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THE ROLE OF INNOVATION CAPABILITY IN ACHIEVING SUPPLY CHAIN AGILITY

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ABSTRACT

Innovation capability has been recognized as important approach for organizations to be competitive. The purpose of this study is to understand how innovation capability, with the notion of cloud computing, trust and open innovation affect supply chain agility.

The main research question to be addressed is *How Does Innovation Capability enabled by cloud computing, trust and open innovation affect supply chain agility of a firm?*

The methodology used in this study is to review existing literature in innovation capability, cloud computing, trust, open innovation and agility and develop some propositions on how firms can achieve supply chain agility.

Some of the expected results from the study are, development and interaction of trust with cloud computing and open innovation is crucial in innovation capability building process. Second, innovation capability building process enabled by cloud computing, trust and open innovation will influence agility of a firm, leading to firm competitiveness.

Keywords: SCM. Innovation capabilities, cloud computing, supply chain agility, trust.

Introduction

Agility refers to firms ability to sense, adapt, respond and perform well in the face of increasingly changing environment (Tallon and Pinsonneault, 2011, Sambamurthy et al., 2003, Mason-Jones et al., 2000). Supply chain agility has become a source of competitive advantage (Lee, 2004, Gligor and Holcomb, 2012). Supply chain agility is defined as the focal firms' ability to match demand with supply in conjunction with members in upstream and downstream of the supply chain (Christopher, 2012).

Previous view on supply agility does not reflect equally important antecedent of supply chain agility, Swafford et al. (2006) which can stimulate capability to innovate in supply chain management. Capability to innovate or innovation capability is widely recognized as necessary ingredient for organizational and/or innovation performance. For example Panayides (2006) asserts that in the current rapidly changing technology and uncertain market environment, firms must improve upon their capability to innovate in order

to meet market demand and customer preference so as to sustain long-term competitive advantage.

Storer and Hyland (2009) argue that even though firms' dynamic capabilities include that of supply chains, there is still the need for supply chains to apply dynamic capabilities in their operations and abandoning old configurations and developing new ones in order to optimize its innovation capabilities.

In this study we adopt the definition of Assink (2006). Assink describes firms' innovative capability "as the internal driving energy to generate and explore radical new ideas and concepts, to experiment with solutions for potential opportunity patterns detected in the markets "whitespace" and to develop them into marketable and effective innovations, leveraging internal and external resources and competencies". (P.5)

The extent to which cloud computing, open innovation, trust and innovation capability influence firms supply chain agility is not highlighted in the literature.

Hence, little is known about the role of innovation capability, cloud computing, trust, and open innovation

in achieving agile supply chain. Furthermore, little attention has been given to innovation capability in Supply Chain Management (SCM) process. A notable work in this area is by Storer and Hyland (2009) who examined the relationships between dynamic capabilities and supply chain innovation capability of large firms. This study, therefore contributes to fill that gap, by considering how innovation capability enabled by cloud computing, trust and open innovation affect supply chain agility of a firm.

The purpose of this study is to understand how innovation capability, with the notion of cloud computing, trust and open innovation affect supply chain agility. Hence, the research question to be addressed in this study is:

RQ How Does Innovation Capability Enabled By Cloud Computing, Open Innovation And Trust Affect Supply Chain Agility Of A Firm?

This paper is structured as follows. In the next section, the existing literature on cloud computing, trust, innovation capability and supply chain agility is reviewed, followed by brief discussion of the methodology. Thereafter, the theoretical framework of the study is presented, followed by some developed propositions to address innovation capability issues which may confront SCM of a firm in achieving supply chain agility, finally conclusion and suggestions for future study is presented.

Literature Review

The literature suggests that cloud computing, trust and open innovation contributes to innovation capability building process (Laursen and Salter, 2006, Cheng and Chen, 2013, Fawcett et al., 2012, Berman et al., 2012). Björkdahl and Börjesson (2011) argue that there are few studies in innovation management and innovation capability management, that identified enablers and hinders in firms effort to develop innovation capability.

Enablers

Several factors which are external or internal may influence firms capability to innovate (Bell, 1984). We consider cloud computing, trust and open innovation as key factors enabling innovation capability, leading to supply chain agility. In this research the enabling effect of cloud computing, trust and open innovation on innovation capability not considered before is investigated.

Cloud Computing

The use of cloud computing in business transactions is regarded as innovation (Armbrust et al., 2010, Ercan, 2010). Cloud computing has enormous potential to enhance business innovation process compared to traditional computing platform, since it provide business opportunity and adaptability (Low et al., 2011). Cloud computing facilitate collaboration, information sharing and exchange of ideas which are important ingredient in innovation capability building process (ibid).

Mladenow et al. (2012) have found cloud computing to offer low cost information asymmetry by allowing firms to act successfully in competitive supply chain through establishing strategic and dynamic capabilities. Schramm et al. (2011) mention, for example, that adoption of cloud computing will revolutionize supply chains in terms of increase speed to the market for new product and services, and organizational transformation (Schramm et al. (2011) and Lindner et al. (2010) further pointed that supply chain process such as planning and forecasting, logistics, sourcing and procurement, service and spare parts management are best suited for cloud computing environment. With regards to supply chain agility, Azevedo et al. (2013) provided empirical evidence that cloud computing helps in determining individual firms and the whole supply chain behavior leading to improve operational efficiency.

Trust

Trust provides an interesting overview from which to explain the effect of interorganisational relationships on innovation activities (Subramaniam and Youndt, 2005, Schiuma and Lerro, 2008). Social capital is the sum of the actual and potential resources embedded within, available through and derived from the networks of relationships by an individual or social unit (Nahapiet and Ghoshal, 1998).

Pérez-Luño et al. (2011) argue that innovation mostly depends on interpersonal relationship than structural relationships. Our research focuses on trust which is an element of relational dimension of social capital. Trust refers to situation whereby relationship partners see each other as credible and benevolent (Ganesan, 1994). Dodgson (1993) argues that high level of trust is an important ingredient necessary for facilitating communication needed for generation of learning and innovation. Several scholars including (Axelrod, 1984, Barney and Hansen, 1994, Chen et al., 2009, Gulati and Nickerson, 2008, Fawcett et al., 2012), have generally, found trust to contribute positively

to the collaborative innovation capability within and across organizations. However, Pérez-Luño et al. (2011) point that trust as dimension of social capital has received less attention in inter-organisational and innovation research in recent times.

Open Innovation

According to Chesbrough et al. (2006) open innovation is the ability to utilize external and internal valuable ideas as well as exchanging the internal and external knowledge and expertise within a given market

Chesbrough (2003) suggests that companies need to find means of increasing their ability to grow into new business areas quickly and foster innovation in areas where they lack expertise: one way to do so is to adopt open innovation and use external resources and capabilities to foster the company's innovation capacity.

In their study of Australian manufacturing firms, Samson and Gloet (2013) found that most of the firms practiced significant degree of open innovation in a bid to develop their capability to innovate. Jaruzleski and Holman (2011) noted that long-standing commitment to open innovation contribute significantly to 3M's ability to deliver innovations. Laursen and Salter (2006) provide empirical evidence that firms that engaged in open innovation are more likely to cultivate higher level of innovation performance. In a similar vein, Cheng and Chen (2013) in a survey of Taiwanese firms, found that open innovation activities positively influence innovation capability. Therefore, we need to better understand how the emergence of open innovation impact on firms' capability to innovate.

Innovation Capability

Innovation capability driven theories help in understanding the process through which a firm changes and develops in dynamic market environment. Generally, organizational capabilities are an indication of what a firm can do and what it cannot do. Organizational capabilities is the ability of the firm to deploy its available resources as its main assets (Prahalad and Hamel, 1990).

Eisenhardt and Martin (2000) expand classical theory of Resource Based View of the firm (RBV) through the perspective of dynamic capabilities, by arguing that dynamic capabilities are the processes which enable a firm to integrate, reconfigure, gain, and release resources, and to respond to and even promote market change. Considering the importance of organizational capability, innovational capability has become a critical

high-order construct for achieving firm competitiveness.

In recent times firms are attaching much importance to capability to innovate, as a result research interest in this phenomenon has increased over the past few years e.g., (Tidd and Bessant, 2011, Lawson and Samson, 2001, Koivisto, 2005).

However, research that specifically focuses on capability to innovate is limited (Haynes and Stewart, 1992, Bjorkdahl, 2012, Schreyögg and Kliesch Eberl, 2007, Börjesson and Elmquist, 2011), especially, studies examining the relationship between innovation capability enabled by cloud computing, trust, open innovation and its effects on supply chain agility.

Linking Cloud computing, Trust, and Open Innovation to Capabilities for innovation

Examining the main innovation capability enablers are important in exploring how these factors may stimulate capability to innovate in any given context. Literature on innovation capability were analyzed to determine some of the enablers used in previous studies.

Recent empirical studies on innovation capability building, for example (Aggeri et al., 2009, Börjesson et al., 2013, Börjesson and Elmquist, 2011, Wallin et al., 2011, Samson and Gloet, 2013), focused on how firms practically developed capability to innovate. Their studies were general in nature since they looked at the phenomenon from the company's perspective and some of the main enablers considered in these research include strategy, culture, individual roles and leadership.

In the context of SMEs several studies have shown that innovation capability building process result in achieving competitive advantage (Saunila et al., 2012, Albaladejo and Romijn, 2000, Çakar, 2006), however, their studies consider the firm as a unit of analysis and their focus was on general innovation capability. Some of the enablers identified in the context of SMEs include power distance, institutional support and skills of workforce.

The only study identified in the field of supply chain management was by, Storer and Hyland (2009) who examined linkages between firms dynamic capabilities and development of innovation capacity in supply chains. However, their study focused on how the nature and types of inter-organizational relationships influence dynamic capabilities of supply chains, and types of dynamic capabilities needed to develop innovation capacity in supply chains.

As outlined in table 1. The following studies in

innovation capabilities differed in terms of antecedent or enablers to innovation capability building in an organization. Regardless, there are certain enablers that play a major role in stimulating capability to innovate. For example Terziovski and Samson (2007) identified new product development, e-Commerce and sustainability orientation as the main antecedents to innovation capability. Börjesson and Elmquist (2011) empirically found that the main antecedents to innovation capability are involvement, experimentation, collaboration with external parties and communication.

Samson and Gloet (2013) identified innovation strategy, innovation process, innovation culture, innovation rewards, innovation payoffs, as the main determinants of innovation capability building process in an organization. Calantone et al. (2002) in their study of US firms, identified learning orientation to be the major

antecedent to innovation capability and firm performance.

Lawson and Samson (2001) identified seven key enablers of innovation capability including vision and strategy, harnessing the competence base, organisational intelligence, creativity and idea management, organisational structure & systems, culture and climate and management of technology

In sum, table 1. shows that none of the studies used cloud computing, trust and open innovation as an antecedent to innovation capability and supply chain agility. Also worthy of note is limited number of research on capability to innovate in supply chains (Storer and Hyland, 2009). This paper contributes to the growing stream of literature on the innovation capabilities, and provides an integrative framework that focuses on important dimensions of firm level innovation capability building process.

Table 1: Summary of selected studies on innovation capability and enablers

<i>Study</i>	<i>Enablers</i>	<i>Findings</i>	<i>Context</i>
(Samson and Gloet, 2013)	Innovation strategy Innovation processes, Innovation behaviour/culture Innovation rewards/recognition Innovation measures/payoffs	The study found leadership, innovation oriented culture, employee rewards and recognition.	manufacturing organisations Australia
(Albaladejo and Romijn, 2000)	Internal Sources Professional background of the managers, skills of the workforce, internal effort to improve technology, intensity of networking, institutional support, proximity advantages	R&D, proximity to suppliers, the facilitating role played by the regional science base in nurturing high-tech spin-offs we found to positively influence capability to innovate	SMEs UK
(Tuominen and Hyvönen, 2004)	Marketing channel, Channel dynamism	Innovation capability positively influence business performance	Large firms UK
(Börjesson and Elmquist, 2011)	Involvement Experimentation Collaboration with external parties Communication	Management need to develop management capability in terms of cognition and propensity	Automobile industry Sweden
(Börjesson and Löfsten, 2012)	Skills, motivation drivers behavior, Business, external networks	Statistical analysis shows positives effect on innovation performance: cooperation with universities and business planning and advice.	High-tech SMEs Sweden
(Terziovski and Samson, 2007)	New product development, e-Commerce, sustainable orientation.	Leadership and strategy, new product development, e-commerce, sustainable development orientation were	Large companies Australia

		positively related to innovation performance	
(Çakar, 2006)	Collectivism, power distance, participative management	Collectivism was found to be positively related to participation and innovation capability whilst negatively related to innovation capability.	SMEs Turkey
(Liao et al., 2007)	Knowledge sharing Absorptive capacity	The result indicate knowledge sharing has a positive effect on absorptive capacity which in turn leads to innovation capability	knowledge-intensive industries Taiwan

Methodology

The role of innovation capabilities in achieving supply chain agility is under researched. Therefore, insights drawn from existing literature on general management, innovation management, cloud computing, trust, open innovation, innovation capability and supply chain agility ,is integrated with framework for assessing innovation capabilities, proposed by Björkdahl and Börjesson (2012), to develop an integrated framework.

The Theoretical Model

Building on the foregoing theoretical discussions, we hereby discuss our theoretical model. The theoretical model suggests that a firm's supply chain agility will be influenced by the firm's innovation capability building process. Conceptually, we view that innovation capability underpins firm's ability to integrate, reconfigure, renew and recreate its resources and capabilities in achieving supply chain agility. Generally, Innovation Capability refers to how a firm continuously modifies knowledge and ideas into new systems, processes and products (Lawson and Samson, 2001). For example ,innovation capabilities have been found to contribute to achieving firm competitiveness (Tuominen and Hyvönen, 2004). Relationship between innovation capability and supply chain agility can be strengthen with cloud computing, trust and open innovation as the main enablers of innovation capability building process.

Enablers

The main enablers that we consider to influence innovation capability and ultimately supply chain agility include cloud computing, trust and open innovation.

Trust

Trust refers to the situation whereby relationship partners see each other as credible and benevolent (Ganesan, 1994). Trust may generate positive

atmosphere among key players involve in innovation capability building process. Fawcett et al. (2012) found that trust enabled collaborative innovation, generate superior business performance among supply chain network. Trust can aid the interaction of open innovation and cloud computing, in the process of enabling innovation capability building.

Cloud Computing

The most cited definition of cloud computing is by Mell and Grance (2011)who defined cloud computing as “ a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models “(p.2)

In the context of supply chain management, cloud computing technologies is emerging as integral part of Internet technology and it is becoming ever important application in supporting electronic Supply Chain Management (e-SCM) (Casey et al., 2011). Firms are now in better position to reduce operational costs and scale up responsiveness of their supply chain through cloud computing investments (Casey G. et al., 2012; Buyya et al., 2009).Azevedo et al. (2013) found that supply chains that used cloud computing have overall positive agility behavior.

The adoption of cloud computing entails the possibility of a firm surrendering control of their system and data to third parties(Autry et al., 2010). Another concern raised by (Wu et al., 2013)is that firms run the risk of data lock-in with cloud service provider .Hence, development of trust is important for supply chain members willing to utilise cloud computing platform, in the process of innovation capability building. As figure 1 depicts, the interaction

between trust and cloud computing will combine to influence innovation capability building among supply chain partners.

Open Innovation

Open innovation refers to the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough et al., 2006). Rather than supply chain members focusing on internal expertise, they may benefit from absorbing external knowledge and competencies possessed by other supply chain members through open innovation, this newly acquired knowledge and expertise may contribute to innovation capability building process. Innovative companies such as Procter & Gamble, Honda, and Wal-Mart utilise open innovations, and depend on other members of their supply chains in the process of generating most of their innovations (Fawcett et al., 2012). Assink (2006) consider utilization of internal and external knowledge as a major source of innovation capability. We argue that trust will facilitate the exchange of information, expertise and competencies among supply chain members. Since the prevalence of trust will make network members not to feel they have to protect against opportunistic behavioral tendencies from other partners. Trust, is therefore, pre-condition for synchronizing cloud computing and open innovation activities in an effort to build innovation capability.

As figure 1. shows, the interaction between trust and open innovation will influence innovation capability

building of a firm. Whilst innovation capability will in turn influence supply chain agility of a firm .In this study we adopt innovation capabilities dimensions from (Björkdahl and Börjesson, 2012), the dimensions include strategy for innovation, prioritization, culture, idea management, external environment and linkages, implementation, systems and decision rules and organizational context and learning. These dimensions of innovation capabilities are expected to be influenced by cloud computing, trust and open innovation. innovation capabilities will then influence supply chain agility.

Supply Chain Agility (SCA) refers to the degree of swiftness with which supply chains respond to customer’s needs (Christopher, 2012). SCA comprises of customer satisfaction, quality improvement, cost minimization, delivery speed, new product introduction, service level improvement, lead time reduction (Agarwal et al., 2007). As figure 1. shows, supply chain agility will not depend only on innovation capability, but also include the degree to which supply chains engage in open innovation activities, using cloud computing as flexible and scalable platform. In order to have proper executed innovation capability, it is relevant to introduce the effect of trust as one of the important enablers impacting innovation capability. Figure1. clearly shows, that innovation capability will influence supply chains agility. However, the interaction of the constructs in figure 1 and their impact on supply chain agility is emphasized instead of stressing on the relative importance of each construct in the theoretical model.

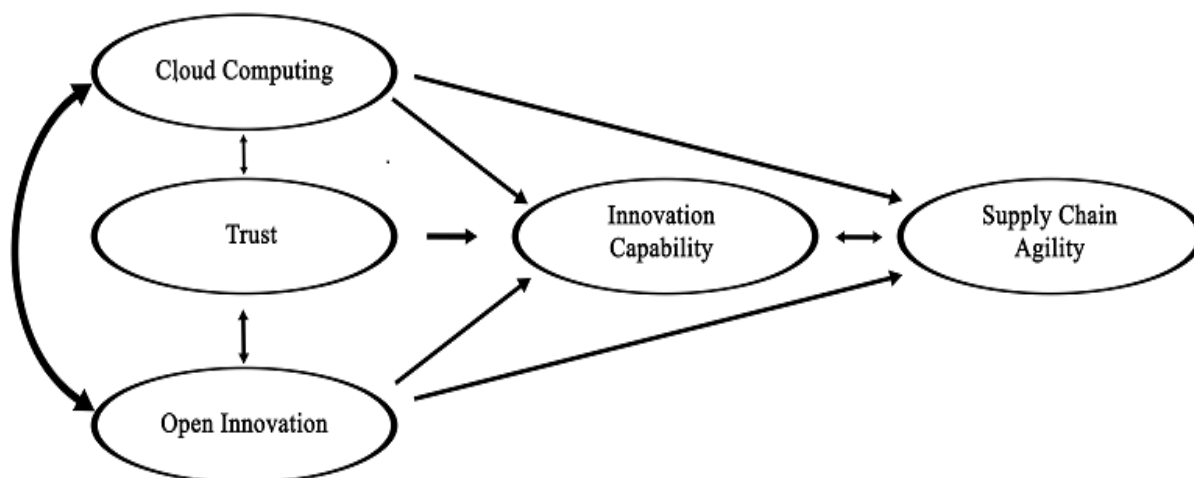


Figure 1: A model showing relationships between enablers, innovation capability and supply chain agility

Propositions

Below we develop a number of propositions, which aims at guiding future empirical research.

Cloud computing is fast changing the delivery of software and hardware to businesses the globe over, cloud infrastructure is deemed as cost effective means of rendering information services, reduction in complex nature of IT management and promotion of innovation (Boss et al., 2007). The focus of business innovation activities is fast moving into the cloud (I O Graph and Morgens, 2008). Therefore, supply chains ability to deploy cloud computing services in the face of increasing IT cost will be significant. This leads to our first proposition.

P1. Ability to utilize cloud computing may facilitate innovation capability building and will enhance SCM agility

Social and economic interactions give rise to most of the innovations we see today (Edquist, 2011), trust as an element of social capital may facilitate learning, information sharing, exchange of ideas and experiences. Xavier Molina-Morales et al. (2011) provided empirical evidence in support of positive relationship between trust and innovation. Firms capacity for collaborative innovation driven activities tend to be high, as they build capability to establish trust among network partners (Fawcett et al., 2012). This leads to our second proposition.

P2. Ability to establish trust among network of significant actors of firm's SCM will enhance SCM agility

Supply chains may tap into external knowledge in search for new ideas, and the emergence of open innovation signifies that knowledge outside the firm is valuable and very important for firms (Konsti-Laakso et al., 2012). Cheng and Chen (2013) empirically support the notion that open innovation activities impact positively on breakthrough innovation and innovation capabilities.

The paradigm shift from close to open innovation present potential source of ideas, knowledge, expertise, and experiences and information for innovation among network members. This brings our third proposition.

P3. Firm's ability to engage in open innovation may contribute to innovation capability which may in turn enhance SCM agility.

Conclusion

The purpose of this study is to understand how innovation capability, with the notion of cloud

computing, trust and open innovation affect supply chain agility of a firm.

Supply chains are reconfiguring their structures and relationships and creating value networks for enhanced information, decision making and planning, and collaboration. These activities are based on capabilities of the supply chain members to innovate swiftly, in respond to the rapidly changing customer's needs.

There are number of gains to be obtained by supply chains that are more agile as a result of innovation capability. The study shows that interaction of cloud computing, trust and open innovation will enhance innovation capability building process. The innovation capabilities will in turn influence supply chain agility of a firm.

Supply chains need to aim at better synchronizing processes among significant actors in a network, with the aim of gaining and integrating knowledge leading to supply chain agility. By recognizing opportunities in business environment, supply chains are making an effort to seek new knowledge which may facilitate the process of innovation capability, which in turn help the firm to anticipate and help in innovating to meet customers changing needs, in a competitive manner.

Suggestions for Future Research

The present research is mainly conceptual, the proposition developed requires further empirical investigation based on the insights presented in this study. This will better help in understanding how innovation capability, with the notion of cloud computing, trust and open innovation affect supply chain agility of a firm.

Reference

- AGARWAL, A., SHANKAR, R. & TIWARI, M. 2007. Modeling agility of supply chain. *Industrial Marketing Management*, 36, 443-457.
- AGGERI, F., ELMQUIST, M., POHL, H., AGGERI, F., ELMQUIST, M. & POHL, H. 2009. Managing learning in the automotive industry – the innovation race for electric vehicles. *International Journal of Automotive Technology and Management*, 9, 123.
- ALBALADEJO, M. & ROMIJN, H. 2000. Determinants of innovation capability in small UK firms: an empirical analysis. Eindhoven Centre for Innovation Studies, The Netherlands.
- ARMBRUST, M., FOX, A., GRIFFITH, R., JOSEPH, A. D., KATZ, R., KONWINSKI, A., LEE, G., PATTERSON, D., RABKIN, A. & STOICA, I. 2010. A view of cloud computing. *Communications of the ACM*, 53, 50-58.

- ASSINK, M. 2006. Inhibitors of disruptive innovation capability: a conceptual model. *European Journal of Innovation Management*, 9, 215-233.
- AUTRY, C. W., GRAWE, S. J., DAUGHERTY, P. J. & RICHEY, R. G. 2010. The effects of technological turbulence and breadth on supply chain technology acceptance and adoption. *Journal of Operations Management*, 28, 522-536.
- AXELROD, R. 1984. THE EVOLUTION OF COOPERATION.
- AZEVEDO, S., PRATA, P. & FAZENDEIRO, P. 2013. Assessment of Supply Chain Agility in a Cloud Computing-based Framework. *Scalable Computing: Practice and Experience*, 13.
- BARNEY, J. B. & HANSEN, M. H. 1994. Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15, 175-190.
- BELL, R. M. 1984. "Learning" and Accumulation of Industrial Technological Capability in Developing Countries in: M. Fransman and K. Kind (eds) *Technological Capability in The Third World*. Macmillan, pp. 189-209.
- BERMAN, S. J., KESTERSON-TOWNES, L., MARSHALL, A. & SRIVATHSA, R. 2012. How cloud computing enables process and business model innovation. *Strategy & Leadership*, 40, 27-35.
- BJORKDAHL, S. B. J. 2012. Assessing firm capabilities for innovation. *International Journal of Knowledge Management Studies*, 5, 171.
- BJÖRKDAHL, J. & BÖRJESSON, S. 2011. Organizational climate and capabilities for innovation: a study of nine forest-based Nordic manufacturing firms. *Scandinavian Journal of Forest Research*, 26, 488-500.
- BJÖRKDAHL, J. & BÖRJESSON, S. 2012. Assessing firm capabilities for innovation. *International Journal of Knowledge Management Studies*, 5, 171-184.
- BOSS, G., MALLADI, P., QUAN, D., LEGREGNI, L. & HALL, H. 2007. Cloud computing. IBM white paper, Version, 1.
- BÖRJESSON, S. & ELMQUIST, M. 2011. Developing innovation capabilities: a longitudinal study of a project at Volvo Cars. *Creativity and Innovation Management*, 20, 171-184.
- BÖRJESSON, S., ELMQUIST, M. & HOOGE, S. 2013. The Challenges of innovation capability building: learning from longitudinal studies of innovation efforts at Renault and Volvo Cars. *Fourth Coming Journal of Engineering Technology and Management*.
- BÖRJESSON, S. & LÖFSTEN, H. 2012. Capabilities for innovation in small firms—a study of 131 high-tech firms and their relation to performance. *International Journal of Business Innovation and Research*, 6, 149-176.
- ÇAKAR, N. D. 2006. Enhancing innovation capability through human resource practices: an empirical study in Turkish SMEs. *SEER-South-East Europe Review for Labour and Social Affairs*, 109-126.
- CALANTONE, R. J., CAVUSGIL, S. T. & ZHAO, Y. 2002. Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31, 515-524.
- CHEN, H., DAUGHERTY, P. J. & LANDRY, T. D. 2009. Supply chain process integration: a theoretical framework. *Journal of Business Logistics*, 30, 27-46.
- CHENG, C. C. & CHEN, J.-S. 2013. Breakthrough innovation: the roles of dynamic innovation capabilities and open innovation activities. *Journal of Business & Industrial Marketing*, 28, 444-454.
- CHESBROUGH, H., VANHAVERBEKE, W. & WEST, J. 2006. *Open innovation: Researching a new paradigm*, Oxford university press.
- CHESBROUGH, H. W. 2003. *Open innovation: The new imperative for creating and profiting from technology*, Harvard Business Press.
- CHRISTOPHER, M. 2012. *Logistics and supply chain management*, Pearson UK.
- DODGSON, M. 1993. Learning, trust, and technological collaboration. *Human Relations*, 46, 77-95.
- EDQUIST, C. 2011. Design of innovation policy through diagnostic analysis: identification of systemic problems (or failures). *Industrial and Corporate Change*, 20, 1725-1753.
- EISENHARDT, K. M. & MARTIN, J. A. 2000. Dynamic capabilities: what are they? *Strategic Management Journal*, 21, 1105-1121.
- ERCAN, T. 2010. Effective use of cloud computing in educational institutions. *Procedia-Social and Behavioral Sciences*, 2, 938-942.
- FAWCETT, S. E., JONES, S. L. & FAWCETT, A. M. 2012. Supply chain trust: the catalyst for collaborative innovation. *Business Horizons*, 55, 163-178.
- GLIGOR, D. M. & HOLCOMB, M. C. 2012. Understanding the role of logistics capabilities in achieving supply chain agility: a systematic literature review. *Supply Chain Management: An International Journal*, 17, 438-453.
- GULATI, R. & NICKERSON, J. A. 2008. Interorganizational trust, governance choice, and exchange performance. *Organization Science*, 19, 688-708.
- HAYNES, M. & STEWART, N. 1992. Improving the capability of organizations. *Creativity and Innovation Management*, 1, 194-205.
- JARUZLESKI, B. & HOLMAN, R. 2011. Casting a wide net: building the capabilities for open innovation. *Ivey Business Journal*.
- KOIVISTO, T. 2005. Developing strategic innovation capability of enterprises. Theoretical and methodological outlines of intervention. Espoo: VTT Publications.(ProACT).
- KONSTI-LAAKSO, S., PIHKALA, T. & KRAUS, S. 2012. Facilitating SME innovation capability through business networking. *Creativity and Innovation Management*, 21, 93-105.
- LAURSEN, K. & SALTER, A. 2006. Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27, 131-150.

- LAWSON, B. & SAMSON, D. 2001. Developing innovation capability in organisations: a dynamic capabilities approach. *International Journal of Innovation Management*, 5, 377-400.
- LEE, H. L. 2004. The triple-A supply chain. *Harvard business review*, 82, 102-113.
- LIAO, S.-H., FEI, W.-C. & CHEN, C.-C. 2007. Knowledge sharing, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries. *Journal of Information Science*, 33, 340-359.
- LINDNER, M., GALÁN, F., CHAPMAN, C., CLAYMAN, S., HENRIKSSON, D. & ELMROTH, E. The cloud supply chain: A framework for information, monitoring, accounting and billing. 2nd International ICST Conference on Cloud Computing (CloudComp 2010), 2010.
- LOW, C., CHEN, Y. & WU, M. 2011. Understanding the determinants of cloud computing adoption. *Industrial management & data systems*, 111, 1006-1023.
- MASON-JONES, R., NAYLOR, B. & TOWILL, D. R. 2000. Lean, agile or leagile? Matching your supply chain to the marketplace. *International Journal of Production Research*, 38, 4061-4070.
- MELL, P. & GRANCE, T. 2011. The NIST definition of cloud computing (draft). NIST special publication, 800, 7.
- MLADENOW, A., FUCHS, E., DOHMEN, P. & STRAUSS, C. Value Creation Using Clouds: Analysis of Value Drivers for Start-Ups and Small and Medium Sized Enterprises in the Textile Industry. *Advanced Information Networking and Applications Workshops (WAINA)*, 2012 26th International Conference on, 2012. IEEE, 1215-1220.
- NAHAPIET, J. & GHOSHAL, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, 23, 242-266.
- PANAYIDES, P. 2006. Enhancing innovation capability through relationship management and implications for performance. *European Journal of Innovation Management*, 9, 466-483.
- PÉREZ-LUÑO, A., CABELLO MEDINA, C., CARMONA LAVADO, A. & CUEVAS RODRÍGUEZ, G. 2011. How social capital and knowledge affect innovation. *Journal of Business Research*, 64, 1369-1376.
- PRAHALAD, C. & HAMEL, G. 1990. The core competence of the corporation. *Boston (MA)*, 235-256.
- SAMBAMURTHY, V., BHARADWAJ, A. & GROVER, V. 2003. Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS quarterly*, 237-263.
- SAMSON, D. & GLOET, M. 2013. Innovation capability in Australian manufacturing organisations: an exploratory study. *International Journal of Production Research*, 1-19.
- SAUNILA, M., UKKO, J. & RANTANEN, H. 2012. Innovation capability and its measurement in Finnish SMEs. *Practice-Based Innovation: Insights, Applications and Policy Implications*. Springer.
- SCHIUMA, G. & LERRO, A. 2008. Knowledge-based capital in building regional innovation capacity. *Journal of Knowledge Management*, 12, 121-136.
- SCHRAMM, T., NOGUEIRA, S. & JONES, D. 2011. Cloud computing and supply chain: A natural fit for the future. *Logistics Management Magazine*.
- SCHREYÖGG, G. & KLIESCH-EBERL, M. 2007. How dynamic can organizational capabilities be? Towards a dual-process model of capability dynamization. *Strategic Management Journal*, 28, 913-933.
- STORER, M. & HYLAND, P. 2009. Dynamic capabilities and innovation in supply chains.
- SUBRAMANIAM, M. & YOUNDT, M. A. 2005. The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, 48, 450-463.
- SWAFFORD, P. M., GHOSH, S. & MURTHY, N. 2006. The antecedents of supply chain agility of a firm: scale development and model testing. *Journal of Operations Management*, 24, 170-188.
- T O GRAPH, B. & MORGENS, Y. R. 2008. Cloud computing. *Communications of the ACM*, 51.
- TALLON, P. P. & PINSONNEAULT, A. 2011. Competing Perspectives on the Link Between Strategic Information Technology Alignment and Organizational Agility: Insights from a Mediation Model. *Mis Quarterly*, 35.
- TERZIOVSKI, M. & SAMSON, D. 2007. Innovation capability and its impact on firm performance.
- TIDD, J. & BESSANT, J. 2011. *Managing innovation: integrating technological, market and organizational change*, John Wiley & Sons.
- TUOMINEN, M. & HYVÖNEN, S. 2004. Organizational innovation capability: A driver for competitive superiority in marketing channels. *The International Review of Retail, Distribution and Consumer Research*, 14, 277-293.
- WALLIN, J., LARSSON, A., ISAKSSON, O. & LARSSON, T. 2011. Measuring Innovation Capability—Assessing Collaborative Performance in Product-Service System Innovation. *Functional Thinking for Value Creation*. Springer.
- WU, Y., CEGIELSKI, C. G., HAZEN, B. T., HALL, D. J., WU, Y., CEGIELSKI, C. G., HAZEN, B. T., HALL, D. J., WU, Y., CEGIELSKI, C. G., HAZEN, B. T. & HALL, D. J. 2013. Cloud Computing in Support of Supply Chain Information System Infrastructure: Understanding When to go to the Cloud. *Journal of Supply Chain Management*, 49, 25.
- XAVIER MOLINA-MORALES, F., TERESA MARTÍNEZ-FERNÁNDEZ, M. & TORLÒ, V. J. 2011. The dark side of trust: the benefits, costs and optimal levels of trust for innovation performance. *Long Range Planning*, 44, 118-133.