

Integrating Emerging Technologies in IT Services Companies – The “Driver” CIO

Full paper

Nabil Georges Badr
Grenoble Graduate School of Business
nabil.badr@mailbox.grenoble-em.com

Abstract

The task of the CIO or information technology (IT) manager is to steer the technology base of the company in the right direction with the right solution choices. To innovate their business models companies often rely on emerging technologies in IT (EIT). Disruption introduced by EIT affects the ability of IT organizations to sustain the continuity of services required by the business. Therefore, IT organizations are reluctant to act quickly to integrate EIT. Through in-depth case studies in IT services companies, field interviews and focus group discussions with practitioners who underwent business model innovations based on IT, the research attempts to learn what mechanisms CIOs adopt to motivate IT organizations to innovate. Whilst proposing several directions for future research, this study offers an empirically supported CIO typology in the context of business model innovation based on IT.

Keywords

Emerging technologies, IT organizational capability, CIO Typology, CIO capability

Introduction

Businesses rely on information technology (IT) as a catalyst that enables components of new products, services, channels, processes, and business models (Cash et al, 2008). Whilst business model innovations focus on redefining the business (Johnson, 2010), they often employ innovations in other industries (Mitchell and Coles, 2004), sometimes leveraging emerging technologies in IT (Kraemer et al, 2000). Factually, CIOs lead innovation¹ reached 41 % of organizations in 2014. Innovations based on IT depend greatly on the combination of the technology, the organization’s technical expertise, and the organization’s ability to make effective use of the new capabilities (Peppard, 2005). In an era of rapid technological change, the timing of the investment decisions (Cegielsky et al, 2005) with respect to the emerging technology hype cycle becomes an imperative challenge (Bajwa et al, 2008). Rapid change in EIT causes problems for IT managers (Benamati et al, 1997) as they try to integrate EIT into an existing environment. Luftman et al. (2012) and practitioners agree that IT reliability and efficiency as a top management concern. The risk of disrupting to the environment while, at the same time, avoiding the disruption to the services is a real issue. A tension is felt by the IT organization in form of costs, compatibility, and stability of the existing infrastructure and a threat to continuity of the IT services. Chief Information Officers (CIO) have to reinvent themselves, their teams, what they do and how they address these challenges. Mechanisms are required for IT organizations to (1) manage the integration of EIT into the infrastructure; (2) sustain the competitive advantage through IT services in the midst of a rapidly changing environment; and (3) maintain the delivery and support of IT services at service levels that bolster the value of IT in the organization. Inevitably, this is a drain on the resources (Benamati and Lederer, 2010) that support the technology deployments. The challenges facing IT organization are hence elevated to a level at which mechanisms that were effective a few years ago have to be significantly overhauled. Therefore, practitioners attribute their reluctance to integrate emerging technologies in the operational infrastructure in part to the organizational ability to overcome the extant obstacles. Chief Information Officers (CIO) are challenged to maintain the necessary balance between technology

¹ Changing Role of the CIO in IT-enabled Business Innovation, Business Wire [New York] 12 Mar 2014

innovation effectiveness and operational effectiveness (Santa et al, 2009). Effectively, in practitioner circles, IT organizations are perceived as a hindrance rather than an enabler to innovation. This paper targets mechanisms for IT organization leaders effective in building IT organizational capabilities as a lever for integrating IT innovations in face of these complex challenges.

Literature Review

Studies on business model innovation indicate challenges for the CIO to understand the disruptive implications of business model innovation practices (Chesbrough, 2006). Attention has been given to identify opportunities and barriers to business models (Deshler and Smith, 2011) and the organizational change leadership that must be brought to bear in order to overcome these barriers (Chesbrough, 2010). Potential issues of reliability, availability, and scalability of the IT services were indeed specified (Ghosh and Skibniewski, 2010). Watts and Henderson (2006) reviewed how CIOs create innovative IT climates through reality-checking and promoting credibility in order to innovate the business model. Though organizational dynamics for technology based innovation were thoroughly deliberated (Wastell and McMaster, 2008), such studies were not centered on the organizational challenges and ways to address them in the context of such transformation.

Research has discussed how innovations based on IT (Peppard, 2005) depend greatly on technology and the organizations' ability to make effective use of the new capabilities. Guillemette and Paré, (2012), have posited theory on choosing the right IT organizational profile and identified leadership roles and typologies that are fit for specific context of IT organizations. These roles may vary in IT competence, business competence, and organizational competence depending on the client groups and activities covered (Hooper and Bunker, 2013). Doherty et al (2012) postulated that benefits delivery from IT projects would be realized if the IT projects were conducted as ongoing exercises in technology-enabled organizational change. However, without laying out the mechanisms required to lead an organization that is confident in emerging IT integration. Obstacles of knowledge acquisition and training demands, product procurement dilemmas, implementation and support prevail (Edwards and Peppard, 1997). IT leaders strive to promote capabilities of both innovation and operation: they uphold service levels, and emphasize collaboration within IT and between IT and the business in an effort to drive innovation. Furthermore, studies have presented practices for quickly adapting to changing requirements (Peppard et al., 2011) contrasting issues and benefits of rapid implementations (Tom et al. 2013), and depicting the essential role of the CIO or IT manager in these initiatives. Others confirms the role of a CIO focused on business involvement to ensure alignment and aware of the need for organizational fitness for innovation and business transformation (Feeny et al, 1992). For Philip (2007), IT leaders are technology scouts and interpreters. This is a coordinating role that drives awareness and often involves the business leaders in the early stages of integration projects (Broadbent and Kitzis, 2005). Successful firms setup a matrix management structure that puts the technology teams among the business units for regional decision making (Peppard et al, 2011) which motivates communication, collaboration in the IS function in the organization and builds the IT organizational capabilities for innovation (Lawson and Samson, 2001).

Historically, studies had debated a key role as both an executive-level manager focused on the firm's strategy and processes, and a technical manager focused on rationalizing the existing IS infrastructure (Chun and Mooney, 2009). Streams of literature approach CIO typologies mostly depicting a CIO who promotes adoption (Rai and Patnayakuni, 1996) and evaluation of emerging technology (Bendoly et al, 2007; Cash et al, 2008), with a central focus on operational management as priority (Peppard, et al (2011). Technology acceptance models (Davis, 1989; Fichman and Kemerer, 1999; Dan et al, 2010) specified organizational and technology factors in the adoption and diffusion processes of innovation. In the context of Strategy and IT-business alignment, models of alignment maturity and relationship between the business and IT leadership were defined (Henderson and Venkatraman, 1991; Luftman, 2003) presenting mechanisms for aligning investments in IT/IS with business goals and exploiting IT for a competitive advantage (Tallon and Pinsonneault, 2011). CIO competencies were recognized as contextual factor affecting IT implementation (Shin and Edgington, 2007). Some authors extend that a more dominant role of IT organizations in the strategic planning process might damage the partnership between business and IT (Silvius and Stoop, 2013). Mechanisms that balance between risks of incremental versus breakthrough innovations (Dervitsiotis, 2010) were introduced, however, only as guidelines; potential implications of this alignment exercise on organizational ability to maintain the

balance between integrating innovation and supporting the operation were not discussed. The literature is clear that the transfer of know-how accumulated in the incumbent technology in a continuous capability reconfiguration (Lavie, 2006) of skills and tooling strengthens the operational absorptive capacity (Cohen and Levinthal, 1990). This was found to create a progressive and cumulative capability enhancement (Roberts et al, 2012). Studies suggest dynamic resource redistribution including a strategic partner to facilitate knowledge (Willcocks and Olson, 2006), and partnerships with suppliers (Levina and Su, 2008). Propagating institutions were prescribed in lowering the knowledge barriers of adoption (Swanson and Ramiller, 1997) by using external subject matter experts to overcome the organizational factors affecting innovation diffusion and to accelerate the diffusion process (Bunker et al., 2008). IT leaders were offered information acquisition and transformation mechanisms (Alavi and Leidner, 2001). Such mechanisms were complemented by the deployment of cross functional teams are suggested to motivate teams to interact in a decision making helping the understanding of new external knowledge (Tsai, 2001). Despite the fact that coordination between exploitation and exploration capabilities is recognized as key to dynamic capabilities in IT firms (Sherif et al, 2013), guidance was not offered for IT organizations that aim to maintain their innovation capability in balance with operational duties.

In the context of business model innovation based on IT what mechanisms should a CIO apply to transform the IT organization to a lever to integrating innovations based on emerging technology?

Research Methodology

This research explores mechanisms that CIOs apply to transform the IT organization to a lever to integrating innovations based on emerging technology. Using the method of grounded theory this paper attempts to develop a set of concepts that depict the objective or goals of IT managers (CIOs), identifying mechanisms employed to encourage IT organizations to innovate the business model based on new technologies in IT. These objectives would relate to a CIO typology of a “Driver” of innovation. For this aim, two in-depth case explorations were conducted on location with IT organizations in Telecom **Company A**, and in application hosting services **Company B**, selected purposefully (Patton, 1990) for this research (Table 1).

	Company A	Company B
Company Background	Leading internet services and hosting solutions provider, established in 1995 with 130+ employees	Hosting and cloud services, re-established in 2006 with 42 employees
IT Organization	15 members managing security credentials, moves and changes of the internal users; planning of new technology deployment; internal and external customers.	12 employees in charge of the planning, implementation and support of the internal infrastructure with a service desk attending to escalated customer calls.

Table 1: Summary for the two site case study

The firms chosen investigated IT as not just a tool to support business processes or to enable business model innovation, but for both. Leveraging emerging technologies such as business process management tools on a cloud platform, **Company A** adapted the way of doing business and changed the operational systems, organizational structures and pricing models, to support the integration of the new mobile services in the market. The disruption to the IT organization and the business organization was substantial. The IT management team faced a user base resisting change and reluctance from the IT staff to adopt and adapt the new application. Similarly, the implementation of cloud and BPM (business process management) technologies enabled Company B to provide on demand subscription services, pushing them to a leading hosting provider position in their market and provide a turnkey IT solution based on software as a service (SAAS). The fact that both companies are IT services companies may present a factor of bias in the findings. In these two companies, IT is the product of the business processes, and this influences all the decision variables (from the skills of the employees to be hired to the choice of the IT vendor). Thereby, the outcome of the study is expected to be centered on companies with IT services. This is still of value as a research as it treats a systemic issue in IT organizations of companies

in the IT industry. These organizations are often asked to be the internal IT provider for the internal customers (i.e. employees) and external solutions and service providers for IT clients (i.e. customers). The similarities in the sites selected reinforce the findings by adding depth into the discovery; similarities to note are of industry context (Miles et al, 2000), culture (Kwon, 1990), international presence, IT organization setting: centralized management model with a collective decision making (Damanpour, 1991). These sites also present complementarities that may shed a light on some cross case observations further enriching the empirical study. The sites differ in organization size (Fichman and Kemerer, 1997) and maturity (Kwon 1990), employed different mitigation measures in their scope of integration of EIT (Swanson, 1994). The data collection activity combined interviews and brainstorming sessions (Hargadon and Sutton, 1997). Focus group workshops (Stewart et al, 2007) were conducted due to the nature of the topic that requires stimulation and interaction. These workshops recorded all the participants' input while probing for details; where possible, using illustrative examples (Patton, 1990) to help establish neutrality in the process. In total data collection involved 15 informants chosen from the two companies. Case summaries and cross-case comparison were compiled in a tabular summary (Creswell, 1998), in the form of interview transcripts, field notes from observations, and relevant exhibits (e.g. organizational structures). The data analysis investigated the data correlation through a predefined coding system (Miles and Huberman, 1991) in order to organize the data and provide a means to introduce the interpretations (Strauss and Corbin, 1990). A step by step 'Key Point' coding technique (Allan, 2003) was applied to the interview transcripts (Douglas, 2003), and relevant concepts are identified. These concepts were categorized as "Key Concepts" for the proposed typology (Appendix).

Research Findings and Discussion

IT services companies expect their IT organizations to be the innovators of the company. When innovating a business model, IT leadership and IT organizations, endure multi-dimensional challenges, especially in IT services companies. These IT organizations must participate in the success of their host companies in an effort to lead IT based innovation, internally and externally. *"We need to keep IT involved in the business strategy" stated the IT Director of Company A, "... their competencies add value to the company... sometimes, the industry."* Further, IT organization in IT service companies have two customers. IT is not only a cornerstone for the internal business model with internal users of the company, but also the core business in providing customer facing services. This puts a burden on the IT organization to stretch its abilities and cover users' issues internal and external to the company context with a persisting conundrum of providing a reliable service to existing customers or creating new customer through innovation. In addition to necessary approaches that foster IT - business alignment, mechanisms were reported by the study participants to raise the confidence inside the IT organization and of the business in IT organizational capabilities to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the business organization.

Fostering IT - Business Alignment

Company A established a gatekeeping function between IT and the business in order to limit the unnecessary business process changes that may have a large impact on technology with little return. This engagement setup the IT manager as the interface between the IT organization and the business, communicating technical needs concretely to the business. Furthermore, in order to drive these benefits into the business model, the IT knowledge of business leaders was continuously refreshed. In a close link, IT leaders were able to exploit their IT knowledge to identify the benefits of that technology to improve the business model, directly impact priorities and adjust project scopes. Further, **Company A** educated the IT team on the business processes in order to understand the challenges and address them. **Company A** business leadership consulted their IT team on all decisions in order to relay the business requirements. Business unit managers and IT managers of **Company A** participated in enforcing the new processes. The leadership of each business group had to get involved in normalizing the business process to be automated by the BPM, thus reducing the complexity into a standard process within the business. The IT Manager in **Company A** was consulted and aware of the business requirements for technology, striving to *"establish proper planning for technology including participation in choice of technology for the business solution offered to the external customer..."* Correspondingly, recognizing the importance of IT to the business, the responsibility for the IT organization in **Company B** was in the role of the deputy GM/Operations Director. Through this representation, IT participated as a board member in defining the

strategy of the company. The deputy GM, also the leader of IT leader aligned IT with the business through the inclusion of “*IT objectives into the business strategy*” (*Company B*).

Building IT Skills and Competence

IT personnel skills in technology management were viewed as the most important skill set in affecting IS infrastructure flexibility and competitive advantage (Byrd and Turner, 2001). This could come as evident in an IT services company. The empirical statements highlighted the importance of *IT skills and competence* in transforming the IT organization to a lever for innovation. **Company B’s** IT organization led the technology evolution and business process innovation of the company, raising the self-confidence of the IT staff through training. One of the challenges expressed by the general manager of **Company B** was related to the complacency of some team members of the support team who tended to process routine and repetitive work. This “*routinization*” (Galunic and Rodan, 1998) seemed to constrain joint learning, and to restrict the creation of new knowledge by imposing existing knowledge. The routine work and the lack of time to access new knowledge was clearly a handicap for their advancement required to review and evaluate new technologies. In order to address this, **Company B** first established “*clear roles and responsibilities*”. Then in order not to burn-out the support team, **Company B** established “*a rotation plan moving support team members in and out of projects to help the IT infrastructure team: selected activities that the infrastructure team used to handle were now allocated to the support team*”, stated the GM. The rotation plan instigated a knowledge transfer and underscored the coordination capabilities of the IT organization (Jansen et al, 2005): the support teams were re-energized and their morale improved. As a result, processes such change management needed to be revisited and updated. A ripple effect extended to formalize some processes and increased the level of an organization’s realized absorptive capacity (Vega-Jurado et al, 2008). Consequently, the infrastructure team was doing less daily work and the support team acquired new skills. A team of champions was elected for each technology based on experience, willingness to learn, ability to lead, etc. These champions followed rigorous training and education and lead working groups which facilitated the transition of knowledge (Martin and Horne, 1993). Champions encouraged the dissemination of information among the team and participated in the professional services functions of the business (Cash et al, 2008). Thereby, continuing to hone their skills and bringing new knowledge and creativity into the team.

Raising Confidence in Capabilities of IT Organizations

A long term challenge for CIOs, is the wavering confidence of the business in the capabilities of the CIO and the IT organization (Earl and Feeny, 1995). The role of leadership was highlighted in both sites, as both companies reported a focus on increasing *the skills and competence of their engineers* in order to drive the innovation in their host organizations. At **Company A**, the assessment of maturity of a hosting platform was conducted based on requirements of the business. The collaboration within the company anchored the IT organizational processes for **Company A**, and boosted the competence of the IT team to drive the business strategy. Empirical evidence portrayed IT and company leadership’s to motivate *IT organizational learning capabilities, collaboration and internal information exchange through the training and cross training of technical staff* (*Company A*). The empirical statements explicate that IT organization do this by reinforcing knowledge acquisition practices through training, collaborations with key partners and suppliers, tools and testing and R&D. Acquired knowledge is then shared internally in cooperation with the business and other team members through the integration of new ideas with research and testing practices. Further, standards and best practices were introduced into the knowledge base of **Company A**. The reported effect was in the increase of confidence inside the IT organization, and the normalized communication among the team members. In the case of **Company B**, this was also true in the firm’s customer base. The IT organization of **Company B** embraced emerging technology by boosting its analytical abilities through the “*analysis of technical features and feasibility studies*”, acquiring knowledge on standards and best practices and maintaining an alignment with the business needs and the customer needs. With a strong initiative to embrace new technology, the leadership of the IT organization of **Company B** implemented a reward program. The program encouraged the participation of the IT organization to innovate. Team building activities built personal bridges between the business members and the technical IT staff. Project performance, financial and non-financial incentives were introduced. Key competencies of the team in the technology verticals (specific applications with a specific objective) were linked to the revenue from each vertical. Job evaluations were

carried across the organization. These evaluations were linked to the key performance indicators (KPIs) of the business and service level metrics such (*based on uptime and resolution time, on experience, willingness to learn, ability to lead, etc...*). The higher the expected value to the business, the harder management push for the competency. Incentives were then applied through annual reviews and project bonuses, which motivated the IT organization to exploit their competencies into successful implementations.

Conclusion

Though the capabilities of a “**Driver**” CIO are to be expected from CIOs in any type of organization however, the value of this paper is the connection made between these capabilities as mechanisms to reduce the reluctance of the organization to integrate innovations based on IT (Table 2).

CIO’s Capability to...	Mechanisms employed to encourage IT organizations to innovate the business model based on new technologies in IT
Foster IT- Business Alignment	<ul style="list-style-type: none"> – IT and business leadership involvement – Focus on business needs and priorities – Leverage participation of IT team in a leadership role in the business
Build IT Skills and Competence of the IT organization	<ul style="list-style-type: none"> – Provide training in technology and in related business aspects – Encourage participation in decision making – Define clear roles and responsibilities with effective work rotations – Perform rigorous analysis of the requirements – Drive collaboration with suppliers and customers
Raising Confidence in Capabilities of IT Organization	<ul style="list-style-type: none"> – Enhance IT Organizational Learning capabilities – Exploit IT Organizational Analytical capabilities – Reinforce Adoption of standards – Encourage Networking with peers. – Demonstrate Leadership Competence

Table 2: Capabilities of a “Driver” CIO in Business Model Innovation

The innovation “**Driver**” CIO’ would exhibit these capabilities and apply the mechanisms explored by this research in order to bolster the value of IT and the IT organization in the realization of the business competitive edge. The “**Driver**” CIO would focus on fostering IT- business alignment, building the IT skills and competence of IT organizations and raising the “confidence” of the IT organization and the business in capabilities of IT. The “driver” CIO ought to demonstrate leadership competence and empower the IT organization to lead innovation through strong interpersonal and knowledge networking skills. Additionally, “**Drivers**” would reinforce knowledge acquisition and transfer to enable the IT organization to participate in delivering the vision of the business, educating the technical staff on the business aspects of firm, and preparing them to participate in a business leadership role. IT organizational analytical capabilities are promoted for successful assessment of impact on operation and ability to match the strategic objectives of the business. Furthermore, this study brings forth new knowledge on potential CIO capabilities essential to drive the business strategy, and innovate the business model for a competitive value realization based on EIT. While focusing on IT organizations inside IT services companies, this study could provide a launch pad for further explorations in different contexts, different participants or companies in other fields to extend the external validity of its findings. This “**Driver**” typology introduces new knowledge in the context of balancing innovation with operation and paves the way for further research. Although the research has reached its aim, some unavoidable limitations can be noted. Limitations related to case study research the research and other contexts such as culture, organizational context and industry can be recognized. The indicated limitations of this study could offer opportunities for follow on research.

REFERENCES

Alavi, M. and Leidner, D. 2001. “Review: Knowledge Management Systems: Conceptual Foundation and Research Issues”, *MIS Quarterly* Vol. 25 No. 1, pp. 107-136/March 2001

- Allan, G. 2003. “A Critique of Using Grounded Theory as A Research Method”. *Electronic Journal of Business Research Methods*, 2(1), 1-10.
- Bajwa, D. S., Lewis, L., Pervan, G., Lai, V. S., Munkvold, B. E., and Schwabe, G. 2008. “Factors in the Global Assimilation of Collaborative Information Technologies: An Exploratory Investigation in Five Regions”. *Journal of Management Information Systems*, 25(1), 131-165
- Benamati, J., and Lederer, A. L. 2010. “Managing the Impact of Rapid IT Change”. *Information Resources Management Journal*, 23(1), 1-16.
- Benamati, J., Lederer, A.L., and Singh, M. 1997. “Changing Information Technology and Information Technology Management”. *Information and Management*, 31, 275-288.
- Bendoly, E., Citurs, A., and Konsynski, B. 2007. “Internal Infrastructural Impacts on RFID Perceptions and Commitment: Knowledge, Operational Procedures, and Information-Processing Standards”. *Decision Sciences*, 38(3), 423-449.
- Broadbent, M. and Kitzis, E. 2005. “Linking Business and IT Strategies Together: Four factors for success”. *Ivey Business Journal* 69(3): 1–6.
- Bunker, D., Kautz, K., and Anhtuan, A. 2008. “An exploration of information systems adoption: Tools and skills as cultural artefacts - the case of a management information system”. *JIT*, 23(2), 71-78.
- Byrd, T., and Turner, D. B. 2001. “An Exploratory Analysis of the Value of the Skills of IT Personnel: Their Relationship to IS Infrastructure and Competitive Advantage”. *Decision Sciences*, 32(1), 21-54.
- Cash, J. I., Earl, M. J., and Morison, R. 2008. “Teaming Up to Crack Innovation and Enterprise Integration”. *Harvard Business Review*, 86(11), 90-100.
- Cegielski C. G., Reithel, B. J., and Rebman, C. M. 2005. “Emerging Information Technologies and IT Strategy.” *Communications of the ACM*, August, 2005. Volume (48).8 pp113-117
- Chesbrough, H. 2006. *Open Business Models: How to Thrive in the New Innovation Landscape* ISBN: 978-1422104279
- Chesbrough, H. 2010. “Business Model Innovation: Opportunities and Barriers”. *Long Range Planning*, 43(2/3), 354-363.
- Chun, M., and Mooney, J. 2009. “CIO roles and responsibilities: Twenty-five years of evolution and change”. *Information and Management*, 46(6), 323-334.
- Cohen, W. M., and Levinthal, D. 1990. “Absorptive Capacity: A New Perspective on Learning and Innovation”. *Administrative Science Quarterly*, 35: 128–152.
- Creswell, J. W. 1998. *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. Thousand Oaks, CA: Sage.
- Damanpour, F. 1991. “Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators”, *Academy of Management Journal* (34:3), 1991, pp. 555-590.
- Dan, Y. and Chang Chieh, H. 2010. “A Reflective Review of Disruptive Innovation Theory”. *International Journal of Management Reviews*, 12(4), 435-452
- Davis, F. 1989. “Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology”. *MIS Quarterly* (13:3), 1989, pp. 319-340.
- Dervitsiotis, K. N. 2010. “A framework for the Assessment of an Organization’s Innovation Excellence”. *Total Quality Management*. Vol. 21, No. 9, September 2010, 903–918
- Deshler, R., and Smith, K. 2011. “Making Business Model Innovation Stick”. *People & Strategy*, 34(4), 18-23.
- Doherty, N. F., Ashurst, C., and Peppard, J. 2012. “Factors affecting the successful realisation of benefits from systems development projects: Findings from three case studies”, *JIT*, 27(1), 1-16.
- Douglas D. 2003. “Inductive Theory Generation: A grounded Approach to Business Inquiry”. *Electronic Journal of Business Research Methods*, Volume 2, Issue 1, Article 4, Academic Conferences International Limited, 2003
- Edwards, C. and Peppard, J. 1997. “Operationalizing Strategy through Process”. *Long Range Planning*, 30
- Eisenhardt, K. M. (1989). “Building Theories from Case Study Research”, *The Academy of Management Review*, Vol. 14, No. 4 (Oct., 1989), pp. 532- 550
- Feeny, D. F., Edwards, B. R., and Simpson, K. M. 1992. “Understanding the CEO/CIO Relationship”. *MIS Quarterly*, 16(4), 435-448.
- Fichman, R. G. and Kemerer, C. F. 1997. “The Assimilation of Software Process Innovations: An Organizational Learning Perspective”, *Management Science* (43:10), 1997, pp. 1345-1363.
- Galunic, D. C. and Rodan, S. 1998. “Resource Recombinations in the Firm: Knowledge Structures and the Potential for Schumpeterian Innovation”. *Strategic Management Journal*, 19: 1193–1201.

- Ghosh, S., and Skibniewski J., S. 2010. “Enterprise Resource Planning Systems Implementation as a Complex Project: A Conceptual Framework”. *Journal of Business Economics & Management*, 11(4), 533-549.
- Guillemette, M. G., and Paré, G. 2012. “Toward a New Theory of the Contribution of the IT Function in Organizations”. *MIS Quarterly*, 36(2), 529-551
- Hargadon, A. B., and Sutton, R. I. 1997. “Technology Brokering and Innovation in a Product Development Firm”. *Administrative Science Quarterly*, 42: 716–749.
- Henderson, J. C., and Venkatraman, N. 1991. “Understanding Strategic Alignment”. *Business Quarterly*, 56(3), 72.
- Hooper, V., and Bunker, B. 2013. “The role and requisite competencies of the public sector CIO: A two-sided perspective”. *Electronic Journal of Information Systems Evaluation*, 16(3), 189-200.
- Jansen, J.J., Van den Bosch, F. A. J. and Volberda, H. W. 2005. “Managing Potential and Realized Absorptive Capacity: How Do Organizational Antecedents Matter?” *Academy of Management Journal*, 48, 6, 999–1015.
- Johnson, M. W. 2010. *Seizing the White Space: Business Model Innovation for Growth and Renewal*. Harvard Business Review Press. ISBN 1422124819.
- Kraemer, K., Dedrick, J., and Yamashiro, S. 2000. “Refining and Extending the Business Model With Information Technology: Dell Computer Corporation”, *The Information Society*, 16:5–21, 2000
- Kwon, T. H. 1990. “A Diffusion of Innovation Approach to MIS Infusion: Conceptualization, Methodology, and Management Strategies”. *Proceedings of the Tenth International Conference on Information Systems*. Copenhagen, Denmark, 1990, 139-146.
- Lavie, D. 2006. “Capability Reconfiguration: An Analysis of Incumbent Responses to Technological Change”. *Academy Of Management Review*, 31(1), 153-174.
- Lawson, B. and Samson, D. 2001. “Developing Innovation Capability in Organizations: A Dynamic Capabilities Approach”. *International Journal of Innovation Management*, Vol. 5, No. 3 (September 2001) pp. 377–400
- Levina, N. and Su, N. 2008. “Global Multisourcing Strategy: The emergence of a supplier portfolio in services offshoring”, *Decision Sciences* 39(3): 541–570.
- Luftman, J. 2003. “Assessing IT/Business Alignment”. *Information Strategy: The Executive's Journal*, 20(1), 7.
- Luftman, J.; Zadeh, H. S; Derksen, B.; Santana, M.; Rigoni, E. H. et al. 2012. “Key information technology and management issues 2011-2012: an international study”. *JIT* 27.3 (Sep 2012): 198-212.
- Martin C. R. Jr, Horne, D.A. 1993. “Services Innovation: Successful Versus Unsuccessful Firms”, *International Journal of Service Industry Management*, Vol. 4 ISS: 1, pp.49 – 65
- Miles, M. and Huberman, A.M. 1991. *Qualitative Data Analysis: A Sourcebook of New Methods*. Sage Publications, Newbury Park, CA, USA.
- Miles, R. E, Snow, C. C., and Miles, G. 2000. TheFuture.org, *Long Range Planning*, 33/3 (June 2000): 300-321).
- Mitchell, D.W. and Coles, C.B. 2004. “Business model innovation breakthrough moves”. *Journal of Business Strategy*, 25:1, pp. 16-26.
- Patton, M. Q. 1990. *Qualitative evaluation and research methods (2nd edition)*. Newbury Park, CA: Sage Publications.
- Peppard, J. 2001. “Bridging the Gap between the IS Organization and the Rest of the Business: Plotting a route”. *Information Systems Journal*, 11(3), 249-270
- Peppard, J. and Ward, J. 2005. “Unlocking Sustained Business Value from IT investments”. *California Management Review* (48:1), 2005, pp. 52-70.
- Peppard, J., Edwards, C., and Lambert, R. 2011. “Clarifying the Ambiguous Role of the CIO”. *MIS Quarterly Executive*, 10(1), 31-44.
- Philip, G. 2007. “IS Strategic Planning for Operational Efficiency”. *Information Systems Management*, 24(3), 247-264.
- Rai, A. and Patnayakuni, R. A. 1996. “Structural Model for Case Adoption Behavior”. *Journal of Management Information Systems*, 13, 2 (Fall 1996), 205-234.
- Roberts, N., Galluch, P. S., Dinger, M., and Grover, V. 2012. “Absorptive Capacity and Information Systems Research: Review Synthesis, and Direction for Future Research”. *MIS Quarterly*, 36(2), 625-A6.

- Santa, R., Ferrer, M., Bretherton, P., and Hyland P. 2009. “The Necessary Alignment between Technology Innovation Effectiveness and Operational Effectiveness”. *Journal of Management and Organization* 2009 15:2, 155-169
- Sherif, K., Tsado, L., Zheng, W., and Airhia, B. 2013. “An exploratory study of organization architecture and the balance between exploration and exploitation of knowledge”. *VINE*, 43(4), 442-461.
- Shin, N., and Edington, B. H. 2007. “An Integrative Framework for Contextual factors affecting Information technology Implementation”. *Journal of Information Technology Theory and Application*, 8(4), 21-38.
- Silvius, A. J. G., and Stoop, J. 2013. “The relationship between strategic information systems planning situational factors, process configuration and success”. *Journal of International Technology and Information Management*, 22(1), 1-1.
- Stewart, D. W., Shamdasani, P. N., and Rook, D. W. 2007. *Focus Groups: Theory and Practice*. Thousand Oaks, CA: Sage Publications.
- Strauss, A. and Corbin, J. 1990. *Basics of Qualitative Research*. Sage Publications, Newbury Park, CA.
- Swanson, E. B. 1994. “Information Systems Innovations among Organizations”, *Management Science* (40:9), 1994, pp. 1069-92.
- Tallon, P. P. and Pinsonneault, A. 2011. “Competing Perspectives on the Link between Strategic Information Technology Alignment and Organizational Agility: Insights from a Mediation Model”. *MIS Quarterly*, 35(2), 463-486
- Tom, E., Aurum, A., and Vidgen, R. 2013. “An Exploration of Technical Debt”. *Journal of Systems and Software*, 86(6), 1498-1516.
- Tsai, W. 2001. “Knowledge Transfer in Intra-organizational Networks: Effects of Network Position and Absorptive Capacity on Business-unit Innovation and Performance”. *Academy of Management Journal*, 44: 996– 1004.
- Vega-Jurado, J., Gutierrez-Gracia, A., and Fernandez-de-Lucio, I. 2008. “Analysing the Determinants of Firm’s Absorptive Capacity: Beyond R&D”. *R&D Management* 38, 4, 2008
- Wang J. 2006. “Economies of IT Systems at WAL-MART. An Historical Perspective. *Academy of Information and Management Sciences Journal*, Volume 9, Number 1, 2006
- Wastell, D. G., and McMaster, T. 2008. “Organizational dynamics of technology-based innovation: Diversifying the research agenda”. *JIT*, 23(2), 63-70.
- Watts, S., and Henderson, J. C. 2006. “Innovative IT climates: CIO perspectives”. *The Journal of Strategic Information Systems*, 15(2), 125-151.
- Westerman, G. and Curley, M. 2008. “Building IT Enabled Innovation Capabilities at Intel”. *MIS Quarterly Executive*, 7(1), 33-48

Appendix

Key Category: Foster IT- Business Alignment

Key Concepts	Empirical statement
IT and business leadership involvement	“...IT manager is the interface between the IT Organization and the business...” Director of IT (A); “Everyone participates in generating the strategy for the company. Customer support managers are intimate with customer issues and bring back customer success stories and share them ...” Ops Director (B)
Focus on business needs and priorities	“Internal communications focus on the business needs and priorities. IT leadership disseminates information in regular staff meetings (weekly)...” Director of IT (A); “... The IT leader must find the technology that will fit the model of the business and identify the benefits of that technology to improve the business model. VP Sales (A)
IT team in a leadership role in the business	“The IT team took a leadership role in the business. Especially that our business is an IT business so that was a positive reinforcement for the IT organization”...VP of sales (A)

Table 3: Key Concepts and Categories from Empirical Statements

Key Category: Build IT Skills and Competence of the IT organization

Key Concepts	Empirical statement
Training in technology and in related business aspects	<i>“(Technical people) are trained in the business aspect of our industry not just the technical training”. VP of sales (A); “Technical boot camps on clouds empower the IT teams to focus on datacenter and cloud strategy execution.” Ops Director (B); “We lay out certification and training plans... elect champions for each technology... General Manager (B)</i>
Participation in decision making	<i>“...discuss and consider input from all team members.” Director of IT (A); “When you put the IT groups responsible for such decisions, they will take ownership of the outcome and become energized in preparing the best solution for the business. ... General Manager (A); “...started including them in the follow on decisions, and increasing their knowledge in the business, [...] encouraging them identify the technology fit, the IT organization was energized to drive the innovation”. VP of sales (A)</i>
Analysis of requirements	<i>“With the right analysis – a deep analysis of the potential technology, [...] feature evaluation, costing and risk, [...] A proof of concept is required in order to place the technology contextually in our environment.” Director of IT (A); On new deployments, a feasibility study is a must. I ask them the “can we do it” question and if they say no, I then ask them to tell me “how we would be able to do it”. Ops Director (B)</i>
Collaboration with suppliers and customers	<i>[...] We have to build the awareness internally in order to read the market as customers drive our efforts through collaboration with suppliers and customers.” General Manager (B)</i>

Key Category: Raising Confidence in Capabilities of IT Organization

Key Concepts	Empirical statement
Org. Learning capabilities	<i>“We focus on the IT organization’s learning capabilities, collaboration and internal information exchange through the training and cross training of technical staff”. Director of IT (A)</i>
Org. Analytical capabilities	<i>“... (We focus on) the analytical abilities to see and build the business case with a consideration of the return on investment, impact on operation and ability to match the strategic objectives of the business. Director of IT (A)</i>
Adoption of standards	<i>“We push standards by which evaluations should be made and that need to be adhered to”. [...] Director of IT (A); “The adoption of standards such as ITIL is a priority, [...] This raises the confidence through knowledge of standards and best practices”. Ops Dir. (B)</i>
Networking with peers.	<i>“... We send them to conference. They will then have a chance to network with peers and learn, gain the confidence with the technology and come and convey the knowledge internally...” Director of IT (A)</i>
Demonstrate Leadership Competence	<i>“The IT manager must take fast decisions”. Director of IT (A); “If the IT manager acts in courage to embrace the technology, then the IT organization will do the same.” Director of IT (A); “... Through the evaluation process and the continuous monitoring of team performance, the IT managers are empowered to train, educate, promote and rearrange their teams in alignment with the requirements” GM (B)</i>

Table 3 (Continued): Key Concepts and Categories from Empirical Statements