Journal of Strategic Information Systems xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Strategic Information Systems

journal homepage: www.elsevier.com/locate/jsis

Exploring the relationships between IT competence, innovation capacity and organizational agility

T. Ravichandran

Lally School of Management, Rensselaer Polytechnic Institute, Troy, NY 12180, United States

ARTICLE INFO

Article history:
Received 5 June 2015
Received in revised form 30 June 2017
Accepted 5 July 2017
Available online xxxx

Keywords:
IT strategy
Agility
IT competence
Complementarities

ABSTRACT

Business environments today are characterized as being very dynamic and hyper competitive. Organizations in these environments have to be agile in order to adapt their strategies and actions to be successful. While it is recognized that information technology can enable firms to be agile, there is a limited understanding of the mechanisms through and the contexts in which Information Technology (IT) enhances agility. This study examines two key antecedents of organizational agility, namely the IT competence of a firm and its innovation capacity and, examine their independent and joint effects on agility. We test our model using data collected from large firms in the US. The results provide strong support for our model. We found that firms with superior IS capabilities coupled with an aggressive IT investment orientation create digital platforms that enable them to be agile. We also found that the innovation capacity of the firm has a positive relationship with organizational agility and that firms with higher innovation capacity are better able to leverage their digital platforms to enhance agility. Our results indicate that organizational agility has a strong positive impact of firm performance. We interpret and discuss these results and their theoretical and practical implications.

Introduction

Organizations today face changes in their environments that require them to adjust and adapt their actions and strategies very quickly. In this hypercompetitive environment, organizational agility has become an important firm competence that can have profound impacts on performance (D'Aveni and Gunther, 1994). Empirical studies suggest that firms capable of responding quickly and with innovative actions to changes in their business environments have been able to improve their performance (Ferrier, 2001). While a growing body of research has examined the nature of such actions and their effects on firm performance (Ferrier and Lyon, 2004; Ferrier et al., 1999), research on the resources and capabilities that enable firms to be agile is still nascent.

In the information systems (IS) literature, conceptual work has alluded to the role of information technology in enabling firms to be agile (Sambamurthy et al., 2003). Information technology creates digital options for firms that allow them to respond effectively to shifts in the business environments. Firms that have digitized their business processes have options that could be exercised in creating new channels for accessing customers, building real-time integration with supply chain partners, gaining efficiencies in internal operations, and offering new digital products or services (Wheeler, 2002). For example, Cisco which has digitized its business processes has linked its suppliers and contract manufacturers in a supply web that

E-mail address: ravit@rpi.edu

http://dx.doi.org/10.1016/j.jsis.2017.07.002
0963-8687/

Please cite this article in press as: Ravichandran, T. Exploring the relationships between IT competence, innovation capacity and organizational agility. J. Strateg. Inform. Syst. (2017), http://dx.doi.org/10.1016/j.jsis.2017.07.002

is capable of quickly responding to shifts in demand (Tapscott et al., 2000) and many commercial banks depend on their digitized processes to create and deliver new products to their customers (Ross and Beath, 2002).

Recent empirical studies have examined a myriad of factors that enable firms to be agile. Roberts and Grover (2012) posited and found that a firm's IT infrastructure can enable it to sense and respond to customer needs effectively thereby enhancing its agility. Lu and Ramamurthy (2011) found that IT infrastructure capability, synergy between IT and the business and a proactive IT stance could enable firms to be agile. Tallon and Pinsonneault (2011) argued that a firm's strategic IT alignment will impact its agility and that this relationship will be moderated by IT flexibility. Others have examined agile behaviors in specific IS activities such as systems development (Lyytinen and Rose, 2006) and how the existence of inflexible legacy systems hinder firms from becoming agile (van Oosterhout et al., 2006).

Collectively, these studies have examined how information systems capabilities and the characteristics of the digital platforms impact agility. However, not much work has been done in exploring the necessary complementary organizational capabilities that enable firms to leverage their digital platforms effectively. While many firms have developed digital platforms, not all of them have been successful in leveraging these platforms to be agile. Digital platforms provide an opportunity for firms to be agile. However, the extent to which these resources are leveraged effectively could depend on other capabilities of the organization. In particular, a firm's capacity to innovate is critical in enabling it to leverage its digital platforms to rethink its activity systems to become agile. In this research, we seek to contribute to the literature by examining if and how the IT competence and the innovation capacity of a firm independently and jointly enable a firm to be agile. While past research has argued that both IT and firm innovativeness are drivers of firm renewal and adaptation, limited research has examined if and how these competencies are complements and the effects of such complementarities. Theorizing about such complementarities holds the potential of furthering our understanding of the mechanisms through which firms become agile.

This line of enquiry fills critical gaps in theorizing in the literature. First, while the performance effects of digital platform capabilities have been examined and mixed results found, the mechanisms through which such platforms enable firms to perform well is still under researched. In this study, we argue for the need to examine mediating firm competencies such as agility that could link digital platform capabilities to firm level outcomes. We further theorize that such competencies are created through complementary interactions between digital platform capabilities and other non-IT capabilities, specifically the firm's innovation capacity. Second, there is a need to develop and test models that link functional level capabilities to higher order competencies to develop a better understanding of the heterogeneity in firm competencies such as agility. In this study, we develop and test a nomological network that links IS functional capabilities, non-IS organizational capabilities, higher order firm competencies and firm performance in one model and empirically test this model.

Theoretical background

Capability based view of agility

Grant (1996) presented an architecture where task level capabilities aggregate to process level and functional capabilities, which in turn combine to create unique firm competencies. Competencies essentially then are the higher order capabilities that enable firms to accomplish a given organizational goal (Teece et al., 1997; Teece, 2007), preferably in a manner superior to competitors. This somewhat hierarchical structure proposed by Grant implicitly suggests a nomology that relates functional capabilities to higher order rent yielding competencies.

Organizational agility represents a competence that allows firms to adapt to contingencies posed by the environment (Lu and Ramamurthy, 2011; Roberts and Grover, 2012; Tallon and Pinsonneault, 2011). In dynamic environments, where the value of a chosen plan of action might be uncertain, firms could improve their performance by their ability to adjust their activity systems to enhance their rent yielding potential. Such flexibility requires both inherent flexibility in the resources available for deployment by the firm as well as flexibility in deploying the resources (Sanchez, 1995).

In this paper, we argue that IT enables firms to enhance the flexibility of firm resources. We further argue that a firm's innovation capacity provides them the flexibility to configure resources into activity systems that could be rent yielding. This complementary view suggests that firms that have superior IT competence have the potential to be agile but this effect is likely to be enhanced when firms also have a higher innovation capacity. In a similar vein, we also argue that innovative firms are more likely to be agile when they also have higher IT competence.

IT can enhance the inherent flexibility of other firm resources (Sanchez, 1995). For example, use of technologies such as computer aided manufacturing has made manufacturing capacity flexible and the use of automation tools for design have made product development more modular and flexible (Sanchez, 1995). Similarly, the use of warehouse management systems has enabled firms to deploy their warehouse capacities flexibly and the Internet has opened new market channels that are inherently more flexible than traditional channels. Moreover, firms that have digitized their processes could increase their business degrees of freedom when confronted with market opportunities and threats (Gosain et al., 2004). For example, extensive business process digitization allows American Airlines to aggressively respond with price changes to specific routes when competitors announce promotional fares on routes served by American and, digitization of customer boarding processes allows Delta Airlines to be more responsive to customer service needs (Ross and Beath, 2002). Similarly, Dell can dynamically alter the mix of price, promotion and products it offers based on the component inventory levels in its supply

Please cite this article in press as: Ravichandran, T. Exploring the relationships between IT competence, innovation capacity and organizational agility. J. Strateg. Inform. Syst. (2017), http://dx.doi.org/10.1016/j.jsis.2017.07.002