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IT-ENABLED BUSINESS INNOVATION: DOES CIO CAPABILITY MATTER? A PERSPECTIVE FROM INSTITUTIONAL ENTREPRENEURSHIP THEORY¹

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Abstract

Today IT has evolved from a mere efficiency tool to enabling business innovation and providing strategic value. As the highest level IT leader in organizations, CIO should be largely responsible for the success of IT-enabled business innovation. CIO must possess necessary skills, knowledge, and abilities to lead IT staff, business partners, and even high-level executives in IT-enabled business innovation. However, as IT innovation researchers have just begun to look at business transformation and innovation resulted from the application of new IT, insights on how CIO can leverage IT to enable business innovation are still scant. We aim to address the question of whether and how CIO capability impact on the success of IT-enabled business innovation. Anchoring on the theory of institutional entrepreneurship, we propose a conceptual model describing that CIO's political savvy, communicative ability, strategic IT and business knowledge have positive impact on the success of IT-enabled business innovation, through the mediating role of innovation legitimacy. The findings are expected to provide several theoretical implications for the areas of IT innovation and CIO effectiveness.

Keywords: IT-enabled business innovation, CIO capability, Legitimacy, Institutional entrepreneurship theory.

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1 BACKGROUND

With the combination of IT and business, the role of information technology (IT) in business innovation is becoming increasingly important (Bassellier & Benbasat 2004; Tarafdar & Gordon 2007). The nature of how IT enables competitive advantage and superior performance has shifted. Rather than providing competitive advantage through specific IT applications, today IT is viewed as a platform for enhanced automation, decision-making empowerment, control and coordination, and industry transformation (Smaltz et al. 2006). Therefore, business innovation is increasingly relied on IT, resulting in that IT has evolved from a mere efficiency tool to enabling business innovation and providing strategic value (Saldanha and Krishnan 2011).

As the highest level IT leader in organizations, CIO should be largely responsible for the success of IT-enabled business innovation (Enns and McDonagh 2012). Unlike general business innovation, IT-enabled business innovation is realized through the application of information systems (IS) augmented with complementary organizational innovations including new forms of cognition, meaning, work process, business process, or organizational structure (Lyytinen & Rose 2003). The implementation of both information systems and augmented organizational innovations require that CIO is able to educate their business counterparts to potential opportunities resulting from new emerging IT methods and help to persuade them to become business innovation champions, who agree to provide extra resources for new IT initiatives (Smaltz et al. 2006). Therefore, those with authority to implement and allocate resources for new innovations must be proactively influenced if CIO wishes to be catalysts for technological innovation (Enns and McDonagh 2012). Qualified CIO should possess necessary skills, knowledge, and abilities to lead IT staff, business partners, and even high-level executives in IT-enabled business innovation.

Despite of the critical role of CIO capability in IT-enabled business innovation, practitioners still question the role of the CIO in terms of the contribution that CIOs make to innovation (Tansley et al. 2008). In fact, several CIOs remain locked in the traditional inward role and fail to effectively “boundary-span” outside of the IT organization in practice (Saldanha 2012). Hence, there is an urgent need to empirically investigate on the role of CIO capability in IT-enabled business innovation.

Prior literature on IT innovation has yielded tremendous insights on the question of “whether, when, and how to innovate with IT” (Fichman 2004; Swanson and Ramiller 2004). However, as IT innovation researchers have just begun to look at business transformation and innovation resulted from the application of new IT (Lucas et al. 2007), insights on how CIO can leverage IT to enable business innovation are still scant. In business innovation literature, the role of IT in business innovation has received scant attention and is relatively understudied (Gordon and Tarafdar 2007; Joshi et al. 2010; Kleis et al. 2012). Although some studies have examined the role of CIO (Saldanha and Krishnan 2011) and CIO’s strategic leadership (Leidner et al. 2010), whether and how CIO capability influences IT-enabled business innovation remain obscure. Thus, CIO may do not know what kinds of abilities, skills, or knowledge he or she should cultivate in order to play a leading role in IT-enabled business innovation.

To fill this gap in the literature, we aim to address the question of whether and how CIO capability impact on the success of IT-enabled business innovation. Specifically, four types of CIO capability are important, i.e., political savvy, communicative capability, strategic IT and business knowledge, which are essential for CIO to be an effective leader (Smaltz et al. 2006). The specific research questions are: (1) Does CIO capability matter in the success of IT-enabled business innovation? (2) How does CIO capability influence the success of IT-enabled business innovation?

Anchoring on the theory of institutional entrepreneurship, we propose a conceptual model explaining how CIO capability impacts on IT-enabled business innovation. The model proposes that CIO’s political savvy, communicative ability, strategic IT and business knowledge influence the success of IT-enabled business innovation, through the mediating role of innovation legitimacy.

2 LITERATURE REVIEW

Based on systematic review on IT-enabled business innovation literature, we classified relevant studies into two streams: IT innovation and business innovation. The prior one discusses IT-enabled business innovation from the perspective of information systems implementation augmented with business innovation, while the latter focuses on the enabling role of IT in business innovation.

2.1 IT Innovation

During the past twenty years of IS research, quite a rich but diverse body of theoretical and empirical work has accumulated on the adoption and diffusion of IT-based innovations (Jeyaraj et al. 2006). The IT innovation field is concerned with understanding the factors that facilitate or inhibit the adoption and diffusion of emerging IT-based processes or products within a population of potential adopters (Swanson 1994). After systematically reviewing literature on IT innovation, Fichman (2004) identify a dominant research paradigm wherein the more organizations possess of the right independent variables, the more the IT innovation will be adopted.

The right independent variables can be generally categorized into four groups, i.e., innovation, organizational, environmental and individual characteristics (Jeyaraj et al. 2006; Chan and Ngai 2007). Innovation characteristics include relative advantage, complexity, compatibility, observability and trialability (e.g. Rogers 1995). For organizational characteristics, its size and structure, centralization and formalization, organization slack, support from top management, championship, existing resources, and IT expertise are considered relevant (Jeyaraj et al. 2006; Jeon et al. 2006). Environmental characteristics include external pressure, competition, coercive influence, support from government, and environmental uncertainty etc. (Jeyaraj et al. 2006; Hameed et al. 2012). At individual level, CEO's knowledge of IT, TMT's attitude towards IT, CIO's strategic leadership, CIO's demographic characteristics, personality traits etc. (Li et al. 2006; Damanpour and Schneider 2009; Leidner et al. 2010).

Many IT innovations are not straightforward cases of 'adoption' of new technology (Ashurst et al. 2012), but are actually intellectual technologies in that they have properties that can be "innovated endlessly, depending on its interaction with the intellect of the human beings who implement and use it" (Lee 1999, p.8). Hence, IT innovation itself and the IT-induced business innovation, i.e. Type III IT innovation in "tri-core" model (Swanson 1994), should both be well studied. While antecedents could be different for each type of IT innovation (Ramamurthy et al. 2008), the determinants discovered might not have impacts on IT-enabled business innovation. It is better to distinguish IT-enabled business innovation from general IT innovation, which responds to the call that we should pursue studies that help us understand how innovating with IT can lead to organizational capabilities and competitive advantage (Lucas et al. 2007). While prior researches in IT innovation focus on the quantity and speed of IT innovation adoption and diffusion, they do not investigate independently on IT-enabled business innovation.

2.2 Business Innovation

Ahuja et al. (2008) and Gilbert (2006) review the vast studies on innovation. These reviews broadly characterize innovation output as a production function with several input determinants. As noted in Ahuja et al. (2008, p. 5), factors influencing innovation can be broadly characterized into four categories: "industry structure, firm characteristics, intra-organizational attributes, and institutional influences." More broadly, Crossman and Apaydin (2010) view innovation as both a process and an outcome and identified three groups of innovation determinants, i.e., leadership, managerial levers, and business processes, based on systematic review of literature on innovation published from 1993 to 2010.

Reviews of the innovation literature (Gilbert 2006; Ahuja et al. 2008; Crossman and Apaydin 2010) show that IS capabilities have not been extensively studied as drivers of business innovation. Although

the business value of IT literature includes much research on the role of IT in operational efficiency, the role of IT in business innovation has received scant attention and is relatively understudied (Gordon and Tarafdar 2007; Joshi et al. 2010; Kleis et al. 2012). Saldanha (2012) synthesizes the literature at the nexus of IT and business innovation into four broad themes, based on the underlying mechanisms or conceptual arguments made in the literature for how IT may potentially influence innovation. Although research on IT-enabled business innovation is growing, the critical role of CIO lacks sufficient attention. As the boundary spanning role serving as a link between IT and the rest of the firm and beyond (Watson 1990), CIO should cultivate necessary capabilities to utilize them to facilitate IT-enabled business innovation.

3 THEORY AND HYPOTHESES DEVELOPMENT

3.1 Institutional Entrepreneurship Theory

IT-enabled business innovation induces changes in process, products or service by introducing new information systems. New IT often involves new actors and activities for which existing institutional arrangements cannot easily be invoked or needed arrangements do not yet exist (Wang and Swanson 2007). Hence, IT-enabled business innovators need to design, develop, and create new institutions to transform existing institutions. This process is consistent with institutional entrepreneurship, which enlightens us to take the institutional entrepreneurship theory as our theoretical lens.

Institutions are in effect “historical accretions of past practices and understandings that set conditions on action” (Barley & Tolbert 1997); they constitute templates for actions. Those actions conforming to institutional rules will be considered appropriate, whereas those deviating from them will be sanctioned in some way and thus are costly. Institutional entrepreneurship is defined as “the activities of actors who have an interest in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones” (Maguire et al. 2004). In institutional entrepreneurship theory, institutional entrepreneurs’ political and social capabilities are important to the success of institutional entrepreneurship (Fligstein 1997; Garud et al. 2002). Furthermore, the key task of institutional entrepreneurs is to attain legitimation of new institutions (Maguire et al. 2004).

Legitimacy, a critical concept of institutional entrepreneurship theory, refers to “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman 1995). Institutional entrepreneurs can improve the rate of successful institutional entrepreneurship by verifying legitimacy of new institutional arrangements. Suchman (1995) proposes three types of legitimacy including pragmatic, moral, and cognitive legitimacy. Pragmatic legitimacy rests on the self-interested calculations of an organization's most immediate audiences. Moral legitimacy reflects a positive normative evaluation of the organization and its activities. While cognitive legitimacy must mesh with both larger belief systems and with experienced reality of the audience’s daily life.

Institutional entrepreneurship perspective provides innovation scholars with anchor points to explain the diffusion of innovation as being endogenously shaped by institutional entrepreneurs rather than exogenously driven by institutional pressures of isomorphism. Taking institutional entrepreneurship perspective, a number of studies have examined how organizations promote the diffusion of a variety of innovations (e.g. Wang and Swanson 2007).

3.2 Hypotheses Development

IT innovation is usually defined as “innovation in the organizational application of digital computer and communications technologies” (Swanson 1994; Fichman 2004). In Swanson’s (1994) “tri-core model”, IT innovation can be categorized into three types along the business impact dimension. Type I innovation involves changes in system development processes, such as new development tools or programming teams (Lyytinen and Rose 2003). Type II innovation involves uses of IT to support the administrative core of the organization. Type III innovation integrates IS products and services with

core business technology (Swanson 1994), which includes IS product and business technological process innovation, IS product and business product innovation, and IS product and business integration innovation. Saldanha and Krishnan (2011) define IT-enabled business innovation as “new products, processes or services developed by a firm through the application of IT”. We will adopt this definition, because it focuses on innovation outputs rather than inputs (Saldanha 2012). Furthermore, this definition emphasizes the critical role of IT-enablement. In sum, we integrate Type III innovation and Saldanha and Krishnan’s (2011) definition to define IT-enabled business innovation as “new processes, products, services, or external relations developed by a firm through the application of IT”.

3.2.1 Impact of CIO capability on IT-enabled business innovation

CIO capability refers to personal skills, knowledge, and abilities that a CIO needs to effectively lead his or her followers to reach a certain goal (Smaltz et al. 2006; Feeny and Willcocks 1998; Pretson et al. 2008). Based on prior researches, we argue that CIO capability includes political savvy, communicative ability, relationship building ability, strategic business knowledge, and strategic IT knowledge. Political savvy refers to an executive’s ability to negotiate, influence, and persuade (Hambrick and Mason 1984). Communicative ability denotes the ability to communicate clearly, persuasively, and in business terms (Smaltz et al. 2006). Strategic business knowledge is defined as the person’s understanding and appreciation of their firm’s competitive forces and business strategies. Strategic IT knowledge is defined as awareness and understanding about current and emerging information technologies, their relevance for the firm, and insights related to investment timing and acquisition of information technologies (Smaltz et al. 2006).

Literature on CIO role effectiveness and leadership have found that CIO’s capabilities or IT management capabilities are essential to CIO’s role effectiveness or effectiveness in exploiting IT (Smaltz et al. 2006; Chen and Wu 2011; Feeny and Willcocks 1998). While Chun and Mooney (2009) point out that a critical role of CIO would be “innovator & creator”. McLean and Smits (2003) argue that CIO needs to play four key roles, including enabler, innovator, strategist, and technologist. Therefore, CIO capability is important to role effectiveness of CIO as an innovator. CIO with stronger capability is able to play highly effective innovator role, thus facilitating the success of IT-enabled business innovation in a more efficient way. Based on the above arguments, we propose:

H1a: CIO’s political savvy is positively related with success of IT-enabled business innovation.

H1b: CIO’s communicative ability is positively related with success of IT-enabled business innovation.

H1c: CIO’s strategic business knowledge is positively related with the success of IT-enabled business innovation.

H1d: CIO’s strategic IT knowledge is positively related with the success of IT-enabled business innovation.

3.2.2 Impact of legitimacy on IT-enabled business innovation

IT-enabled business innovation is viewed as a process of institutional entrepreneurship, in which CIO, as the institutional entrepreneur, has to regard attaining legitimacy as a key task so that new products or services, processes, and external relations could be institutionalized as a new set of institutional arrangements (Maguire et al. 2004). Pragmatic legitimacy is evaluated on the self-interested calculations of an organization’s most immediate audiences (Suchman 1995), which is expected to play an important role in shaping the early stages of IT innovation diffusion (Kaganer et al. 2007). Moral legitimacy reflects a positive normative evaluation of the organization and its activities, based on judgments about whether a new venture is consistent with and/or promotes moral norms and values prevalent within a particular social audience (Kaganer et al. 2007). Cognitive legitimacy must mesh with both larger belief systems and with experienced reality of the audience’s daily life. It arises when there is a broad awareness about a new practice among the relevant audiences (Aldrich and Fiol 1994) and the practice is perceived as coherent and meaningful in the context of the prevalent beliefs, logics, and categories (Suchman 1995; Golant and Sillince 2007).

Actions conforming to institutional rules will be considered appropriate, whereas those deviating from them will be sanctioned in some way and thus are costly. Fang and Sun (2012) argue that legitimization of new institutions is one of the key success factors of institutional entrepreneurship. Wang and Swanson (2007) suggest that legitimizing IT innovation by developing a coherent organizing vision may enhance the likelihood of successful launch. Thus, we propose the following hypotheses:

H2a: Cognitive legitimacy of IT-enabled business innovation is positively related with the success of IT-enabled business innovation.

H2b: Moral legitimacy of IT-enabled business innovation is positively related with the success of IT-enabled business innovation.

H2c: Pragmatic legitimacy of IT-enabled business innovation is positively related with the success of IT-enabled business innovation.

3.2.3 Mediating effects of legitimacy

When institutional entrepreneurs establish new institutions, a fragmented social situation with a range of competing institutional practices, competing authority structures, and social networks may emerge. These can be divided into “friends” and “enemies” with respect to the intended institutional change (Misangyi et al., 2008). In order to win this competition in the institutional field, institutional entrepreneurs and his or her allies must exploit resources to bargain for acceptance from further important constituencies (Hargrave and van de Ven, 2006). Common resources used by institutional entrepreneurs include profound technical know-how (Maguire et al., 2004), political, social, and analytical skills (Garud et al., 2002), the ability to educate stakeholders (Marcus and Anderson, 2008), and domain-relevant expertise (Lawrence et al., 2005). Based on the above arguments, CIO, acting as an institutional entrepreneur, can also leverage his or her strategic knowledge and IT know-how, political savvy, and communicative ability to facilitate the implementation of IT-enabled business innovation.

Political savvy is important because IT-enabled business innovation is an occasion for organization change (Barley 1986). Savvy CIOs are more likely to be effective in facilitating IT-enabled organizational change and innovation and educate their business peers about the value and risks of promising IT projects and investments. Thus, their peers’ judgment on significant opportunities for business innovation is more likely to be positive. With fully understanding on the potential of new products, service or business processes to contribute to business growth, their peers tend to believe that new business is taken for granted and result of new business is consistent with the firm’s objective. Thus, we propose the following hypotheses:

H3a: Cognitive legitimacy of IT-enabled business innovation mediates the effect of CIO’s political savvy on the success of IT-enabled business innovation.

H3b: Moral legitimacy of IT-enabled business innovation mediates the effect of CIO’s political savvy on the success of IT-enabled business innovation.

CIOs with strong communicative ability are able to make CEO and business peers understand what they want to advertise. On the contrary, CIOs who are not able to communicate well with the rest of the business fail to show that they understand and respect others’ concerns and values in facilitating problem solving (Feeny and Willcocks 1998). In this case, CEO and business peers would hardly believe in IT-enabled business innovation ideas proposed by them. For instance, CEO and business peers might view the potential of new products, service or business processes advertised by CIO as a result of CIO’s miscalculation on market trend or firm’s industry position. Thus it is very possible that CEO and business peers reject innovative ideas that have great potential to increase sales, attract new customers or reduce operation cost. So the following hypotheses are raised:

H4a: Cognitive legitimacy of IT-enabled business innovation mediates the effect of CIO’s communicative ability on the success of IT-enabled business innovation.

H4b: Moral legitimacy of IT-enabled business innovation mediates the effect of CIO's communicative ability on the success of IT-enabled business innovation.

CIOs who have a high level of strategic business knowledge will be able to understand the business priorities, opportunities, and needs for the strategic use of IT. They will be in a better position to align IT with key business processes and promote IT-based business innovation (Smaltz et al. 2006). They are more likely to propose more reasonable innovative ideas that will benefit more stakeholders. Hence, we propose:

H5: Pragmatic legitimacy of IT-enabled business innovation mediates the effect of CIO's strategic business knowledge on the success of IT-enabled business innovation.

CIOs who have a high level of strategic IT knowledge are better able to advise their TMTs about IT issues, such as appropriate technologies, their timing, and the level of investment (Chen and Wu 2011). They are more likely to be able to integrate IT functions with core business processes, provide the right guidance about investing in information technologies and managing complex integration projects. Hence, we propose:

H6: Pragmatic legitimacy of IT-enabled business innovation mediates the effect of CIO's strategic IT knowledge on the success of IT-enabled business innovation.

To test the above hypotheses, we need to control for organizational variables that might influence the success of IT-enabled business innovation, which include IT budget, organizational size, and industry sector.

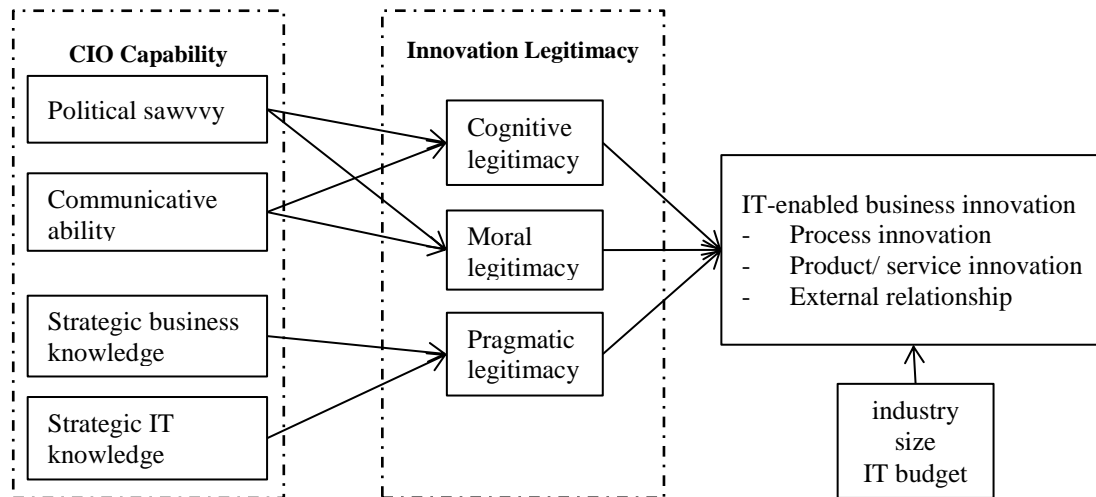


Figure 1. Conceptual model

4 RESEARCH METHOD

4.1 Data Collection

Field survey is chosen as the methodology for this research. Before conducting the final field survey, we will follow the steps suggested by Straub (1989) to improve validity and reliability of our measurements. We will conduct a pretest containing three parts, i.e., open-ended general discussion, semi-structured discussion, and highly structured item-by-item examination of the draft instrument.

Since asking CIO as the single respondent will cause common method bias, matched pair survey will be conducted. The questionnaire containing items of CIO capability and legitimacy of innovation will be sent to a peer of CIO, who will be recommended by CIO as the one involved in IT-enabled business innovation to the largest extent. Questionnaire containing items of success of innovation and

legitimacy of innovation will be answered by CIO. In order to improve the response rate, the survey will be conducted as a part of annual study initiated by a leading media.

4.2 Scale Development

All measures are adapted from those that are validated and used in prior studies. CIO capability is measured based on CIO (individual) capability proposed by Smaltz et al. (2006) and core IS capabilities proposed by Feeny and Willcocks (1998). Specifically, political savvy is measured by assessing CIO's ability to: 1) accurately read potentially contentious situations; 2) act with tact when confronted with potentially contentious situations; and 3) develop good rapport with most people. Communicative ability is measured by assessing CIO's ability to: 1) effectively use nontechnical terms when making presentations to the TMT; 2) effectively use business terms familiar to the other members on the TMT; and 3) effectively use clinical terms when making presentations to clinical business units. Strategic IT knowledge is measured by assessing CIO's personal knowledge of the organization's present and future products (services), markets and business processes, and on the organization's basis of competition. Strategic business knowledge is measured by rating the CIO's knowledge regarding: 1) how other organizations like their own are applying IT; 2) how to utilize existing organizational IT assets to address current needs; 3) how to identify relevant emerging technologies to support the organization; and 4) how to guide the organizations IT acquisition decisions (Smaltz et al. 2006). A five-point Likert scale was used for evaluation.

The scale to measure legitimacy of innovation is created based on the category of legitimacy raised by Suchman (1995). Moral legitimacy is measured based on evaluations of outputs and consequences, techniques and procedures, structures, and leaders of a typical IT-enabled business innovation realized in the past three years. Pragmatic legitimacy is measured with respondents' judgement on the extent of: 1) the new business provides specific favorable exchanges; 2) the new business is responsive to their larger interests; 3) the new business includes their feedback and suggestions. Cognitive legitimacy is measured with respondents' judgement on the extent of: 1) the new business is completely comprehensible; 2) the new business is accepted; 3) the new business has been integrated into the whole business.

Success of IT-enabled business innovation is measured by the scales adapted from Li et al. (2006) and Tsou and Chen (2012). Respondents will be asked to evaluate the extent to which their firm introduced new and improve existent processes, products/services, and external relations during the past three years. Employee is used as a measure of firm size (Brynjolfsson et al. 1994). Industry is coded by categories made by China Ministry of Commerce, a commonly used standard for industry classification. IT budget is measured by the average investment in software and hardware during the past three years.

5 POTENTIAL CONTRIBUTIONS

This study serves as an early effort to systematically investigate the influence mechanism of four types of CIO capabilities on IT-enabled business innovation. We expect the findings to provide several theoretical implications for the areas of IT innovation and CIO effectiveness. First, although the great potential of IT in driving business innovation has been widely recognized, the IT innovation research is still putting the majority of its effort in how to exploit the potential of IT in reducing cost and enhancing efficiency. Our study contributes to the emerging stream of IT-enabled business innovation, responding to the call for an innovation approach to IT as a 'third paradigm' (Ashurst et al. 2012).

Second, this research contributes to CIO effectiveness research by supporting the view that CIO can add value by facilitating business innovation with IT. It will elaborate upon and enhance our understanding of specific constructs, relationships, processes, structures, and mechanisms that underlie such IS Leadership concerns (Karahanna and Watson 2006).

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