alignment was found to be weakly correlated with market growth (0.057). Also strategic alignment was found to have a statistically significant positive correlation with financial performance (0.011, $p < 0.05$),

and was weakly negatively correlated with company reputation (-0.391). The authors concluded that IS strategy and alignment are linked to perceived IS and business unit performance. They also found that IS strategic alignment was a better predictor of IS effectiveness than is strategic orientation. The study provided support for the notion that Information Systems do make contributions to business performance. They went on to note that organizations, when allocating scarce IS resources, should favor those IS projects which support business strategies that are producing desired marketplace results.

In a later empirical study, Chan (1999) extended their research by also classifying the responding firms using Miles and Snow's (1978) model of business strategy (Defenders, Prospectors, Analyzers, and Reactors). They collected data from two hundred twenty six companies in four industries- banking, insurance, pharmaceutical manufacturing and auto-parts manufacturing. The firm performance measures used were overall business success, financial success and product innovation. As before, the strategic instruments used were the STROPIS and STROBE, and were sent to corporate CEOs and CIOs. Regressions were conducted for the entire sample, for the business strategy groups and the four industries. The authors found that IS alignment does affect business performance, but only in some organizations. For the population sample as a whole, there was a significant correlation between alignment and firm performance ($p < 0.001$). When examining the four business strategic types however, Defenders did not have a significant correlation ($p < 0.05$) between BSP—ISSP and firm performance, while Prospectors and Analyzers ($p < 0.05$) did. Chan noted that Defenders emphasize stability, operational efficiency and economies of scale. They do not particularly search outside their domains for new business opportunities and tend to make few radical

adjustments to the technologies they employ. It may not be surprising that this group, as a whole, does not reap the benefits of alignment. When the results were examined according to industry groups, (using $p < 0.05$), overall business success was significantly affected in pharmaceutical manufacturing and insurance industries, but not in auto-parts manufacturing and banking. Financial performance was, however, significantly impacted by alignment in the banking industry.

Bryan (1999) essentially duplicated Chan's et al. (1997) study, but added the additional variable of IT investment as a factor. In other words, he asked if business and IT strategy alignment improved depending on the level of IT investment. Bryan used the STROBE and STROPIS scores to create a moderating variable which was then tested against outcomes from the IT investment. Bryan found a positive significant correlation (at the .05 level) between fit and IT investment. He concluded that greater investment in IT, relative to the IT investment of competitive firms, leads to better overall competitive position. He went further in suggesting that IT investment does improve the performance of the firm, as long as the level of alignment is at a reasonable level. The performance of the firm was measured in two ways: (1) the Chief Executive Officer (CEO) gave an appraisal of the overall competitive position of the firm, and (2) the evaluation of the Chief Information Officer (CIO) of the overall investment in IT relative to its main competition.

In summary, four instruments have been used in the literature to assess the alignment between business- and IT strategies. The first is the STROBE/STROPIS measure(s) by Venkatraman and Chan. These two measures focus on operationalized strategies. The second is the four-item instrument (IT awareness of BSP, IT directed by

BSP, IT participates in BSP, and interaction of ISSP and BSP) used by Fiedler, Dean, and Grover, (1996). The third measure is the four stages (administrative, sequential, reciprocal, and full integration) of Teo and King, (1997). The fourth measure is the five stages of planning (none, stand alone, reactive, linked BSP—ISSP, and integrated planning) by Synnott, (1987). The instruments by Fiedler, Dean and Grover, Teo and King, and Synnott focus on the process of forming strategies. These instruments assume that if the process of developing the business and IT strategy is integrated, then the strategies will be closely aligned.

It would be intuitively expected that the acquisition of resources by organizations would be a rational process in which it is determined that present and future benefits will exceed costs. A difficulty associated with this notion is in measuring the full range of costs and benefits. Interactions of a resource with other elements, time related streams of benefits and costs, the difficulty of resource net worth evaluation, and differing views of evaluating the resulting benefits of investment (Payback, Net Present Value or Internal Rate of Return) make the process somewhat problematic. It appears that while it is relatively easy to measure the tangible returns of such investment, it is difficult to measure the intangible. Thus the need to create such a measure as the *q* ratio, whose purpose is to find the amount of a firms' intangible value.

Still, Return On Investment is the most common method by which firms evaluate the result of project investment. However, ROI-type measures are outcome specific and may be impacted by such variables as IT efficiency or customer switching costs. Many firms have abandoned the search for one universal measure of business performance, and have embraced the notion of multidimensional performance measures which encompass a

range of measures such as quantitative, qualitative, internal and financial market information.

Increased investment in IT does not automatically result in increased organizational financial performance. It appears that how the capital is used to implement the technology is important. As an example, Hitt and Brynjolfsson, (1997) found that firm structure (decentralized authority and related practices) was linked to increased IT investment and concluded the IT organizational architecture must match the use of Information Technology.

Some empirical research has found a correlation between BSP—ISSP alignment and financial outcomes of the firm (Bryan, 1999; Chan, 1999a; Chan et al., 1997). As was mentioned previously, variables such as industry type and strategic orientation seem to impact the correlation. In contrast, Reich and Benbasat (1996) found that at least some organizations can operate without high levels of short- and/or long-term linkage between business objectives and IS objectives.

The Role of IS Management in BSP—ISSP Alignment

Luftman and Brier (1999) note that the importance of alignment is well known and has been documented since the late 1970s. Alignment will continue to grow in importance, even, as firms evolve from viewing IT as a service center in a supporting role to one of serving in a competitive role, one that will enable the furtherance of the firms' mission. What is not known is how to achieve and sustain this alignment and what impact misalignment will have on the firm.

King and Teo (1996) examined key organizational factors that facilitate and/or inhibit the development of strategic applications of Information Technology in business firms. Prior to their study, most existing research had been anecdotal and only exploratory in nature (King, Grover, & Hufnagel, 1989; Neo, 1989; Sabherwal & King, 1991). A list of inhibitors and facilitators were developed by these researchers with the aid of the previous literature and then pretested and modified for better conformation before mailing to a sample of four hundred nineteen executive M.B.A. graduates from a large northeastern university. The respondents were asked to classify their firm into either a Strategic Information System (SIS) firm or Non SIS firm depending on whether their organization had developed IT applications which met the following definition: "IT applications are considered strategic if their use enables the firm to gain an edge over competitors or prevented competitors from gaining an edge over the firm" (p. 39). The groups were then asked to respond to factors that facilitated and inhibited the strategic use of IT applications. A total of one hundred forty three firms responded, with a final usable response rate of 30 percent. Organizational facilitators were defined as "factors that positively influence the ability of an organization to exploit information resources; information resources include both information technology and information" (p. 37). Organizational inhibitors were operationalized as factors that negatively influence an organizations' decision to use IT applications for strategic purposes.

King and Teo found five key dimensions for facilitators (innovative needs, competitive position, environment, economies of scale, and top management guidance). Three dimensions for inhibitors were found (lack of IT drivers, the lack of economies of scale, and the lack of innovative needs). An understanding of these differences in

perceptions between SIS and Non SIS groups may help explain why some companies are able to exploit IT strategically while others do not. King and Teo summarize by suggesting that firms wishing to enhance their ability to develop strategic use of IS should focus on communicating the need for innovation and change, develop economies of scale, build a strong competitive position, and ensure that top management integrates IS as a key element of the business strategy. The authors suggest that in the short run, communications may be the most controllable element.

Luftman and Brier (1999) even attempted to examine the extent of BSP—ISSP integration empirically with a population sample of five hundred firms in fifteen industries. They found six enablers and six inhibitors (in rank order) that help and/or hinder alignment. (See Table 6). They then presented a six-step approach that maximized alignment enablers and minimized inhibitors. It is striking that the opposites of several of the items appear as enablers and inhibitors: (1) top management support of IS, (2) understanding of business, (3) IT leadership ability and (4) the ability of IT management to prioritize projects.

Luftman noted that up to thirty percent of IT projects are canceled before completion, fifty to one hundred percent are over budget, and are often completed an average of six to twelve months late. These findings may in fact contribute to the lack of strategic integration.

Table 6: Enablers and Inhibitors

Enablers:	Inhibitors:
Top management supports IT	IT/business lack close relationships
IT involved in strategy development	IT does not prioritize well
IT understands the business	IT fails to meet its commitments
Business/IS partnership	IT does not understand business
Well-prioritized IS projects	Top management does not support IT
IT demonstrates leadership	IT management lacks leadership

Adapted from: Luftman, J., & Brier, T. (1999). Achieving and sustaining business-IT alignment. *California Management Review*, 42(1), 109-123.

In a similar study, Niederman and Brancheu (1991) also ranked the top ten critical issues of senior IT executives in a three-round Delphi survey. The rankings included: (1) information architecture, (2) data resource, (3) strategic planning, (4) IT Human Resources, (5) organizational learning, (6) technology infrastructure, (7) IT organization alignment, (8) competitive advantage, (9) software development and (10) telecommunications systems. It is again interesting to note that rank 3- strategic planning and rank 7- IT organizational alignment, are topics of the present review.

An intuitive view of IS planning would imply that increased planning or improved quality of planning would improve IS performance as a department and perhaps organizational performance as a whole. In an empirical study, King, (1995) concluded that IT strategic planning is inherently of value to organizations. Two hundred forty five firms were successfully surveyed from the one thousand largest manufacturing and service firms in the US. About thirty percent of the firms were manufacturers, twenty percent were in banking, insurance, communication, and the balance were in computers, retail, utilities, oil and gas, and publishing. Inputs to the study included business strategies and goals as they related to IT planning and financial resources, and the time and effort of end-users and top management involved in planning. King found that the following factors significantly influenced the value of IT strategic planning positively: (1) information about business strategy and the IS missions, (2) planning integration mechanisms and (3) the resources committed to planning.

In a latter study, King (2000) examined the relationship of different planning methodologies to organizational performance and IS performance. The methodologies of one hundred fifty seven U.S. based firms used in the study were categorized into two

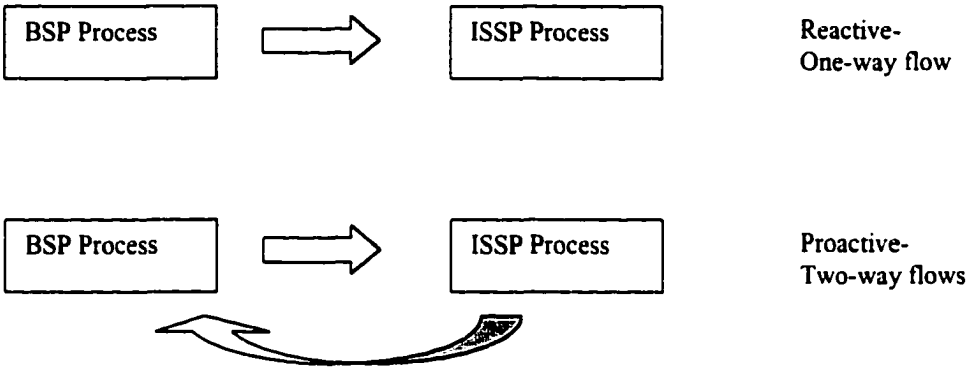
groups—proactive and reactive. The category of proactive ISSP was made up of the range of methodologies that involve two-way flows of information between BSP and ISSP.

Reactive methodologies were those that involved one-way flows of information. King believed that they were reactive in the sense that IS reacted to the BSP process even though they may be forward-looking in the ISSP activities that are enacted. If the relationship between BSP and ISSP was mainly administrative, or if the BSP process provided the primary inputs to ISSP, and there was not a significant reverse flow of information back to BSP, which allowed for the possibility of influencing BSP decisions, the process was categorized as reactive planning. A common reactive pattern was one in which the ISSP process begins after the business strategy has been determined, suggesting that the IS process was primarily one of a supportive role. If on the other hand, there was significant feedback from the ISSP process and consideration of the IT resources and capabilities were taken into account in developing the business strategies, or if the process was integrated between BSP and ISSP, then the process was categorized as proactive planning. The key to the two different groups was the differentiation of information into one-way or two way flows. (See Figure 11).

King received one hundred fifty seven completed, usable surveys from U.S. based firms. A business planning executive and an IS executive participated from each firm by completing questionnaires which evaluated their planning methods. The purpose was to find the extent of reactive and proactive planning processes and to exam their relative effectiveness. As a result of the study, King found eighty two (fifty two percent) of the

firms used reactive planning methods and seventy five (forty eight percent) used proactive planning.

Figure 11: Reactive vs. Proactive planning process



Adapted from: King, W. R. (2000). Assessing the efficacy of IS strategic planning. *Information Systems Management*, 17(1), 81-84.

The relative effectiveness of the two planning methods on IS performance was measured by an instrument which identified eighteen ISSP problem areas that might be influenced by the quality of the ISSP process. These judgments were made by the IS executives of the organizations which participated. King found that proactive ISSP firms had significantly fewer problems in eleven of the eighteen problem areas than did reactive planners. Of the remaining seven areas, the proactive planners were uniformly better than reactive planners, but not at a level that demonstrated statistical significance. This study demonstrated the superiority of proactive ISSP over reactive planning.

Overall, companies studied that use proactive methods have fewer ISSP problems than those using reactive methods. In addition, the relative effectiveness of the two planning methods on organizational performance was measured in five areas as assessed

by the business executives. These five areas contributed to internal operational efficiency, market share, ROI, customer satisfaction, and sales revenue. King found that the proactive ISSP firms were statistically superior to the reactive planners at for all five measures.

Atkinson (1992) is of the opinion that it is not uncommon for a firm to experience a cycle of IT strategic planning, disuse of the plan, and then updating of the plan in the next yearly planning cycle. The perception of the plan not being used during the year may, he says, be partially explained by the fact that many comprehensive strategic plans are in reality multiyear plans, comprised of a series of projects which are scheduled and managed from year-to-year. In addition, because the planning is so intensive, IS managers become be so involved with the details of the plans that they do not need to refer to the current yearly plans. Regardless of these possible explanations, Atkinson regards disuse of strategic IT plans as problematic. This discussion of plans may happen as IT managers make tactical adjustments in response to environmental changes, without regard to the strategic plan. Because the plan is now out of date, there is little point in its use—so why go back to it? The adjustments by IT management can even be considered a good thing compared to working the plan in the face of changing conditions, however, it may even be better to amend the yearly strategic plan with the tactical changes shown in it and then to continue using it.

Atkinson suggested that one reason for disregarding concurrency of the strategic plan may be explained by the fact that many organizations find building a comprehensive IT plan a major project in itself. As a result, the focus may be on completing the project as opposed to using the opportunity to focus on how to position the organization.

Additional factors to consider in plan disuse include: (1) lack of permanent resources established to maintain the plan, (2) loss of continuity of planning skills as employees cycle on and then off the planning project, (3) the lack of automated support (CASE tools) without which, it is difficult to maintain complex interrelations within a comprehensive plan and (4) failure to implement and maintain between-cycle processes for plan maintenance by key planners to keep the plan current.

The competence of IT management is imperative then. According to Laud and Thies, (1997), most IT managers are highly technical and conversant in IT language, but not in business strategy. Likewise, most CEOs are competent in business strategy but not technology. They often put their faith in the CIO's recommendations. Just as with doctor recommendations or accountants' suggestions for a new deduction, many consumers of technology products follow the expertise of professionals, often without considering options or alternatives. As the demands and expectations of IT have grown, many top managers have begun to seek second and third opinions regarding IT recommendations, In frustration, often as a consequence, many organizations have cut IT funding or implemented outsourcing of partial or all of IT functions.

Laud and Thies suggest that the combination of culture, reward system and information flows of IT organizations were intended to drive a set of outcomes very different from current organizational needs. They say that the solution to this dilemma is to thoughtfully, creatively and decisively transform the structure to set the stage to encourage the right behaviors. This structure should be flexible, focus on quality and value creation, provide for empowerment through education and delayering, and align the strategic needs of the enterprise with the capabilities of IT.

The key for creating this structure is for the CIO to be both a change agent and an organizational architect. They suggest a process for this transformation that includes: (1) the CIO must understand how enterprise strategy affects and shapes the context of designing the IT organization, (2) align the vision of IT strategically with that of the enterprise, (3) translate the alignment between enterprise and IT strategies into a clear direction, (4) group related IT functions, processes, and activities and then link these groups together at the strategic level, (5) generate alternatives to create the appropriate degree of centralization or decentralization for each major function or process, (6) generate a benchmark profile of the ideal IT organization, by comparing, contrasting and evaluating the various design alternatives. To evaluate the status of alignment, they suggest asking the prescriptive question, "Is IT in a position to enable the execution of business strategies, or is there an opportunity for IT to drive the business strategies"?

Laud and Thies say that as a result of such a transformation, the CEO, CIO and other top executives will come to understand information technology better and CIOs will gain a cross-functional understanding of the enterprise, the interrelations of various refinements, adaptations and the essential changes which will foster the alignment of IT and business strategies.

Related to these points, Reich and Benbasat (1996) note that Lederer and Mendelow's (1989) study found that a mandate from the CEO was a significant enabler of linkage between business and Information Technology objectives. In addition, they found that linkage inhibitors included: (1) a lack of a stable, clear business plan, (2) lack of communication between IT and business executives, (3) IT not being involved in business planning and (4) unrealistic expectations of users.

In a later empirical study Reich and Benbasat (2000) examined the influence of factors on the social dimension of alignment within ten business units in the Canadian life insurance industry. The social dimension of alignment refers to how business and IT executives understand and are committed to the business and IT mission, objectives and plans. The factors studied include: (1) shared domain knowledge between business and IT executives, (2) IT implementation success, (3) communication between business and IT executives and (4) connections between business and IT planning processes. The dependent variable was business and IT alignment concerning mission, objectives and plans. Alignment was operationalized in two ways: (short-term) the degree of mutual understanding of current objectives and (long-term) the congruence of IT vision between business and IT executives. Using written business and IT strategic plans, minutes from IT steering committee meetings, and other strategy documents, a total of fifty-seven interviews were held with forty-five informants of ten business units. All four factors in the model (shared domain knowledge, IT implementation success, communication between business and IT executives, and connections between business and IT planning), were found to influence short-term alignment. However, only shared domain knowledge was found to influence both short- and long-term alignment.

Caldow and Kirby (1996) even suggest that the corporate culture is critical to these major corporate transformations. The skill sets of top management (including IT people) in this effort should include the following components: (1) traditional cultural (key values, assumptions, beliefs and shared norms), (2) organizational design elements (control and coordination policies, structure, etc.), (3) HR programs and policies and (4) organizational capabilities (the skills of employees and the translation of those skills into

competitive advantage). They say it is useful also to understand the continuum ends of each component in order to evaluate the present status of the firm. They also say that it is unlikely that the new structures will come about without new forms of leadership embodying coaching, enabling or orchestrating skills.

Luftman and Brier (1999) also suggest an approach to maximize alignment enablers and to minimize inhibitors in order to improve the degree of alignment: (1) set the goals and establish a team, (2) understand the business-IT linkage, (3) analyze and prioritize gaps between the current and future states of each of the twelve alignment components, (4) specify the actions needed (project management), (5) choose success criteria and evaluate actions relating to these criteria and finally, (6) sustain the alignment.

They say that the alignment should be viewed as an ongoing process and not a destination; and that no single strategy or combination of activities will enable achieving and sustaining alignment. Instead, alignment of business strategies and IT strategies should be seen as a complex, changing process, which takes time to develop and even more time to sustain. Nevertheless, working to maximize enablers and to minimize inhibitors will move the firm along the strategic alignment continuum. A major part of the problem arises of knowing where the firm is along the continuum at any given time. Self-perception of the process can oftentimes be subjective and perhaps viewed by others as self-serving. Luftman and Brier suggest the selection and continuous tracking of appropriate value measurements. Stakeholders must also be made aware of these measurements and that all partners will be held accountable for their actions and the impacts on measured results.

In summary, research has shown that both business top management and IS top management can affect the degree to which BSP—ISSP is aligned. King and Teo, (1996) suggested that dimensions which can facilitate the extent of alignment include: (1) innovative needs, (2) competitive position, (3) environment, (4) economies of scale and (5) top management guidance. Luftman and Brier (1999) also include the following enablers: (1) IT understanding of the business, (2) extent of the business and IS partnership, and (3) IS leadership. In contrast, inhibitors listed by King and Teo consist of: lack of IT drivers, lack of economies of scale and the lack of innovative needs. Luftman and Brier also suggested that the opposites of several enablers acted as inhibitors. These include: (1) lack of close business/IT relationships, (2) IT not prioritizing well, (3) IT not meeting commitments and (4) lack of business knowledge by IT.

King (2000) also found that the type of IS Planning methodologies (reactive or proactive) can also affect the effectiveness of IS and organizational performance as measured in five areas: (1) internal operational efficiency, (2) market share, (3) ROI, (4) customer satisfaction and (5) sales revenue. The frequency and extent of use of ISSP also seems to be an issue.

Laud and Thies (1997) say that while IT managers tend to be competent in the technical area, business strategy is a challenge for many. Research shows that IS top managers' business competence, their relationship with top business unit managers, planning ability, and even their skills in communication can effect the extent of BSP—ISSP alignment. The next section will more closely examine the individual variables of top IS management to such alignment.

The Relationship of CIO Individual Variables to BSP—ISSP Alignment

As noted before, Teo and King (1997) empirically tested the notion of an evolutionary pattern that moves organizations through the four stages (type 1-4) of BSP—ISSP integration: administrative integration to sequential integration to reciprocal integration to full integration. In the same study, they also empirically tested the individual variables that may influence this evolution. Variables examined for influence of BSP—ISSP alignment extent include, first, the informational intensity of products/services. This is defined as "the amount of intellectual work done by people as they conduct their affairs" (p. 6). Second was the information intensity of the Value Chain. This was operationalized as "the extent of information use, the frequency of information updating and the accuracy of information (p. 6). Third, was top management's perception of IT importance. This was indicated by "top management's recognition of the strategic potential of IT, their commitment to IS function, their knowledge about information assets and opportunities, their recognition that IT is essential to the success of the firm and their view of IT spending as a strategic investment" (p. 6). The final variable was IS competence, which was operationalized as "perceived competence within the firm, the reliability and efficiency of services provided by the IS function, the IS executive's knowledge about business, and the IS executive's ability to identify and plan for future challenges" (p. 6).

In this study, Teo and King found that the business competence of the IS executive appeared to be a key factor in influencing the extent of integration. Teo and King found only two individual variables that influenced the extent of BSP—ISSP

integration; the perception of top management of IT importance and the business competence of the IS executive. They suggest that this implies that the business competence of the IT executive may be more important than technical competence. Thus, those executives who wish to play an active role in business planning should, then, be well versed in the business of the firm.

As was noted, strategy is "the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A strategy that is well-formulated marshals and allocates resources of the organization into a unique and viable posture based on its competencies and shortcoming, changes in the environment, and contingent moves by opponents" (Quinn, 1980a, p. 3). One could surmise, then, that the process of "marshaling and allocating resources" should be based on the competencies and shortcoming of the organization as a whole. Based on the literature, and intuitively, BSP and ISSP should ideally be integrated (aligned).

Karimi and Gupta (1996) are even more specific about the importance of the competence of the IT executive (CIO). They suggest that the CIO has a major impact on how the CEO views the competence of IT. CIO's are no longer just required to be capable in technology management, but they must also be aware of corporate business strategies. In addition to rising expectations, conflicting skill sets, and tough challenges, Markus and Benjamin (1997) suggest that these pressures are taking their toll on CIO positions. There seems to be higher than average corporate dismissal rate and shorter tenures for IT leaders when compared with other top executives (Lovelace, 2000; Nylan, 1990; Rothfeder, 1990; Violino, 2000).

With regard to the power of IT to improve its effectiveness in the organization, Karimi and Gupta (1996) say that research has shown (1) that the competitive strategy of a firm has a significant impact on the IT strategic orientation and its use of IT (Boynton & Zmud, 1994; Floyd & Wooldridge, 1990), (2) the role and qualifications of the IT leader should reflect the IT strategic orientation and use (Earl, 1989), (3) the hierarchical rank of the IT leaders has a significant bearing on the orientation of the firm's IT strategy (Raghunathan & Raghunathan, 1989), and (4) IT management decision-making strategies should align with the business strategy in order for the firm to be effective (Earl, 1989). They go further by saying "IT leaders who aspire to higher positions and have not yet broadened their knowledge, skills and experiences in business operations, strategy, and management should immediately embark on personal career development programs to acquire these insights" (p. 75).

Karimi and Gupta (1996) empirically studied the relationship between CIO individual variables (role, rank, hiring status) and the competitive strategy of the firm. They concluded that firms with different strategic types (Miles and Snow typology: Defender, Prospector, Analyzer or Reactor) differ with respect to the role of the IT leaders. They found a significant difference among the means ($p < 0.05$) for the role of the leader as relates to at least one of the four strategic types (Defender). They explained this finding by saying that firms more heavily reliant on IT for conducting their value-chain activities would be more likely to accord higher rank and a more influential role to their IT leaders. Further, while the IT leader rank was not significantly related to the competitive strategy of the firm, they found that strategy was significantly related to their rank and hiring status combined. Hiring status was operationalized as internal or external.

CIOs were classified as internal hires if they had been with the firm for more than five years at the time they had assumed the IT leadership position. Individuals were classified as external hires if they had been with the firm for five years or less. Therefore, they suggest that the strategic orientation of the firm (Defender, Prospector, Analyzer or Reactor) is related to the rank (levels of management separating the CIO and the CEO) and hiring status of the CIO (external or internal hire).

Grover and Jeong (1993) also empirically studied the managerial roles as applied to the Chief Information Officer. Their study used six of the ten roles of Mintzberg's classic managerial model for roles (leader, spokesman, monitor, liaison, entrepreneur, and resource allocator). The other four roles (figurehead, disseminator, disturbance handler, and negotiator) were not used because the activities constituting these roles were correlated with the activities of the other six roles. They found that finance senior managers and IS middle managers were significantly ($p < 0.05$) similar to IS CIOs in terms of the relative importance of managerial roles. No significant similarity was found for manufacturing or sales managers. One possible reason for the similarity between IS and finance may be their common history as organizational information support functions.

Grover and Jeong also found that the liaison and spokesman roles were significantly correlated ($p < 0.05$) with the two IS maturity factors (end-user computing and IS management). However, leader, monitor, entrepreneur and resource allocator roles were not found to significantly correlate with the IS maturity factors.

While managerial aspects of top IS managers have been empirically studied, CIO leadership is a topic with limited empirical research. Hackman and Johnson (2000)

suggests that the difference between managing and leading lies in the area of focus of each. Managers are problem solvers who focus on physical resources, are absorbed in the status quo, planning, budgeting, organizing, staffing, controlling, and seek to produce a degree of predictability and order. Leaders on the other hand, are more concerned with the ultimate direction of the group by developing a vision, communicating the direction by words and deeds, motivating, inspiring to followers, and seeking to product change.

> "Leading does not mean managing; the difference between the two is crucial. There arte many institutions that are very well managed and very poorly led. They may excel in the ability to handle all the routine inputs every day, yet they may never ask whether the routine should be preserved at all" (Bennis, 1976, p. 154).

The need for effective IS leadership is thought to be imperative. As a part of this mix, top IS leadership style may also play a part in BSP—ISSP alignment. Empirical studies of leadership in general, have generated mixed results regarding the validity and utility of major leadership theories, leader effectiveness, differences between leaders and managers, and gender differences in leadership styles. Klenke (1993) says that such conflicting results are characteristic of leadership research. As an example she offers the observation that some research on leader traits indicate that personality characteristics are not predictive of leadership effectiveness (Stogdill, 1974). Yet Kirkpatrick and Locke (1985) have found that in studying personality traits relating to leadership effectiveness does matter. Klenke concludes that while leadership has been defined, constructed and researched from a bewildering number of conceptual perspectives, and with a large amount of empirical evidence, each model has failed to serve as the basis of a generally accepted knowledge base.

Burns (1978) suggests the process of leadership as being either transformational or transactional. Transformational leaders are able to define and articulate a vision for their organizations which the followers accept. Similarly, Bass and Avolio (1995) proposed a definition of transformational leadership with four dimensions: (1) idealized influence which results in follower admiration, respect and trust, (2) inspirational motivation- this articulates clear expectations and demonstrates commitment to organizational goals, (3) intellectual stimulation demonstrates leaders who solicit new ideas and creative solutions to problems, and (4) individualized consideration is evidenced by leaders who listen attentively and pay special attention to follower achievement and growth needs. Burns (1978) says that transactional leadership is rooted in bureaucratic authority and legitimacy with the organization. These leaders tend to focus on task completion and employee compliance. Typically leaders rely on organizational rewards and punishments to influence employee performance.

Avolio and Bass (1999) developed a multifactor model based on the notion of transactional and transformational leadership while empirically researching one hundred ninety-eight US Army field grade officers who were asked to rate their respective superior officers. The survey developed over time as researchers repeatedly tested it. By 1995, it had developed into a set of alternative leadership factor models referred to as the Multifactor Leadership Questionnaire (MLQ). The MLQ Leader 5X-Short form is the current version of this instrument.

Their leadership style is operationalized as a two-factor model: transformational leadership (TF) vs. transactional leadership (TA). The first factor (TF) comprises all of the transformational components. This includes (1) Inspirational Motivation (IM), (2)

Intellectual Stimulation (IS), and (3) Individual Consideration (IC). IM provides followers with a clear sense of purpose that is energizing, is a role model for ethical conduct, and builds identification with the leaders and their articulated vision. IS gets followers to question the "way we have always done things for problem solving" and encourages them to question the methods they use to improve upon them. IC focuses on understanding the needs of each follower and works to get them to develop to their full potential.

The second general factor (TA) is comprised of active transactional leadership with the factors of Contingent Reward (CR) and Active Management-by-exception (AM). CR clarifies what is expected from followers and what they will receive if they meet expected levels of performance. AM focuses on monitoring task execution for problems. Both of these transactional factors represent a clear delineation of agreements, expectations and enforcements. A composite transformational score (TF) (i.e., the average of the three transformational factor scores) and a composite transactional score (TA) (i.e., the average of the two transactional factor scores) are typically obtained for analysis.

Overview of the Literature

There are many different frameworks with which to specifically implement Quinn's notion of a "well-formulated strategy to marshal and allocate resources into a unique and viable posture" (Quinn, 1980a, p. 3). Business Strategic Planning (BSP) then, is an attempt by firms to use the resources and organizational capabilities to somehow differentiate themselves from their competitors. IS may be a resource that can be added to

the other capabilities of the organization to enable this differentiation. For this to happen, the organization must believe that IS is more than a department offering file and print services. If an Information System is to be effective, it must also "marshal and allocate its resources into a unique and viable posture" by the process of Information Systems Strategic Planning (ISSP).

Weill and Broadbent (1998) say that ISSP is the management of the firms' investment in computing and communications technology. The purpose of the management is to balance risk, find ways to build customer and shareholder value, and increase ROI. Regardless, the ISSP strategy can be tailored to compliment and enhance the BSP. BSP—ISSP alignment is "the coordination of four sets of decisions by the firm: business strategy, IT strategy, business infrastructure and IT infrastructure" (Luftman, 1996, p. 4) or the degree to which resources being directed to each of the dimensions of the IS strategic orientation are consistent with the strength of the organization's emphasis on each of the corresponding dimensions of business strategic orientation (Chan, 1993). Chan went on to say that "there are both strategic and structural dimensions of IS alignment. The two dimensions are distinct although related. Generally they are positively related. However, in some instances (e.g., in introducing strategic changes and managing these changes), improving one may be done at the expense of the other." (Chan, 1999b, p. 18). Bensaou and Earl (1998) suggest that misalignment is prevalent when organizations discover that existing IS systems do not support the business strategies being implemented. King and Teo (1996) conceptualized BSP—ISSP alignment as an evolution through four stages (administrative, sequential, reciprocal and full).

The acquisition of resources should be a rational process in which it is determined that present and future benefits will exceed costs. A difficulty associated with this notion is in measuring the full range of costs and benefits. It appears that while it is relatively easy to measure the tangible returns of such investment, it is difficult to measure the intangible. Increased investment in IT does not automatically result in increased organizational financial performance. It appears that how the capital is used to implement the technology is important.

Some empirical research has found a correlation between BSP—ISSP alignment and financial outcomes of the firm (Bryan, 1999; Chan, 1999a; Chan et al., 1997). Variables such as industry type and strategic orientation, however, seem to impact the correlation. The somewhat mixed results may be the result of difficulty in measuring intangible benefits to the firm resulting from increased IS investment. The timeframe used to measure those benefits may also be part of the problem. Research has also shown that both business and IS top management can affect the degree to which BSP—ISSP is aligned. The dimensions that may facilitate the extent of alignment include: top management guidance, IS understanding of the business, extent of the business and IS partnership, and IS leadership. The type of IS Planning methodologies (reactive or proactive) can also affect the effectiveness of IS and organizational performance.

The relationship of BSP—ISSP alignment to organizational performance shows the importance of such alignment. Little empirical research has been done on the relationships between characteristics of the top IS manager (CIO) and the extent of the alignment. This study will add to the knowledge base because new independent variables are being examined in relationship to the dependent variable (BSP—ISSP alignment

extent). These independent variables include: CIO self-perceived leadership style, role, rank, hiring status, education type and education level.

While IS managers tend to be competent in the technical area, business strategy is a challenge for many of these individuals. Research shows that the business competence of top IS managers, their relationship with top business unit managers, their planning abilities, and even their skills in communication can affect the extent of BSP—ISSP alignment. Limited empirical research has been done on CIO individual variables in relation to the extent of BSP—ISSP alignment.

The problem therefore is that uncertain ROI from IS capital investment may result in hesitation in further investment by top business management, and needs to be investigated further. The suggestion from the literature, is that low ROI may be due in part from poor BSP—ISSP alignment. Empirical studies are needed to examine the relationship between the CIO individual variables and the extent of BSP—ISSP alignment.

CHAPTER THREE: METHODOLOGY

Methodology

Research Design

The design, procedures and analysis plan for carrying out the purpose of this study are presented in this chapter. The purpose of this study was to examine the relationship between CIO individual variables (independent variables) and extent of alignment (dependent variable) as modeled by Teo and King (1996).

This study seeks to answer whether CIO individual variables affect the extent of BSP—ISSP alignment. CIO individual variables are operationalized into six areas; self-perceived leadership style, role, rank, hiring status, education type and education level.

Selection of Subjects

Firms surveyed were randomly selected from the directory "Directory of Top Computer Executives" (2000 Spring). Organizations qualify for inclusion by meeting the following four criteria: (1) the ownership of a mainframe computer or minicomputers and/or 100 or more PCs, (2) a formal MIS staff, and (3) gross annual sales volume of $50 million or more and (4) an annual IS budget greater than $250,000. Thus a wide variety of firm types and sizes were included. Only firms located in the states of Michigan and Illinois were surveyed to allow geographic homogeneity in the population sample. All organizations were randomly selected from the directory "Directory of Top Computer Executives" (2000 Spring) by choosing every second listing until the population sample was completed. This directory lists in three volumes (Eastern, Western and Canadian) more than 41,000 United States and approximately 6,900 Canadian executives with

computer or data processing responsibilities. Executives were selected from these United States and Canadian companies. Entries are listed in three separate volumes with alphabetical company name and industry indexes. The volumes are issued on an annual basis.

Information listed in this directory includes: company name, address, phone number, top computer executive name and title, and major computer systems used. In addition, firms are classified into the following groups: manufacturing and services, banking, diversified finance, insurance, retail, transportation, utilities, education, health service, federal government, state government, local government, and other. After the list of firms had been selected, the following steps were taken. The Chief Information Officer (CIO) for each of the member organizations was identified. If the specific organization did not have a CIO, a top manager responsible for the IS function was identified. A survey was mailed to each of the CIOs or top IS managers (See Appendix A).

Instrumentation

A survey questionnaire was the measurement instrument used in this study. The subjects were allowed to complete the instrument by self-report. The survey instrument measured: (1) CIO and organizational profile information, (2) King and Teo's (1997) four-stage model of alignment extent between Business Strategic Planning and Information Systems Strategic Planning (administrative, sequential, reciprocal, full), (3) CIO self-perceived style of leadership (transactional, transformational) using Bass and Avolio's MLQ instrument, and (4) Karimi and Grupta's (1996) CIO role measure.

Page one of the survey measured organizational demographic information and CIO profile data. The CIO profile data captured the CIO education level, education type, and rank. Questions 1-8 on page one capture CIO role using the Karimi and Gupta (1996) inventory. The model adapted from King and Teo (1997) on page two of the survey, measures the extent of BSP—ISSP alignment. Questions 1-20 on page three measures the self-perceived style of leadership of the CIO. The transformational leadership style is made up of three components: (1) Inspirational Motivation (IM), (2) Intellectual Stimulation (IS), and (3) Individual Consideration (IC). Questions 5, 7, 13, 20 measure Inspirational Motivation. Questions 2, 4, 16, 18 measure Inspirational Stimulation. Questions 8, 10, 15, 17 measure Individual Consideration. The score for transformational leadership is computed as the mean sum of IM, IS and IC scores. The transactional leadership style is made up of two components: (1) Contingent Reward (CR), and (2) Active Management-by-exception (AM). Questions 1, 6, 9, 19 measure Contingent Reward. Questions 3, 11, 12, 14 measure Active Management-by-exception. The score for transactional leadership is computed as the mean sum of CR and AM scores.

Independent variable alignment extent: is defined as being categorized into one of four distinct stages of BSP—ISSP alignment using King and Teo's model: (1) administrative- separate BSP and ISSP planning, (2) sequential- one-way linked planning with sequential integration, (3) reciprocal- two-way linked planning with reciprocal integration and (4) full- integrated planning. This variable is composed of categorical data.

Dependent variable CIO self-perceived leadership style: self-reported self-perceived style of leadership using Bass and Avolio's (1995b) MLQ 5X instrument.

Scores will be calculated on two leadership styles: (1) transactional, and (2) transformational. This variable is based on interval data

Dependent variable CIO role: self-reported role of the IS executive as operationalized by the Karimi and Gupta (1996) inventory. This inventory measures the role of the senior IT leader and is based in part on eight attributes that Rockart and Earl (1996) say successful IT leaders should possess: (1) They see themselves as corporate officers, (2) They are seen by others as corporate officers, (3) They are general business managers, not IT specialists, (4) They are candidates for top-line management jobs, (5) They see the IT function as critical to company success, (6) They have a high-profile image in their firms, (7) They have political as well as rational perspectives, and (8) They have a clear view of their own critical success factors. This variable is operationalized by taking the mean of the eight questions and reporting it as interval data. As CIO role is defined as "attributes that successful IS leaders should possess" (Karimi & Gupta, 1996, p. 71), a higher score suggests a higher likelihood of success.

Dependent variable CIO rank: self-reported rank of IS executive. This variable is operationalized by reporting the number of levels separating the CIO from the top management position (CEO) of the organizational unit (e.g., if the IS manager reported directly to the President, the two would be one level apart.) The choices include: (1) zero, (2) one, (3) two and, (4) three or more. This data is interval in nature.

No empirical research could be located examining the relationship of CIO rank and BSP—ISSP alignment extent. In fact, the empirical research does not show a significant correlation between the rank of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles &

Snow, 1978). This lack of a significant correlation between CIO rank and strategic orientation led this researcher to suggest that the BSP—ISSP alignment extent would not vary significantly with the CIO rank.

Dependent variable CIO hiring status: self-reported hiring status of IS executive. This variable was operationalized as one of two choices: (0) internal, and (1) external. CIOs were classified as internal hires if they had been with the firm for more than three years at the time they had assumed the IT leadership position. Individuals were classified as external hires if they had been with the firm for three years or less. This variable is based on nominal data.

Dependent variable CIO education type: self-reported education type of the last degree completed of the executive. This variable was operationalized as one of three choices: (0) business emphasis, (1) computer emphasis, and (2) other emphasis. This variable is based on nominal data.

Dependent variable CIO education level: self-reported education level of the executive. This variable was operationalized as one of five choices: (0) certificate, (1) no college degree, (2) undergraduate degree, (3) master's degree, and (4) doctorate degree. This variable is based on nominal data.

Instrumentation Permissions

King and Teo's (1997) BSP—ISSP alignment instrument was used in the research survey. Permission to use the instrument was granted by Dr. Teo. Karimi and Gupta's (1996) instrument measuring the role of top IS executives is also used in the research survey. Permission to use the instrument was granted by Dr. Karimi.

The Bass and Avolio (1995b) Multifactor Leadership Questionnaire (MLQ), Form 5X, was also included in the research survey. Permission for use was granted with the purchase of this instrument from their distributor, Mind Garden Inc.

The King and Teo Instrument

King and Teo (1997) used a survey of 600 firms listing the top 1000 corporations in the U.S.A. to validate their BSP—ISSP alignment model. In their study, 600 surveys sent out, one hundred fifty-seven usable responses (26.2 percent) were returned. These questionnaires were used to explore the typology and evolution of BSP and ISSP integration and the contingency variables that may influence it. The contingency variables were operationalized into two distinct areas, organizational- and environmental-characteristics. The organizational characteristics include: 1) information intensity of products/services, 2) information intensity of the value chain, 3) business managements' perception of IT importance, and 4) IS competence. The environmental characteristic measured was environmental uncertainty. Environmental uncertainty was operationalized as: 1) dynamism, 2) heterogeneity, and 3) hostility. Questionnaires were sent, in the King and Teo study, to the CEO with instructions asking them to forward the questionnaire to the Senior Information Systems Executive. Because some organizations may not have a corporate CIO, the CEO was asked to select a core business segment and forward the questionnaire to the CIO responsible for it.

Respondents to King and Teo's survey were asked to indicate their firm's path of evolution through the BSP—ISSP alignment model (administrative, sequential, reciprocal and full), as well as the current state of integration. Such a self-typing approach is

commonly used in organizational research (James & Hatten, 1995; Shortell & Zajac, 1990). A first follow-up mailing was made three weeks from the date of initial mailing. A second follow-up mailing was sent out about seven weeks from the initial date. Comparisons using Chi-Square tests were made between respondents and nonrespondents in terms of industry representation, annual sales revenue and the number of employees in order to confirm the absence of nonresponse bias.

Factor analysis was used to assess construct validity. More specifically, principal component analysis with varimax rotation was used to determine if all items measuring a construct cluster should load onto a single factor. Because a single item might not filly tap into a construct or might be subject to misinterpretation by the respondents, multiple items were used for each construct. Items with loadings of less than 0.5 on any factor or with loadings greater than 0.5 on more than one factor were dropped from subsequent analyses.

Construct reliability was assessed using Cronbach's alpha, which gives an indication of the internal consistency of the items measuring the same construct. High values of Cronbach's alpha indicate high internal consistency of the multiple items measuring each construct, and indicate high reliability of the individual constructs. All of the reliability coefficients are above the recommended value of 0.60.

Four validation checks were made on the ability of the instrument to measure the paths of evolution. The first was that telephone calls were made to respondents to determine whether they had any difficulty in understanding or distinguishing among the descriptions of the four types of integration. Results of the telephone interviews showed that none of the respondents had any difficulty. As a second validation check, the

relationships between stages of integration and commonly accepted measures of growth (age of firm and number of years of formal ISSP) were examined. As a third check, an ANOVA test indicated that only the number of years of IS strategic planning was significant, and not the age of the firm. As Information Technology is relatively new (since the 1970s), ISSP is also a relatively new management tool. The fourth check was that the authors asked the respondents to indicate the amount of time (duration) spent at each stage of integration. This ensured that the respondents thought about the paths of evolution while completing the self-typing measure.

In concluding, King and Teo listed three limitations: (1) the retrospective nature of the study made it difficult to guarantee accuracy due to respondent memory of past events, (2) the questions about evolutionary paths may be leading to some extent and (3) only one respondent per firm was used.

The Karimi and Gupta Instrument

Rockart and Earl's (1996) suggested eight attributes that successful IS leaders should possess. These include:

1.) They see themselves as corporate officers.

2.) They are seen by others as corporate officers.

3.) They are general business managers, not IT specialists.

4.) They are candidates for top-line management jobs.

5.) They see the IT function as critical to company success.

6.) The have a high-profile image in their firms.

7.) They have a political as well as rational perspectives.

8.) They have a clear view of their own critical success factors.

Karimi and Gupta (1996) based their instrument measuring the role of top IS executives on the work done by Rockart and Earl. Karimi and Gupta (1996) define the CIO role as "attributes that successful IS leaders should possess" (p. 71). The role of the CIO, therefore, is associated with behaviors that are implicit for success for the leaders and the organizational subunits they direct. Applegate and Elam (1992) posit that the structure or chosen strategy of the IS department somewhat directs the role adopted by the CIO. When the function of IS is strictly a supportive one, then the top IS leader may only be a technical expert and a merely competent manager. For example, Keen (1988) says that many organizations choose their CIOs by promoting their best technical managers without regard to communication or business skills. However, when the firm makes the change to using Information Systems as one of the firm's competitive weapons, the role of the top IS leader is necessarily extended. They must begin to act as a link between IS and other executives in the firm. Earl (1989) suggests that successful top IS leaders see themselves as corporate officers and general business managers. He says that good political skills and a high profile may place them in contention for top-line management positions. He goes on to delineate four leadership attributes for IS leaders: (1) business leadership- to link the use of IS with the business needs and strategy of the firm, (2) technology leadership- drawing up and implementing technology policies, (3) organizational leadership- directing and steering IS structures and performing the controlling managerial function to make them work, and (4) functional leadership- managing the IS function and the accompanying specialist sub-groups.

Rockart and Earl (1996) suggest that their attributes serve as job specifications for the CIO position. These eight questions served as the basis for an empirical test of their instrument to examine the role of the CIO in relationship to the organizational strategy. Karimi and Gupta (1996) added a question to the survey in response to Applegate and Elam's (1992, p. 479) suggestion that IS leaders should be "spending more time inside the IS department managing the function on a day-to-day basis". Also, in response to Moad's (1990) notion that if IS leaders build alliances with business unit and line managers, to build a broad constituency of support for IS, an additional question was added by Karimi and Gupta (1996) to measure if the CIO was spending more time outside the IS department focusing on the strategic and organizational aspects of IS.

The CIO role consists of attributes that successful IS leaders should possess, and is operationalized by Karimi and Gupta (1996) as:

1. I see myself as a corporate officer.
2. In my organization, I am seen by others as a corporate officer.
3. I am a general business manager, not an IS specialist.
4. I am a candidate for top-line management positions.
5. I have a high-profile image in the organization.
6. I have political as well as rational perspectives of my organization.
7. I spend most of my time outside of the IS department focusing on the strategic and organizational aspects of IS.
8. I spend most of my time inside the IS department managing the function on a day-to-day basis.

This instrument uses a Likert scale (0-4) with the total score being averaged. As the CIO role score increases, the test subject displays increased attributes of IS success.

Construct reliability was assessed using Cronbach's alpha, which gives an indication of the internal consistency of the items measuring the same construct. Karimi and Gupta (1996) removed two questions because of small corrected item total correlations and added two additional items to measure the new responsibilities of the IT leaders: (1) spending more time outside the IT department focusing on the strategic and organizational aspects of IT; and (2) spending more time inside the IT department managing the function on a day-to-day basis. The final form of the IT leader role construct consisted of eight items and had a reliability of 0.7345. No validity testing has been done on this instrument.

Karimi and Gupta (1996) pretested the questionnaire with a number of academics within their departments at the University of Colorado at Denver and Wayne State University. Their colleagues were asked to examine the instrument to identify construction defects. Pilot tests were also conducted using financial service firms drawn from the survey population, who were not included in the original sample. They were asked to report any defects or inadequacies with the scale to the researchers after scrutinizing the survey. Finally, several IS practitioners from local firms were solicited to help pretest the questionnaire.

The Bass and Avolio Instrument

Since Burns (1978) introduced a new theory of leadership which was later expanded by Bass, (1985) many conceptual and empirical researchers have suggested that transformational leadership has a greater impact on motivation, self-efficacy and individual, group and organizational performance than transactional approaches (Avolio

& Bass, 1995). Because of the possible role of the IS top leadership in both performance of the IS department and in how IS is viewed by top business management, leadership style may have a part in the extent of BSP—ISSP alignment. Bass and Avolio (1995a) are of the opinion that recent meta-analyses of the military and organizational psychology literature have confirmed that the relationships between transformational leadership and objectively measured performance were stronger and more positive than transactional styles of leadership, and stronger even than the less active non-transactional style of laissez-faire leadership (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson et al., 1995). Lowe and Kroeck (1996) concluded that there were strong positive correlations between all components of transformational leadership and both objective and subjective measures of performance. Transactional contingent reward leadership, on the other hand, was less positively correlated with performance and management-by-exception was negatively correlated with measures of performance.

The MLQ Leader 5X-Short form was used in this study to score the leader on the following attributes: (1) inspirational motivation, (2) intellectual stimulation, (3) individual consideration, (4) contingent reward, (5) active management-by-exception.

The latest version of Bass and Avolio's Multifactor Leadership Questionnaire (MLQ), Form 5X, has been used in nearly two hundred research programs, doctoral dissertations and masters theses. In their manual for the MLQ instrument, Bass and Avolio (1995b) describe the development of the measure, and summarize tests of its convergent and discriminate validity. The instrument was developed with a review of the theoretical literature on leadership and the responses of 70 senior executives to open-ended surveys. The result yielded 142 leadership behaviors that were sorted into

transformational, transactional or undecided. A subsequent factor analysis of data from 176 senior military officers yielded seven factors: idealized influence, inspirational motivation, intellectual stimulation, individualized consideration, contingent rewards, active management-by-exception, passive management-by-exception and laissez-faire. Later empirical studies continued to refine the instrument. Component reliabilities for the composite items (IS, IM, IC, CR, AM) ranged from 0.76 to 0.89. All of the scales' reliabilities were generally high and exceeded standard cut-offs for internal consistency recommended in the literature. These scale scores were based on ratings by others in evaluating a target leader.

Convergent and discriminate validity estimates of the MLQ 5X was assessed by examining whether the construct shares more variance with its own measure of indices than with other correlation matrices of the constructs represented in the full range theoretical model. For adequate convergent and discriminate validity, Fornell and Larcker (1981) suggest that the diagonal elements should be greater than entries in the corresponding rows and columns. An examination of Table 7 indicates that all composite items satisfied this criterion. The average variance extracted by constructs (*) exceeds correlations between constructs for composite items (See Table 7).

Bass and Avolio also found generally high positive correlations among the five transformational leadership scales. There were also positive and significant correlations between the contingent reward scale of the transactional construct and each of the five scales comprising transformational leadership.

Table 7: Convergent and Discriminate Validity

	IM	IS	IC	CR	AM
IM	0.65*				
IS	0.60	0.66*			
IC	0.58	0.55	0.61*		
CR	0.54	0.54	0.59	0.59*	
AM	0.04	0.01	0.06	0.02	0.46*

Adapted from: Bass, B. M., & Avolio, B. I. (1995a). *MLQ Multifactor Leadership Questionnaire for Research Manual.* Redwood City, CA.

The CIO self-perceived leadership style is operationalized as a two-factor model: transformational leadership (TF) vs. transactional leadership (TA). The first factor (TF) comprises all of the transformational components. This includes (1) Inspirational Motivation (IM), (2) Intellectual Stimulation (IS), and (3) Individual Consideration (IC). IM provides followers with a clear sense of purpose that is energizing, is a role model for ethical conduct, and builds identification with the leaders and their articulated vision. IS gets followers to question the "way we have always done things for problem solving" and encourages them to question the methods they use to improve upon them. IC focuses on understanding the needs of each follower and works to get them to develop to their full potential.

The second general factor (TA) is comprised of active transactional leadership with the factors of Contingent Reward (CR) and Active Management-by-exception (AM). CR clarifies what is expected from followers and what they will receive if they meet expected levels of performance. AM focuses on monitoring task execution for problems. Both of these transactional factors represent a clear delineation of agreements, expectations and enforcements. A composite transformational score (TF) (i.e., the average of the three transformational factor scores) and a composite transactional score (TA) (i.e., the average of the two transactional factor scores) are typically obtained for analysis.

The MLQ is comprised of two parts: the leader form and the rater form. The purpose of the leader form is to report the self-perceived leadership style of the leader for reference. The purpose of the rater form is to report the followers' perception of how the leader actually leads. For the purpose of this study, the leader form will be used, as the

focus is on self-perceived leadership style. Singer and Singer (1990) used this same methodology in their study comparing the results of a MLQ questionnaire measuring preferred (self-perceived) versus actual leader behavior.

Assumptions and Limitations

There are potential threats to the validity of any study. King and Teo (1997) used the del test to empirically validate benchmark variables for each stage of alignment. No reliability testing was conducted on the instrument by the authors.

Internal and external threats to validity are common in any study. A particular threat to the validity of the present study is the variation in the population sample heterogeneity (Isaac & Michael, 1995). The variations in budgetary, revenue and size from one organization to another may introduce certain characteristics due to common subject size that may be correlated with the dependent variables. In addition, one has to wonder if the respondents will report their perceptions of there IS departments and numbers accurately—especially since they are the only sources of information.

Hypotheses/Rationales

The question this study seeks to answer is how CIO individual variables relate to the extent the extent of BSP—ISSP alignment. CIO individual variables were operationalized into six areas; self-perceived leadership style, role, rank, hiring status, education type and education level. Seven hypotheses were proposed.

$H1_a$ Those CIO managers showing full BSP—ISSP alignment extent types will report more transformational CIO self-perceived leadership styles.

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership styles.

$H2_o$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership styles.

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

H3o There is no statistical difference for BSP—ISSP alignment extent and CIO role.

$H4_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

$H5_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

$H7_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education type.

Hypothesis One- CIO self-perceived transformational leadership style and BSP—ISSP alignment extent. This dependent variable was an interval number type. Possible scores ranged from zero to four. A composite transformational score (TF), composed of the average of the sum of the three transformational factor scores (Inspirational Motivation- IM, Intellectual Stimulation- IS, Individualized Consideration- IC) was obtained. Singer and Singer (1990) used this same methodology in their study comparing the results of a MLQ questionnaire measuring self-perceived versus actual leader behavior. Norming scores by Bass and Avolio (1995b) were obtained from a total sample

of 2,080: mean = 2.60, standard deviation = 0.886. No empirical research could be located directly examining the relationship of CIO leadership styles and BSP—ISSP alignment extent levels. However, research does show a positive correlation between all components of the transformational style: inspirational motivation (IM), intellectual stimulation (IS), and individual consideration (IC) on measures of performance of the organization (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson et al., 1995). This improved performance led this researcher to suggest that the full BSP—ISSP alignment extent may be associated with the transformational leadership style because this improved performance may be related to a leader who can set a course of direction, motivate others and who thinks of the individual desires in achieving those objectives.

$H1_a$ BSP—ISSP alignment extent varies significantly with transformational CIO self-perceived leadership style.

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership style.

Hypothesis Two- CIO self-perceived transactional leadership style and BSP—ISSP alignment. Research shows a slight positive correlation between the contingent reward (CR) component of the transactional style on the performance of the organization (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson et al., 1995). However, the active management-by-exception (AM) component is negatively correlated with measures of performance. This possible poor organizational performance lead this researcher to suggest that full BSP—ISSP alignment extent will not vary significantly with the transactional leadership style because of the implied possible poor performance within IS.

It is thought that good performance and good alignment requires leadership that is based on more than just transactions with employees. Vision and encouragement are needed for greater alignment and better performance.

$H2_0$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership styles.

Hypothesis Three- CIO role and BSP—ISSP alignment. No empirical research could be located directly examining the relationship of CIO role status and BSP—ISSP alignment extent. Empirical research does show a significant correlation between the role of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). This significant correlation between CIO role status and strategic orientation led this researcher to think that full BSP—ISSP alignment will be related to greater CIO role clarity because of the increased business orientations within IS and the implied focus on strategic and organizational aspects of IS.

Karimi and Gupta (1996) define the CIO role as "attributes that successful IS leaders should possess" (p. 71). The role of the CIO, therefore, is associated with behaviors that are implicit for success for the leaders and the organizational subunits they direct. Karimi and Gupta categorized the CIO role scores (n = 213) using Miles and Snow's (1994) four competitive strategy types(defender, prospector, analyzer, reactor). They found CIO role means of: defender 3.794, prospector 3.456, analyzer 3.487, and reactor 3.729. As role scores increase, the IS managers have an increased amount of the attributes needed for successful IS leadership.

Applegate and Elam (1992) posit that the structure or chosen strategy of the IS department directs the role adopted by the CIO. When the function of IS is strictly a supportive one, then the top IS leader may only be a technical expert and a merely competent manager. For example, Keen (1988) says that many organizations choose their CIOs by promoting their best technical managers without regard to communication or business skills. However, when the firm makes the change to using Information Systems as one of the firm's competitive weapons, the role of the top IS leader is necessarily extended. They must begin to act as a link between IS and other executives in the firm.

Earl (1989) suggests that successful top IS leaders see themselves as corporate officers and general business managers. He says that good political skills and a high profile may place them in contention for top-line management positions. He goes on to delineate four leadership attributes for IS leaders: (1) business leadership- to link the use of IS with the business needs and strategy of the firm, (2) technology leadership- drawing up and implementing technology policies, (3) organizational leadership- directing and steering IS structures and performing the controlling managerial function to make them work, and (4) functional leadership- managing the IS function and the accompanying specialist sub-groups. The IS leaders who are more clear on their roles may work in organizations where there is clear alignment.

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

$H3_o$ There is no statistically significant difference between BSP—ISSP alignment extent and CIO role.

Hypothesis Four- CIO rank and BSP—ISSP alignment. No empirical research could be located directly examining the relationship of CIO rank and BSP—ISSP alignment extent. Empirical research does not show a significant correlation between the rank of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). This lack of a significant correlation between CIO rank and strategic orientation led this researcher to suggest that the BSP—ISSP alignment extent will not vary significantly with the CIO rank.

$H4_0$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

Hypothesis Five- CIO hiring status and BSP—ISSP alignment. No empirical research could be located directly examining the relationship of CIO hiring status (external, internal) and BSP—ISSP alignment extent. Empirical research does not show a significant correlation between the hiring status of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). Consequently there was no reason to suspect a relationship here between BSP—ISSP alignment extent and hiring status.

$H5_0$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

Hypothesis Six- CIO education level and BSP—ISSP alignment. No empirical research could be found directly examining the relationship of CIO education level (certificate, no degree, undergraduate degree, masters' degree, or doctorate degree) and BSP—ISSP alignment extent. Nor does the literature directly address the relationship. It

was thought, however, that it would be interesting to examine the relationship of these variables here.

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

Hypothesis Seven- CIO education type and BSP—ISSP alignment. No empirical research could be located directly examining the relationship of CIO education type (business, computer, or other emphasis) and BSP—ISSP alignment extent. The literature does suggest that the CIO executive has a major impact on how the CEO views the competence of IS (Karimi & Gupta, 1996). King and Teo (1996) found five key dimensions for facilitating BSP—ISSP alignment and concluded that firms wishing to enhance their ability to develop strategic use of IS should focus on communicating the need for innovation and change, develop economies of scale, build a strong competitive position, and ensure that top management integrates IS as a key element of the business strategy. The authors suggest in the short run, communications may be the most controllable element.

In addition, top IS positions are increasingly being filled with people who have business backgrounds as compared to just computer backgrounds (Strassmann, 1994). It is thought that these trends will lead to broader educational backgrounds to integrate the IS function with the total organization.

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

$H7_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education type.

Procedures

The firms surveyed were randomly selected from the "Directory of Top Computer Executives" (2000 Spring). Organizations qualify for inclusion by meeting the following criteria: (1) the ownership of a mainframe computer, minicomputer or 100 or more PCs, (2) a formal MIS staff, and (3) gross annual sales volume of annual sales volume of $50 million or more and (4) annual IS budget greater than $250,000. Thus a wide variety of firm types and sizes were included. Only firms located in the states of Michigan and Illinois were surveyed, to allow geographic homogeneity in the population sample. All organizations were randomly selected from the "Directory of Top Computer Executives" (2000 Spring) by choosing every second listing until the population sample was completed.

Information listed in this directory includes: company name, address, phone number, top computer executive name and title, and the major computer systems used. In addition, firms are classified into the following groups: manufacturing and services, banking, diversified finance, insurance, retail, transportation, utilities, education, health service, federal government, state government, local government, and other. After the list of firms has been selected from the master list, the following steps will be taken. The Chief Information Officers (CIOs) for each of the member organizations will be identified. If the specific organization does not have a CIO listed, a top manager responsible for the IS function will be identified.

A survey was mailed to each of the CIOs or top IS managers. The survey instrument was accompanied by a cover letter explaining the study and discussing the informed consent. A self-addressed stamped envelope was included for return of the instruments. The researchers' name, e-mail address and telephone numbers was included in the cover letter for the convenience of the subjects if they had any questions. A copy of the letter is included in the appendices of this dissertation. (See Appendix B). A second letter and copy of the questionnaire was then sent to each organization in the population sample that had not yet returned a completed questionnaire. Thank you letters and final reports (with aggregated data and conclusions) were provided to all organizations that participated in the study.

All questionnaires returned were reviewed for completion. Any surveys not completed in the essential areas (alignment extent, CIO and organizational profile data, and CIO leadership style) were not used. All usable surveys will be entered into a database for this study. The data was analyzed using the Statistical Package for the Social Sciences (SPSS) 9.0. This database and all raw data were in the possession of this researcher in a locked cabinet. Confidentiality of subjects was maintained throughout data collection, analysis and reporting.

Data Processing and Analysis

The research design used in this study was a cross-sectional design. All measurements of the dependent and independent variables were taken at one point in time with a survey instrument. Cross-sectional designs makes it possible to analyze the data of the sample population of organizations at a given time. An analysis of variance

(ANOVA) was used for hypothesis testing and examination of possible relationships between the following independent variables (CIO self-perceived leadership style, and role,) and the dependent variable (extent of BSP—ISSP alignment). In addition, Chi-Squared analysis will be used for hypothesis testing and to examine possible relationships between the following independent variables (CIO rank, hiring status, education level, and education type) and the dependent variable (extent of BSP—ISSP alignment).

Variables. The following are all of the dependent and independent variables, including their operational definitions for this study.

Independent variable alignment extent: was defined as being categorized into one of four distinct stages of BSP—ISSP alignment using King and Teo's model: (1) separate BSP and ISSP planning, (2) one-way linked planning with sequential integration, (3) two-way linked planning with reciprocal integration and (4) integrated planning. This is not a calculated number, but an ordinal number (categorical value) indicated by the respondent who chooses one of the four possible extents of alignment that applies to their organization.

Dependent variable CIO self-perceived leadership style: self-reported self-perceived leadership style (transformational, transactional) as operationalized by the score on the Multifactor Leadership Questionnaire (MLQ) (Bass, 1990). The transformation style is made up of three components; inspirational motivation, intellectual stimulation and individual consideration. The transactional style is made up of two components; contingent reward and active management-by-exception.

Dependent variable CIO role: self-reported role of the IS executive as operationalized by the Karimi and Gupta (1996) inventory. The CIO role is comprised of attributes that successful IS leaders should possess.

Dependent variable CIO rank: self-reported rank (0, 1, 2, 3 or 4) of IS executive. Rank is operationalized as the number or reporting levels separating the CEO from the CIO.

Dependent variable CIO hiring status: self-reported hiring status (internal, external) of IS executive. Hiring status of the CIO was operationalized as internal if the manager had less than three years tenure at the time the IS management position was assumed, and external if tenure was equal to or less than three years.

Dependent variable CIO education type: self-reported education type (business emphasis, computer emphasis, other emphasis) of the last degree completed of the executive.

Dependent variable CIO education level: self-reported education level (certificate, no degree, undergraduate degree, masters' degree, or doctorate degree) of the executive.

CHAPTER FOUR

Findings

Introduction

The content of this chapter presents the results of the statistical tests and analyses outlined in Chapter Three. Chapter Four provides the restatement of the purpose, demographic data, research questions and hypotheses, and a summary of all findings.

Restatement of the Purpose

Little empirical research has been done to test how the Chief Information Officer (CIO) of the firm may affect the alignment extent between BSSP and ISSP. The purpose of this study was to examine the relationship between CIO individual variables on the extent of BSP—ISSP alignment; the independent variable. Alignment extent of the firm has been operationalized into four stages (administrative, sequential, reciprocal and full alignment) as modeled by Teo and King (1996). The CIO individual variables are the dependent variables of the study and include: CIO self-perceived leadership style, role, rank, education level, and education type.

Demographic Data

The demographic and background information was collected by the survey instrument which measured organizational and CIO demographic information. Surveys were mailed to 1,102 CIOs in Michigan and Illinois. Of those mailed, 48 surveys were returned due to incorrect addresses, 15 because the addressee was no longer employed at

the organization, and six indicated they did not participate in such research surveys because of the large volume received. This decreased the original pool to 1,033 possible respondents. Thus, a total of 1,033 organizations were seen as the original sample pool. A second mailing was sent two weeks after the first mailing to all of the population sample who had not responded. This was 89 percent of the original group. In all, 152 valid responses were returned, for a response rate of 14.7 percent (See Table 8).

Page one of the survey measured organizational demographic information and CIO profile data (See Appendix A). The CIO profile data captured the CIO education level, education type, and rank. Questions 1-8 on page one capture CIO role using the Karimi and Gupta (1996) inventory. The model adapted from King and Teo (1997) on page two measures the extent of BSP—ISSP alignment. Questions 1-20 on page three measures the self-perceived style of leadership of the CIO. The transformational leadership style is made up of three components: (1) Inspirational Motivation, (2) Intellectual Stimulation, and (3) Individual Consideration. Questions 5, 7, 13, 20 measure Inspirational Motivation. Questions 2, 4, 16, 18 measure Inspirational Stimulation. Questions 8, 10, 15, 17 measure Individual Consideration. The transactional leadership style is made up of two components: (1) Contingent Reward, and (2) Active Management-by-exception. Questions 1, 6, 9, 19 measure Contingent Reward. Questions 3, 11, 12, 14 measure Active Management-by-exception.

Table 8: Sample Size and Response Rates

	Initial Sample Size	Incorrect Address	Respondent No Longer At Organization	Respondents Not Participating	Final Sample Size	Number of Surveys Returned	Response Rate
Michigan	364	13	9	4	338	59	38.8%
Illinois	738	35	6	2	695	93	61.2.0%
Total:	1,102	48	15	6	1,033	152	14.7%

Demographic data was gathered, then, in eleven areas: (1) total number of fulltime employees for the organization, (2) number of fulltime IS employees, (3) annual sales, (4) CIO gender, (5) CIO age, (6) CIO education level, (7) CIO education type, (8) CIO rank, (9) CIO role, (10) CIO hiring status, and (11) organizational type.

1. Total number of fulltime employees: A frequency distribution analysis of fulltime employees shows the following information: 0 organizations or 0.0 percent less than 50 employees, 10 organizations or 6.6 percent 51 to 100 employees, 41 organizations or 27.0 percent 101 to 500 employees, 30 organizations or 19.7 percent 501 to 1,000 employees, 43 organizations or 28.3 percent 1,001 to 5,000 employees, 8 organizations or 5.3 percent 5,001 to 10,000 employees and 20 organizations or 13.2 percent more than 10,000 employees (See Table 9).

Table 9: Total Number of Fulltime Employees

Total employees n = 152	Frequency	Percent	Cumulative Percent
< or = 50	n = 0	0	0
51-100	n = 10	6.6	6.6
101-500	n = 41	27.0	33.6
501-1,000	n = 30	19.7	53.3
1,001 – 5,000	n = 43	28.3	81.6
5,001 – 10,000	n = 8	5.3	86.8
> 10,000	n = 20	13.2	100.0

2. Number of fulltime IS employees: A frequency distribution analysis of fulltime IS employees shows the following information: 82 organizations or 57.7 percent equal to 1 to 25 employees, 32 organizations or 22.6 percent equal to 26 to 50 employees, 11 organizations or 7.7 percent 51 to 100 employees, 13 organizations or 9.2 percent 101 to 250 employees, 10 organization or 0.7 percent equal to 251 to 500 employees, 1 organization or 0.7 percent equal to 501 to 999 employees, and 2 organizations or 1.4 percent equal to or more than 1,000 employees (See Table 10).

Table 10: Number of IS Fulltime Employees

IS Employees n = 142	Frequency	Percent	Cumulative Percent
1-25	n = 82	57.7	57.5
26-50	n = 32	22.6	80.3
51-100	n = 11	7.7	88.0
101-250	n = 13	9.2	97.2
251-500	n = 1	0.7	97.9
501 – 999	n = 1	0.7	98.6
> 1,000	n = 2	1.4	100

3. Annual sales: A frequency distribution analysis of annual sales of respondents shows the following information: 31 organizations or 20.4 percent from $0 to 50 million dollars, 27 organizations or 17.8 percent $51 to 100 million dollars, 23 organizations or 15.1 percent $101 to 250 million dollars, 20 organizations or 13.2 percent $251 to 500 million dollars, 17 organizations or 11.2 percent $501 to 1,000 million dollars, and 34 organizations or 22.4 percent more than $1,000 million dollars (See Table 11).

Table 11: Annual Sales

Annual Sales* n = 152	Frequency	Percent	Cumulative Percent
$0-50	n = 31	20.4	20.4
51-100	n = 27	17.8	38.2
101-250	n = 23	15.1	53.3
251-500	n = 20	13.2	66.4
501-1,000	n = 17	11.2	77.6
> 1,000	n = 34	22.4	100

*Sales in $Millions

4. CIO Gender: A frequency distribution analysis of gender shows the following information: 127 respondents or 83.6 percent were male, and 25 respondents or 16.4 percent were female (See Table 12).

Table 12: CIO Gender

Gender n = 152	Frequency	Percent	Cumulative Percent
Male	n = 127	83.6	83.6
Female	n = 25	16.4	100

5. CIO Age: The mean age of respondents was 46.0 years. A frequency distribution analysis shows the following information: 0 respondents or 0.0 percent equal to or under twenty years of age, 0 respondents or 0.0 percent twenty one to thirty years of age, 21 respondents or 14.5 percent thirty one to forty years of age, 72 respondents or 49.7 percent forty one to fifty years of age, 50 respondents or 34.5 percent fifty one to sixty years of age, and 2 respondents or 1.3 percent over sixty years of age (See Table 13).

Table 13: CIO Age

Age Range n = 145	Frequency	Percent	Cumulative Percent
0-20	n = 0	0.0	0.0
21-30	n = 0	0.0	0.0
31-40	n = 21	14.5	14.5
41-50	n = 72	49.7	64.2
51-60	n = 50	34.5	98.7
>60	n = 2	1.3	100

6. CIO Education Level: Education level was operationalized as follows: (1) certificate, (2) no college degree, (3) undergraduate degree, (4) master degree, and (5) doctorate. A frequency distribution analysis of education level categories shows the following information: 7 respondents or 4.6 percent held a certificate, 9 respondents or 5.9 percent held no college degree, 72 respondents or 47.4 percent held an undergraduate degree, 55 respondents or 36.2 percent held a master degree, and 9 respondents or 5.9 percent held a doctorate degree (See Table 14).

Table 14: CIO Level of Education

Education Level n = 152	Frequency	Percent	Cumulative Percent
Certificate	n = 7	4.6	4.6
No college degree	n = 9	5.9	10.5
Undergraduate degree	n = 72	47.4	57.9
Master degree	n = 55	36.2	94.1
Doctorate degree	n = 9	5.9	100

7. CIO Education Type: Education type was operationalized as follows: (1) Business, (2) Computer, and (3) other. A frequency distribution analysis shows the following information: 64 respondents or 43.2 percent held a certificate or degree with a business emphasis, 38 respondents or 25.7 percent held a certificate or degree with a computer emphasis, 44 respondents or 30.9 percent held a certificate or degree with an emphasis of other (See Table 15).

Table 15: CIO Education Type

Education type n = 148	Frequency	Percent	Cumulative Percent
Business	n = 64	43.2	43.2
Computer	n = 38	25.7	69.1
Other	n = 44	30.9	100

8. CIO Rank: The rank of the CIO was operationalized as the number of reporting levels separating the CIO from the head of the business unit. For example, if the top IS manager reported directly to the CEO, the two would be one level apart. The ranges of levels include: (1) zero, (2) one, (3) two, and (4) three or more. A frequency distribution analysis shows the following information: 6 respondents or 3.9 percent separated zero levels, 68 respondents or 44.7 percent were separated by one level, 71 respondents or 46.7 percent were separated by two levels, and 7 respondents or 4.6 percent were separated by three or more levels (See Table 16).

Table 16: CIO Rank

CIO Rank n = 152	Frequency	Percent	Cumulative Percent
Zero	n = 6	3.9	3.9
One	n = 68	44.7	48.7
Two	n = 71	46.7	95.4
Three or more	n = 7	4.6	100

9. CIO Role: This independent variable was an interval number type, with higher scores meaning the individual possessed higher amounts of the attributes needed for success IS leadership. Possible scores ranged from zero to four. Descriptive statistics of the CIO role score show the following information: 2.547 was the mean, 0.565 was the standard deviation, 3.50 was the maximum value returned, and 1.25 was the minimum value returned (See Table 17).

Table 17: CIO Role

n = 152	Value
Mean	2.547
Std. Deviation	0.565
Maximum	3.50
Minimum	1.25

10. CIO Hiring Status: The hiring status (external, internal) of the CIO was operationalized as the number of years the IS executive was employed at the business unit before assuming their present management position. External hiring status was defined as being with the firm three or less years before the present position. Internal status was operationalized as being with the firm more than three years before assuming the position. A frequency distribution analysis shows the following information: 72 respondents or 47.4 percent were internal hires, and 80 respondents or 52.6 percent were external hires (See Table 18).

Table 18: CIO Hiring Status

CIO Hiring Status n = 152	Frequency	Percent	Cumulative Percent
Internal	n = 72	47.4	47.4
External	n = 80	52.6	100

11. Organizational Type: The organizational type was operationalized as follows: (1) education, (2) insurance, (3) manufacturing and services, (4) retail, and (5) other. The grouping of the organizations into organizational types was provided by the "Directory of Top Computer Executives" (2000 Spring). A frequency distribution analysis shows the following information: 25 respondents or 16.4 percent education, 13 respondents or 8.6 percent insurance, 93 respondents or 61.2 percent manufacturing and services, 8 respondents or 5.3 percent retail, and 13 respondents or 8.6 percent other, (See Table 19).

Table 19: Organizational Type

Organizational Type n = 152	Frequency	Percent	Cumulative Percent
Education	n = 25	16.4	16.4
Insurance	n = 13	8.6	25
Manufacturing and services	n = 93	61.2	86.2
Other*	n = 13	8.6	94.8
Retail	n = 8	5.3	100

Note: The other category includes: diversified finance, health services, state government and transportation.

Data from the questionnaire was also gathered in two additional areas: (1) BSP—ISSP alignment extent (administrative, sequential, reciprocal, full), and (2) self-perceived leadership style scores (transformational, transactional).

1. BSP—ISSP Alignment Extent: The alignment extent was operationalized into four areas which included: (1) administrative, (2) sequential, (3) reciprocal, and (4) full. A frequency distribution analysis shows the following information: 14 respondents or 9.2 percent administrative alignment, 34 respondents or 22.4 percent sequential alignment, 88 respondents or 57.9 percent reciprocal alignment, and 16 respondents or 10.5 percent full alignment (See Table 20).

Table 20: BSP—ISSP Alignment Extent

Alignment Extent n = 152	Frequency	Percent	Cumulative Percent
Administrative	n = 14	9.2	9.2
Sequential	n = 34	22.4	31.6
Reciprocal	n = 88	57.9	89.5
Full	n = 16	10.5	100

2. Self-perceived Leadership Style: This dependent variable was an interval number type. Possible scores ranged from zero to four. Data was gathered for two styles; transformational and transactional leadership. A composite transformational score (TF), composed of the average of the sum of the three transformational factor scores (Inspirational Motivation- IM, Intellectual Stimulation- IS, Individualized Consideration- IC) was obtained. Singer and Singer (1990) used this same methodology in their study comparing the results of a MLQ questionnaire measuring self-perceived versus actual leader behavior. Norming scores (Bass & Avolio, 1995b) were obtained from a total sample of 2,080: mean = 2.60, standard deviation = 0.886. This contrasts with values found for the population sample of this study: 3.262 mean, 0.435 standard deviation, 4.0 maximum value returned, and 2.0 minimum value returned (See Table 21).

Mean scores for the individual components of the transformational leadership style for the sample were also calculated. They were: IM = 3.354, IS = 3.138, and IC = 3.277 (See Table 21). This places the respondent scores into the following percentiles respectively: 77.7, 76.9, and 73.9 as opposed to the respective original normative percentiles: 42.0, 45.5 and 42.

Table 21: Transformational Self-perceived Leadership Style

n = 152	Value	Norm
Mean	3.262	2.60
Std. Deviation	0.435	0.886
Maximum	4.0	
Minimum	2.0	

A composite transactional leadership score, the sum of the average of the two transactional factor scores (Contingent Reward- CR, Active Management by Exception-AM) was also calculated. Singer and Singer (1990) used this same methodology in their study comparing the results of a MLQ questionnaire measuring self-perceived versus actual leader behavior. Norming scores by Bass and Avolio (1995b) were obtained from a total sample of 2,080: mean = 1.975, standard deviation = 0.830. This compares with values found for the present sample of: 2.217 mean, 0.521 standard deviation, 3.63 maximum value, and 0.75 minimum value returned (See Table 22).

Mean scores for individual components of the transactional leadership style for the sample were also calculated. They were: CR = 2.941, and AM = 1.449 (See Table 22). This places the respondent scores into the following percentiles respectively: 78.0, and 34.5 as opposed to the respective original normative percentiles: 45.0 and 33.

Table 22: Transactional Self-perceived Leadership Style

n = 152	Value	Norm
Mean	2.217	1.975
Std. Deviation	0.521	0.830
Maximum	3.63	
Minimum	.75	

Research Questions/Hypotheses

The question this study sought to answer was how CIO individual variables relate to the extent of BSP—ISSP alignment. CIO individual variables were operationalized into six areas; self-perceived leadership style, role, rank, hiring status, education type and education level.

Hypotheses 1 through 3 were tested with the ANOVA technique, while hypotheses 4 though 8 were tested using the Chi-Square analysis technique. The level of significance for all tests was 0.05. Seven hypotheses were proposed.

$H1_a$ Those CIO managers showing full BSP—ISSP alignment extent will report more transformational CIO self-perceived leadership styles.

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership style.

$H2_o$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership style.

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

H3o There is no statistical difference for BSP—ISSP alignment extent and CIO role.

$H4_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

$H5_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

$H7_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education type.

Findings

Four measures of statistical analyses were used in this study; ANOVA, Chi-Square, Regression, and Pearson product-moment correlations. According to Ravid, (1994), analysis of variance (ANOVA) is used to compare the means of two or more independent samples and to test whether the differences between the means are statistically significant. In ANOVA, the independent variable is the categorical variable which defines the groups being compared. The dependent variable is the measured variable whose means are being compared.

ANOVA assumptions include: (1) the dependent variable is measured on an interval or ratio scale, (2) the groups are independent of each other, (3) the dependent variable being measured is normally distributed in the population, (4) the scores are random samples from their respective populations, and (5) the variances of the populations from which the samples were drawn are equal. When only one independent variable is used in ANOVA, the procedures is referred to as a one-way ANOVA. For example, when the BSP—ISSP alignment extent (the independent variable) is compared to the CIO self-perceived leadership style (the dependent variable), the procedure is a one-way ANOVA. All ANOVA analyses in this study were one-way.

Ravid (1994) also says that the Chi-Square test is applied to discrete nominal categorical data, and that it is a nonparametric statistical method. Here the units are frequency counts as opposed to scores. The Chi-Square test is represented by χ^2. The Chi-Square is used extensively in analyzing questionnaire data where groups are assigned a

numeric score (category). For example in this study, the CIO rank was coded into four categories: (0) zero level between top business manager and the CIO, (1) one level, (2) two levels, and (3) three or more levels.

The first Chi-Square assumption is that the observations should be independent of each other. For example, a respondents' answer cannot be counted in more than one category and the total number of observed frequencies should not exceed the number of participants. The second assumption is that the data must be in the form of frequencies. The total number of the observed frequencies must also equal the total number of the expected frequencies. The final Chi-Square assumption is that the data should be organized in some logical, defensible way. In this study for example, the categories of CIO rank progresses in an ascending manner: (0) zero level between top business manager and the CIO, (1) one level, (2) two levels, and (3) three or more levels.

The use of Regression analysis is to predict. It is based on the idea that the predictor and criterion variables are correlated. The higher the correlation between the variables, the more accurate the prediction.

According to Ravid, (1994) the term correlation can be defined as "the relationship or association between two or more variables" (p. 127). The Pearson product-moment coefficient is the most commonly used correlation procedure and is used to explain how well variables track together. Its use require that any scores measured be on an interval or ration scale, and that the two variables being tested have a linear relationship.

Hypothesis one. $H1_a$, the alternative hypothesis stated that those managers showing full BSP—ISSP alignment extent will report more transformational CIO self-perceived leadership styles. The hypothesis stated in the null format, $H1_o$, says that there is no statistically significant relationship between BSP—ISSP alignment extent types and transformational CIO self-perceived leadership styles.

The Analysis of Variance (ANOVA) showed no statistically significant differences. The test produced an F value of 2.228, p of 0.090, with 3 degrees of freedom. The alternative hypothesis was not supported, the null hypothesis was accepted, and the conclusion was drawn that there were no significant differences across BSP—ISSP alignment extent categories as relates to transformational CIO self-perceived leadership styles.

The analyses comparing the extent of alignment and the transformational leadership style scores (TF) showed the following results: Administrative alignment- TF mean = 2.906, standard deviation = 0.568, Sequential alignment- TF mean = 3.211, standard deviation = 0.401, Reciprocal alignment- TF mean = 3.308, standard deviation = 0.396, Full alignment- TF mean = 3.325, standard deviation = 0.532 (See Table 23). Transformational leadership scores, then, did not differ significantly across extent categories—although the trend was in the expected direction (more alignment leading to higher transformational scores).

Table 23: Transformational Leadership Score by BSP—ISSP Alignment Extent

Alignment Extent n = 152	Frequency	Transformational Mean	Transformational Standard Deviation
Administrative	n = 14	2.906	0.568
Sequential	n = 34	3.211	0.401
Reciprocal	n = 88	3.308	0.396
Full	n = 16	3.325	0.532

For exploratory purposes, the relationship between CIO transformational leadership (TF) style and CIO roles was examined. A Pearson product-moment coefficient analysis was completed to obtain the correlation between CIO role and TF. Values between 0.3 and 0.9 were necessary to be considered significant. The result obtained was $r = 0.567$. This correlation result, significant, but only moderately so.

Hypothesis two. $H2_o$, the second hypothesis of this study, stated in the null format, posits that there is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership style. The Analysis of Variance (ANOVA) showed a statistically significant relationship. The test produced an F value of 5.007, p of 0.003, with 3 degrees of freedom. As a result, the null hypothesis was rejected, and the conclusion was drawn that there was significant differences, for BSP—ISSP alignment extent across transactional CIO self-perceived leadership style.

Analysis comparing the extent of alignment and the transactional leadership style score (TF) showed the following results: Administrative alignment- TA mean = 1.813, TA standard deviation = 0.341, Sequential alignment- TA mean = 1.967, TA standard deviation = 0.466, Reciprocal alignment- TA mean = 2.346, TA standard deviation = 0.478, Full alignment- TA mean = 2.075, TA standard deviation = 0.675. A significant difference was noted across alignment extent categories for transactional leadership style (See Table 24).

Table 24: Transactional Leadership Score by BSP—ISSP Alignment Extent

Alignment Extent n = 152	Frequency	Transactional Mean	Transactional Standard Deviation
Administrative	n = 14	1.813	0.341
Sequential	n = 34	1.967	0.466
Reciprocal	n = 88	2.346	0.478
Full	n = 16	2.075	0.675

Hypothesis H2 was tested with the Least Significant Difference (LSD) test, a pairwise multiple comparison test which is equivalent to multiple individual t tests between all pairs of groups. This test is commonly used with the ANOVA technique, when a significant F value is noted.

In Table 25, the mean differences for transactional leadership Scores (TA) are reported for every pair of BSP—ISSP alignment groups. The asterisks (*) printed by the differences column labeled (2 Alignment) indicate that the average TA score differs significantly from that of the first column (1 Alignment). Thus, it is shown, that the average TA score differs statistically significantly among the following pairs: (1) Administrative – Reciprocal, and (2) Sequential – Reciprocal. The Reciprocal alignment group was significantly higher in transactional leadership as compared to the Administrative and Sequential groups, but not as compared to the Full alignment groups (which did not differ significantly from the other groups).

For exploratory purposes, the relationship between CIO transactional leadership (TA) style and CIO roles were further examined. A Pearson product-moment coefficient analysis was completed to obtain the correlation between CIO role and TA. Values between 0.3 and 0.9 were necessary to be considered significant. The result obtained was $r = 0.236$. This correlation result could be termed low to negligible, and was not considered significant.

Table 25: LSD- Alignment Extent & Transactional Style

(1 Alignment)	(2 Alignment)	Mean Difference (1-2)	p
Administrative	Sequential	-0.155	0.456
	Reciprocal	-0.534*	0.005
	Full	-0.263	0.262
Sequential	Administrative	0.155	0.456
	Reciprocal	-0.379*	0.004
	Full	-0.108	0.575
Reciprocal	Administrative	0.534*	0.005
	Sequential	0.379*	0.004
	Full	0.272	0.110
Full	Administrative	0.263	0.262
	Sequential	0.108	0.575
	Reciprocal	-0.272	0.110

Note: * indicates statistical significance at the 0.05 level of significance.

Hypothesis three. $H3_a$, the alternative hypothesis stated that BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the CIO role score. The hypothesis stated in the null format, $H3_o$, posits that there was no statistical significant differences for BSP—ISSP alignment extent and CIO role.

The ANOVA test, here, produced an F value of 3.435, at the p of 0.020 level, with 3 degrees of freedom. As a result, the null hypothesis was rejected, the alternative hypothesis was supported, and conclusion was drawn that as BSP—ISSP alignment extent increases, CIO role scores increase.

The analyses comparing the extent of alignment and the CIO role score showed the following results: Administrative alignment- CIO role mean = 2.078, Role standard deviation = 0.678, Sequential alignment- CIO role mean = 2.454, CIO role standard deviation = 0.572, Reciprocal alignment- CIO role mean = 2.636, CIO role standard deviation = 0.469, Full alignment- CIO Role mean = 2.800, CIO Role standard deviation = 0.708. It was found that, the higher the degree of BSP—ISSP alignment, the higher the Role score (See Table 26).

Table 26: CIO Role Score by BSP—ISSP Alignment Extent

Alignment Extent n = 152	Frequency	CIO Role Mean	CIO Role Standard Deviation
Administrative	n = 14	2.078	0.678
Sequential	n = 34	2.454	0.572
Reciprocal	n = 88	2.636	0.469
Full	n = 16	2.800	0.708

Hypothesis H3 was tested further with the Least Significant Difference (LSD) test, a pairwise multiple comparison test which is equivalent to multiple individual t tests between all pairs of groups. Evidence was found to suggest a significant difference in variance among the four stages of BSP—ISSP alignment and CIO role scores (See Table 27).

In Table 27, the mean difference for CIO role score is reported for every pair of BSP—ISSP alignment groups. The asterisks (*) printed by the differences column (labeled 2 Alignment) indicate that the average CIO role score differs significantly from that of the first column (1 Alignment). Thus, it can be seen that, contrary to the original prediction, the average CIO role scores differ significantly among the following pairs: (1) Administrative – Reciprocal, and (2) Full – Administrative. The trend, then, does seem to be in the predicted direction, but significant differences across CIO role are only noted when comparing the first level of alignment (Administrative) with the later levels of alignment (Reciprocal and Full).

Table 27: LSD- Alignment Extent & CIO Role

(1 Alignment)	(2 Alignment)	Mean Difference (1-2)	p
Administrative	Sequential	-0.376	0.100
	Reciprocal	-0.558*	0.007
	Full	-0.722	0.006
Sequential	Administrative	0.376	0.100
	Reciprocal	-0.182	0.204
	Full	-0.346	0.102
Reciprocal	Administrative	0.558*	0.007
	Sequential	0.182	0.204
	Full	-0.164	0.375
Full	Administrative	0.722*	0.006
	Sequential	0.346	0.102
	Reciprocal	0.164	0.375

Note: * indicates statistical significance at the 0.05 level of significance.

In addition, for exploratory purposes, a stepwise regression was run to further study the interrelationship between CIO role, transactional (TA) and transformational (TF) leadership scores. The analysis was run with CIO role as the dependent variable, and both transactional and transformational leadership scores as the independent variables. The stepwise regression model analysis chose TF as a significant predictor of role scores and excluded TA. The obtained TF value for adjusted R Square was 0.314, which explains 31.4 percent of the dependent variable; CIO role. With a p value of 0.000, TF is highly significant as a predictor of CIO role. TA was not found to be statistically significant as a predictor of CIO role, at the 0.05 level of significance.

Hypothesis four. Hypothesis four was stated in the null format, and posits that there was no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

The null hypothesis for the Pearson Chi-Square test was that the two groups (dependent and independent variables) were independent of each other. The computed Chi-Square statistic for these groups was 5.702, with 9 degrees of freedom, and an associated probability p value of 0.769. Conventionally, if this probability is small enough (less than 0.05 or 0.01), the hypothesis of independence is rejected. Thus, the null hypothesis here was accepted and the conclusion was drawn that there was no significant difference, at the 0.05 level of significance, between BSP—ISSP alignment extent and CIO rank.

Hypothesis five. Hypothesis five was stated in the null format and posits that there was no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

The computed Chi-Square statistic for these groups was 1.999, with 3 degrees of freedom, and a probability p value of 0.573. Thus, the null hypothesis was also accepted and the conclusion was drawn that there was no significant difference, at the 0.05 level of significance, between BSP—ISSP alignment extent and CIO hiring status.

Hypothesis six. Hypothesis seven was also stated in the null format, that there was no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

The computed Chi-Square statistic for these groups was 16.279, with 12 degrees of freedom, and an associated probability p value of 0.179. Thus, the null hypothesis was accepted and the conclusion was drawn that there was no significant difference, at the 0.05 level of significance, between BSP—ISSP alignment extent and CIO education level.

Hypothesis seven. $H7_a$, the alternative hypothesis stated that BSP—ISSP alignment extent varies significantly with and CIO education type. The hypothesis stated in the null format, $H7_o$, said that there would be no statistically significant relationship between BSP—ISSP alignment extent and CIO education type.

The computed Chi-Square statistic for these groups was 6.063, with 6 degrees of freedom, and an associated probability p value of 0.416. As a result, the null hypothesis was accepted, the alternative hypothesis was not supported, and the conclusion was made that there was no significant difference, at the 0.05 level of significance, between BSP—ISSP alignment extent and CIO education type.

Summary

This chapter presented the results of the statistical analyses. Chapter Four included the detailed demographical and background data and the tests of the hypotheses.

Demographic data was gathered in eleven areas: (1) total number of fulltime employees for the organization, (2) number of fulltime IS employees, (3) annual sales, (4) CIO gender, (5) CIO age, (6) CIO education level, (7) CIO education type, (8) CIO rank, (9) CIO role, (10) CIO hiring status, and (11) organizational type.

Hypotheses 1 though 3 were tested with ANOVA, while hypotheses 4 though 8 were tested using the Chi-Square analysis technique. Significant p values were examined for accepting or rejecting the hypotheses. The level of significance for all tests was 0.05. For a summary of the findings of the study regarding statistical results see Table 28.

Table 28: Summary of Statistical Findings (Alignment Extent with CIO Individual Variables)

ANOVA	Variable	Technique	F Value	p Value	df
H1	Transformational Leadership Style	ANOVA	2.228	0.090	3
H2	Transactional Leadership Style	ANOVA	5.007	0.003	3
H3	CIO Role	ANOVA	3.435	0.020	3
CHI-Square	Variable	Technique	χ^2	p Value	df
H4	CIO Rank	Chi-Square	5.702	0.769	9
H5	CIO Hiring Status	Chi-Square	1.999	0.573	3
H6	CIO Education Level	Chi-Square	16.279	0.179	12
H7	CIO Education Type	Chi-Square	6.063	0.416	6

A statistically significant effect was noted (F value of 5.007, p value of 0.003) using the ANOVA technique between BSP—ISSP alignment extent and CIO self-perceived transactional leadership score. Transactional leadership mean scores increased as alignment stages increase over the first three stages of alignment (administrative, sequential, reciprocal). Scores for the Reciprocal alignment category were significantly higher than the transactional scores for administrative and sequential categories, but not as compared to the full alignment category. In addition, Least Significant Differences (LSD) variances were found between stages 1-3 (administrative-reciprocal) & 2-3 (sequential-reciprocal). Significant transactional leadership differences were noted over the first three stages of alignment (increasing, at least, up to the reciprocal alignment stage). No such effect was noted for CIO self-perceived transformational leadership.

A statistically significant effect was also noted (F value of 3.435, p value of 0.020) using the ANOVA technique between BSP—ISSP alignment extent and CIO role (attributes that successful IS leaders should possess). The LSD test found a significant difference in variance among the four stages of BSP—ISSP alignment and CIO role scores. It was found that the average CIO role score differs statistically significantly between stages 1-3 (administrative-reciprocal) & (1-4 (administrative-full). It was also found that as BSP—ISSP alignment extent increased for all four stages as the CIO mean role score increased. (See tests of hypotheses in Table 29: Summary of Results).

No other statistical tests of the hypotheses showed significant effects (transformational and alignment, rank and alignment, hiring status and alignment, education level and alignment, education type and alignment). A statistically significant effect was also noted using the ANOVA technique, in an exploratory manner, on CIO

transformational leadership style and CIO role (F value of 5.7019, p value of 0.000). There was, then, a statistically significant effect noted between the degree of transformational leadership and the CIO role score, such that the higher the transformational leadership score, the higher the CIO role score. No such effect was noted for transactional leadership.

In a similar exploratory analysis, a stepwise regression was conducted to further study the interrelationship between CIO role, transactional (TA) and transformational (TF) leadership scores. Values between 0.3 and 0.9 were necessary to be considered significant correlation coefficients. Thus, the stepwise regression model analysis chose TF and excluded TA. The obtained TF value for adjusted R Square was 0.314, which explains 31.4 percent of the dependent variable of CIO role. With a p value of 0.000, TF is highly predictive of CIO role scores. TA was not found to be statistically predictive in the analysis. Pearson Correlation results were 0. 567 for TF and 0.236 for TA.

The demographic information for this sample was interesting in itself. While a diverse group of firms were surveyed, a majority (61.2 percent) of respondents were from manufacturing and services. In addition, 38.8 percent of respondents were located in Michigan and 61.2 percent from Illinois. The majority of respondents (75 percent) represented firms with employees between 101 and 5,000 total employees (with most falling between 1,100 to 5,000 - 28.39 percent) and IS departments (80.3 percent) with IS employees between 1-100 (most possessing 1-25 employees, 57.7 percent). The distribution for annual sales of the firms was bi-modal, with 20 percent of the firms having annual sales of 0-50 million dollars and 22.9 percent having annual sales greater than a billion dollars. Most respondents were male (83.6 percent) as opposed to female

(16.4 percent). The mean age was 46 years, with the majority (84.2 percent) between 41 and 60 years of age.

Most respondents (52.6 percent) reported a external hiring status (being with the firm three or less years before the present position), while 47.4 percent reported an internal status (being with the firm more than three years). Most respondents (46.7 percent) reported their rank as being separated from the CEO by two managerial levels, while 44.7 percent were separated by one level.

Most (83.6 percent) had either an undergraduate degree (47.4 percent) or a master's degree (36.2 percent). Business degrees represented 43.2 percent of the population, computer related degrees 25.7 percent, and other degrees represented 30.9 percent. Finally, most (57.9 percent) of the respondents reported operating from the Reciprocal Alignment Extent category (a reciprocal and interdependent relationship between Business Strategic Planning and Information Systems Strategic Planning) and the Transformational and Transaction leadership scores were somewhat higher here than in the normative sample for their measures.

Table 29: Summary of Results (Alignment Extent with CIO Individual Variables)

$H1_a$	Transformational Leadership Style	Not Supported	The alternative hypothesis was not supported
$H1_o$	Transformational Leadership Style	Accepted	The null hypothesis was accepted
$H2_o$	Transactional Leadership Style	Rejected	The null hypothesis was rejected A statistical significant effect noted, p = 0.003, 3 degrees of freedom, and F value of 5.007 was found. The null hypothesis was rejected.
$H3_a$	CIO Role	Supported	The alternative hypothesis was supported A statistical significant effect noted, p = 0.020, 3 degrees of freedom, and F value of 3.435 was found.
$H3_o$	CIO Role	Rejected	The null hypothesis was rejected
$H4_o$	CIO Rank	Accepted	The null hypothesis was accepted
$H5_o$	CIO Hiring Status	Accepted	The null hypothesis was accepted
$H6_o$	CIO Education Level	Accepted	The null hypothesis was accepted
$H7_a$	CIO Education Type	Not Supported	The alternative hypothesis was not supported
$H7_o$	CIO Education Type	Accepted	The null hypothesis was accepted

Discussion of the conclusions, implications and recommendations of this study are presented in Chapter Five.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Chapter Five will provide a brief summary of the previous chapters, conclusions based on the analyses of the data presented in Chapter Four, the implications of these results, and recommendations relating to IT/Business strategy and the characteristics of IT managers.

Summary

Restatement of the Problem

While operational computing power has increased by several orders of magnitude since 1970 and multi-trillions of dollars are spent yearly on worldwide Information Technology (IT), at least some believe that productivity has stagnated as relates to the amount invested (Berndt & Morrison, 1995; Loveman, 1994; Strassmann, 1999a). There is mixed empirical evidence that increased spending on IT results in long-term competitive advantage or actual benefits to the bottom-line (the productivity paradox). The current status of the IT productivity paradox is, however, unclear.

It has been suggested (Bryan, 1999; Chan, 1999a; Henderson & Venkatraman, 1999b) that the inability to realize value from these investments is due in part to the lack of alignment between the Business Strategy Planning (BSP) and IS Strategic Planning (ISSP) of organizations. The importance of this alignment may be suggested by some

empirical research noting a correlation between BSP—ISSP alignment and the financial outcomes of firms (Bryan, 1999; Chan, 1999a; Chan et al., 1997).

Research has also shown that both business management, in general, and top IS management can affect the degree to which BSP—ISSP is aligned (King, 2000; King & Teo, 1996; Luftman & Brier, 1999; Reich & Benbasat, 1996). Some of the dimensions offered by these researchers that may facilitate the extent of alignment include: top management guidance, IS understanding of the business, the extent of the business and IS partnership, the type of IS Planning methodologies (reactive or proactive) and the IS leadership. It was thought that a major contribution, here, would be to identify which factors might be related to this alignment and how top management might positively impact BSP—ISSP alignment.

Restatement of the Purpose

Little empirical research has been conducted on how the Chief Information Officer (CIO) of the firm may affect the alignment extent between BSSP and ISSP. The purpose of this study, again, was to examine the relationships between CIO individual variables on the extent of BSP—ISSP alignment, and to make some suggestions for management based on this input. Alignment was operationalized here in four stages (administrative, sequential, reciprocal and full alignment) as modeled by Teo and King (1996). The CIO individual variables included: CIO self-perceived leadership style, role, rank, education level, and education type.

Hypothesis

Seven hypotheses were proposed and tested here.

$H1_a$ Those CIO managers showing full BSP—ISSP alignment extent will report more transformational CIO self-perceived leadership styles.

$H1_o$ There is no statistically significant relationship between BSP—ISSP alignment extent types and CIO self-perceived transformational leadership style.

$H2_o$ There is no statistically significant difference for BSP—ISSP alignment extent across CIO self-perceived transactional leadership style.

$H3_a$ BSP—ISSP alignment extent varies significantly on CIO roles. The more fully aligned, the higher the role score.

H3o There is no statistical difference for BSP—ISSP alignment extent and CIO role.

$H4_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO rank.

$H5_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO hiring status.

$H6_o$ There is no statistically significant relationship between BSP—ISSP alignment extent and CIO education level.

$H7_a$ BSP—ISSP alignment extent varies significantly with the education type of the CIO.

Methodology

Surveys and cover letters were sent to 1,102 IS leaders randomly selected from the Directory of Top Computer Executives in the states of Michigan and Illinois. A second mailing was sent two weeks after the first mailing. In all, 152 valid responses (out of the initial useable pool) were returned, for a response rate of 14.7 percent. Top-level executives of the IS departments were asked to respond to the survey.

Conclusion

The results of the study are summarized here and pertinent conclusions are offered with respect to the tested hypotheses.

A statistically significant effect was noted (F value of 5.007, p value of 0.003) using the ANOVA technique between BSP—ISSP alignment extent and CIO self-perceived transactional leadership score. Transactional leadership mean scores increased as alignment stages increased over the first three stages of alignment (administrative, sequential, reciprocal) and Least Significant Differences (LSD) tests found significant differences between stages 1-3 (administrative-reciprocal) & 2-3 (sequential-reciprocal). Transactional leadership seems to be increasing over the first three stages of alignment. No such effect was noted for CIO self-perceived transformational leadership.

No empirical research in the literature review could be located directly examining the relationship of CIO leadership style and BSP—ISSP alignment extent levels. However, research does show a positive correlation between all components of the transformational style: inspirational motivation (IM), intellectual stimulation (IS), and individual consideration (IC) on measures of performance of the organization (Gaspar, 1992; Lowe & Kroeck, 1996; Patterson et al., 1995). This improved performance led the present researcher to hypotheses that full BSP—ISSP alignment extent may be associated with the transformational leadership style—because improved performance within IS was thought to be related to a leader being able to set a course of direction, motivate others and who has strong desires in achieving those objectives.

The apparent disconnect between transformational leadership style and BSP—ISSP alignment is puzzling because of the strong connection, in previous studies,

between such alignment and organizational measures of performance. Perhaps, BSP-ISSP alignment may not be an adequate measure (because of the categorical nature of the choices). Performance of the firm, such as profitability, market share, or return on investment (ROI) is also a very specific measure. Or perhaps, the forces which move firms along the BSP—ISSP alignment evolutionary continuum may not be completely under the control of the IS CIO. Indeed, Teo and King (1997) empirically tested the notion of an evolutionary pattern that moves organizations through the four stages (administrative, sequential, reciprocal, full) of BSP-ISSP alignment: administrative alignment to sequential alignment to reciprocal alignment to full alignment. In the same study, they also empirically tested variables (top management's perception of IT's importance, IS competence) that may influence this evolution. Teo and King found that organizations generally progress through an evolutionary path moving sequentially from administrative alignment to sequential alignment to reciprocal alignment to full alignment. They also found only two individual variables that influenced the extent of BSP-ISSP integration; the perceptions by top business management of IS's importance and the business competence of the IS executive. Perhaps top management did not hold the IS managers here in high-esteem, consequently not sparking them to move in a transformational direction along the BSP—ISSP continuum.

Similarly, Avolio (1999) says that few leaders are purely transactional or transformation. Instead, people use skills in each method, and apply them as situations demand. In time, he says, even transactional relations with followers can form the basis for transformational relations. For example, if you honor all your various transactions with people, over time they come to trust you; and it is higher levels of trust versus

compliance that transformational leaders use as bases for improved performance in many cases (Avolio, 1999).

Burns (1978) suggests that transformational leaders are able to define and articulate a vision for their organizations which the followers accept. Similarly, Bass and Avolio (1995) propose a definition of transformational leadership with four dimensions: (1) idealized influence which results in follower admiration, respect and trust, (2) inspirational motivation- this articulates clear expectations and demonstrates commitment to organizational goals, (3) intellectual stimulation denotes leaders who solicit new ideas and creative solutions to problems, and (4) individualized consideration, which is evidenced by leaders who listen attentively and pay special attention to follower achievement and growth needs.

It is thought that transformational leaders in Information Systems departments would show a willingness to go beyond the status quo—to push the department and team beyond where they are, and to transform the team to a better match with the business strategy. However, this study did not note a statistically significant effect between BSP—ISSP alignment extent types and transformational leadership styles. The typical IS environment, with its rapid pace of development, and high employee turnover (Rothfeder, 1990), may play into how leadership interacts with BSP—ISSP alignment. While transformational leaders would seem to manage differently as compared to transactional leaders, the style may not have time to develop fully in such a rapid paced competitive environment. Then again, this style simply may not be necessary in such organizational settings.

There was, however, a significant transactional leader by alignment effect noted here. Transactional leadership is rooted in bureaucratic authority and legitimacy with the organization. These leaders tend to focus on task completion and employee compliance. The typical IS environment, with its very rapid pace of development, and high employee turnover may play into how leadership interacts with BSP—ISSP alignment. The reliance on organizational rewards and punishments to influence employee performance that transactional leaders typically use, may be more fruitful over the first three stages of BSP—ISSP alignment.

Burns (1978) says that transactional leadership is rooted in bureaucratic authority and legitimacy within the organization. These leaders tend to focus on task completion and employee compliance. Typically leaders, here, rely on organizational rewards and punishments to influence employee performance. As stated earlier, the typical IS environment, with its very rapid pace of development, and high employee turnover, may play an important role in how leadership is demonstrated in BSP—ISSP alignment. The reliance on organizational rewards and punishments to influence employee performance may be more fruitful in such situations.

According to Avolio, (1999) transactional leaders address the self-interests of their followers. The leaders offer inducements to move in the direction they desire, which is thought to satisfy the self-interests of the followers. Perhaps this leader-follower exchange works more effectively over the first three BSP—ISSP alignment stages (administrative, sequential, reciprocal), but is not necessary, nor does it work so well in the fourth stage (full). On the other hand, perhaps the reward and punishment approach fits well with the reciprocal give and take alignment demands (where most of the IS

managers were found to be here). Or perhaps, IS leaders do not possess, or find it easy, to demonstrate some of the so-called higher level transformational styles.

For exploratory purposes, the relationship between CIO transformational leadership (TF) style and CIO roles was also examined. A Pearson product-moment coefficient analysis was completed to obtain the correlation between CIO role and TF. Values between 0.3 and 0.9 were necessary to be considered significant. The result obtained was $r = 0.567$. This correlation could be termed moderately significant. At least in this study, as transformational scores increased, then role scores increased also. In addition, a stepwise regression was run to further study the interrelationship between CIO role, transactional (TA) and transformational (TF) leadership scores. The analysis was run with CIO role as the dependent variable, and both transactional and transformational leadership scores as the independent variables. The stepwise regression model analysis chose TF as a highly significant predictor of role scores and excluded TA. TA was not found to be statistically significant as a predictor of CIO role, at the 0.05 level of significance. These relationships may be an important one to examine in the future.

Using the Analysis of Variance (ANOVA) technique, a statistically significant relationship was noted here between CIO Role as the dependent variable and BSP—ISSP as the independent variable. The test produced an F value of 3.345, with a p value of 0.020, and 3 degrees of freedom. While, no empirical research could be located directly examining the relationship of CIO role and BSP—ISSP alignment extent, there is some empirical research showing a significant correlation between the role of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). This significant correlation between CIO role

and strategic orientation led the present researcher to think that the BSP—ISSP alignment extent may increase with the CIO role, because of implied business orientations within IS and the emphasis on strategic and organizational aspects of IS.

Karimi and Gupta (1996) define the CIO role as "attributes that successful IS leaders should possess" (p. 71). The role of the CIO, therefore, is thought to be associated with behaviors that are implicit for success of the leaders and the organizational subunits they direct. Applegate and Elam (1992) posit that the structure or chosen strategy of the IS department somewhat directs the role adopted by the CIO. When the function of IS is strictly supportive, then the top IS leader may only be a technical expert and a merely competent manager. However, when the firm makes the change to using Information Systems as one of the firm's competitive weapons, the role of the top IS leader may be necessarily extended. The IS leader must begin, here, to act as a link between IS and other executives in the firm. Earl (1989) even suggests that successful top IS leaders see themselves as corporate officers and general business managers. He says that good political skills and a high profile, may place them in contention for top-line management positions. He goes on to delineate four leadership attributes for IS leaders: (1) business leadership- to link the use of IS with the business needs and strategy of the firm, (2) technology leadership- drawing up and implementing technology policies, (3) organizational leadership- directing and steering IS structures and performing the controlling managerial function to make them work, and (4) functional leadership- managing the IS function and the accompanying specialist sub-groups.

Evidence was found, here then, to suggest significant differences among the four stages of BSP—ISSP alignment and CIO Role scores. It was found that the average CIO Role score differs statistically across the following alignment pairs: (1) Administrative—Reciprocal and (2) Administrative—Full. However, it should be noted that the alignment stage was not found to differ statistically or any of the other alignment-role pairs. It was found, however, that as the BSP—ISSP alignment extent increased for all four stages, the CIO Role mean scores increased, in the positive direction. Karimi and Gupta's (1996) assertion that the CIO role as "attributes that successful IS leaders should possess" (p. 71) may have been reflected in the present study and certainly was reflected at the higher levels of alignment—in some cases significantly so.

In addition, as stated earlier in the analyses of hypothesis one and two, CIO role seems to be related to CIO leadership styles—at least, for transformational leaders. A significant relationship was noted between CIO transformational leadership style and CIO roles. For exploratory purposes, a stepwise regression was conducted to further study the interrelationship between CIO role, transactional (TA) and transformational (TF) leadership scores. The analysis was run with CIO role as the dependent variable, and transactional and transformational leadership scores as the independent variables. The stepwise regression model chose TF as the most predictive of role scores and excluded TA. The obtained TF adjusted R Square value was 0.314, which explains 31.4 percent of the dependent variable, CIO role. With a p value of 0.000, TF is highly significant as a predictor of CIO role scores. Again, TA was not found to be statistically significant as a predictor of CIO role. A Pearson product-moment coefficient analysis was also computed to obtain the correlation between CIO role and TF, and CIO role and TA. The results

obtained for transformational leadership and role was $r = 0.567$. This correlation result could be termed moderately significant. The Pearson product-moment coefficient result for transactional leadership and role was $r = 0.236$, and could be termed negligible to low. These results are consistent with the regression analysis, and again seems to suggest an area to be investigated further.

No statistically significant difference was found , at the 0.05 level of significance, between BSP—ISSP alignment extent and CIO rank. The null hypothesis for a Pearson Chi-Square test was that the two groups (dependent and independent variables) were independent of each other. The computed Chi-Square statistic for these groups was not significant. No empirical research could be located directly examining the relationship of CIO rank and BSP—ISSP alignment extent. In fact, the empirical research does not show a significant correlation between the rank of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). This lack of significant previous findings between CIO rank and strategic orientation led the present researcher to suggest that the BSP—ISSP alignment extent would not vary significantly with the CIO rank. And in fact, this prediction held true.

No significant relationship was found, either, between BSP—ISSP alignment extent and CIO hiring status (internal, external). No previous empirical research could be located directly examining the relationship of CIO hiring status and BSP—ISSP alignment extent. The previous empirical research did not show a significant correlation between the hiring status of the CIO (Karimi & Gupta, 1996) and the strategic orientation (defender, prospector, analyzer, reactor) of the organization (Miles & Snow, 1978). The results seem to be consistent with this prediction.

No significant relationship was found, between BSP—ISSP alignment extent and CIO education level (certificate, no degree, undergraduate degree, master's degree, doctorate). The null hypothesis using, a Pearson Chi-Square test was that the groups (dependent and independent variables) were independent of each other. No previous empirical research could be located directly examining the relationship of CIO education level and BSP—ISSP alignment extent. Nor does the literature seem to indirectly address this relationship, so this test was purely exploratory.

Finally, no significant relationship was found, between BSP—ISSP alignment extent and CIO education type (business-, computer-, and other-emphasis).

Limitations

Several possible limitations to this study were identified. The first potential threat is the ability to generalize to other settings or situations. This threat was thought to be reduced by originally surveying a large variety of firms as found in the "Directory of Top Computer Executives". While there is no specific firm size to qualify for placement into this directory, organizations qualified for membership by meeting the following criteria: (1) the ownership of a mainframe computer, minicomputer or 100 or more PCs, (2) a formal MIS staff, and (3) gross annual sales volume of annual sales volume of $50 million or more and (4) an annual IS budget greater than $250,000. It was thought that a wide variety of firm types and sizes were included. The firm location however, was limited to the states of Michigan and Illinois to create geographic homogeneity and this may limit the generalizability of the results somewhat.

Second, while this study gathered data from currently operating firms, the design is cross-sectional. This limits the data collection to a single time period. This design may result in discovering only tentative relationships. Variables not in the design of the study may cause variations in the dependent measures that may not be accurately identified. In addition, multi-year variations may not be reflected in the data that a cross-sectional study reveals.

A third limitation of the study was that much of the data was gathered through self-reports of the respondents. Thus, the respondents may have inflated or deflated some of the variables due to the need to provide logically consistent information. One example might have been that BSP—ISSP alignment may have been poor, which may have been embarrassing to report.

A fourth limitation here was that the sample population response rate was low in terms of absolute numbers and sizes. This could have been a serious limitation.

Top-level executives of the IS departments were asked to respond to the survey. The use of a single respondent might be thought to create information bias. However, since the hoped-for target respondents were top-level IS executives, and no other executives in the organizations were thought to have the necessary broad view necessary to respond to the questions on the survey, other approaches were not found to be feasible. Originally, it was deemed important to have multiple respondents to classify the firm based on its BSP-ISSP alignment extent (administrative, sequential, reciprocal and full). However, a limited research budget restricted the researcher from identifying other top executives in the firms to participate in the survey.

Non-respondent bias was tested using Chi-Square analysis. No statistically significant differences were found between the groups of responding/nonresponding firms, using the variable of number of full-time IS employees. The computed Chi-Square statistic for these groups was 1.999, with 106 degrees of freedom, and an associated probability (p) value of 0.168. Thus, there was, at least based on size of the IS department, no reason to suspect that IS leaders who did not respond to the questionnaire were significantly differently from the managers who did respond.

As may be expected with surveys involving senior executives (Venkatraman, 1989), response rates are typically low. Despite the fact that sufficient data were gathered to carry out the necessary statistical tests, the survey response rate was just under 15 percent. A number of researchers have argued that for studies of this kind, which involve senior company executives, addressing strategic issues and requiring possible sensitive information, this response rate is actually quite good (Venkatraman, 1989). The response rate for this study was at least typical (Bryan, 1999; Chan, 1999a; Chan, Huff, & Copeland, 1996; Grover & Jeong, 1993; Karimi & Gupta, 1996; King & Teo, 1996; Teo & King, 1997).

In defense of the generalizability of the results, for this study, data was obtained from a variety of firms in terms of employees, annual sales and organizational IS computer systems. Thus the findings may be generalizable to similar organization, under similar selection conditions, in the United States.

Recommendations for Further Research

Since CIO self-perceived transactional leadership style was found to be significantly related to BSP—ISSP alignment extent, more research should be conducted to determine the exact nature of IS leader behavior as relates to alignment levels. Other research might also examine for whether IS managers can change their leadership styles (leadership development) if they desire to be more transformational. This research might be done using IS leaders and followers to capture any unique dynamics within such a diverse and fast paced environment. In addition, the interrelationships of transactional leadership and transformational leadership and BSP—ISSP should be further explored regarding the ability of these variables to predict CIO role scores and vice versa.

A statistically significant relationship was also noted between CIO role and transformational leadership style. The interrelationship of these two variables may be important and requires further research; especially in regards to how IS transformational leaders demonstrate their roles. All of this analysis could also be tied back to BSP—ISSP alignment. These relationships should be also examined as relates to departmental performance measures. The present study did not examine leadership styles, alignment and organizational performance differences—this area is ripe for study.

The researcher recommends that additional studies utilizing larger and more diverse samples be conducted to further clarify many of these findings.

The demographic information was interesting and while the total population sample was from a diverse group, the majority of respondents were from the manufacturing and service sector. Most represented firms with small to medium number

of total employees, small number of IS employees, male and a mean age in the mid-forties.

Future research should also be done to determine if there is any relationship between CIO leadership style, other demographic variables and IS departmental performance outcome measures. Additional variables that might be examined include: corporate culture, the environments of IS departments and how these environments relate to leader behaviors and typical alignment levels, gender, and even impression management skills.

There is also a need to address industry types in relationship to BSP—ISSP alignment extent and/or, the size of the firm as relates to BSP-ISSP alignment extent. Although it was thought that some industry variety and different sized organizations were captured here, perhaps further/larger firms may yield clearer (or perhaps different) results.

Since transactional leadership style and CIO role were found to be significantly related to BSP—ISSP alignment extent, leaders should periodically assess the status of their own leadership characteristics in order to take corrective, developmental or preventive actions as warranted. Also, more workshops/seminars on leadership should be held simultaneously for both leaders and followers of IT groups. These ideas may have organizational/performance implications. If anything, these ideas may have tremendous implications for the IS/business alignment functions.

Recommendations for Practitioners and Organizations

It is recommended that top IS managers familiarize themselves with the current research on effective leadership styles and utilize this research in their endeavors to improve the BSP—ISSP alignment extent, if they so desire. IS managers must also keep abreast with, and utilize the research findings, with regards to factors which influence organizational performance outcome measures, organizational relationships and the variables that might result in real organizational differences. This information could be crucial if IS leadership is to be put into proper perspective.

Since transactional leadership style and CIO role were found to be significantly related to BSP—ISSP alignment extent, leaders should periodically assess the status of their own leadership characteristics, as results to their alignment goals. Also, more workshops/seminars on leadership should be held. These sessions could be very revealing.

Summary

Researching the relationship between the BSP—ISSP alignment extent and CIO individual variables was informative. A statistically significant effect was noted between the BSP—ISSP alignment extent and the degree of transactional leadership of the CIO, such that the higher the transactional leadership score, the higher the degree of BSP—ISSP alignment, at least for the first three stages. In contrast, no statistically significant difference between BSP—ISSP alignment extent and CIO transformational self-perceived leadership style was found. In addition a statistically significant effect was noted between the BSP—ISSP alignment extent and the CIO role score, such that the

higher the CIO role score, the higher the degree of BSP—ISSP alignment, for alignment stage companions one-three and one-four.

This study also found a moderately statistically significant effect, using a Pearson product-moment correlation result between CIO role and transformational leadership style ($r = 0.567$). The interrelationship of these two variables may be important and requires further research; especially in regards to how IS transformational leaders might demonstrate their roles in developing BPS—ISSP alignment. The need for effective IS leadership is thought by some to be a business imperative. As a part of this mix, top IS leadership styles may play an important part in BSP—ISSP alignment process—but many issues remain to be answered.

Research has also shown that both business and top IS management can affect the degree to which BSP—ISSP is aligned (King, 2000; King & Teo, 1996; Luftman & Brier, 1999; Reich & Benbasat, 1996). The dimensions that may facilitate the extent of alignment include: top management guidance, IS understanding of the business, the extent of the business and IS partnership, the type of IS Planning methodologies (reactive or proactive) used and the type of IS leadership used (Bass & Avolio, 1995b). The correlation of BSP—ISSP alignment to so many of the productivity and profitability outcomes of firms emphasizes the importance of understanding such alignment dimensions (Bryan, 1999; Chan, 1999a; Chan et al., 1997). The present study sheds some light on how better alignment may be accomplished through possible leadership strategies and IS leader roles. Clearly, much further research needs to be conducted on individual CIO variables and their relationship to BSP—ISSP alignment.

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Appendix A

Questionnaire

Demographic Information

Name:_____

*Title:*_____

Organization: _____

E-mail: _____
(To be used only to return a summary report to you.)

Number of employees: Fewer than 50 ☐ 51 to 100 ☐ 101 to 500 ☐ 501 to 1,000 ☐
1,001 to 5,000 ☐ 5,001 to 10,000 ☐More than 10,000 ☐

Annual sales: $0 to 50 million ☐ $51 to 100 million ☐ $101 to 250 million ☐
$251 to 500 million ☐ $501 to 1,000 million ☐ More than $1,000 million ☐

Your education:
Certification ☐ No college degree ☐ Undergraduate degree ☐ Master's degree ☐
Doctorate ☐

Certificate or degree emphasis: Business ☐ Computer ☐ Other ☐

Specific certificate: _____

Gender: M ☐ F ☐ Age: _____

Number of years with the organization before assuming your current managerial position: _____

Number of reporting levels separating yourself and the head of the business unit. For example, if the top IS manager reported directly to the CEO, the two would be one level apart.

☐ Zero ☐ One ☐ Two ☐ Three or more

Number of fulltime employees solely or primarily involved in IS department or function: _____

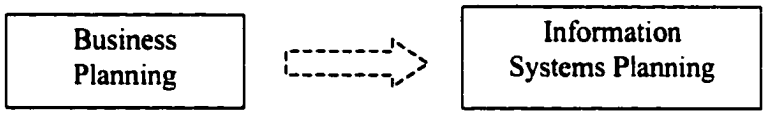
Strongly Disagree 0	**Disagree** 1	**Not Sure** 2	**Agree** 3	**Strongly Agree** 4

1.	I see myself as a corporate officer.	0	1	2	3	4
2.	In my organization, I am seen by others as a corporate officer.	0	1	2	3	4
3.	I am a general business manager, not an IS specialist.	0	1	2	3	4
4.	I am a candidate for top-line management positions.	0	1	2	3	4
5.	I have a high-profile image in the organization.	0	1	2	3	4
6.	I have political as well as rational perspectives of my organization.	0	1	2	3	4
7.	I spend most of my time outside of the IS department focusing on the strategic and organizational aspects of IS.	0	1	2	3	4
8.	I spend most of my time inside the IS department managing the function on a day-to-day basis.	0	1	2	3	4

Business & IS Strategic Alignment

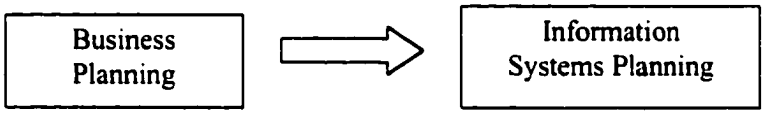
Please indicate with a check mark the description that most closely fits your current Business Strategic Planning (BSP) – Information Systems Strategic Planning (ISSP) alignment.

( ) **Administrative Alignment**



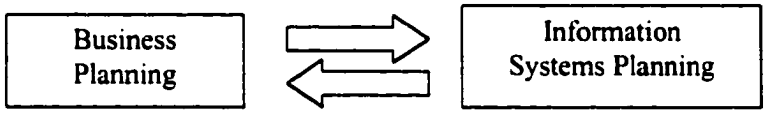
In this type of integration there is a weak relationship between Business Strategic Planning (BSP) and Information Systems Strategic Planning (ISSP) as shown by the dotted arrow above. Generally, there is little significant effort to use Information Technology (e.g., computers, telecommunications, etc.) to support business plans.

( ) **Sequential Alignment**



In this type of integration, a sequential relationship exists between Business Strategic Planning (BSP) and Information Systems Strategic Planning (ISSP). BSP provides directions for ISSP. This relationship is denoted above by a unidirectional arrow flowing from BSP to ISSP. ISSP primarily focuses on providing support for business plans.

( ) **Reciprocal Alignment**



In this type of integration, there is a reciprocal and interdependent relationship between Business Strategic Planning (BSP) and Information Systems Strategic Planning (ISSP). There are therefore two arrows shown above; one flowing from BSP to ISSP, and the other arrow flowing from ISSP to BSP. ISSP plays both a role in supporting and influencing business plans.

( ) **Full Alignment**

In this type of integration, there is little distinction between the Business Strategic Planning (BSP) and Information systems Strategic Planning (ISSP). In this stage, Business and Information Systems strategies are developed concurrently in the same integrated planning process.

Leadership Style

This questionnaire is to describe your leadership style as you perceive it. Please answer all items on this answer sheet. Twenty descriptive statements are listed on this page. Judge how frequently each statement fits you. The word "others" may mean your peers, clients, direct reports, supervisors, and/or all of these individuals.

Use the following rating scale:

Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
0	1	2	3	4

1. I provide others with assistance in exchange for their efforts.	0	1	2	3	4
2. I re-examine critical assumptions to question whether they are appropriate.	0	1	2	3	4
3. I focus attention on irregularities, mistakes, exceptions and deviations from standards.	0	1	2	3	4
4. I seek differing perspectives when solving problems.	0	1	2	3	4
5. I talk optimistically about the future	0	1	2	3	4
6. I discuss in specific terms who is responsible for achieving performance targets.	0	1	2	3	4
7. I talk enthusiastically about what needs to be accomplished.	0	1	2	3	4
8. I spend time teaching and coaching.	0	1	2	3	4
9. I make clear what one can expect to receive when performance goals are achieved.	0	1	2	3	4
10. I treat others as individual rather than just as a member of a group.	0	1	2	3	4
11. I concentrate my full attention on dealing with mistakes, complaints, and failures.	0	1	2	3	4
12. I keep track of all mistakes.	0	1	2	3	4
13. I articulate a compelling vision of the future.	0	1	2	3	4
14. I direct my attention toward failures to meet standards	0	1	2	3	4
15. I consider an individual as having different needs, abilities, & aspirations from others.	0	1	2	3	4
16. I get others to look at problems from many different angles	0	1	2	3	4
17. I help others to develop their strengths.	0	1	2	3	4
18. I suggest new ways of looking at how to complete assignments	0	1	2	3	4
19. I express satisfaction when others meet expectations	0	1	2	3	4
20. I express confidence that goals will be achieved.	0	1	2	3	4

Appendix B

Informed Consent Letter

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Informed Consent Letter

Dear John Smith
Director- MIS

I am an Assistant Professor of Business at Cornerstone University. I am also a doctoral candidate with the University of Sarasota, presently conducting research with top managers of computer departments (IS, IT, etc.).

The purpose of this research is to examine the issues involved in how the alignment of Business Strategic Planning and IS Strategic Planning is affected by top computer managers. If you agree to participate in this study, you are asked to complete the enclosed survey and return it in the attached self-addressed, postage paid envelope within the next ten days.

The survey will take no longer than twenty minutes to complete. Your participation in this research is strictly voluntary. The information you provide for this research will be treated confidentially, and all raw data will be kept in a secured file by the researcher. The data and results will be presented only in aggregate form. The identity of all individuals and organizations will be strictly confidential. In responding to this survey, you are granting permission to use this information in the manner described.

While there will be no direct personal benefits from your participation in this research, the findings of this study will be shared with all individuals that participate. This report will be sent via e-mail those who provide an email address. (No other use will be made of this address.) Otherwise, a formal printed report will be sent via regular mail.

It is anticipated that this research will be beneficial to those organizations who expend large sums annually to implement Information Technology effectively. Thank you for your time and willingness to participate.

Please feel free to contact me. Remember your information will be confidential.

Sincerely,

Michael L. Young
Assistant Professor of Business
Cornerstone University