Managing IT Process Innovation Within Organizations
A Critical Literature Review

Adam Balwant
MSc in Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

IT Process innovation

Critical success factor

Situated change

Resource-based view

ABSTRACT

This review explores the recent literature on managing IT process innovation within organizations. From the various studies in this field, we examine three main approaches to managing IT process innovation - critical success factors (CSF), situated change, and strategic management via the resource based view (RBV) of the firm. The CSF approach emphasizes the importance of management support, team structure, network competence, and culture within IT process innovation. However, the CSF approach ignores the concept of emergent change within the IT process, and this is where the situated change approach is more useful. The situated change approach challenges the traditional CSF approach by showing the importance of incremental and frequent change within the IT process. Finally, the strategic management approach illustrates how innovation is managed through the RBV of the firm. The RBV of the firm proposes that organizations should develop their IS resources into strategic assets and capabilities to gain a competitive edge from the IT process.

Introduction

Innovation is a concept that describes how organizations acquire new technological capabilities and explore new business processes (Murat Ar and Baki, 2011). There are two main types of innovation: product and process. On the one hand, product innovation has an external focus on customers who will purchase and use the product. On the other hand, process innovation typically has an internal focus in which the customer is senior management, who seeks to improve the process in order to increase the efficiency of the organization (Bender et. al, 2000). There are several benefits that organizations derive from innovation.

Innovation plays a vital role on the economic performance of businesses because it facilitates rapid expansion, higher profit margins, and a competitive edge (Kleinknecht et. al, 2003). However, not all businesses that attempt to innovate are successful in the process. For instance, within process innovation, 90% of all early Enterprise Resource Planning (ERP) projects were either delayed or over their initial budget (Plant and Willcocks, 2007). Therefore, even though IT process innovation provides economic benefits for businesses, the evidence shows that

this type of innovation must be managed carefully to ensure that these benefits are realized in time and within budget.

There are several different approaches that can be adopted by organizations to manage IT process innovation. Some of the common approaches include: an examination of the critical success factors (CSF), social construction of technology (SCOT), strategic management via RBVF, institutional approach, and situated change approach. While each of these approaches are useful for managing new IT process innovation, I have opted to focus on only three of these approaches: CSF, situated change, and strategic management. I chose these approaches as they are more prominently featured in new innovation literature, as compared to SCOT and the institutional approach. This review juxtaposes these unique approaches.

First, the CSF approach describes a range of success factors that is critical for managing IT process innovation. The CSF approach was the traditional model used in early literature to describe successful implementation of IT processes. The most common success factors examined in the literature are top management support, team structure, network competence, and organizational culture (Soja, 2006; Bender et. al, 2000). The CSF approach is discussed in more detail in Section 1 of this review.

Corresponding Author
Email Address: Balwantadam@gmail.com (A. Balwant)

Second, the situated change approach describes the social construction of IT process innovation from a socially embedded perspective. While the CSF approach states success factors that must be implemented at a point in time, the situated change approach illustrates how innovation is rather a continuous process. The interaction with new IT processes change over time due to ongoing learning of the actors involved (Igira, 2008). Section 2 focuses on how such change is managed in IT process innovation through the concept of improvisation and ongoing learning.

Third, the strategic management approach describes process innovation management from a technical rational perspective where the resource-based view (RBV) of the firm is utilized. The RBV of the firm proposes that firms utilize their IS resources and capabilities such as knowledge management and collaboration in order to manage new IT processes (Tarafdar and Gordon, 2007). Section 3 describes the strategic management approach in more detail. At the end of this review, I develop a conclusion on the different approaches explored in the literature, and offer further implications for future research based on the limitations discovered.

1. Critical Success Factors of Managing IT Process Innovation

The CSF approach describes how organizations achieve success by implementing a set of factors that past experiences have shown to be important for success (Karin et. al, 2011). The concept of success factors was developed in early literature by Ronald Daniel in the 1960s. From this concept, Rockart (1978) derived the CSF approach, which is still used in practice today within many IT studies. For instance, in some recent studies, authors use the CSF approach to show how ERP systems can be successfully implemented. Bender et. al (2000) argue that as long as project managers are able to facilitate the following critical success factors, they will differentiate themselves through increasing rates of IT process innovation.

1.1. Management Support

Management support refers to the involvement of high level managers in the implementation duties of the IT process (Soja, 2006). Support from top level management is one of the most important of all the critical success factors of IT process innovation (Plant and Willcocks, 2007; Soja, 2006). Without proper management support in the IT process, employees may follow a wrong direction which can result in a defective process (Blindenbach-Driessen et. al, 2006). In giving support, managers must ensure that the process is aligned with the strategic goals of

the organization (Kuang et. al, 2001). Furthermore, managers should be fully committed and willing to dedicate resources to the implementation of the process.

Management support also comprises of setting appropriate schedules and deadlines. As Bender et. al (2000) argue, deadlines should be set aggressively to encourage a faster work pace in the organization. However, deadlines should not be unrealistic as this can lead to reduced morale of the employees and thus inefficiencies (Bender et. al, 2000). Bender et. al (2000) make the assumption that employees working at a faster pace does not compromise the quality of their performance, and thus the IT process.

In addition to scheduling, the vision of top management is also important to facilitate IT process innovation. Managers must be aware of the goals, labour required, process limitations, and the capital investment that is essential for the IT process (Soja, 2006). The goals must be detailed in order to ensure that the scope and plan of the process are well understood by all users involved (Soja, 2006). Additionally, the goals must be clearly stated and comprehensible so as to communicate with the employees involved in the process. Such communication improves the visibility and awareness of the IT process innovation within the organization (Blindenbach-Driessen et. al, 2006).

1.2. Team Structure

Teams should include a variety of highly skilled and knowledgeable workers (Soja, 2006). In addition, it is beneficial to have a mixture of skills and experience within the team from both internal and external sources. In his study of ERP success factors, Kuang et. al (2001) argue that organizations should utilize cross functional teams that include the best people from internal staff and external consultants. Blindenbach-Driessen et. al (2006) reinforce this view by adding that cross functional teams are beneficial because they enhance collaboration and improve results due to a better understanding of the process.

Blindenback-Driessen et. al (2006) make the assumption that cross functional teams are able to work together and implement the new process in an efficient manner. However, within cross functional teams, there may be circumstances of disagreements and conflicts which may lead to the disruption of the new IT process. Nonetheless, cross functional teams can create a competitive advantage for organizations by creating a resource that is difficult to imitate (vis-à-vis RBV), e.g., a highly cohesive team built on trust (Karimi et. al, 2007). This will be discussed further in Section 3.

Management Support for the new IT process	
Kuang et. al (2001)	• Managers must ensure process is aligned with strategic goals. • Goals must be detailed and clearly communicated to improve visibility and awareness of IT process. • Deadlines and schedules should be set aggressively but not unrealistic.
Soija (2006)	
Bender et. al (2000)	
Team formation of both internal and external sources	
Soja (2006)	• Teams should include a variety of highly skilled and knowledgeable workers. • Cross functional teams enhance collaboration and improve results.
Blindenbach-Driessen et. al (2006)	
Network competence to obtain useful resources	
Ritter and Gemunder (2003)	• Social interactions with firms allow access to critical resources which are useful for the innovation process.
Culture that links employees' relations with the organization	
Kuang et. al (2001)	• Firms should promote a culture with shared values and common goals.

Table 1. Success factors of managing IT process innovation

1.3. Network Competence

Network competence is the ability of a company to manage their technological network in order to perform tasks while also managing the skills and knowledge needed to perform these tasks (Ritter and Gemunder, 2003). A company's network competence is positively correlated with process innovation success (Ritter and Gemunden, 2004). Network competence is important because social interactions and managerial skills are required for successful completion of the IT process. (Ritter and Gemunder, 2003). Social interactions with other organizations provide firms with access to critical resources which can enhance their knowledge and skills regarding the innovation process (Ritter and Gemunden, 2004). These resources may include skilled personnel (e.g. consultants), larger facilities, and quality information on the new process.

1.4. Culture

Organizational culture describes the shared meanings and expectations held by different members of a group (Igira, 2008). An organizational culture should not be viewed as an obstacle to implementing an IT process, but rather as an important concept that is linked to the socio-economic aspects of employees' relations within the organization (Igira, 2008). Kuang et. al (2001) extend this view by stating the importance of promoting a culture with shared values and common goals in

order to achieve IT process innovation success. The underlying assumption here is that the culture of the organization can be easily implemented to suit the new process. However, it is more likely that a new culture emerges as users adapt to the new IT process and make sense of it (Kostopoulos et. al, 2002). This concept of emergent culture will be discussed in Section 2 where we analyse the importance of situated change in managing process innovation.

2. A Situated Change Approach to Managing IT Process Innovation

The situated change approach is developed from a socially embedded reasoning, and this approach demonstrates how the IT process is socially constructed. Socially constructed processes are subjected to different interpretations that are compatible with various relevant groups (Howcroft et. al, 2004). For example, when implementing a new ERP process, it is likely that different users will have different reactions to the process as it evolves over time (Sunmer, 2006).

While the CSF approach of managing process innovation is useful, it may not be the most comprehensive of the three approaches. In order to implement success factors, organizations act in a planned way, which contrasts with the view of the situated change approach. The idea of success is vague and a simple implementation of success factors may not always be sufficient. Additionally,

much of the literature that adopts the CSF approach is dated. Within recent studies, there have been more complete perspectives for understanding process innovation management, such as the situated change approach.

As a process, the situated change approach to innovation management consists of emergence, development, and implementation of ideas that are spread across organizations (Garud et. al, 2013). Larsen and Bogers (2014) question whether innovation is a result of practices as opposed to ideas, because such practices are prone to changes over time due to the concepts of improvisation and ongoing learning (Igira, 2008). These changes are incremental and continuous and are impacted by both internal and external factors. Furthermore, such emergent changes challenge the traditional CSF approach because these changes illustrate a different approach to managerial involvement, team structure, and culture.

2.1. Managerial Involvement

Improvisation allows managers to adapt to changes and improve their products and services in a continuous and creative manner (Vera and Crossan, 2005). Contrary to the CSF approach, IT process innovation is sometimes implemented without a predetermined strategy and without the initial support of top management (Essen and Lindblad, 2013). Instead, the IT process is often a matter of managers and employees improvising and learning throughout. Larsen and Bogers (2014) describes process innovation as a paradox where managers are in charge of the process but not in control of the improvisational aspect. Nonetheless, once the process is in place, managers must be aware of and participate in the improvisation within the implementation of an IT process innovation (Larsen and Bogers, 2014).

Improvisation is dynamic because ideas emerge in a nonlinear fashion (Larsen and Bogers, 2014). As a result, a 'shadow' often unfolds within the implementation of new IT processes (Larsen and Bogers, 2014). These 'shadows' are informal conversations between employees that arise in the innovation process. These informal conversations assist in understanding the negotiations of the process. Managers should include these shadow themes because they can lead to creative potential and important ideas for improving the process (Larsen and Bogers, 2014). However, the task of filtering out unimportant informal conversations may be difficult and time consuming for managers.

2.2. Team Structure

Teams improvise when they adjust and make sense of new IT processes. Vera and Crossan (2005) introduce the idea of collective improvisation where they assume that improvisation is a skill that can be learned by team members. Collective improvisation within the IT process is influenced by the expertise of the team members, the degree of trust, and the level of communication (Vera and Crossan, 2005). Vera and Crossan (2005) assume that organizations should train teams to develop an understanding of what improvisation is. However, teams are more likely to participate in an ongoing learning process as opposed to improvising based on any formal training procedure.

2.3. Culture

While the CSF approach assumes that a culture can be implemented to suit the process, the situated change approach highlights that culture emerges as users adapt to the process. The situated change approach indicates that managers should embrace a culture that facilitates experimentation, controlled risk and continuous learning (Vera and Crossan, 2005). In dealing with the uncertainty of new IT processes, employees continuously learn new activities and skills that are used to alter the process and improve efficiency (Igira, 2008). Kostopoulos et. al (2002) extend this point by stating that this process of ongoing learning has a positive effect on innovation because it helps the firm to generate new knowledge, develop existing skills, and adapt to the changing nature of the environment. Continuous learning is also critical for the 'sense and response' approach to ongoing learning (Kostopoulos et. al, 2002). The sense and response approach to ongoing learning indicates that the organization makes sense of the changes in the process and reallocates its resources to employ a suitable response (Kostopoulos et. al 2002).

3. Strategic Management of IT Process Innovation: A Resource-Based View (RBV) Perspective

In theory, the RBV of the firm explains how firms are able to develop and sustain a competitive advantage by utilizing their resources (Kostopoulos et. al, 2002). While the situated changed approach is developed from social embedded reasoning, the strategic management approach arises from the technical rationality perspective. The CSF approach and situated change approach are both beneficial, but they fail to account for the significance of the resource-based view (RBV) of the firm in managing IT process innovation.

A firm's individual IS resources should not be isolated but rather looked at as a collective and supplementary

Managers are in charge but not in control of the IT process	
Larsen and Bogers (2014)	• IT process is often a matter of managers and employees improvising and learning throughout. • Informal conversations often arise in the process and it is important for managers to accommodate such conversations as they can lead to creative potential and new ideas.
Teams improvise as they adjust and make sense of IT process	
Vera and Crossan (2005)	• Collective improvisation is influenced by the expertise of team members, the degree of trust, and level of communication.
Culture changes and adapts to the IT process	
Vera and Crossan (2005)	• Managers should embrace a culture that facilitates experimentation, controlled risk and continuous learning.
Igira (2008)	• In dealing with the new IT process, employees continuously learn new activities and skills that are used to alter the process and improve efficiency.

Table 2. Situated change approach to managing IT process innovation

benefit (Karimi et. al, 2007). Firms must develop these resources into strategic assets and capabilities which are valuable, rare, and difficult to imitate (Wade and Hulland, 2004). Within IT process innovation, there has been a shift in focus from tangible assets to intangible assets. These intangible strategic assets impact process innovation by promoting knowledge sharing, organizational learning, and relationship building (Hervas-Oliver et. al, 2014).

3.1. Knowledge Management

Knowledge management allows employees to obtain knowledge about the new IT process and to access and spread this knowledge within the organization (Tarafdar and Gordon, 2007). Organizations should focus on developing a knowledge management competency in order to better manage IT process innovation because the process is knowledge intensive (Tarafdar and Gordon, 2007).

In addition to creating a competency based on internal knowledge, it is important for organizations to obtain knowledge from external sources. External sources such as interaction and community building are critical to managing a new IT process (Sorensen and Lundh-Snis, 2001). According to Hervas-Oliver et. al (2014), some organizations rely on the external community to compensate for weak in-house capabilities. These organizations need to integrate external information from previous research, as well as the expertise of other external sources such as consultants (Tarafdar and Gordon, 2007).

In summary, organizations should utilize a combination of internal and external sources of knowledge to develop a unique capability that is difficult to imitate. However, there are two underlying assumptions here that can weaken this argument. Firstly, some organizations may have strong in-house capabilities and may not require external advice on the new process innovation. Secondly, employees may find it difficult to immediately utilize the knowledge obtained because the new IT innovation may be a process of ongoing learning.

3.2. Collaboration and Communication

In addition to building a strong knowledge management competency, organizations should develop a competency in collaboration and communication to better manage the IT innovation process. This competency allows the users involved to complement each other's efforts by disseminating knowledge and suggesting new ideas or solutions to the process (Tarafdar and Gordon, 2007). Furthermore, this competency can lead to the development of unique relationship resources within the organization.

3.3. Relationship Resources

A relationship resource is built on the level of trust that is developed among the employees within a team through their history of interactions (Karimi et. al, 2007). Trust among team members is necessary for employees to agree on the various operations involved in the implementation of the new IT process. Additionally, trust can be an extremely rare competency which is difficult to imitate because it takes years of working together to develop (Karimi et. al, 2007). This trust competency in the strategic management approach contrasts the CSF approach because trust goes beyond the basic idea of team

Develop a knowledge competence as IT processes are knowledge intensive	
Hervas-Oliver et. al (2014)	• Some organizations rely on external sources (community, research, and consultants) to compensate for weak in-house capabilities.
Communication facilitates a smooth implementation of IT process	
Tarafdar and Gordon (2007)	• Users complement each other's efforts by disseminating knowledge and suggesting new ideas for the IT process.
Relationship resource built on trust between team members	
Karimi et. al (2007)	• Trust among team members is important for employees to agree on the different operations involved in the implementation of the new IT process. • Trust can be a rare competence that is difficult to imitate as it takes years of working together to develop.

Table 3. Strategic management of IT process innovation

structure. The strategic management approach identifies that organizations must build on the relationships of team members to gain a competitive advantage (Karimi et. al, 2007), rather than simply composing a team of the best people (Kuang et. al, 2001).

Conclusion

The three approaches identified in this review are all important to managing IT process innovation. The CSF approach identifies a variety of key success factors that organizations should implement in order to successfully introduce a new IT process innovation. Some of these factors include management support, team formation, network structure, and culture. While this approach is useful, it is highly outdated and it fails to account for the emerging change that occurs when implementing these factors.

To compensate for the shortcoming of the CSF approach, the situated change approach is utilized to illustrate the importance of incremental change and ongoing learning within the IT process (Igira, 2008). For instance, Larsen and Bogers (2014) illustrate how a new IT process is often a of matter managers improvising and learning throughout. In addition to managers, teams also improvise as they adjust and make sense of the new IT innovation. Finally, an organizational culture changes as it adapts to the cultural habits of the new IT process.

The strategic management approach illustrates how firms are able to better manage the IT process by developing strategic assets and unique capabilities (Kostopoulos et. al, 2002). For example, Hervas-Oliver et. al (2014) highlights that firms must focus on developing a knowledge competence as IT processes are usually knowledge intensive. The strategic management approach also emphasizes the importance of building a relationships resource based on a high degree of trust between team members.

Overall, firms may find it useful to draw from all three approaches to manage IT process innovation. Although the CSF approach may be dated, it can still be useful for managers to utilize CSF if they are able to integrate these factors with a situated change approach. For example, as an ERP process evolves over time, organizations should alter the role of managers and the structure of the team (Sunmer, 2006). In addition, managers should also develop their IS resources (i.e., knowledge, collaboration, and relationship building) in order to gain a competitive edge.

The literature examined in this review is not without limitations. First, most of the studies focus on evaluating one IT process (e.g., ERP) within one organization or a select few organizations. Future research can evaluate the implementation of a variety of IT processes across a larger number of firms in order to better generalize the findings. Second, most of the studies look at a limited number of factors and competencies which limits the scope of the research. In order to overcome this, more thorough studies should be conducted with a wider range of factors that are also updated to suit the IT changes that have occurred over the years. Third, the relationship between success factors, competencies and IT process innovation is context-specific and will be different depending on the organization or industry (Tarafdar and Gordon, 2007). Further research should compare the differences between organizational settings and sectors. Finally, future research is needed on the best practices for consolidating the links between (a) success factors and IT process innovation and (b) competencies and IT process innovation.

References

Bender, K., Cedeño, J., Cirone, J., Klaus, K., Leahey, L. and Menyhert, T. (2000). Process Innovation: Case Studies of Critical Success Factors. Engineering Management Journal, 12(4), pp.17-24.

Blindenbach-Driessen, F. and van den Ende, J. (2006). Innovation in project-based firms: The context dependency of success factors. Research Policy, 35(4), pp.545-561.

Damanpour, F., Walker, R. and Avellaneda, C. (2009). Combinative Effects of Innovation Types and Organizational Performance: A Longitudinal Study of Service Organizations. Journal of Management Studies, 46(4), pp.650-675.

Essén, A. and Lindblad, S. (2013). Innovation as emergence in healthcare: Unpacking change from within. Social Science & Medicine, 93, pp.203-211.

Fui-Hoon Nah, F., Lee-Shang Lau, J. and Kuang, J. (2001). Critical factors for successful implementation of enterprise systems. Business Process Management Journal, 7(3), pp.285-296.

Garud, R., Tuertscher, P. and Van de Ven, A. (2013). Perspectives on Innovation Processes. The Academy of Management Annals, 7(1), pp.775-819.

Hervas-Oliver, J., Sempere-Ripoll, F. and Boronat-Moll, C. (2014). Process innovation strategy in SMEs, organizational innovation and performance: a misleading debate? Small Business Economics, 43(4), pp.873-886.

Howcroft, D., Mitev, N. and Wilson, M. (2004). What we may learn from the social shaping of technology approach. Social Theory and Philosophy for Information Systems, pp.329-371.

Igira, F. (2008). The situatedness of work practices and organizational culture: implications for information systems innovation uptake. Journal of Information Technology, 23(2), pp.79-88.

Karimi, J., Somers, T. and Bhattacherjee, A. (2007). The Role of Information Systems Resources in ERP Capability Building and Business Process Outcomes. Journal of Management Information Systems, 24(2), pp.221-260.

Konstantinos, K., Spanos, Y. and Prastacos, G. (2002). Kostopoulos, K.C., Spanos, Y.E. and Prastacos, G.P., 2002, May. The resource-based view of the firm and innovation: identification of critical linkages. European Academy of Management Conference, Stockholm, Sweden.

Larsen, H. and Bogers, M. (2014). Innovation as Improvisation 'In The Shadow'. Creativity and Innovation Management, 23(4), pp.386-399.

Murat Ar, I. and Baki, B. (2011). Antecedents and performance impacts of product versus process innovation. European Journal of Innovation Management, 14(2), pp.172-206.

Olson, D. and Zhao, F. (2007). CIOs' perspectives of critical success factors in ERP upgrade projects. Enterprise Information Systems, 1(1), pp.129-138.

Plant, R. and Willcocks, L. (2007). Critical success factors in international ERP implementations: a case research approach. Journal of Computer Information Systems, 47(3), p.60.

Ritter, T. and Gemünden, H. (2004). The impact of a company's business strategy on its technological competence, network competence and innovation success. Journal of Business Research, 57(5), pp.548-556.

Rockart, J. (1978). Chief executives define their own data needs. Harvard Business Review, 57(2), pp.81-93.

Soja, P. (2006). Success factors in ERP systems implementations: lessons from practice. Journal of Enterprise Information Management, 19(6), pp.646-661.

Sorensen, C. and Lundh-Snis, U. (2001). Innovation through knowledge codification. Journal of Information Technology, 16(2), pp.83-97.

Sumner, M. (2006). Critical success factors in erp implementation: Five years later. AMCIS 2006 Proceedings, p.305.

Tarafdar, M. and Gordon, S. (2007). Understanding the influence of information systems competencies on process innovation: A resource-based view. The Journal of Strategic Information Systems, 16(4), pp.353-392.

van der Panne, G., van Beers, C. and Kleinknecht, A. (2003). Success and Failure of Innovation: A Literature Review. International Journal Innovation Management, 07(03), pp.309-338.

Vera, D. and Crossan, M. (2005). Improvisation and Innovative Performance in Teams. Organization Science, 16(3), pp.203-224.

Wade, M. and Hulland, J. (2004). Review: The resource-based view and information systems research: Review, extension, and suggestions for future research. MIS Quarterly, 28(1), pp.107-142.