

Understanding Information System Innovation: Moving beyond adoption and diffusion

Badrunnesa Zaman

Information Systems School
Queensland University of Technology
Brisbane, Australia
Email: badrunnesa.zaman@hdr.qut.edu.au

Erwin Fiel

Information Systems School
Queensland University of Technology
Brisbane, Australia
Email: e.fiel@qut.edu.au

Abstract

The ongoing introduction of new information technology and the wide range of opportunities it provides to individuals and organizations makes information system innovation a prominent theme for practitioners and researchers. However, information system research has predominantly focused on the adoption and diffusion of information technology, as opposed to the discovery and development of new ideas for how information technology can enable or drive business innovation. To address this gap, this paper conducted a literature review into business innovation (and related notions of organizational and administrative innovation) as it has been studied within the IS discipline. The contribution of this paper is that it presents ten important factors which influence business innovation with information technology. This review can provide guidance to decision makers in organizations that use new information technology to improve or transform their business.

Keywords Innovation, IS innovation, IT innovation, Business innovation, Organizational innovation, Administrative innovation, Innovativeness.

1. INTRODUCTION

Innovation driven and enabled by new Information Technology (IT) and Systems (IS) has affected business processes and firms operations resulting in substantial change in productivity and efficiency (Brynjolfsson & Hitt, 1996; Saldanha & Krishnan, 2011). For example, the robust development of electronic commerce is a sign of how companies have seized prospects brought by the widespread adoption and use of the Internet (Hsu, Lee, & Straub, 2012). This has brought about profound changes in markets and industries such as financial services where online banking is becoming the de facto standard and mobile apps are on the rise. For example, in Australia the Commonwealth Bank strives to be the market leader in online banking with its NetBank offering real-time banking and introducing innovative apps like Kaching (including Facebook friend payments) and Property Guide.

IS innovation is quite diverse and pervasive as it includes both technical and organizational elements that cover a wide spectrum of IS development and use (Lyytinen & Rose, 2003; Swanson, 1994) “Whether, when, and how to innovate with information technology? This complex and crucial question confronts managers in virtually all of today’s enterprises” (Swanson & Ramiller, 2004, p. 553). According to Robert G Fichman (2001) “the ability to innovate has always been an important contributor to organizational success” (Robert G Fichman, 2001, p. 428). Organizations need to act as innovators and “be proactive and scout for opportunities to exploit new information technologies through the conceptualization and development of innovative applications” (Nambisan, Agarwal, & Tanniru, 1999, p. 365). According to Nambisan et al. (1999) there is a gap in fulfilling these questions – “Who is responsible for such creative and innovative activity?” And “Where innovative ideas for IT deployment originate and evolve in organizations?” However, most of the IS innovation research is centred on the adoption, diffusion, implementation, acceptance and assimilation of IT in organizations as opposed to the discovery and development of new ideas (Fichman, 2000; Fichman, Dos Santos, & Zheng, 2014; Lucas Jr, Swanson, & Zmud, 2008). A comprehensive review of IS literature by Jha and Bose (2015), similarly concludes that there is a strong research tradition in the adoption and diffusion phases of IS innovations but that there has been limited attention for the earlier phases.

To better understand how IS can help organizations to innovate; there is a need to understand what is going on beyond the adoption and diffusion of IT. To address this gap, this paper looks into how IS can contribute to business innovation, that is IT-enabled or driven business innovation. Business innovation can be defined as “*the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system*” (Sawhney, Wolcott, & Arroniz, 2006, p. 76). According to Brynjolfsson and Saunders (2010), it is the changes in the business practices that determine how new information technology creates value for business and its customers. Swanson (1994, p. 1072) states that IS innovation is ‘fundamentally organizational innovation’ and can broadly be defined as ‘innovation in the organizational application’ of IT, which entails both information technological features and work organizational features. However, where Swanson also includes process innovation restricted to the functional IS core (type I), this is out of scope for IT-enabled or driven business innovation.

Specifically, we conducted a review of IS literature on business innovation (and related notions of organizational and administrative innovation). A review of past literature is a crucial endeavour for any academic research (Webster and Watson 2002). This research article represents ten important factors which influences IT enabled or driven business innovation in organizations. We propose these factors are especially relevant for the discovery and development of IS innovation. Findings from this literature review will help future researchers to develop theoretical insights related to how organizations identify whether, when and how to innovate with information systems. This review will provide guidance for developing and implementing IS innovation to practitioners. Consequently, the insightful findings from the paper will be useful for both academics and practitioners because “someone needs to prepare the managers and business leaders of tomorrow to thrive in and contribute to this golden age of digital innovation, and it would be a shame if we in IS did not stand up, seize this opportunity, and lead the way forward” (Fichman et al., 2014).

The paper is organised as follows: the next section presents a brief overview of the literature to explore the concept of IS/IT innovation. Subsequently, the research method is depicted, followed by the results of the archival analysis. The paper concludes with discussion and conclusion.

2. LITERATURE REVIEW

In this section we will provide a brief overview of past literature on IS/IT innovation. There are very few definitions of IS/IT innovation. A notable exception is Swanson who defines IS innovation as innovation in the organizational application of information technology and states that “it is fundamentally organizational innovation” (Swanson, 1994, p. 1072). Nambisan (2013) notes that where IT’s role has traditionally been focussed on as operand resource (i.e., enabler of innovation) in the innovation process and/or outcome, it’s more recent role is that of operant resource (i.e., trigger or initiator of innovation).

Most of the IS innovation research is centred on the adoption, diffusion, implementation, acceptance and assimilation of IT in organizations (Fichman, 2000; Fichman et al., 2014; Lucas Jr et al., 2008). In most of the IT/IS innovation researches, researchers have studied adoption and diffusion by making use of economic rationalist models (Fichman, 2004a). According to these models organizations which are rich in innovation exhibit more innovative activity, more frequently (Robert G Fichman, 2001; Fichman, 2004a). For organizational adoption typical predictors are top management support, professionalism of IS unit, external pressure, and external information sources (Jeyaraj, Rottman, & Lacity, 2006). Swanson stresses the importance of institutional forces that play significant role in the adoption IT innovation, also for the early adoption (as opposed to local, rationale choice) (Swanson & Ramiller, 1997).

Some researchers have conducted literature reviews on innovation in the IS field. While searching for most recent literature reviews we have found two quite recent reviews of IS innovation literature. One is written by Xiao, Califf, Sarker, and Sarker (2013) and the second one is by Jha and Bose (2015). As for gaining in-depth knowledge about IS innovation it is necessary to know the phases or different stages of innovation. According to Xiao et al. (2013), innovation ecosystem (process) consists of three phases: Design/Creation, Adoption/Diffusion and Impact. Whereas, Jha and Bose (2015) introduced a five phases: conceptualization, generation, adoption, diffusion and impact, to better understand and portray the diverse actions of innovation cycle (Jha & Bose, 2015).

3. RESEARCH METHOD

According Templier and Paré (2015, p. 113), “by uncovering prior knowledge, literature reviews offer foundations for further scientific research and are, thus, essential to any field’s development”. Using a good and appropriate method to review the existing literature is crucial while doing a good literature review (Vom Brocke et al., 2009). Additionally, while searching for literature in a complex field like information systems is a fairly challenging task (Bandara, Furtmuller, Gorbacheva, Miskon, & Beekhuizen, 2015). For our literature review we have choose the five step method which includes define, search, select, analyse and present, introduced by Wolfswinkel which involves Techniques from grounded theory where used during the analysis stage (Wolfswinkel, Furtmueller, & Wilderom, 2013).

1. Define: While thinking of undertaking a literature review, defining the criteria of the data sets or papers is crucial (Wolfswinkel et al., 2013). We have decided to look for answers for the question of what is going beyond adoption and diffusion phase. Then we have to think about which type of paper should we look for and where should we look for those papers (Wolfswinkel et al., 2013). That means we need to consider the search strategies for our literature review because according to Bandara et al. (2015), the well-defined search strategy plays a significant role in simplicity of the outcome. For our literature review, we have decided to look for the papers related to “business innovation” and related notions of “organizational innovation” and “administrative innovation” in the Senior Scholars' Basket of Journals (assuming we could leave out the IT-enabled or driven when targeting IS journals). The basket’s eight journals are: European Journal of Information Systems; Information Systems Journal; Information System Research; Journal for the Association of Information Systems; Journal of Information Technology; Journal of Management Information Systems; Journal of Strategic Information Systems; and Management Information Systems Quarterly.

2. Search: The data in literature review means the appropriate evidence from the existing literature (Cooper, 2016). Furthermore, before choosing and selecting the data, the first phase for gathering data includes searching through literature (Templier & Paré, 2015). The search process is time consuming and also confusing in some cases (Wolfswinkel et al., 2013). That is why in our case we have searched using the key words within an inverted comma such as “Business Innovation”, “Organizational Innovation” and “Administrative innovation” and focussed our search on the titles and the abstracts of the papers. In conducting our literature search, several academic databases and search engines were

used e.g. Proquest database, AIS Electronic Library (Aisel), ACM Digital Library, Science Direct, Emerald, Google Scholar, Emerald Engineering Database, InfoSci collection and IEEE Xplore Digital Library. By searching these libraries, a total of 18 relevant papers were identified and used.

3. Select: In this third phase we have gone through the text to find those papers which were actually related to the study. We have checked the abstract and made sure that all the papers were related to our research (Wolfswinkel et al., 2013). A total of 18 papers were selected for analysis phase. Table 1 presents an overview of the publications by journal and keyword. With respect to the publications over the years, almost every year or every other year a paper has been published (except the consecutive years of 2013-14 when no paper was published for 2 years). Two years had multiple publications: 2004 had 3 publications and 2002 had 2 publications.

Journal Name	Tot.	Business Innovation	Organizational Innovation	Administrative Innovation	References
MISQ	2		2		(Swanson & Ramiller, 2004), (Robert G. Fichman, 2001)
JMIS	4	2	2		(Fuller & Swanson, 1992), (Lindgren, Andersson, & Henfridsson, 2008), (Larsen, 1993) (Susarla, Barua, & Whinston, 2010)
ISR	4	2	1	1	(Zahra & George, 2002), (Wheeler, 2002), (Fichman, 2004b), (Hsu et al., 2012)
EJIS	4	1	2	1	(Hackbarth & Kettinger, 2004), (Whitley, 2005), (Grover, 1997), (Rai, 1995)
ISJ	1		1		(Lindgren et al., 2008)
JIT	2		2		(Sørensen & Lundh-Snis, 2001), (Simon, Sanchez, & Olazaran, 1999)
JAIS	0				
JSIS	1	1			(Watts & Henderson, 2006)
Total	18	6	10	2	

Table 1. Publication by year table

4. Analyze: For literature review, analysis can be done using or following different methods or techniques (Cooper, 2016). For our research paper, after selecting all the papers, we have chosen to analyse them using the coding techniques (open, axial and selective) from grounded theory. While using the coding technique from grounded theory method for literature review, the data has to be the literature itself not the interviews or ethnographic observations. The literature will act as transcripts (Bandara et al., 2015; Wolfswinkel et al., 2013).

We have used qualitative data analysis tool NVivo for analysis for our literature review. NVivo is a computer software which is made for qualitative data analysis, which allowed us to import textual data from the selected papers for coding (Bandara, Miskon, & Fielt, 2011). While coding the literature, individual code, concepts and sub-categories will emerge. When concepts and sub-categories (groups) begin to emerge, researcher should continuously compare those with existing literature, which is called comparative analysis. Based on the similarities and differences coding procedure can be used to refine the ideas and groups (Wolfswinkel et al., 2013). For our research article a total of 133 codes, 72 sub-categories and 10 categories emerged from 18 papers.

5. Present: According to Saldaña (2015, p. 7), “the act of coding requires that you wear your researcher’s analytic lens. But how you perceive and interpret what is happening in the data depends on what type of filter covers that lens”. The gained knowledge from the analytic phase should be represented in an explained manner which consists of finding and insights from the area of research. Furthermore, when concepts and categories developed from the analysis phase, the researcher should think about how to represent those concepts. Using a qualitative tool like NVivo gave us the capability to write a compact analytic explanations and keep a clear track of data and the references (Bandara et al., 2011).

4. DATA ANALYSIS AND FINDINGS

In this step appropriate techniques should be used to make sense of the information collected. During this step we will analyse all the data and after that it should be concise to make a combined representation. This section precises the results obtained from the literature review on how organizations are becoming more innovating and what are the aspects or factors that influences organizations to become innovative in conceptualization phase. Total 10 aspects were extracted from literatures which are presented in table 2.

Aspects & References	Description	Example Codes
Pro-activeness (Hackbarth & Kettinger, 2004), (Larsen, 1993), (Zahra & George, 2002), (Rai, 1995), (Lindgren et al., 2008), (Robert G. Fichman, 2001)	Innovation process involves a group of people or an organization itself which needs enough energy and enthusiasm to make the necessary change or improvement for the organization itself (Tidd, Pavitt, & Bessant, 2001).	"The importance of organizational and individual alertness and the search for new ideas as being crucial to identifying and exploiting such innovative technologies" (Zahra & George, 2002, p. 148).
Leadership (Watts & Henderson, 2006), (Hackbarth & Kettinger, 2004), (Swanson & Ramiller, 2004), (Hsu et al., 2012)	In the case of Innovation and transformation, Leadership is important (Tidd et al., 2001). Whether, when, and how to innovate with information technology? This complex and crucial question confronts managers in virtually all of today's enterprises (Swanson & Ramiller, 2004).	"Leaders create innovative climates" (Watts & Henderson, 2006, p. 129).
Creativity (Zahra & George, 2002), (Hackbarth & Kettinger, 2004), (Wheeler, 2002), (Grover, 1997)	Creativity is a vital prerequisite to all kinds of innovative movement (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Nambisan et al., 1999). Organizations has to creatively identify the exclusive ways through which new ideas can be derived (Nambisan et al., 1999).	"the ability to improvise involves the ability to be spontaneous and creative, it should be an important factor of organizational innovativeness" (Chatterjee, Moody, Lowry, Chakraborty, & Hardin, 2015, p. 162).
Organizational Vision (Zahra & George, 2002), (Wheeler, 2002), (Hackbarth & Kettinger, 2004), (Swanson & Ramiller, 2004), (Robert G. Fichman, 2001)	<i>"An organizing vision is a focal community idea for the application of information technology in organizations"</i> (Swanson & Ramiller, 1997, p. 460).	"A firm's ability to recognize and identify new market spaces, determine their potential strategic importance, visualize their evolution, and match them with emerging technological capabilities are central tenets for surviving in dynamic markets" (Zahra & George, 2002, p. 148).
Mindfulness (Susarla et al., 2010), (Zahra & George, 2002), (Wheeler, 2002), (Swanson & Ramiller, 2004)	<i>"Mindfulness as the nuanced appreciation of context and ways to deal with it lies at the heart, we believe, of what it means to manage the unexpected in innovating with IT"</i> (Swanson & Ramiller, 2004, p. 556).	"mindfulness plays a dual role in innovation, enhancing the recognition of organizational circumstances demanding an innovative response" (Swanson & Ramiller, 2004, p. 556).
Top management support (Sayeed & Gill, 2009), (Wheeler, 2002), (Simon et al., 1999), (Grover, 1997)	Sayeed and Gill (2009) suggested that Managerial process consists of management, incorporation, knowledge and reconfiguration.	"firms must decide whether to apply newly developed technical competences to existing lines of business or to go after new markets through a business innovation strategy" (Hackbarth & Kettinger, 2004, p. 274).
Experience (Larsen, 1993),	Innovation is a complex process that requires comprehensive knowledge of	"IT innovation may be better explained by managers'

(Watts & Henderson, 2006)	people business prospects and working with the organizations. This kind of knowledge only can be obtained by experience (Larsen, 1993).	experience with IT” (Larsen, 1993, p. 1).
Organizational Climate (Lindgren et al., 2008), (Watts & Henderson, 2006)	According to Klein and Sorra (1996)p. 1060) “The more comprehensively and consistently implementation policies and practices are perceived by targeted employees to encourage, cultivate, and reward their use of a given innovation, the stronger the climate for implementation of that innovation”.	“Climate plays a key role in stimulating innovation of all kinds, stimulating knowledge sharing (Bock et al., 2005), and engendering organizational change” (Watts & Henderson, 2006, p. 128).
Organizational Structure (Hackbarth & Kettinger, 2004), (Grover, 1997)	Organizational structure mainly depends in the diversity of the works that is executed by the organization itself (Tidd et al., 2001).	“innovation in the IS core is more dependent on innovative IS unit structures, while innovation in the organizational unit is more dependent on host organization innovative structures” (Grover, 1997, p. 236).
Competitive Advantage (Wheeler, 2002), (Hsu et al., 2012), (Hackbarth & Kettinger, 2004),	According to Wheeler, “the timing and cost of the change-oriented strategy would influence a firm’s ability to create and sustain a competitive advantage” (Wheeler, 2002, p. 148).	“In hypercompetitive environments, organizations continually need to refocus their business” (Wheeler, 2002, p. 132).

Table 2. Aspects/factors that influences organisations

1. Pro-activeness: Basically innovation is about knowledge and change and is frequently disruptive, risky and expensive (Tidd et al., 2001). As organizational environment becoming more dynamic and distributed, proactive behaviour and initiatives become even more critical determinants of organizational success. Pro-activeness include identifying the opportunities to improve things that is innovate (Crant, 2000). According to Nambisan “It is increasingly evident that organizations can no longer afford to wait for suitable problems to occur for information technology deployment; instead, they need to be proactive” (Nambisan et al., 1999, p. 365). More pro-activeness will give more success on IS innovation. The importance of organizational alertness and the urge for new ideas is central for identifying and exploring innovative technologies (Wheeler, 2002; Zahra & George, 2002). Manager and stakeholders are making investment decision for exploring innovative technologies (Rai, 1995). An organization should innovate across all phases of innovation process rather than just a part of the process (Robert G. Fichman, 2001). Furthermore, Lindgren et al. (2008) added, absorptive capacity plays an important role also, as it determines the ability of an organization to recognize the value of new and external information and apply it towards commercialization.

2. Leadership: In the case of Innovation and transformation, Leadership is important (Tidd et al., 2001). Whether, when, and how to innovate with information technology? This complex and crucial question confronts managers in virtually all of today's enterprises (Swanson & Ramiller, 2004). CIOs and IT managers need to drive the innovation in organizations because CIOs can build innovative IT organizations and leadership create innovative climate throughout the organization (Watts & Henderson, 2006).The strong participation of top management boosts towards a successful innovation process (Hsu et al., 2012). According to Hackbarth and Kettinger (2004), top managements leadership reflects internal capabilities of an organization to adopt IT innovation. Furthermore, Fichman (2004b) added, managers must innovate and it's important to know what to innovate and how to manage implementation process.

3. Creativity: Creativity is a vital prerequisite to all kinds of innovative movement (Amabile et al., 1996; Nambisan et al., 1999). Organizations have to creatively identify the exclusive ways through which new ideas can be derived (Nambisan et al., 1999). The ability to become creative is an important factor in organizational innovativeness because it influences the organization to improvise the existing products as well as new product development (Chatterjee et al., 2015). Furthermore Chatterjee et al. (2015)) added improvisation in an organization, is a form of innovation. Identifying the new ideas, building, adapting and reconfiguring is a dynamic process which needs deeper understanding and

because of rapid technological change and the nature of competition (Wheeler, 2002). Being creative is an important aspect of innovation process because shaping ideas and problems are ongoing process in innovation (Grover, 1997).

4. Organizational Vision: *“An organizing vision is a focal community idea for the application of information technology in organizations”* (Swanson & Ramiller, 1997, p. 460). The adopting organization needs to know not only the expenses and technological structures of the new innovation, it also needs to identify what business processes are likely to benefit from the application of the technology (Nambisan et al., 1999). Satisfying customers are the main focus for any business for doing so a firm must be able to identify and categorize new possibilities for business and match them with emerging technologies (Wheeler, 2002). According to Swanson and Ramiller, organizing vision provides a focus for innovation interpretation (Swanson & Ramiller, 1997, 2004). Furthermore Robert G. Fichman (2001) added low centralization and formalization leads to more willingness to embrace new ideas and encourages the initiation for innovation process (Robert G. Fichman, 2001).

5. Mindfulness: Many of the firms are unaware of emerging technologies, thus mindful thinking is vital for organizational as well as innovation success (Swanson & Ramiller, 2004; Wheeler, 2002). An organization is mindful in innovating with IT when it joins to an innovation with incorporation with organizational facts. *“Mindfulness in organizational innovation overall also holds more specifically for IT innovation. Mindfulness as the nuanced appreciation of context and ways to deal with it lies at the heart, we believe, of what it means to manage the unexpected in innovating with IT”* (Swanson & Ramiller, 2004, p. 556). Mindful decision making includes selecting the ideas or choices that best fit a firm's circumstances (Swanson & Ramiller, 2004) involving in the conceptualization phase (Jha & Bose, 2015). According to Susarla et al. (2010), organizational designers should be mindful while selecting and replicating features for the business. Furthermore, Wheeler (2002) added when new technologies emerge, firms are blindsided and with mindful thinking organizations can prescribe effecting choices for firms success and thus can deal with the volatile environment (Wheeler, 2002).

6. Top Management Support: Sayeed and Gill (2009) suggested that Managerial process consists of management, incorporation, knowledge and reconfiguration because the top management of an organization can impact organizational policies and practices (Zaman & Sedera, 2015). Management's abilities should include timely demonstration of responsiveness, rapid innovation and effective coordination of internal and external sources. Managers must continually achieve resources that matches or creates marketplace change (Wheeler, 2002). Top management is responsible also for better business strategies which prelude to favourable contextual condition and leads organizations towards innovation (Grover, 1997).

7. Experience: Innovation is a complex process that requires comprehensive knowledge of people business prospects and working with the organizations. This kind of knowledge only can be obtained by experience (Larsen, 1993). CIOs and managers with better understanding about IT can leads to a successful implementation of IT/IS innovation. It is important for the organizations that CIOs must communicate with top business unit managers , since managers with IT experience are more likely to become champion IT and innovation requires champions (Watts & Henderson, 2006). IT innovation is better explained by managers' experience with IT (Larsen, 1993). According to Larsen, the more experience with IT the more increased chance of IT innovation (Larsen, 1993).

8. Organizational Climate: According to (Klein & Sorra, 1996p. 1060) *“The more comprehensively and consistently implementation policies and practices are perceived by targeted employees to encourage, cultivate, and reward their use of a given innovation, the stronger the climate for implementation of that innovation”*. The organizational culture and climate has an important role in studying the innovation process. Nambisan added, the close interaction between IT staff and user is possible if a positive organizational climate exists (Nambisan et al., 1999). Most of the IS researchers has recognized that organizations are highly dependent on the intelligent organizational environment (Lindgren et al., 2008). Furthermore, according to Chatterjee et al. (2015), organizational wisdom and courage forms the basis of innovation because it gives organizations flexibility to face itself with an environment of unexpected change, competition and insecurity (Chatterjee et al., 2015).

9. Organizational Structure: Organizational structure mainly depends in the diversity of the works that is executed by the organization itself (Tidd et al., 2001). For higher innovation outcome firms changes their internal capabilities as well as organizational structure (Hackbarth & Kettinger, 2004). The more innovative organizational structure the more chance for a better innovation outcome (Grover, 1997). Furthermore, Robert G. Fichman (2001) added organizational characteristics such as size, structure and expertise are important factors for IT innovation.

10. Competitive Advantage: In a competitive market organizations need to continuously refocus on their business which leads to better innovation outcome (Wheeler, 2002). IT can be pertained to different organizational frameworks in solving the organizational problems of different innovation strategies as such IT can be serve to create a organizations which can innovate better in today's highly competitive market (Chatterjee et al., 2015). According to Wheeler, "the timing and cost of the change-oriented strategy would influence a firm's ability to create and sustain a competitive advantage" (Wheeler, 2002, p. 148). In a hypercompetitive business atmosphere, organizations innovate and change their business processes in response to the external forces (Hackbarth & Kettinger, 2004; Hsu et al., 2012). Furthermore, according to Fichman, "Increasing sustainability of competitive advantage increases the expected value and variance potential returns and thus increases the option value of positioning investments in IT platforms" (Fichman, 2004b, p. 142).

5. DISCUSSION

In the last few years, there has been extensive progress in computer hardware, software and networks (Brynjolfsson & McAfee, 2012) which resulted in IT innovation. IT innovation is a complex process. For this research article we have looked beyond the adoption and diffusion, which has often been the focus of IS research (Fichman, 2004a; Jha & Bose, 2015). According to Fichman, "IS researchers have studied a wide diversity of factors that promote or hinder the adoption and diffusion of digital innovations" (Fichman et al., 2014, p. 347) but there has been always less attention given on the factors related to, for example, awareness, consideration, idea selection and idea generalization (Fichman et al., 2014; Gopalakrishnan & Damanpour, 1997; Jha & Bose, 2015).

Our research article represents ten important factors which influences how IT can enable or drive business innovation in organizations. These factors include pro-activeness, leadership, creativity, experience, organizational vision, mindfulness, top management support, organizational structure, organizational climate and competitive advantage. We propose that these factors are in particular relevant for the early phases of IS innovation, such as discovery and development (Fichman et al. 2014) or conceptualization and generation (Jha & Bose, 2016). As such this addresses an important research gap.

An important question to ask is what are the similarities between our innovation factors and traditional adoption and diffusion factors? Important factors from adoption and diffusion literature include administrative authority, financial support, organizational size, IT capability, management styles, competitive pressure etc. (Bradford & Florin, 2003; Fichman, 2000; Kamal, 2006). Some of the factors we identified could play throughout the whole innovation process from conceptualization and generation till adoption and diffusion such as leadership, top management support, organizing vision (Swanson & Ramiller, 1997) and mindfulness (Swanson & Ramiller, 2004). According to Tidd et al. (2001, pp. 102, 103) "Organizations have traditionally conceived of leadership as an heroic attribute" and "Top management commitment is a common prescription associated with successful innovation". However, one may ask if there are differences between, for example, leadership when considering the discovery and development of IS innovation than when considering the adoption and diffusion of IS innovation, for example, showing more entrepreneurial characteristics. In addition, factors like pro-activeness and creativity in relation to the creation and development of IS innovation ideas have received less attention in adoption and innovation studies.

6. CONCLUSION

Successful innovation is a key contributor to organizational success. However, effective innovation for better business outcomes is a complex process (Fichman, 2000). As most of the IT/IS research is about adoption and diffusion of IT, we wanted to look beyond that by examining IS literature related to IT-enabled or driven business innovation (and related notions of organizational and administrative innovation) in top IS journals. We have found and analysed 18 papers in the Senior Scholars' Basket of Journals using title and abstract search.

We identified 10 factors which we propose are in particular relevant for the earlier stages of IS/IT innovation: pro-activeness, leadership, creativity, experience, organizational vision, mindfulness, top management support, organizational structure, organizational climate and competitive advantage. Overall, it is surprising to only find 18 papers in the top IS journals on business innovation, organizational innovation and administrative innovation given the focus of IS journals on organizational and business issues and the prominence of innovation over the last years, in particular with major developments like Internet and mobile.

This paper has several limitations. First of all we only looked at a small part of the full IS literature and also relevant papers may have been published in non-IS outlets. Furthermore, while we think that our search for (IT-enabled or driven) business innovation (including the related notions of organizational and administrative innovation) is a good starting-point, there are factors that we may have overlooked due to this focus. For example, we did not look into specific types of innovation such as IT-enabled business process innovation (and related notions of business process improvement and business process reengineering) or business transformation. Future research could look at a broader search strategy to identify literature with a more comprehensive view on IS innovation beyond adoption and diffusion. In addition, backward and forward search can help to further identify significant papers in this area. A more comprehensive search will also assist with enhancing our understanding so that we can develop a set of propositions that can serve as a research agenda and guide future work.

7. REFERENCES

- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of management journal*, 39(5), 1154-1184.
- Bandara, W., Furtmuller, E., Gorbacheva, E., Miskon, S., & Beekhuyzen, J. (2015). Achieving Rigour in Literature Reviews: Insights from Qualitative Data Analysis and Tool-support. *Communications of the Association for Information Systems*, 37(1), 8.
- Bandara, W., Miskon, S., & Fielt, E. (2011). *A systematic, tool-supported method for conducting literature reviews in information systems*. Paper presented at the Proceedings of the 19th European Conference on Information Systems (ECIS 2011).
- Bradford, M., & Florin, J. (2003). Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. *International journal of accounting information systems*, 4(3), 205-225.
- Brynjolfsson, E., & Hitt, L. (1996). Paradox lost? Firm-level evidence on the returns to information systems spending. *Management science*, 42(4), 541-558.
- Brynjolfsson, E., & McAfee, A. (2012). Winning the race with ever-smarter machines. *MIT Sloan Management Review*, 53(2), 53.
- Brynjolfsson, E., & Saunders, A. (2010). *Wired for innovation*: The MIT Press.
- Chatterjee, S., Moody, G., Lowry, P. B., Chakraborty, S., & Hardin, A. (2015). Strategic Relevance of Organizational Virtues Enabled by Information Technology in Organizational Innovation. *Journal of Management Information Systems*, 32(3), 158-196.
- Cooper, H. (2016). *Research synthesis and meta-analysis: A step-by-step approach* (Vol. 2): Sage publications.
- Crant, J. M. (2000). Proactive behavior in organizations. *Journal of management*, 26(3), 435-462.
- Fichman, R. G. (2000). The diffusion and assimilation of information technology innovations. *Framing the domains of IT management: Projecting the future through the past*, 105-127.
- Fichman, R. G. (2001). The role of aggregation in the measurement of IT-related organizational innovation. *MIS quarterly*, 427-455.
- Fichman, R. G. (2001). The role of aggregation in the measurement of IT-related organizational innovation. *MIS Quarterly*, 25(4), 427-455.
- Fichman, R. G. (2004a). Going beyond the dominant paradigm for information technology innovation research: Emerging concepts and methods. *Journal of the Association for Information Systems*, 5(8), 11.
- Fichman, R. G. (2004b). Real options and IT platform adoption: Implications for theory and practice. *Information systems research*, 15(2), 132-154.
- Fichman, R. G., Dos Santos, B. L., & Zheng, Z. (2014). Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum. *MIS quarterly*, 38(2), 329-343.
- Fuller, M. K., & Swanson, E. B. (1992). Information centers as organizational innovation: exploring the correlates of implementation success. *Journal of Management Information Systems*, 9(1), 47-67.

- Gopalakrishnan, S., & Damanpour, F. (1997). A review of innovation research in economics, sociology and technology management. *Omega*, 25(1), 15-28.
- Grover, V. (1997). An extension of the tri-core model of information systems innovation: Strategic and technological moderators. *European journal of information systems*, 6(4), 232-242.
- Hackbarth, G., & Kettinger, W. J. (2004). Strategic aspirations for net-enabled business. *European Journal of Information Systems*, 13(4), 273-285.
- Hsu, C., Lee, J.-N., & Straub, D. W. (2012). Institutional influences on information systems security innovations. *Information systems research*, 23(3-part-2), 918-939.
- Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology*, 21(1), 1-23.
- Jha, A. K., & Bose, I. (2015). Innovation research in information systems: A commentary on contemporary trends and issues. *Information & Management*, 53(3), 297-306.
- Kamal, M. M. (2006). IT innovation adoption in the government sector: identifying the critical success factors. *Journal of Enterprise Information Management*, 19(2), 192-222.
- Klein, K. J., & Sorra, J. S. (1996). The challenge of innovation implementation. *Academy of management review*, 21(4), 1055-1080.
- Larsen, T. J. (1993). Middle managers' contribution to implemented information technology innovation. *Journal of Management Information Systems*, 10(2), 155-176.
- Lindgren, R., Andersson, M., & Henfridsson, O. (2008). Multi-contextuality in boundary-spanning practices. *Information Systems Journal*, 18(6), 641-661.
- Lucas Jr, H. C., Swanson, E. B., & Zmud, R. (2008). Implementation, innovation, and related themes over the years in information systems research. *Journal of the Association for Information Systems*, 8(4), 8.
- Lyytinen, K., & Rose, G. M. (2003). Disruptive information system innovation: the case of internet computing. *Information Systems Journal*, 13(4), 301-330.
- Nambisan, S. (2013). Information technology and product/service innovation: A brief assessment and some suggestions for future research. *Journal of the Association for Information Systems*, 14(4), 215.
- Nambisan, S., Agarwal, R., & Tanniru, M. (1999). Organizational mechanisms for enhancing user innovation in information technology. *MIS quarterly*, 23(3), 365-395.
- Rai, A. (1995). External information source and channel effectiveness and the diffusion of CASE innovations: an empirical study. *European journal of information systems*, 4(2), 93-102.
- Saldaña, J. (2015). *The coding manual for qualitative researchers*: Sage.
- Saldanha, T., & Krishnan, M. (2011). *Leveraging IT for business innovation: Does the role of the CIO matter?* Paper presented at the International Conference on Information Systems.
- Sawhney, M., Wolcott, R. C., & Arroniz, I. (2006). The 12 different ways for companies to innovate. *MIT Sloan Management Review*, 47(3), 75.
- Sayeed, L., & Gill, S. (2009). *Implementation of Green IT: Implications for a dynamic resource*. Paper presented at the American Conference on Information Systems.
- Simon, K., Sanchez, P. J., & Olazaran, M. (1999). IT-based product and process innovation: a case from the Spanish legal information sector. *Journal of Information Technology*, 14(2), 171-179.
- Sørensen, C., & Lundh-Snis, U. (2001). Innovation through knowledge codification. *Journal of Information Technology*, 16(2), 83-97.
- Susarla, A., Barua, A., & Whinston, A. B. (2010). Multitask agency, modular architecture, and task disaggregation in SaaS. *Journal of Management Information Systems*, 26(4), 87-118.
- Swanson, E. B. (1994). Information systems innovation among organizations. *Management science*, 40(9), 1069-1092.
- Swanson, E. B., & Ramiller, N. C. (1997). The organizing vision in information systems innovation. *Organization science*, 8(5), 458-474.
- Swanson, E. B., & Ramiller, N. C. (2004). Innovating mindfully with information technology. *MIS quarterly*, 28(4), 553-583.

- Templier, M., & Paré, G. (2015). A Framework for Guiding and Evaluating Literature Reviews. *Communications of the Association for Information Systems*, 37(1), 6.
- Tidd, J., Pavitt, K., & Bessant, J. (2001). *Managing innovation* (Vol. 3): Wiley Chichester.
- Vom Brocke, J., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R., & Cleven, A. (2009). *Reconstructing the giant: On the importance of rigour in documenting the literature search process*. Paper presented at the European Conference of Information Systems
- Watts, S., & Henderson, J. C. (2006). Innovative IT climates: CIO perspectives. *The Journal of Strategic Information Systems*, 15(2), 125-151.
- Wheeler, B. C. (2002). NEBIC: A dynamic capabilities theory for assessing Net-enablement. *Information Systems Research*, 13(2), 125-146.
- Whitley, E. A. (2005). Visiting the red-light zones with Claudio. *European journal of information systems*, 14(5), 477-479.
- Wolfswinkel, J. F., Furtmueller, E., & Wilderom, C. P. (2013). Using grounded theory as a method for rigorously reviewing literature. *European journal of information systems*, 22(1), 45-55.
- Xiao, X., Califf, C. B., Sarker, S., & Sarker, S. (2013). ICT innovation in emerging economies: a review of the existing literature and a framework for future research. *Journal of Information Technology*, 28(4), 264-278.
- Zahra, S. A., & George, G. (2002). The net-enabled business innovation cycle and the evolution of dynamic capabilities. *Information systems research*, 13(2), 147-150.
- Zaman, B., & Sedera, D. (2015). *Green Information Technology as Administrative innovation-Organizational factors for successful implementation: Literature Review*. Paper presented at the Australasian Conference on Information Systems.

Copyright: © 2016 Zaman & Fiel. This is an open-access article distributed under the terms of the [Creative Commons Attribution-NonCommercial 3.0 Australia License](https://creativecommons.org/licenses/by-nc/3.0/australia/), which permits non-commercial use, distribution, and reproduction in any medium, provided the original author and ACIS are credited.