

# FROM INNOVATIVE I.S. STRATEGY TO CUSTOMER VALUE: THE ROLES OF INNOVATIVE BUSINESS ORIENTATION, CIO LEADERSHIP AND ORGANIZATIONAL CLIMATE

**RUNNING TITLE:** *From Innovative IS Strategy to Customer Value*

## **Abstract**

*While information systems (IS) have traditionally been used primarily for firm-wide operational efficiency, emerging theoretical perspectives have shifted scholarly focus to IS as a force that can drive value through business innovation. This study examines how IS strategy creates customer value through an innovative business orientation and how IS leadership and the organizational context can influence the relationship between innovative IS and business strategies. Integrating several research streams under the umbrella of the IS strategic management literature, we develop and empirically validate a research model based on confirmatory analysis and structural equation modeling applied to survey data collected from senior IS executives in 165 organizations based in the United States and India. Our results suggest that organizations that have an innovative IS strategy are well positioned to engage in business innovation, which in turn yields greater customer value. Furthermore, we find that strong IS leadership and a creative organizational climate enhance the relationship between an innovative IS strategy and innovative business orientation.*

**Keywords:** *Innovative IS Strategy, Innovative Business Orientation, Chief Information Officer, Customer Value, Organizational Climate*

# 1. INTRODUCTION

Innovation in business, that is, the pursuit and development of novel products, services, or processes, is vital to bringing superior customer value and advantage to firms competing in an increasingly complex and fast changing marketplace (Craighead et al., 2009; Sambamurthy et al., 2003; Smith and Tushman, 2005). As such, many contemporary firms have the incentive to pursue innovations around their core business strategy. In this study, we employ the term *innovative business orientation* to describe a business strategy that relies on continued market experimentation and customer knowledge to constantly seek new business opportunities in relation to existing products/services, as well as seek first mover opportunities for new products and services (Miles and Snow, 1978; Venktraman, 1989). Since an ever increasing proportion of business innovations are being driven by information systems (IS) or IS-enabled strategic initiatives (Chatterjee et al., 2006; Peppard and Ward, 2004; Piccoli and Ives, 2005), there is consequently great interest in understanding the relationship between innovation focused IS strategy and innovative business orientation.

While traditionally the role of IS has often been to facilitate firm-wide operational efficiency, emerging conceptualizations of corporate IS have shifted emphasis with regard to the role of IS in shaping the business strategy of the firm (Chen et al., 2010a; Sambamurthy et al., 2003; Wang, 2009). In such a role, IS has the potential to fundamentally “transform” the competitive forces of the industry within which a firm operates by altering products and markets (Armstrong and Sambamurthy, 1999; Wang, 2009), driving digitally-enabled business innovation (Wheeler, 2002), creating “options” and capacities for launching strategic initiatives (Sambamurthy et al., 2003; Singh et al., 2011), and creating a sustained competitive advantage through IS resource barriers (Piccoli and Ives, 2005). Correspondingly, IS strategy has been recognized as a shared perspective regarding the role that IS plays within the organization and as a guiding framework for IS-related business decisions and activities (Chen et al., 2010a). In

particular, an *innovative IS strategy* (i.e., the “IS Innovator”), represents an organizational perspective to continuously seek to be innovative through new IS initiatives, including taking risks to adopt novel technologies and/or exploring new ways to leverage existing IS resources (Chen et al., 2010a).

Organizations have often sought to generate enhanced firm performance by dedicating organizational resources toward information technologies (IT) investments; however, the substantial IT investments have been widely noted to have mixed results on performance (Tallon et al., 2000). Consequently, considering the uncertainty of business benefits derived directly from IT investments, some researchers have sought to understand the strategic impact of IS to organizational performance through business strategy. However, the few existing studies that have argued that IS can be the driving force behind business strategy and competitive action are primarily conceptual [e.g.,(Chen et al., 2010a; Galliers, 2004; Piccoli and Ives, 2005; Wheeler, 2002)]. As such to advance research in this domain, it is important to conduct empirical research in this stream to provide theoretical advancement to the emerging literature on IS-driven business strategy. The current study aims to fill the above gap by offering theoretical extension and empirical evidence to the relationship between an innovative IS strategy and customer value through innovative business orientation<sup>1</sup>.

Furthermore, it is also essential to examine the contingencies which may potentially influence the extent of the influential relationship between IS strategy and business strategy. Prior strategic management literature has suggested that, in addition to the competitive environment, business strategy is also a function of various organizational factors (Henderson and Mitchell, 1997; Johns, 2006) which often include executive leadership (Hambrick et al., 1996) and organizational climate(Amabile, 1996; Amabile et al., 1996; Neal et al., 2005; Preston et al., 2008a). Following these traditions within the strategic management domain, we apply two

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<sup>1</sup>The extant literature has generally proposed that it is the business strategy that drives the IS strategy. However, the focus of the current study is that, under certain circumstances, IS strategy could also drive business strategy, which has not been widely addressed in the literature.

highly relevant contingency factors to our research context: 1) the executive leadership role of the Chief Information Officer (CIO); and 2) and a creative organizational climate<sup>2</sup>. We contend that the CIO's leadership role and organizational climate can potentially influence the degree to which an innovative IS strategy promotes a business strategy towards innovation.

To be specific, the study seeks to address the following research questions: 1) Does an innovative IS strategy drive an organization's innovative business orientation?; 2) Does an innovative business orientation mediate the influence of innovative IS strategy on customer value?; and 3) How do the CIO's leadership role and organizational climate influence the relationship between IS strategy and innovative business orientation?

By integrating several research streams under the umbrella of the IS strategic management literature, we develop and empirically validate a model suggesting that organizations that employ an innovative IS strategy are well positioned to engage in innovative business orientation. Furthermore, we provide evidence showing that an innovative business orientation delivers customer value and mediates the influence of innovative IS strategy. In addition, our findings suggest that both the CIO's leadership role and organizational climate enhance the degree to which an innovative IS strategy will positively influence innovative business orientation.

In the next section, we present the research model and develop the hypotheses. We then describe the details of the field survey methodology, including the process that we employed to test the research model. We follow with a discussion of the research findings and their implications for future research and practice. In the final section, we provide a summary conclusion.

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<sup>2</sup> The two moderating variables were chosen based on literature as well as their relevance to the current study. Also, the number of moderators was limited to this set for the purpose of parsimony. We note that there may be other contextual variables that can potentially shape an organization's business strategy (e.g., firm size, industry, top management team characteristics, etc.). We included additional relevant variables as control variables to test our research model, which we describe later in the paper.

## **2. RESEARCH MODEL AND HYPOTHESES**

### **2.1. Conceptual Background and Research Model**

The conceptual framework of this study is grounded within multiple streams of research that fall under the overarching domain of strategic IS management. Specifically, four highly relevant research streams have guided our thoughts in developing the research model: 1) IS strategy literature (Chen et al., 2010a; Earl, 1989; Galliers, 1993; Galliers, 2004; Ross et al., 2006; Sabherwal and Chan, 2001); 2) IS-enabled business innovation literature (Piccoli and Ives, 2005; Wang, 2009; Wheeler, 2002); 3) IS leadership (i.e., the CIO) literature (Armstrong and Sambamurthy, 1999; Chen et al., 2010b; Preston et al., 2008a); and 4) organizational climate (Amabile et al., 1996; Schneider, 1975; West and Anderson, 1996). The first stream of literature has traditionally focused on the use of IS to support business strategy, implying that the particular business strategy is central to determining IS strategy. It focuses on concepts such as strategic alignment between business strategy and IS strategy (Chan et al 1997), and between business strategy/critical success factors and applications (Sabherwal and Chan 2001, Henderson and Venkatraman 1993, Segars and Grover 1999). Emerging conceptual ideas from the second stream of literature suggest that an organization's IS capabilities can be a driver of positive competitive outcomes such as customer value, through business innovation (Gefen, 2002; Kim et al., 2011). In conjunction, there is the idea, therefore, that IS strategy should not only support but also potentially nudge or stretch the business strategy (Earl 1989, Preston and Karahanna 2009, Galliers 2004). Extant studies have suggested that IS strategy can potentially drive business strategy by enabling possible new products, processes (Wheeler 2002) and strategic initiatives (Sambamurthy et al., 2003; Singh et al., 2011). The third stream of literature suggests that effective strategic IS leadership within the organization can influence the relationship between IS strategy and business strategy (Chen et al., 2010b; Feeny and Willcocks, 1998). In addition, we also draw on the literature on organizational climate (Amabile

et al., 1996; Schneider, 1975) that promotes organizational creativity (Amabile, 1996; West and Anderson, 1996) to enrich our theoretical development.

Based upon this cumulative theoretical foundation that informed this paper's research questions, and as shown in the organizing theoretical framework in Table 1, we note the following observations. First, there is substantial literature describing IS strategy as a support for the strategic objectives of the business initiatives. Second, although recent *conceptual* ideas suggest the possibility of IS strategy as a potential enabler or driver of strategic business objectives, there is a significant need for theoretical clarification and empirical validation on how this could happen (Chen et al., 2010a). Third, there is a dearth of studies that examine the pathways through which IS strategy could affect business outcomes such as customer value or competitive advantage. This paper addresses the research gaps identified in Table 1.

Insert Table 1 about here

Specifically we developed a research model which links innovative IS strategy to customer value through an innovative business orientation as outlined in the nomological network presented in Figure 1. This model also suggests both the CIO leadership and organizational climate have a positive moderating effect on the relationship between an innovative IS strategy and an innovative business orientation. The details of the concepts and theories that provide support for this model are embedded in the following paragraphs describing the hypotheses development.

Insert Figure 1 about here

## **2.2. Innovative Business Orientation and Customer Value**

We first discuss the relevance of an innovative business orientation to the firm. An innovative business orientation is geared toward exploring opportunities for the development of new products/services and markets. Such a strategic orientation is exemplified by the prospector strategy (Miles and Snow, 1978) to the extent that product innovation and new product introduction form the basis for differentiation, which has the potential to deliver

competitive advantage to the firm (Porter, 1985). Furthermore, this idea is consistent with the futuristic and proactive stances described by the strategic orientation of business enterprises (or STROBE) conceptualization (Venktraman, 1989) which suggest that organizations can be strategically oriented toward innovation by proactively seeking new business opportunities relating to current and future or potential products<sup>3</sup>. Specifically, the aspects of an innovative business orientation would include locating and exploiting new market opportunities, facilitating change in the industry, and growing through product/market development.

The strategic management literature has suggested that firms with an innovative business orientation are future oriented (Gatignon and Xuereb, 1997) with a focus to anticipate and meet customer needs (Siguaw et al., 2006). As such, these firms are more likely to follow practices devoted to gathering information about customer and competitor offerings (Siguaw et al., 2006). Such practices, which entail understanding customer preferences and evaluating competing products, facilitate the extent to which the firm is able to constantly develop products that are superior to those of its competitors and of greater value to customers (Danneels, 2002; Pavlou and El Sawy, 2006). In this way, the firm is able to carry out sustained product innovation to keep products and services useful, novel and relevant to value creation (Rindova and Petkova, 2007). The above findings are consistent with the conceptualization of the prospector firm (Miles and Snow, 1978), implying customers are expected to have a positive perception of the firms with innovative business orientation due to the possible wide range of product/service offerings by these firms as well as the user-friendly functionality and features (Gefen, 2002).As suggested by these observations, the current study examines the organizational outcome of an innovative business orientation through the lens of customer value, and posits:

*H1: An innovative business orientation is positively associated with customer value.*

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<sup>3</sup>The STROBE construct has several dimensions that describe specific business orientations, of which “proactive” and “futuraity” imply an innovative orientation, and have been considered in this study.

### **2.3. Innovative IS Strategy and Innovative Business Orientation**

The traditional business/IS strategic alignment literature conceptualizes IS strategy as the adoption and implementation of IS by an organization to support its business strategy and objectives (Chan et al., 1997a; Chan et al., 1997b; Earl, 1989; Sabherwal and Chan, 2001). This conceptualization has been considered the standard approach for most organizations in the initial phase of IS deployment where the primary role of IS in this phase was to automate business transactions, enable cross-functional integration, support decision-making and transform business processes (El Sawy, 2003; Ross, 2003) in support of the business strategy. In more recent years, however, there has been even greater emphasis of the role IT plays, when it is deeply embedded in both product and process routines, in enabling the creation and delivery of new products and services (Singh et al., 2011; Wang, 2009; Wheeler, 2002).

Consequently, the role of IS has evolved appreciably for many organizations – from that of a baseline component for operational efficiency to an enabler of product design and delivery as well as a platform for inter-organizational partnerships. As such, the strategic potential for IS to become an organizational weapon, alluded to in a number of early conceptualizations of the strategic role of IS (Galliers, 1993; King and Teo, 1994; McFarlan et al., 1983; Porter and Millar, 1985) has now acquired greater conceptual tangibility; IS can serve as sources of sustained resource barriers and as options for future products, thereby transforming businesses and serving as a critical source for competitive advantage (Hidding, 2001; Piccoli and Ives, 2005; Sambamurthy et al., 2003). Accordingly, researchers have more recently suggested that IS strategy should not be simply treated as a supporter of business strategy. Rather IS strategy, in so far as it can reveal possibilities for new firm offerings, can also be a driver of the business's strategic orientation (Agarwal and Sambamurthy, 2002; Baker et al., 2011; Galliers, 2004; Ross et al., 2006; Sabherwal et al., 2001). Recent developments in IS strategy literature have therefore emphasized that IS strategy can and, at times, should act as the driver of the business strategic objectives (Chen et al., 2010a; Galliers, 2004; Tanriverdi et al., 2010).

The relationship between IS strategy and the business's strategic objectives is contingent upon the nature of the IS strategy itself (Chen et al., 2010a). For instance, Chen et al. (2010a) propose that for organizations with a conservative IS strategy (i.e., IS conservatives), business strategy is more likely to drive IS strategy. In contrast, organizations with an innovative IS strategy (i.e., IS innovators) are well positioned to drive business strategy<sup>4</sup>. The basis for this argument is that organizations with an innovative IS strategy are among the earliest in their industry to respond to opportunities from new IS and develop new IS initiatives (Chen et al. 2010a). Such activities can reveal possibilities for innovative IT-enabled economic opportunity and novel business strategies (Wheeler 2002). Furthermore, firms with an innovative IS strategy are often required to be at the vanguard of their industry with regard to their ability to develop and effectively utilize IS and thus constantly look for ways of leveraging new and existing IS resources to develop and deliver new firm level business initiatives (Chen et al., 2010a). As such, an innovative IS strategy enables the firm to be more strategic be more open and proactive in sensing opportunity and potential for launching innovative products and processes (Piccoli and Ives, 2005), and thereby enhances an innovative business orientation. Thus, we posit:

*H2: An innovative IS strategy is positively associated with an innovative business orientation.*

A number of papers have put forward the premise that IS can be a driver of positive competitive outcomes. However, the empirical works that have tested the direct link between IS investments and firm performance have shown mixed results (Karimi et al., 2001; Kohli and Devaraj, 2003). Recent literature (Piccoli and Ives, 2005; Wheeler, 2002) suggesting that the influence of IS on organizational outcomes requires intervening mechanisms. For example, Wheeler (2002) contends that intermediate processes exist through which IS resources facilitate

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<sup>4</sup> According to Chen et al. (2010a), both the innovative and conservative IS strategies are useful and applicable across contemporary organizations, although each interacts with business strategy in a different manner.

customer value. Piccoli and Ives (2005) posit that IT assets (such as infrastructure and repositories), IT capabilities (i.e., technical, managerial, and personal skills) and IT driven process change can lead to sustained competitive advantage from IS-enabled business initiatives.

Similarly, we propose that the path from an innovative IS strategy to business outcomes could also be progressive. Emerging conceptualizations of IS strategy (Chen et al., 2010a; Tanriverdi et al., 2010) help to clarify the circumstances under which IS strategy might drive business strategic moves (i.e., when the IS strategy is innovation focused). The literature (Wheeler, 2002) also suggests that the pursuit of innovative products and services (borne in part out of an innovative business orientation) that are enabled by innovative IS strategy should ultimately lead to value for the customer. We draw from these theoretical logics to suggest that an innovative business orientation can act as an intermediate channel through which an innovative IS strategy will potentially drive business outcomes<sup>5</sup> such as, in the context of the current study, customer value. For example, an innovative IS strategy that promotes the use of digitized enterprise work processes and knowledge systems could promote an organization-wide innovative business orientation that calls for identifying possibilities for competitive actions based upon digital options (Sambamurthy et al., 2003). Such an innovative business orientation is likely to bring marketplace advantages to the firm and eventually create customer value (Wheeler, 2002). Stated formally, we posit:

*H3: Innovative business orientation mediates the influence of innovative IS strategy on customer value.*

#### **2.4. The Moderating Effect of CIO Leadership**

The hypothesized link between IS strategy and innovative business orientation is based upon an underlying assumption that the ultimate goal of organizations for investing in IS/IT is to

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<sup>5</sup> We wish to note our ingoing assumption is that IS are viewed as being strategically important to the firm. If not, this proposition may not hold.

improve business performance. However, as we have noted, findings of prior studies on IT pay-off are mixed. Recent IS leadership research suggests that the variation in organizational benefits derived from IT is partly contingent upon the leadership role that the CIO performs (Chen et al., 2010b; Karimi et al., 1996; Preston et al., 2008b). In particular, the CIO plays a primary role in IS assimilation and IS effectiveness (Armstrong and Sambamurthy, 1999; Preston et al., 2008b). The extent to which the CIO is an effective strategic visionary can influence the contribution of IS to strategic growth of the firm (Chen et al., 2010b) .

On the one hand, with the growing dependence of business on information systems, today's CIOs are typically members of the upper echelon of organizations. On the other hand, although they may have a "seat at the table", many CIOs actually do not have the same level of strategic decision-making authority as that of other business executives (Kaarst-Brown, 2005; Preston et al., 2008a). CIOs are often absent from the organization's strategy formulation due to gaps between functional backgrounds, knowledge structures, and mental models with the top management team who are ultimately the decision-making body for the organization (Preston and Karahanna, 2009). In addition, a notable proportion of CIOs are granted limited strategic decision-making authority due to their personal shortcomings as organizational leaders; however, the presence of an effective CIO is paramount to ensuring that the tenor of the firm's IS strategy and business orientation are consistent with one another (Preston et al., 2008b).

Hence, we suggest that the CIO, as the organization's top IS executive, will play an intrinsic role in establishing a connection between innovative IS strategy and innovative business orientation. To be effective, CIOs are responsible for educating business executives regarding strategic implications of IT investment, promoting the strategic vision for IS to the entire organization, making critical strategic decisions in resource allocation, and coordinating between internal and external stakeholders to generate new ideas for business improvement / innovation (Carter et al., 2011). These responsibilities are critical to bridging the knowledge gaps between the IS and business sides (Grover et al., 1993; Preston and Karahanna, 2009).

Furthermore, IS strategy is cross-functional as it encompasses product, process, and human resources (Lefebvre et al., 1997). The CIO is often the key figure responsible for overall strategic IS decisions, for representing the IS function to the rest of the firm, for securing organization-wide commitment and resources in support of IS strategy, and for aligning the IS strategy with business orientation (Preston et al., 2008b). Therefore, we argue that in organizations with CIOs who effectively act as organizational leaders, innovative IS strategies can more effectively enhance an innovative business orientation. Thus, we posit:

*H4: The association between innovative IS strategy and innovative business orientation is positively moderated by CIO leadership role.*

## **2.5. The Moderating Effect of Organizational Climate**

The formulation of business strategy is often contingent upon organizational context (Johns, 2006). The strategic management literature has particularly emphasized the role of the social context of the organization in empowering the strategic direction of the firm (Eisenhardt and Zbaracki, 1992). We thus examine organizational social context as another key moderating factor that can facilitate the relationship between IS strategy and business orientation. The social context of the organization can be conceptualized in terms of the organizational climate<sup>6</sup>, which is the shared perception among organizational members of the organizational practices and procedures and provides an indication of the institutionalized normative systems that guide behavior (Neal et al., 2005; Schneider, 1975). Specifically, and as relevant to innovation, we consider an organizational climate that promotes creativity (Amabile, 1996; Amabile et al., 1996; Preston et al., 2008a), defined as an organizational social context that encourages members to

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<sup>6</sup>In certain organizational behavior literature, the terms of culture and climate are used interchangeably, which could cause confusion to readers. The authors believe culture and climate are two different concepts. In particular, organizational culture is a broader concept that includes the organization values, visions, norms, working language, systems, symbols, beliefs and habits. We emphasize the role of organizational climate which describes a social context of the organization that shapes shared perception among organizational members.

be creative, engage in risk-taking, and take-up challenges (Amabile and Khaire, 2008; Woodman et al., 1993).

It is important to note that, conceptually, the climate for creativity described in strategic management literature is different from the traditional psychological approach to creativity. As pointed out by Amabile et al. (1996), while the psychology literature focuses on identifying the characteristics of creative individuals, an organizational climate for creativity emphasizes the social environment that can influence both the level and the frequency of creative behavior. Recently, the concept of organizational climate for creativity has been introduced to strategic IT management literature. For example, Preston et al. (2008a) examine the influence of organizational climate to CIO decision making authority. Other scholars (Leidner et al., 2010) have found that organizational climate has a significant impact to the level of IT innovation in hospitals. Furthermore, Chen et al. (2010a) also suggest that organizations that promote a creative climate are more likely to develop innovative IS strategies.

We are interested in examining the moderating effect of an organizational social context or climate that promotes creativity because, by nature, an innovative business orientation demands creative ideas for novel products and processes (Madjar et al., 2002; Shankar, 2006). Further, within the extant literature, there is evidence suggesting that an organizational social context encouraging employee creativity can make an important contribution to innovation in the organization (Amabile, 1996). Organization environments that encourage and facilitate creativity are in general characterized as “organic” (Burns and Stalker, 1966). They have low levels of bureaucracy and formalization and hence facilitate flexibility for quick adaptation to market changes. Such organizations are characterized as providing incentives for new ideas (Barczak et al., 2007), tolerating deviance and non-conformity (Mainemelis, 2010; Nemeth, 1997; Plucker and Runco, 1999; Staw, 1995), eliminating tight controls (Moss-Kanter, 2006), establishing supervisor and peer support for new and potentially unpopular ideas (Madjar et al., 2002), and having participative work structures (Woodman et al., 1993).

For several reasons, such an internal climate may afford a firm greater latitude in appropriating an innovative business orientation from an innovative IS strategy. First, it prepares employees for those tasks that are necessary for innovation such as: ideation (Shalley et al., 2004), collaboration, learning and exploration, sharing of ideas (Amabile and Khaire, 2008), experimentation (Harkness and Kettinger, 1996) and risk taking (Woodman et al., 1993). Second, such a climate facilitates organizational-wide activities of technology scanning and identification of IS-based business opportunity, which are essential aspects of the link between an IS strategy that is innovative and a business orientation that is focused on innovation (Earl, 1989; Wheeler, 2002). Third, such a climate may allow IS professionals to identify emerging IT of potential value to the business by following technology trends and to disseminate awareness of these technologies to managers in other business functions (Feeny and Willcocks, 1998). In this vein, an organizational climate that promotes creativity also helps IS professionals envision and assist the development of new products and processes based on IT (Applegate et al., 2003), such that the innovative orientation of the business can draw from the innovation focus of the IS strategy. And fourth, for an innovative IS strategy, IS planning and interfacing activities are expected to reflect an innovation and creativity focus (Lederer and Sethi, 1996; Segars and Grover, 1999; Swanson and Ramiller, 2004); the presence of an organizational climate that encourages creativity can leverage that to strengthen the slant of that focus toward an innovative orientation for the business itself. Thus, we posit:

*H5: An organizational climate that encourages creativity positively moderates the relationship between an innovative IS Strategy and an innovative business orientation.*

### **3. METHODS, ANALYSIS AND RESULTS**

To test the research hypotheses, we employed a field study approach to collect data from CIOs through a questionnaire. In the following sections we discuss: 1) item development and questionnaire design; 2) data collection procedures; and 3) analysis of results.

### **3.1. Item Development and Questionnaire Design**

The questionnaire contains a number of existing valid instruments that were adapted to the current context. Where validated scales did not exist, new items were created following the standard instrument development procedures. All constructs were measured using multi-item scales, each item being measured along a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items used to measure these constructs are included in Appendix A. The questionnaire was developed and validated in a three-step process. First, semi-structured interviews were held with CIOs and senior functional executives from five manufacturing organizations to assess content validity and to gain insights into the relationship between innovative business orientation and innovative IS strategy, and the roles of CIO leadership and organizational climate. We then conceptualized items based on these interviews and theoretical discussions in Section 2. Furthermore, the psychometric properties of the scales were statistically assessed.

*Innovative IS Strategy* is defined as an organizational perspective or stance to be at the forefront of adopting new IS, and to take risks with regard to adopting new IS. This construct was measured via the following items adapted from Chen et al. (2010a): i) In general, our organization engages in risk taking with regard to IT; ii) We constantly seek to be at the forefront when it comes to trying out new IT; iii) We constantly seek to develop new IT based applications; iv) We adopt a rather conservative view when making decisions about major IT systems (reverse coded).

*Innovative Business Orientation* is defined as an organizational perspective that seeks new business opportunities in relation to existing products, first mover opportunities for new products, and introduction of new products. This construct was measured via the following

items, adapted from Venkatraman (1989): i) We constantly seek new opportunities; ii) We are usually the first ones to introduce new brands or products to the market; iii) We are constantly on the lookout for business that can be acquired; iv) We strategically eliminate products/services in the late stages of the life cycle.

*Customer Value* is defined as the extent to which the firm's customers are satisfied with the quality, functionality and variety of its products. This construct was measured via the following items adapted from several sources (Devaraj et al., 2002; Keeney, 1999; Kumar and Petersen, 2006; Szymanski and Hise, 2000): i) Our customers are satisfied about our ability to customize products / services; ii) Our customers are satisfied about the variety of our products / services; iii) Our customers are satisfied about the quality of our products / services.

*CIO Leadership* is defined as the different broad-level leadership activities undertaken by the CIO vis-a-vis generating ideas, developing action plans, coordinating among departments, and engaging in proactive decision making. This construct was measured via the following items adapted from a number of sources (Applegate and Elam, 1992; Earl and Feeny, 2000; Grover et al., 1993; Smaltz et al., 2006): i) The role of the CIO is that of an active decision maker; ii) The role of the CIO is that of a coordinator; iii) The role of the CIO is that of an internal consultant; iv) The role of the CIO is that of a developer of action plans; v) The role of the CIO is that of an idea generator.

*Organizational Climate* is defined as an organizational environment that encourages members to be creative, risk-taking and take up challenges. This construct was measured via the following items adapted from several studies (Amabile et al., 1996; Amabile and Khaire, 2008; Burns and Stalker, 1966; Moss-Kanter, 2006): i) In our organization creativity is encouraged; ii) In our organization risk taking is encouraged; iii) In our organization challenges are encouraged; iv) In our organization caution is encouraged (reverse coded); v) In our organization drive is encouraged.

As we indicated earlier, prior literature has suggested a variety of other firm level variables (e.g., size, resources, industry, top management team characteristics) that may explain the different business strategies organizations choose to pursue. To account for the differences among organizations, we included four control variables, namely organization size, number of years the firm is in business, IS budget (as a percentage of revenue), industry turbulence, top management team's understanding of IT impact to business (i.e., process, products, and competitive actions) to predict innovative business orientation. Noting also that the CIO's effectiveness could be important, we included CIO tenure and CIO's membership in top management as control variables for the same. Including these variables allows us to assess the validity of the focal hypothesized relationships in our research model while not ignoring the possible effects of other explanatory factors to a firm's business strategy. Variable measurement details are included in Appendix A2.

### **3.2. Data Collection**

Data was collected from organizations in both the United States (U.S.) and India. For the data collection in the U.S., we conducted a web-based survey. The researchers purchased an email list containing contacts of 1,000 IS executives of the rank of CIO, vice president (IT/IS), or director (IT/IS). We sent an initial letter explaining the purpose of the research and inquiring their willingness to participate. Approximately 400 of our emails were filtered by email daemons and as such did not reach the potential respondents even after two attempts of distribution. Several other prospective participations declined our invitation due to company policies that forbid participation in survey research or due to time constraints and as such were eliminated from the prospective pool of target respondents. A target pool of 102 IS executives who agreed to participate in our study were subsequently sent our web-based survey. Of this sample of 102 individuals, after two rounds of follow-up, we received 56 completed responses, yielding a response rate of 54.9%. We note that using email or telephone to explain the purpose of the survey prior to sending the questionnaire is increasingly regarded as an effective means for

increasing the number of people who are receptive to taking surveys in management fields (McFadden et al., 2009). Based on the original target sample, excluding those 400 emails that were filtered by daemons, the response rate was 9.3%.

For data collection in India, the surveys were delivered to senior IS executives through MBA students interning with large organizations. In particular, these graduate students were provided with a cover-letter that briefly explained the research model and were asked to establish contact with the senior-most IS executive in their respective organizations and request the IS executive to participate as a respondent in the study. This activity was voluntary on part of these students and did not involve any incentive. A total of 168 Indian firms were identified as prospective firms for which their top IS executive would be an appropriate respondent. A total of 109 IS executives from different firms agreed to participate and completed the questionnaire yielding a 64.9% response rate. Thus we received a final set of 165 responses (i.e., 56 U.S. responses and 109 Indian responses) from IS executives for analysis. Appendix B provides a summary of the sample characteristics.

### **3.3. Analysis for Model Testing**

To test the research model, we used PLS, a latent structural equations modeling technique that utilizes a component-based approach to estimate construct and path parameters. The psychometric properties for the constructs were evaluated through assessment of their convergent validity and discriminant validity and reliability. Appendix C provides a summary of the descriptive statistics of the variables used in the study.

#### **3.3.1. Psychometric Properties of the Constructs**

We assessed the psychometric properties of the scales in terms of item loadings, internal consistency, and discriminant validity. All the variables were modeled as reflective constructs. To address the psychometric properties of the scales in terms of item loadings, we split our entire sample into two data sets representing the two sub samples collected from the U.S. (56 cases) and India (109 cases). First, an exploratory factor analysis (EFA) was conducted for the

data collected in U.S using SPSS, i.e., the Principal Factor Analysis/Varimax Rotation (Appendix D). Next we conducted a confirmatory factor analysis (CFA) of the Indian data set using Smart PLS to validate the results from the initial EFA conducted on the U.S. data set (Appendix E). We observe that for both data sets all of the indicators load on the same constructs. Further, they all have a factor loading on their own construct generally greater than 0.60 and also load more strongly on their corresponding construct than on other constructs in the model (Chin, 1998), which provides proper support for discriminant validity and the measurement model. We observe that the factor structure and item loadings from the CFA (Indian data set) validate those from the EFA (U.S. data set). As such we combine both data sets for our analysis<sup>7</sup>.

The latent variable loadings for the complete data set are presented in Table 2. The psychometric properties of the scales for the complete data set were assessed in terms of item loadings, internal consistency, and discriminant validity. As can be observed from the factor analysis results (Table 2) and composite reliability scores (Table 3), scales used in the study meet standard guidelines as we further discuss. We note that one item for the Innovative Business Orientation construct (i.e. BusOr2: “We are usually the first ones to introduce new brands or products to the market”) was dropped due to an insufficient loading on its respective construct. We observe that the other three items for this construct have sufficient loading levels.

Table 3 provides inter-construct correlations, and the reliability (Composite Reliability and Cronbach’s Alpha) and the square-root of the AVE values respectively. The composite reliabilities of most of the constructs were greater than or close to 0.90, with the lowest value at 0.83. All Cronbach Alpha values are higher than the recommended value of 0.70 (Nunnally,

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<sup>7</sup>We conducted tests for statistical assessment of differences in the data collected from the firms in India and USA. We tested for similarities of the two samples of data based on four firm demographic variables - age of firm workforce, industry category, IS budget as a percentage of firm revenues, and number of years of existence of the firm. We used the Kolmogorov-Smirnov statistic (Goodman, 1954) to test whether the frequency distributions of these four variables differed across the two samples. We did not find the samples statistically different with respect to these four parameters.

1978). To assess convergent and discriminant validity (Chin, 1998), we examined cross-loadings and average variance extracted. As can be seen by the factor analysis results (Table 2), items load more highly on their own construct than on other constructs. Furthermore, as shown by comparing the inter-construct correlations and the square root of the AVE (in shaded leading diagonal in Table 3, all above 0.77), the AVE for each construct (all above 0.59) thus was significantly higher than the correlation of that construct with all other constructs. That is, all constructs share more variance with their indicators than with other constructs (Fornell and Larcker, 1981; Wetzels et al., 2009). Thus, these results indicate satisfactory convergent and discriminant validity of the constructs.

**Insert Table 2 about here**

**Insert Table 3 about here**

### **3.3.2. Structural Model: Testing for Hypotheses**

We tested the research model on the combined data set (i.e., U.S. and Indian data sets) using the technique of structural equation modeling with PLS. T-statistics of the model coefficients were obtained by bootstrapping<sup>8</sup>. All the loadings and path coefficients are significant, thus indicating that all hypotheses are supported<sup>9</sup>. The path coefficients and explained variances in the dependent variables for the structural model are presented in Figure 2. We note that among the six control variables (CIO tenure, CIO membership in top management, firm size, IS budget as a percentage of sales, industry turbulence, and top management's understanding of IT impact on products, processes and competitive action for

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<sup>8</sup>The model was generated using 200 samples, which is the default sampling option to provide reasonable standard error estimates in PLS (Chin, 1998).

<sup>9</sup>We also tested relationships in PLS separately for the India and US sample, and did not find any of the hypothesized relationships to be substantively different in terms of the path coefficients or significance levels.

innovative business orientation), the first five were observed to be non-significant ( $p < 0.05$ ). The sixth one was significant ( $p < 0.05$ ).

Since we used the CIO as the sole respondent for each of the variables in our research model, we assessed potential for common method variance. We note that since the predictor and criterion variables were measured in the same contexts and since it was not possible to identify the source of potential methods bias, the recommended methods for guarding against or assessing the possible presence of methods bias are 1) to ensure procedural remedies in the questionnaire design, 2) to ensure respondent anonymity and, 3) to apply the single common method factor approach (Podsakoff et al 2003). The first condition was met by ensuring that the survey items were clearly worded, referred to specific and single possibilities, and were face validated by domain-familiar professionals. We addressed the second condition by ensuring that respondents were assured anonymity. For the third, we used two methods. We first conducted a Harmon's single-factor test (Harmon, 1967) to examine if the constructs of interest formed a single factor (i.e., whether a single factor explained the majority of the variance in the data). If this bias exists then a single factor would emerge (Podsakoff et al., 2003), or majority of the variance would be explained by one factor (Doty and Glick, 1998). In the current study, we conducted a factor analysis with all the items and identified five factors that explains 75% of variance. No one factor was found to be dominant, thus indicating an absence of bias. The second method that was conducted included the use of a marker variable (Lindell and Whitney, 2001; Malhotra et al., 2006). Through this method, two different models were tested. The first model represents the research model in the current study. In the second model, we introduced a marker variable to our research model, which has no conceptual relationship to the constructs in our research model. Paths were introduced between the selected marker variable and the two dependent variables. With the inclusion of this marker variable, we observed that the correlations and path coefficients were not substantially different between these two models, and the paths from the marker variable were non-significant. As such, the introduction of the

marker variable did not significantly affect any of the research model parameters(Podsakoff et al., 2003).

**Insert Figure 2 about here**

**Insert Table 4 about here**

A summary of the hypotheses for this study is provided in Table 4. We found that all the five hypotheses are supported. Specifically, the results indicate that an innovative business orientation has a significant influence on customer value and that an innovative IS strategy has a significant influence on innovative business orientation, providing support for Hypotheses 1 and 2, respectively. We tested Hypothesis 3, which posits that an innovative business orientation mediates the effect of IS strategy on customer value via the mediation analysis proposed by Baron and Kenny (1986) and through a Sobel test (1982). In accordance with the approach outlined by Baron and Kenny (1986), we created direct link between IS strategy and customer value (while retaining the business orientation to customer value relationship) in the model. In this modified model, we observe that both paths to customer value are statistically significant. This finding can imply that business orientation partially mediates the influence of IS strategy on customer value; however, addition assessment via a Sobel test (1981) is needed to further examine this proposed mediating effect. The Sobel test (1991) allows the examination if: a) the influence of the independent variable (IS strategy) on the dependent variable (customer value) is reduced to a statistically significant level after the mediating variable (business orientation) is introduced into the model; and b) if the mediation effect is statistically significant. The results indicate that business orientation partially mediates the influence of IS strategy on customer value ( $z = 2.44, p < 0.05$ ), thus providing support for Hypothesis 3, which is based on the literature. As such, our mediation analysis provides support that business orientation mediates the influence of IS strategy on customer value and that each of the constructs are appropriately placed in the nomological network.

In addition to the linear aspect of our model, we examined the moderating effects of the CIO's leadership role and organizational climate. Hypotheses 4 and 5 posit that the CIO's leadership role and a creative organizational climate, respectively, will augment the relationship between IS strategy and business orientation. These two moderating effects were tested through two separate tests for moderation. Testing a moderating effect involves a comparison of a main effect model versus a moderating effect model. First, the respective moderating variable was added as an antecedent to business orientation in the main model. Second, an interaction term between the respective moderating variable and IS strategy was added to the main structural model to create the moderating effect model. The interaction variable between these two variables was computed directly using Smart PLS, which cross-multiplies the standardized items of each construct (Chin et al., 2003). The moderating effect for the CIO's role was found to be significant ( $\beta = 0.344$ ,  $p < 0.01$ ,  $\Delta R^2 = 11.1\%$ ). In addition, the moderating effect for the organizational climate was also found to be significant ( $\beta = 0.188$ ,  $p < 0.10$ ,  $\Delta R^2 = 3.5\%$ )

To further examine this interaction effect, we tested whether the variance explained due to the moderated effect is significant beyond the main effects using the following F-statistic (Carte and Russell, 2003):  $F[df_{interaction} - df_{main}, N - df_{interaction} - 1] = [\Delta R^2 / (df_{interaction} - df_{main})] / F[(1 - R^2_{interaction}) / (N - df_{interaction} - 1)]$ . The F-statistic was found to be significant for both the CIO's leadership role (22.2;  $p < 0.01$ ) and organizational climate (6.9;  $p < 0.01$ ). Therefore, these sets of findings provide support that the interaction term significantly increases the model  $R^2$  from that found with just the main effects. These findings provide validation, that both the CIO's role as leader and a creative organizational climate have a significant positive interaction effect with IS strategy that enhances the degree to which innovative IS strategy influences business innovation, in accordance with Hypothesis 4 and 5, respectively.

## **4. DISCUSSION**

Prior IS strategic management literature has conceptually suggested that the potential for IS to shape the strategic opportunities a firm pursues is contingent upon firm-level IS capabilities (Piccoli and Ives, 2005; Wheeler, 2002) and perspectives to innovate with new IS-enabled initiatives (Chen et al., 2010a). This paper extends this discourse by empirically showing that an innovative IS strategy is associated with an innovative business orientation strategy, which is in turn key to creating customer value. Furthermore, we find that CIO leadership and organizational climate facilitate the influence of an innovative IS strategy on innovative business orientation. In this section we discuss the theoretical and practical contributions of the current study, and acknowledge its limitations.

### **4.1. Theoretical Contributions, Implications, and Future Research**

As a response to the calls for theory-driven empirical research to examine how IS strategy can drive both business strategy and ultimately organizational performance (Chen et al., 2010a), the current study offers several theoretical contributions. First, our findings contribute to the emerging yet largely conceptual literature that examines the leading role for IS strategy in shaping business strategy and influencing organizational performance. Adopting the lens that IT can be a driver of innovations in the firm's offerings, our theoretical development effort indicates that an innovative IS strategy can drive an innovative business orientation, which in turn mediates the influence of IS strategy on customer value.

Second, our data analysis provides empirical results in the support and extension of this literature that has had a dearth of empirical work. With the growing infusion of IS within both products and processes, it has increasingly become the job of IS leaders to help envision and assist development of new products and processes based on IS (Applegate et al., 2003). This idea is increasingly being highlighted within the practitioner literature. For example, the IS department of Quest Diagnostics (i.e., a medical diagnostic organization) and Corbis (i.e., an

online photograph seller) have found themselves engaged in and responsible for: assessing new trends in technology; identifying new IS-enabled ways of interacting with customers; and guiding the development of prototypes of new IS-enabled products (Gregg, 2008). Furthermore, IS managers at Sony Electronics are specifically responsible for the development of new products and new product features (Nash, 2009). Based upon empirical analysis, the current paper suggests that an innovative IS strategy can enhance the effectiveness of an innovative business orientation and thereby result in greater customer value. The importance of this contribution is thus predicated on increasing information intensity and scope for information-processing driven innovation across multiple industries. We note that our data reveal that innovative business orientation does not fully mediate the influential effect of IS strategy on customer value. This finding is interesting as it suggests there exist multiple direct and indirect pathways through which IS strategy could affect organizational outcomes. Future research should look to examine how IS strategy contributes to both business innovation and organizational value based on industries with varying levels of information-processing needs, which can in turn potentially influence the degree to which organization are dependent upon IS.

Third, this study also explores the contextual factors that facilitate the degree to which an innovative IS strategy is able to boost an innovative business orientation. Specifically we find that both CIO leadership and a creative organizational climate are facilitating factors that allow innovative IS strategy to have greater impact on innovative business strategic orientation. Prior literature has argued that the CIO's role is critical in driving business innovation from IS, the current study extends the IS leadership literature in that it provides empirical support that the CIO is a key organizational actor that can tie IS initiatives with business innovations. Future research would benefit by examining this phenomenon with a greater level of granularity. Specifically future research should examine if there are CIOs with certain characteristics (i.e., CIO profiles) that can best establish and foster this bridge between IS strategy and business strategy. Furthermore, it would be of interest to examine if CIOs with certain experiential

backgrounds or with particular cognitive traits are best prepared to facilitate the IS-business innovation relationship. In addition to the need for IS leadership, we found that the organizational social context was also an important facilitating factor between innovative IS strategy and business strategy. Specifically our results provide support that an organizational climate that promotes creativity enhances the degree to which innovative IS strategy influences strategic business innovation. Future research that examines additional organizational contexts would be of value. For instance, the examination of flatter organizational structures with fewer hierarchical constraints or an organizational climate that allows for greater individual decision-making would be of interest.

Furthermore, the nature of the interaction between IS leadership (i.e., the individual level factor) and climate (i.e., the organization level factor) may be a fruitful area of future work. In the current study, we found that CIO leadership was a more influential moderating factor than organizational climate when examining the relationship between IS and business strategies. Future research should examine if synergies between IS leadership and climate can be developed. Future research would also benefit by examining if there are potentially optimal levels of fit with regard to IS leadership and certain organizational contexts and if such a fit can positively influence business innovation.

Finally, we found that one of the control variables, that is, top management's cognizance of possible impact of IT on business (i.e., products, processes, and competitors' action) is positively associated with an innovative business orientation. In this context, recent research (Kaganer et al., 2010; Wang, 2009) has suggested the role of broader institutional mechanisms outside the organization in building legitimacy for IS innovations. Therefore, combined effects of leadership, organizational context, and the external environmental may prove to be a productive area of future research for a more nuanced understanding of how an innovative IS strategy might result in a more innovative business orientation.

## 4.2. Implications for Practice

Our findings yield a number of practical insights for managers who work at the interface between IS strategy and business strategy. First, the study confirms that organizations pursuing innovative IS strategy are likely to reap customer value when they consistently seek for IS-enabled business innovations. Second, organizations that wish to derive IS-enabled innovation for business should consider the importance of technology leaders and the organizational social context. Specifically, firms in which the CIO plays a proactive role in the form of generating new ideas and plans and coordinating across functions are more likely to be able to appropriate business innovation from an innovative IS strategy. An IS leader of this sort will likely need to have high levels of business skills and cognizance, have sufficient technical aptitude, and also have the ability to maintain productive relationships with top management from all functional areas.

The organization could also potentially benefit by seeking to enhance the creativity of the IS staff. We acknowledge that there may simply be some firms that do not seek IS-enabled innovation, despite value creating benefits, due to certain internal or environmental factors. Such firms may thus seek to economize efforts with regard to IS leadership skills and organizational creativity, and possibly consider a less proactive approach to IS leadership and organizational creativity within their organization. However, there are several approaches that can be undertaken by firms that wish to derive the benefits of IS-enabled innovation. Human resource initiatives of recruiting, retaining, and promoting IS personnel with a tolerance, aptitude, and propensity for innovation is likely to lead to greater IS innovation. Moreover, encouraging and rewarding a climate of innovation within the IS function itself will further this goal. Such actions would augment the CIO's efforts in facilitating business strategy from IS strategy.

### 4.3. Limitations

As with all research studies there are several limitations with the current study. First we recognize that the cross-sectional design does not allow the researchers to fully establish the causality between the independent variables and the dependent variables. It does not, for instance, rule out a mediating role for Innovative IS Strategy on the relationship between Innovative Business Orientation and Customer Value. Although our research model was backed by theory and our data analysis (including the mediation and moderating analysis) provided empirical support for the model, a suitably designed longitudinal study may be able to provide additional insight into the relationship between IS strategy, innovative business orientation, and customer value. Second, and as explained in Section 3.3.2 there is the possibility of common method variance effects in this study since we collected our data on both independent and dependent measures through a single executive respondent. We wish to note certain limitations of both methods we employed to assess for common method bias. The single-factor method does not control for common methods bias and is less conservative as the number of variables increases. The marker variable method similarly, does not rule out bias due to social desirability, assumes that common method bias has the same effect on all variables and can only inflate the relationship among variables, and does not take measurement error into account. Based on the observations from these tests, although we take the probability of common method variance to not be substantive, we acknowledge that common method bias is a potential limitation of the current study.

Furthermore, we acknowledge that the data used in our study is subjective. While we believe the CIO is the most appropriate informant for this study, this choice potentially limits the findings to the particular perspective of the CIO. Obtaining the response of a matched-pair business executive within each organization would allow for the assessment of inter-rater agreement for several of the measures (particularly the measures for organizational climate), which would allow for further validity of the findings. Furthermore, such an approach would

generate insight from top management within other functional business areas. Future research should consider the use of matched-pair primary data as well as lagged secondary firm performance data such as operating revenue and market share to study additional dependent variables associated with an innovative IS strategy. Third, our data did not enable us to assess if there was significant non-response bias. All of this said, we wish to note that, in the current study, we assess validity issues by examining two data sets of CIOs from different nations. The first data set (i.e., U.S. CIOs) was used as a hold out sample for the exploratory factor analysis while the second data set (i.e., Indian CIOs) was used for validation via confirmatory factor analysis. As a check, we also conducted exploratory factor analysis on the Indian data set as well as analyzed the path model for each separately, yielding no significant difference in the results. This approach provides triangulation and generalizability for our constructs and hypotheses across a reasonably expansive context.

## **5. CONCLUSION**

In this paper, we investigated how an innovative IS strategy leads to greater customer value through an innovative business orientation. In addition, we assessed the contextual factors that influence the nature of the relationship between innovation-oriented IS and business strategies. The results show that an innovative business orientation mediates the influence of an innovative IS strategy on customer value. Furthermore, both the organization's IS leadership and creative organizational climate enhance the influence of an innovative IS strategy on innovative business orientation. This study provides a logical extension of the IS strategic management literature that is now beginning to examine the role of IS as a driver of business strategies and expected business outcomes, and a framework for future research to further examine how IS can impact the business value delivered by the organization.

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## **FIGURE AND TABLE LEGENDS**

Figure 1: Research Model and Hypotheses

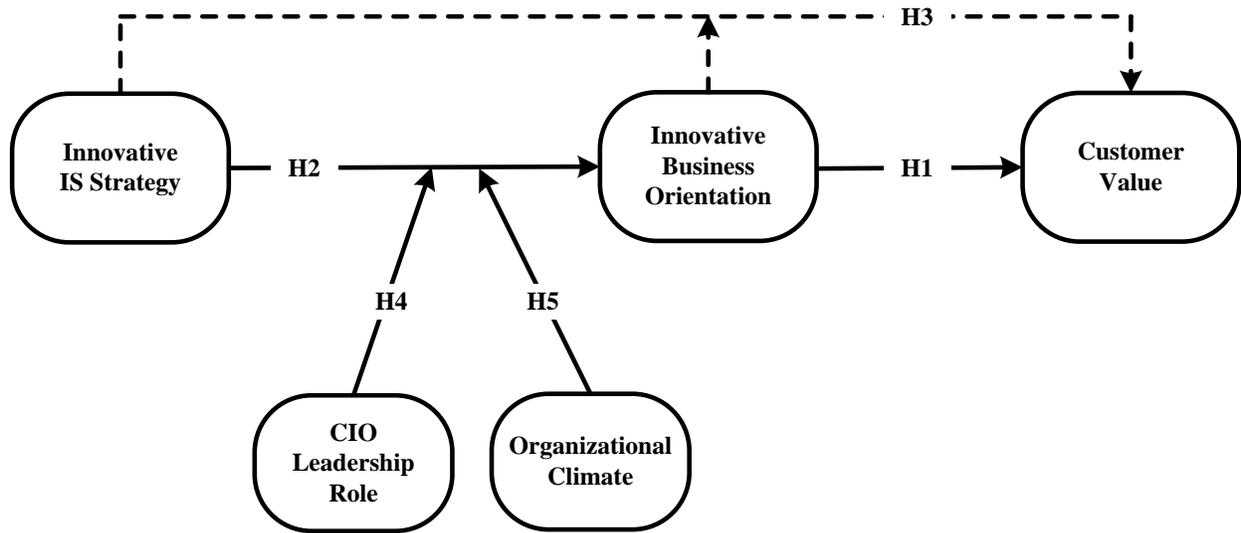
Table 1: Confirmatory Factor Analysis

Table 2: Inter- Construct Correlations

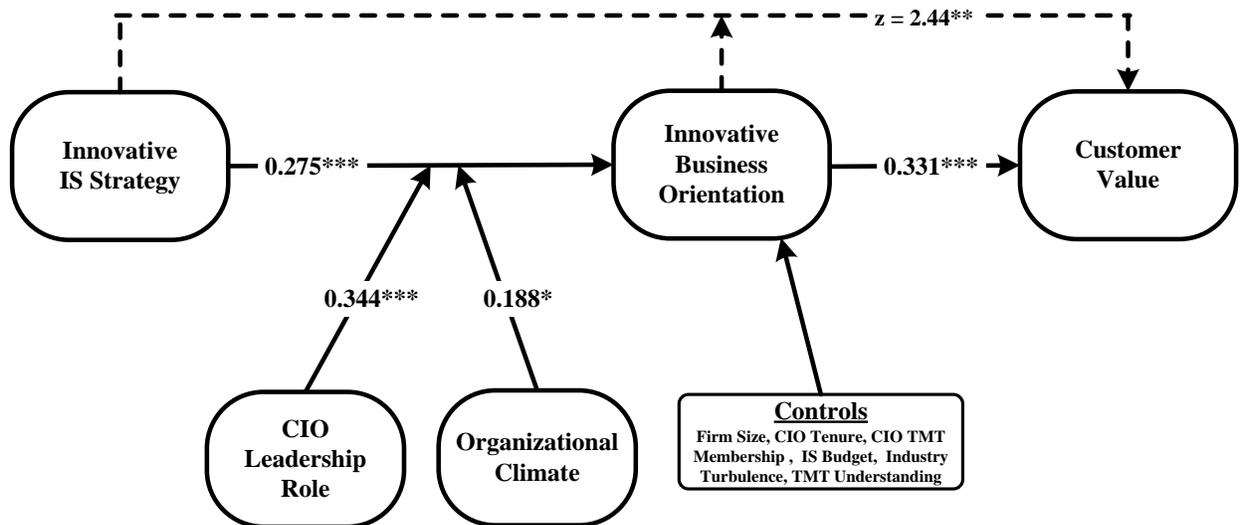
Figure 2: PLS Results

Table 3: Summary of Hypotheses Results

**FIGURES**



**Figure 1: Research Model and Hypotheses**



Note: \* p < .10, \*\* p < .05, \*\*\* p < .01

**Figure 2: PLS Results**

## TABLES

**Table 1: Organizing Framework**

Theoretical foci informing this study	Theoretical premise	Supporting literature and research gaps	Research questions addressed in this paper
<b>IS Strategy as a support for strategic objectives of the business</b>	How IS can be used to support and align with the chosen business strategy toward a targeted competitive advantage.	Literature has a number of theoretical frameworks (e.g. Earl 1989) and empirical studies (e.g. Sabherwal and Chan 2001, Brady and Targett 1995, Duhan et al. 2001, Hidding 2001)*	
<b>IS Strategy as a potential enabler or driver of strategic business objectives</b>	How IS can be used to influence the business's strategic objectives.	Literature has some theoretical concepts and ideas (e.g. Earl 1989; Galliers 2004; Sambamurthy et al 2003, Agarwal and Sambamurthy 2002) and <i>very few</i> empirical studies	Does an innovative IS strategy drive an organization's innovative business orientation?  How do the CIO's leadership role and organizational climate influence the relationship between IS strategy and innovative business orientation?
<b>IS Strategy as a driver of business outcomes</b>	How IS can be used to effect organizational outcomes such as customer value	Literature has mostly theoretical concepts and ideas (Piccoli and Ives, 2005; Wang, 2009; Wheeler, 2002, Nevo and Wade 2010). A few empirical studies exist, focusing on <i>specific</i> domains such as new product development and competitive advantage (Pavlou and EISawy 2006)	Does an innovative business orientation mediate the influence of innovative IS strategy on customer value?

\*For a review of this particular focus of study see Chen et al 2010a

**Table 2: Confirmatory Factor Analysis (Complete Data Set)**

	IS Strat	Bus Orient	Cust Value	CIO Role	Org Climate
ISStrat1	<b>0.917</b>	.278	.369	.388	.264
ISStrat2	<b>0.923</b>	.271	.290	.432	.287
ISStrat3	<b>0.692</b>	.157	.069	.189	.091
ISStrat4	<b>0.829</b>	.197	.217	.300	.166
BusOr1	0.283	<b>0.792</b>	0.209	0.143	0.388
BusOr3	0.176	<b>0.801</b>	0.250	0.168	0.172
BusOr4	0.194	<b>0.791</b>	0.324	0.170	0.224
CustValue1	0.256	0.291	<b>0.907</b>	0.368	0.127
CustValue2	0.286	0.298	<b>0.927</b>	0.321	0.147
CustValue3	0.286	0.300	<b>0.901</b>	0.394	0.227
CIORole1	0.341	0.177	0.305	<b>0.852</b>	0.235
CIORole2	0.400	0.185	0.389	<b>0.900</b>	0.188
CIORole3	0.334	0.158	0.309	<b>0.866</b>	0.199
CIORole4	0.386	0.150	0.273	<b>0.844</b>	0.288
CIORole5	0.200	0.155	0.355	<b>0.674</b>	0.196
OrgClim1	0.252	0.246	0.182	0.223	<b>0.867</b>
OrgClim2	0.217	0.268	0.199	0.155	<b>0.814</b>
OrgClim3	0.244	0.172	0.122	0.249	<b>0.786</b>
OrgClim4	0.147	0.151	0.062	0.030	<b>0.649</b>
OrgClim5	0.140	0.343	0.114	0.285	<b>0.717</b>

**Table 3: Inter-construct correlations.**

	Reliability <sup>a</sup>	Cronbach's Alpha	IS Strat	Bus Orient	Cust Value	CIO Role	Org Clim
ISStrat	0.908	0.865	0.845 (0.714)				
BusOrient	0.836	0.709	0.280	0.793 (0.629)			
CustValue	0.937	0.898	0.302	0.326	0.912 (0.832)		
CIORole	0.916	0.883	0.404	0.200	0.397	0.829 (0.687)	
OrgClim	0.879	0.834	0.256	0.341	0.185	0.266	0.771 (0.594)

Notes: <sup>a</sup>Composite Reliability. The shaded numbers on the leading diagonal are the square root of the AVE (the AVE values are in parenthesis).

**Table 4: Summary of Hypothesis Tests**

<b>Hypotheses</b>	<b>Support for Hypotheses</b>
H1: Innovative Business Orientation → Customer Value	Supported
H2: Innovative IS Strategy → Innovative Business Orientation	Supported
H3: Business Orientation Mediates the Influence of IS Strategy on Customer Value	Supported
H4: A CIO Organizational Leadership and an Innovative IS Strategy will have a Positive Interactive Effect on Innovative Business Orientation	Supported
H5: A Creative Organizational Climate and an Innovative IS Strategy will have a Positive Interactive Effect on Innovative Business Orientation	Supported

## Appendix A1: Construct Operational Definitions and Scales

**Innovative IS Strategy:** An organizational perspective or stance to be at the forefront of adopting new IT, and to take risks with regard to adopting new IT.

(Source: Chen et al., 2010)

ISStrat1: In general, our organization engages in risk taking with regard to IT;

ISStrat2: We constantly seek to be at the forefront when it comes to trying our new IT;

ISStrat3: We constantly seek to develop new IT based applications;

ISStrat4: We adopt a rather conservative view when making decisions about major IT systems (reverse coded).

**Innovative Business Orientation:** An organizational perspective that seeks new business opportunities in relation to existing products, first mover opportunities for new products, introduction of new products

(Source: Venkatraman 1989)

BusOr1: We constantly seek new opportunities;

BusOr3: We are constantly on the lookout for business that can be acquired;

BusOr4: We strategically eliminate products/services in the late stages of the life cycle.

**Customer Value:** The extent to which the firm's customers are satisfied with the quality, functionality and variety of its products.

(Source: Keeney 1999, Kumar and Petersen 2006, Szymanski and Hise, 2000, Devraj et al 2002)

CustValue1: Our customers are satisfied about our ability to customize products/services;

CustValue2: Our customers are satisfied about the variety of our products/services;

CustValue3: Our customers are satisfied about the quality of our products/services.

**CIO Leadership Role:** The different broad-level activities undertaken by the CIO vis-a-vis generating ideas, developing action plans, coordinating among departments, and engaging in proactive decision making.

(Source: Smaltz et al. 2006, Earl and Feeny 2000, Grover 1993 Applegate and Elam 1992)

CIORole1: The role of the CIO is that of an active decision maker;

CIORole2: The role of the CIO is that of a coordinator;

CIORole3: The role of the CIO is that of an internal consultant;

CIORole4: The role of the CIO is that of a developer of action plans;

CIORole5: The role of the CIO is that of an idea generator.

**Organizational Climate:** an organizational environment that encourages members to be creative, risk-taking and take up challenges.

(Source: Amabile et al. 1996, Amabile and Khairi 2008, Moss-Kanter 2006 and Burns and Stalker 1965))

OrgClim1: In our organization creativity is encouraged;

OrgClim2: In our organization risk taking is encouraged;

OrgClim3: In our organization challenges are encouraged;

OrgClim4: In our organization caution is encouraged (reverse coded);

OrgClim5: In our organization drive is encouraged

## Appendix A2: Control Variables

1. **CIO Organizational Tenure&Number of Years in Business:** Number of years
2. **CIO Membership in Top Management Team:** Yes/No
3. **Organization Size:** Measured by number of employees
4. **IS budget as a percentage of sales:** Percentage
  
5. **Industry turbulence:** The rate at which industry characteristics change  
(Source: Ravichandran and Liu 2011, Kearns and Lederer 2004)
  - a) In our industry products/services become obsolete quickly
  - b) In our industry barriers to entry are low
  - c) Our industry is competitive
  
6. **Top management team's understanding of IT impact to business:** The extent to which top management understands strategic implications of emerging IT  
(Source: Teo and King 1997, D'Aveni 1999)
  - a) Top management is knowledgeable about strategic use of emerging information technologies
  - b) Top management is knowledgeable about the probable effects of EIT on products
  - c) Top management is knowledgeable about competitors use of EIT
  - d) Strategic use of emerging information technologies

## Appendix B: Sample Characteristics

Variable	Characteristics	Number of Firms
<b><u>Executive Characteristics</u></b>		
CIO Organizational Tenure	Less than 3 years	47
	3 years to 7 years	58
	7 years to 10 years	37
	More than 10 years	23
CIO Membership in Top Management Team	Yes	94
	No	71
<b><u>Organizational Characteristics</u></b>		
Industry category	Manufacturing	84
	Service	81
Number of employees	0-500	38
	500-1000	39
	1000-5000	28
	5000 – 10,000	50
	Above 10,000	10
IS budget as a percentage of sales	Less than 2%	69
	2% to 4%	43
	Above 4%	53
Number of Years in Business	Less than 5 years	12
	5-10 years	46
	More than 10 years	107

## Appendix C: Summary Statistics

Variable	N	Mean	Std Dev	Min.	Max
<b><u>Constructs</u></b>					
Innovative IS Strategy (4 questions)	165	3.4864	.80360	1.00	5.00
Innovative Business Orientation (3 questions)	165	3.7879	.63834	2.25	5.00
Customer Value (3 questions)	165	4.0242	.69314	1.67	5.00
CIO Role (5 questions)	165	3.9515	.78899	1.40	5.00
Organizational Climate (5 questions)	165	3.7806	.64059	1.40	5.00

### Appendix D: Exploratory Factor Analysis (U.S. Data Set)

	IS Strat	Bus Orient	Cust Value	CIO Role	Org Climate
ISStrat1	<b>.779</b>	.209	.078	.211	.271
ISStrat2	<b>.822</b>	.011	.021	.226	.147
ISStrat3	<b>.592</b>	.198	.184	.110	.283
ISStrat4	<b>.516</b>	.098	.053	.033	.180
BusOr1	.135	<b>.891</b>	.111	.007	.281
BusOr2	.318	<b>.472</b>	.188	.271	.229
BusOr3	.057	<b>.511</b>	.171	.196	.182
BusOr4	.053	<b>.784</b>	.163	.228	.069
CustVal1	.068	.303	<b>.781</b>	.285	.081
CustVal2	.045	.094	<b>.871</b>	.053	.034
CustVal3	.013	.030	<b>.868</b>	.292	.118
CIORole1	.187	.064	.037	<b>.780</b>	.083
CIORole2	.025	.078	.224	<b>.876</b>	.052
CIORole3	.188	.107	.300	<b>.681</b>	.066
CIORole4	.185	.221	.029	<b>.794</b>	.173
CIORole5	.009	.084	.138	<b>.767</b>	.036
OrgClim1	.270	.150	.076	.072	<b>.768</b>
OrgClim2	.279	.189	.108	.063	<b>.768</b>
OrgClim3	.061	.026	.001	.113	<b>.787</b>
OrgClim4	.256	.347	.279	.257	<b>.691</b>
OrgClim5	.040	.063	.056	.062	<b>.756</b>

### Appendix E: Confirmatory Factor Analysis (Indian Data Set)

	IS Strat	Bus Orient	Cust Value	CIO Role	Org Climate
ISStrat1	<b>0.905</b>	.262	.423	.395	.271
ISStrat2	<b>0.918</b>	.285	.344	.455	.271
ISStrat3	<b>0.728</b>	.208	.118	.199	.180
ISStrat4	<b>0.839</b>	.198	.292	.327	.175
BusOr1	0.300	<b>0.802</b>	0.224	0.133	0.400
BusOr3	0.184	<b>0.811</b>	0.242	0.135	0.161
BusOr4	0.194	<b>0.786</b>	0.336	0.084	0.232
CustVal1	0.311	0.268	<b>0.9011</b>	0.330	0.164
CustVal2	0.330	0.325	<b>0.9384</b>	0.314	0.188

CustVal3	0.333	0.310	<b>0.8964</b>	0.360	0.247
CIORole1	0.305	0.141	0.303	<b>0.874</b>	0.310
CIORole2	0.418	0.149	0.379	<b>0.892</b>	0.278
CIORole3	0.363	0.120	0.238	<b>0.894</b>	0.305
CIORole4	0.372	0.103	0.266	<b>0.846</b>	0.342
CIORole5	0.263	0.088	0.345	<b>0.628</b>	0.286
OrgClim1	0.291	0.221	0.197	0.308	<b>0.857</b>
OrgClim2	0.246	0.251	0.200	0.190	<b>0.792</b>
OrgClim3	0.321	0.132	0.135	0.313	<b>0.755</b>
OrgClim4	0.168	0.134	0.149	0.133	<b>0.599</b>
OrgClim5	0.140	0.365	0.145	0.348	<b>0.738</b>

#### Appendix F: Exploratory Factor Analysis (Indian Data Set)

	IS Strat	Bus Orient	Cust Value	CIO Role	Org Climate
ISStrat1	<b>.821</b>	.252	.156	.192	.084
ISStrat2	<b>.819</b>	.043	.189	.291	.164
ISStrat3	<b>.771</b>	-.116	-.057	.080	-.095
ISStrat4	<b>.778</b>	.088	-.030	.092	.018
BusOr1	-.032	<b>.616</b>	.185	.005	.395
BusOr2	.092	<b>.342</b>	.161	.102	.047
BusOr3	.161	<b>.560</b>	.368	.055	.199
BusOr4	.084	<b>.861</b>	.087	.242	.062
CustVal1	.021	.152	<b>.913</b>	.163	-.024
CustVal2	.044	.064	<b>.945</b>	.099	.029
CustVal3	.083	.256	<b>.828</b>	.274	.091
CIORole1	.153	.081	.041	<b>.852</b>	.169
CIORole2	.064	.125	.118	<b>.863</b>	.059
CIORole3	.173	.097	.192	<b>.824</b>	.065
CIORole4	.118	.033	.057	<b>.825</b>	.195
CIORole5	.175	.053	.192	<b>.768</b>	.102
OraClim1	.038	.118	.061	.138	<b>.851</b>
OraClim2	.126	.369	.124	.124	<b>.735</b>
OraClim3	-.057	.057	.002	.145	<b>.834</b>
OraClim4	.060	.039	.011	-.023	<b>.722</b>
OraClim5	-.002	.083	-.032	.247	<b>.823</b>