Dimensions of an Innovative Digital Culture

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Abstract

In many organizations the Chief Information Officer (CIO) is key to driving business innovation. This research examines the CIO in the context of their ability to create an innovative digital culture. We explore the concept of innovative digital cultures through qualitative analysis with 50 CIOs, Chief Digital Officers (CDOs) and VPs of the IT department. We characterize the dimensions of innovative digital cultures combining theories from the disciplines of organizational design, entrepreneurship, and transformational leadership. Our findings expand our conceptual understanding of innovative digital cultures as well as provide pragmatic advice for practitioners.

1. Introduction

Digital technologies, such as data analytics, mobile apps, and social media platforms, are transforming many industries. For example, Uber has dramatically changed the way consumers order and pay for their transportation needs. The impact has been staggering for the traditional taxi driver. Specifically, in New York City, the value of a medallion (the right to operate a taxi in urban areas) has decreased from $1.3 million in 2014 to $250,000 in 2016. With an 80% decrease in value to the taxi drivers, organizations are growing increasing concerned about and trying to anticipate the impact of digital transformations in their industry (Holodny, 2016). Information Technology (IT) and more specifically IT professionals are a significant source of innovation capabilities that many argue precede corporate strategy (Watts and Henderson, 2006). In an effort to support digital transformation, the IT function is going through radical changes in its own capabilities placing an increasing focus on the IT department's ability to work with all different areas of the business to innovate current products and services.

This paper explores how leading CIOs exhibit their values, behaviors, and actions in support of innovation to influence their IT colleagues to more effectively enact digital transformation. Our goal is to determine how these leaders build innovative cultures as they work across their organizations to design processes, structures and strategies in an increasingly digital world. We begin by describing key constructs in innovative cultures from the literature. We next outline three distinct but converging streams of literature which informed our framework of an effective IT culture: the organizational design literature, entrepreneurship research, and the leadership literature. Our research question is: How do senior leaders (CIOs) enable a culture of digital innovation?

2. Conceptual Framework: Dimensions of an Innovative Culture

Culture is referred to as the values, norms, behaviors, and beliefs that employees share about a particular organization. It is exhibited in the way the business treats its employees and its customers. The fit between organizational culture and business expectations is considered one of the most important determinants of business success and has been studied extensively over the years (Kotter, 2008). Innovative cultures are defined in previous research as values, behaviors and climates that promote experimentation and learning from past mistakes (Rao and Weintraub, 2012).

IT professionals must be enabled, developed and encouraged to be more innovative in their approaches and solutions to generate technology-induced products and services. After studying innovation practices among 759 companies in 17 different geographical markets, Telis et al. (2009) found that corporate culture is a much more important driver of transformational innovation than labor, capital, government or national culture. In a recent *McKinsey Quarterly* report, Goran, LaBerge and Srinivasan point out that "shortcomings in organizational culture (such as risk aversion, poor customer focus and siloed approaches to problem solving) are a major barrier to organizational success in a digital age (July 2017).

Conversely, IT cultures have typically been defined by the structured processes in which the IT professional engages. Traditional IT cultures have rewarded technical skills, such as the ability to code, manage and deliver on complex IT projects, but developing an innovative IT culture may be counter to the core of what has typically been IT work.

Based on the work of Watts and Henderson (2006) Figure 1 represents our framework where organizational culture mediates the CIO's leader practices to organizational practices.

Fig. 1 Innovative Digital Culture

2.1 Governance - Organizational Design and Structure

In IT, the term used most often to discuss the role of IT strategy and its relationship to the business is IT governance. IT governance refers to the leadership and decision-making structures and processes that ensure that the organization's IT department extends the organization's business strategy (ITGI, 2003). Previous research has demonstrated that IT governance structures are complex, dynamic and, most importantly, involve interdependent subsystems (processes, structures, and relational mechanisms) that deliver value to the organization (Peterson, 2003).

We argue that while these types of organizational design models are still valuable when focused on back-end IT solutions, the external requirements of today's customer-centric digital world require agility and anticipation of business needs in order to create new technology-based business models, products, and services. Therefore, we propose that governance models include

design features that enable forward thinking and anticipation versus strict alignment with strategic business goals.

2.2 Governance - Organizational Design and Structure

The literature from R&D suggests that traditionally, the most strategic and "core" innovation activities of an organization are concentrated in a centralized unit. In this centralized hub model (Bartlett, 1990), there was only a center of excellence in one location, i.e. the home country, as the source of innovation and competitive advantage. More recently, due to the demand driven innovative activities that are required around the world by many multi-national organizations, R&D activities such as innovation labs are located in multiple global regions to accelerate the rate of change and to encourage spillover processes among locations.

In the IT context, innovation hubs and centers of excellence have not been the focus of extensive research but the area is growing. Recently, Markus & Bui (2012) in a study of interorganizational coordination hubs, found that while hubs affect efficiency and effectiveness, the governance of these arrangements are difficult. They found that, interorganizational hubs require hybrid arrangements as opposed to categorical choices such as member-owned or investor owned forms as suggested by previous research.

2.3 Entrepreneurial Processes- Design Thinking: Prototyping, Experimentation, Idea Generation

A growing amount of research in the entrepreneurship literature is based on the work done in the new product design literature. From a theoretical perspective, design constructs emphasize how to perceive the environment, think about the artifacts in the environment, and conceive new ideas to improve and excel upon new ideas (Goldsby, 2012). Design Thinking, is the more popular term given to the body of research (Brown, 2008). The emphasis is placed on how to enable business professionals in all different domains to think and act as designers in solving business problems, and to use designers' methods to jump start anyone's ability to think and act more innovatively.

In the IT context, processes such as idea generation, experimentation and piloting new systems is the core of the work that many IT organizations conduct. IT system development methods such as Agile/Scrum were originally conceived of as people and process methods that are design-centric (Suthlerland, 2014). Design Thinking methods reflect the need for IT professionals to think and act as designers to iterate, gain feedback, generate visual representations of systems via prototypes, and most importantly, learn from previous iterations.

2.3.1 Prototyping

In the design thinking literature, prototyping is a critical piece of the design process because it is a physical representation of an idea about which potential customers can provide feedback (Goldsby 2012). Prototyping fosters the generation of many iterations of the process or product, which build upon each other to create a refined and improved product/solution.

A significant piece of the IT development process requires prototyping solutions that enable individuals to reduce complexity and make sense of their surroundings (Herkema, 2003). In the IT context, prototyping solutions are a way to engage user feedback and to decrease the risk of delivering a solution that does not meet the needs of the user. For example, IT professionals use prototyping tools to generate both high and low fidelity mock-ups of the

system under development. End-users can then interact with the system to see problems or suggest new alternatives.

2.3.2 Experimentation

Experimentation, the systematic testing of ideas to create and refine products (Thomke, 2001), is critical to the innovation process. Experiments result in learning, and these learnings are often the mistakes which ultimately enable innovation (Kelley, 2001).

Learning how to fail effectively in IT systems development is an important mindset and skill but, not one that IT cultures have typically embraced. Early IT research (Lyytinen and Robey, 1999) noted that what IT professionals have not done successfully is learn from their mistakes to optimize their next project.

2.3.3 Idea Generation

The idea generation process enables individuals to make sense of things via fresh contexts and/or stimuli, to break out of typical thinking processes (Wylant, 2008). Wylant's research proposes that invention occurs when the designer "effectively thinks in a very different box." Idea generation techniques promote clusters of thinking, enabling individuals to work closely together in contextually-matched endeavors.

In the IT context, researchers have examined idea generating tools such as journey maps and mind-mapping techniques to enable this type of stimuli so that new ideas can occur.

2.4 Leadership

In one of the first empirical studies to examine the capabilities that are most closely linked to the enablement of innovation, Howell and Higgins (1990) suggested specific leadership behaviors important for innovation. In their study of champions of technological innovation, they found that the leaders of these projects used transformational leadership behaviors, exhibited higher risk-taking, initiated more influence attempts, and used a greater number of influence tactics than the non-champions.

Often referred to as "transformational," "charismatic," and "visionary" leadership, researchers agree that transformational leaders exhibit charismatic behaviors, inspire and motivate their team, and provide intellectual guidance and stimulation but do not micro-manage their teams. Also referred to as "servant" leadership, team members are encouraged to take risk, and the is empowered to take action. From Howell's early work up to more current application of the theories by Dvir et al. (2002), these leadership behaviors have been found to be important behaviors exhibited by innovators.

In an IT context, the literature has contrasted the leadership of the "chief programmer-led" team to that of the "egoless" software team leader (Faraj and Sambamurthy, 2006). This concept is particularly salient in today's environment because the work of the software developer/engineer has changed so dramatically. With innovative solutions so necessary the egoless servant leader or transformational leader approach is becoming increasingly powerful, instead of the chief programmer-led model.

3. Methodology

This research employed a qualitative approach to the data collection effort. Qualitative approaches lend themselves to exploration and inductive logic (Patton, 1990). The researcher begins with specific information and a priori theories but moves towards more general categories

for analysis because the approach involves interactive, natural conversation (Fontana and Frey, 1994). In this phase of the research, we generated evidence in a deductive mode, with the goal of exploring the conceptual model (Figure 1) and IT innovation dimensions described in Section 2.

Sample selection was theoretical, or criteria based (Eisenhardt, 1989). We believe that this is an appropriate approach when trying to specify characteristics and experiences that will help to focus the study. An important criterion for inclusion in the study was that the interviewees had to be engaged in IT innovation efforts. First, we identified an IT training firm that had worked with organizations on their transformation efforts. The particular firm has been in the business of training IT professionals for over 40 years and has worked with over 250 companies. We asked the CEO of this company to suggest IT leaders who were active in the most relevant and innovative dimensions of IT today - social, mobile, cloud and analytics - collectively referred to as "the third platform" by market research firm IDC. From their contacts, we contacted the CIOs and asked for 45 minute interviews. Additionally, we identified CIOs in the popular press who had been interviewed for select journals and published in the area of innovation and contacted them for an interview as well.

These approaches yielded 50 in-depth individual interviews with senior level IT professionals across several industries, including healthcare, automotive, financial services, government, technology products, energy, and retail. The interviews lasted between 45-60 minutes.

Interviews were recorded, transcribed and coded, based on a priori research questions. A graduate student was trained to theme the interview data using a rubric. Following Soens and Kovacs' (September 2005) approach: categorization schemes and decision rules were created; pre-defined categories for each dimension were created; the coding schemes were fine-tuned using pilot interviews that were not used in the final study; multiple coders were used to ensure reliability (the graduate student as well as two of the authors.)

Following Watts and Henderson (2006) the interview protocols included structured questions but also included probes for elaboration as appropriate, to secure the full perspective from the interviewees. Hence, the interviewees were encouraged to describe their current IT initiatives in the ways most appropriate to their experiences.

4. Results

The next section describes the results of the analysis in regards to the theoretical dimensions of IT innovation practices previously defined. Each dimension includes a description of the ways that CIOs talked about the relative importance of each.

4.1 Governance

The CIOs discussed the value of "anticipating the needs of the business" and presenting alternative points of view to inform IT strategy and it's relationship to the business. As one large pharmaceutical CIO stated: "We are constantly looking for ways to do things differently and differentiate our skills in comparison to the outsourcing options." And our new projects "need to be recognized in many levels" of the organization. Another large conglomerate stated, "IT had to take a new approach to stay relevant in today's world. With the proliferation of the cloud, we have to innovate to show the CEO what we can do."

For a nationally-recognized, large non-profit organization, anticipating needs was achieved when the business strategy and IT innovations became one and the same. As the VP of IT explained, "We've determined a few simple tenets for our IT transformation: Everything is

simplified, standardized, secured, but the key is the ownership by the people doing the work. We encourage them to be creative and innovative in their solutions, and we reward them for taking risks. Thinking and acting innovatively is a critical part of our business strategy going forward."

Several organizations talked about the increased ability to see the connection between data and business strategy. For example, a participant from a large oil and gas company explained, "We are taking the lead because with mobile payment we can gather data on customer habits and get the people from the pumps into the store." And, "The new analytics give us the ability to create new marketing strategies that will re-energize our business."

Taking this notion a step even further, a car manufacturer explained that they are now are able to anticipate needs because the silos have finally been broken, enabling a more holistic view of the business: "Corporate applications, global infrastructure, there's no differentiation between IT and product support, it's one organization…and I'm proud to say that in IT automation is as vertically integrated as it can be and is aligned and even ahead of senior management on this."

Anticipating needs took many forms, which included: new roles and responsibilities, structural changes, as well as additional governance approaches. For example, many IT groups created specific roles whose responsibility it is to scan the environment for new solutions and position these technologies for possible prototyping and rapid experimentation. A major financial institution senior director put it this way, "A large part of my job is spent attending conferences, taking workshops around the country, and keeping up on the latest technologies from the start-up companies, particularly those involved with cloud and social capabilities. I then bring these ideas back into our organization on a regular basis, and we prioritize as a team with the business which one(s) we'd like to experiment with and why. We drive these meetings and the business is always interested because we are able to make the link to business strategy. Many of these tools have easy user interfaces and can be downloaded onto mobile apps, which our stakeholders really understand. The experimentation periods are short in duration; many different types of tools and processes are reviewed, and then a few are chosen for the larger IT group to pilot."

An insurance provider suggested that they had to restructure their governance approach for innovation-type projects to have a better chance of anticipating need: "We combined marketing people, product development as well as informatics together. We called this the incubator of ideas." Because of this new structure, members of the team were on a level playing field and all were contributing to the conversations.

Finally, we heard from a few of the companies that their governance structure now includes a corporate venture group along with the more classic IT portfolio approach. Institutional venture groups look for and evaluate the ways organizations create, promote and institutionalize innovative products and services. The processes and criteria that they pursue to accept and/or reject ideas are much different than the processes an IT steering group might use to prioritize projects. For example, external venture groups who invest in innovation start-ups have longer time horizons (often 7-10 years) and do not lose interest, as often happens when corporate venture groups have to manage to shareholder expectations. Different criteria and "staying power" has to be ingrained in the corporate venture group to create an IT culture of innovation.

4.2 Organization Structures

Organization structure is a lever that firms can use to drive digital transformation. Many firms are pursuing restructuring the IT organization as an approach. One VP of IT from a large pharmaceutical company is rethinking how work is done with the intent of providing a single platform on which people can innovate. With a more holistic IT center, the company believes it

will be easier to provide research capabilities and innovation in the form of quick prototypes and experimentation, which will help IT professionals anticipate business needs and future opportunities.

A large retail company set up a corporate venture team inside their organization to vet new ideas to focus on technology-induced innovations. The group was comprised of the CEO, general counsel, EVP of marketing as well as the CIO. A few companies were using a portfolio approach to strategically fund innovative projects. The money saved from standardizing and effectively redesigning business processes was/is now being used for more innovative projects. One large, global storage organization kept their ERP implementation completely vanilla, dramatically reducing design and implementation costs. The business agreed to have a significant piece of the savings sent back to the IT group for the funding of innovative projects. This type of portfolio approach is becoming more popular, even for companies who have not had innovation at the heart of their strategic planning efforts, because the business can minimize risk while promoting a significant piece of innovative efforts.

A prevailing structure that CIOs referred to were the strategically-located, innovation hubs beyond headquarters for best practice sharing as well as economy of resources. "We have stood up four hubs now for IT innovation. They are strategically placed in Singapore, Prague and New Jersey. In Prague, we were particularly interested in hiring people who can speak several different languages and have had experiences in many different cultures. We were also looking for a large number of millennials who have not been exposed to the corporate culture back in the States and are anxious to work collaboratively and to use all types of new methods and techniques."

Another CIO discussed the power of having the hubs share ideas and best practices. "It's really tough, but we are beginning to see this between our local hub and our European labs. The knowledge sharing is beginning to occur, but it has taken time."

4.3 Entrepreneurial Processes

4.3.1 Prototyping

Over 80% of the CIOs discussed the importance of prototyping techniques while working with their business partners on customer facing applications. One VP, in particular, was working on a new mobile application for a specific disease state, employing observation, user profiling, and prototyping and rapid experiments. The team observed extreme users in their natural work environment, as opposed to the classic interview strategy for requirements generation. They then developed user personas that drove their insights and interpretations for the application. After a number of ideation sessions, a quick prototype using Balsamiq software demonstrated the capabilities of the app. This type of rapid prototyping enabled a quick proof of concept for immediate user feedback. Now the team is going for external funding from institutional venture capital groups to determine the business potential of the mobile app as an additional service offering for the company.

4.3.2. Experimentation

The use of user personas, sprints, and prototyping leads to rapid experimentation techniques that can take costs out of the upfront design. From a health care provider, "In Agile you are working on small increments of work. The innovation occurs when you can break things into smaller bits of work, show people the prototype, gather their opinions and gain their approval and then move forward." This is the classic definition of experimentation in innovation.

Another example of experimentation came from an international health care company who created a two day proof of concept experiment to determine the viability of using Google Glass for certain surgical procedures. Working in a lab-type environment, IT professionals, a pathologist and a surgeon worked collaboratively through ideation sessions. The team used an ethnographic approach to data collection. They observed a live surgery to experience the conditions necessary for effective use of Google Glass. A second lab was used to compare Google Glass capabilities to the standard approach. User insights were then generated and will be used to inform the next iteration. The lessons learned were easily captured in real time and the cross-functional team was open about the strengths and weaknesses of the experiment. Mistakes were converted into valuable lessons for the entire team for future experimentation efforts.

4.3.3. Idea Generation

Creating a cross-functional team whose skills complement each other is an important approach to cultivating innovative anticipator skills in the organization. These skills are important to make sense of and generate ideas from multiple and fresh perspectives. A mid-sized insurance company created user-experience teams composed of people with very different strengths and perspectives: "We have created a group of people with different backgrounds to work on the most innovative projects in our company. This team sees the users' opportunities from different perspectives. There are software engineers on the team, an artist who is now trained as an engineer, as well as business domain experts." The team is deliberately set up to question each other's ideas, provide unique perspectives on problems, and balance the analytical skills of the software engineers with the creative skills of the artists to get the most innovative product for the client. Orchestrating a mix of analytical and creative skills endows the team with "cognitive ambidexterity" (Neck, 2011), promoting idea generation.

Another example of a formal process to encourage new ideas that a number of leaders mentioned was increasing the diversity of skills on project teams. Companies stressed their investments in diversity initiatives, which are critical in order to encourage the different points of view that foster innovative thinking. The definition of diversity is very broad and includes gender differences, age differences, ethnic differences as well as different functional capabilities. Many companies specifically called out hiring as many millennials as possible because in one interviewee's words, "They don't care as much about money as they do about making a difference."

Finally, a large international non-profit conducted brainstorming techniques to generate new technology-induced ideas. Stakeholders from across the organization, including varied management levels and multiple functions, brainstormed solutions with the IT organization. A nominal group technique was used to give equal representation to ideas, and individuals were rewarded, in some way, for the initiatives that were piloted. The rewards were not financially significant but were highly-valued by the employees because individuals were visibly recognized for their accomplishments.

4.4. Leadership Behaviors

When we think of senior leadership in the IT domain, we often hear about the importance of technical acumen as well as business knowledge. Certainly as leaders of innovation initiatives, the senior managers interviewed had to demonstrate technical as well as management capabilities. But, they also demonstrated additional capabilities – transformational leadership behaviors, which have been positively associated with organizational innovation initiatives in

R&D organizations. These behaviors include: providing a vision, proactive engagement in problem-solving while heavily encouraging self-management, a willingness to take calculated risks and learn from mistakes, as well as the genuine ability to listen to and entertain new ideas. While every senior IT leader in our sample did not discuss all of these behaviors, many talked about several aspects of transformational leadership characteristics, with the following representative examples.

Commenting on the ability to take risks and learn from mistakes, one senior member of an internal government think tank stated: "We were in a tough position to deliver quickly. I said to my entire team 'you haven't made enough mistakes so we are not learning enough. We need to take more risk.' And we threw everything away we had done up to this point and started over." Another senior leader in a global health care company set up his work teams so that they could fail within a six month period, see what they learned, and then prioritize the next steps. A CIO from a retail company put it this way, "If we are not failing, we are not fixing."

A member of a health care company's senior leadership team, commented on the importance of self-management, "I had to pull people out of the business, separate a small team into 'creative labs'. We called them ninja teams. They decided on their own goals and deliverables. I do not interfere with their work processes but stated the vision for the project." And the leader from a consumer products company stressed, "I deliberately do not tell the team what to do. They decide on deliverables and time-tables. Using the stand-ups from our agile methodology approach, this works the best for our innovation."

The ability to authentically listen and entertain new ideas is not a surprise to most of us in regards to enabling innovation, but it was revealing to hear senior IT leaders describe the importance of being open-minded when in the past IT was rewarded for following business direction. In a mid-sized insurance company, "As a leader I realized it was about approachability. I try to exhibit the demeanor that encourages people to share ideas. Micro-management is never a good thing, so I am trying to balance the need for autonomy but providing as much feedback as I can for some type of control. It doesn't always come naturally to me because I have spent so much of my career making sure that our projects are execution focused."

Another example of how to entertain new ideas is to formalize the process of sharing and mentoring but then naturally let it happen. Reverse mentoring is one way to do this. As one health care company mentioned, "We blend co-op entry level people with experienced engineers and they naturally cross-fertilize, teach each other." From one of the co-ops we heard, "Now I am teaching a senior engineer, giving him information, now I'm teaching him." The result is self-management and increased empowerment. As one co-op stated, "What motivates me is the accountability they give me here. Management trusts me enough to be a part of the decisions that matter, he trusts me enough to represent him in meetings."

5. Implications for Future Research and Conclusions

This research was undertaken to explore the innovative practices and capabilities of CIOs and to identify dimensions of innovative IT cultures. We present evidence of the importance of anticipating business strategy mechanisms, adjusting organizational structures, using entrepreneurial processes and methods, and leading with transformational behaviors. The 50 CIOs we interviewed articulate the values, behaviors and mechanisms that we believe foster a culture of innovation. The capacity to innovate exists within many IT organizations, but it is still

the work of leaders to create a culture that promotes these types of behaviors. As anticipated by the conceptual model, once the senior leaders in these organizations shared their belief systems through all of the aforementioned practices and behaviors, subsequent behaviors of their development teams began to change, and the culture was able to change, in this instance in the direction of increased innovative capabilities (Burke and Litwin, 1992).

Further, this study aims to comply with "consumable Information Systems research" academically rigorous and relevant to practice (O'Keefe and Paul, 2000). We were anxious to conduct rigorous research that advances our knowledge in the areas of culture, leadership and innovation as well as provide pragmatic results that can be used to move the innovation conversation forward in all IT organizations.

This study is not without limitations. IT departments do not function in isolation, and clearly the entire organization as well as the external environment impacts culture. We were not able to collect data from non-IT stakeholders, so our findings are limited in this regard. Further, the findings are descriptive and therefore not meant to be generalizable beyond this sample, but we believe this sample of 50 organizations indicative of today's forward-thinking and customer-centric IT groups. Further research is needed to validate this assumption.

Finally, this research was focused on the role of the leader in enabling IT culture change. Future research should look at the relationship between innovative digital cultures and organizational outcomes such as decreased time to market and /or increased number of products. The impact that innovative IT groups are having on business results is an increasingly important research area.

There may never be a better time for IT leaders to make an impact. Influencing the culture of the IT organization to enable a culture of digital innovation will not be an easy task, but it will be strategic. Future technology solutions clearly lie in the innovation space. Cloud computing, mobile applications, social analytics, IoT, and cognitive computing will continue to drive digital business opportunities. All of these opportunities require an innovative approach to anticipating the needs of the business. There is no prescribed formula for IT solutions in the future, only the passion, drive and will to make a difference as well as the ability to constantly change and embrace new ideas, learn from previous mistakes and create new opportunities.

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References

Holodny, Elena. "Uber and Lyft Are Demolishing New York City Taxi Driver." Business Insider, 12 Oct. 2016. http://wwww.businessinsider.com/nyc-yellow-cab-medallion-prices-falling -further-2016-10.

Watts, S., & Henderson, J. C. (2006). Innovative IT Climates: CIO Perspectives. *Journal of Strategic Information Systems, 15*(2), 125-151.

Kotter, J. and Heskett, J. (2011). Corporate Culture and Performance. Free Press.

Rao, J., & Weintraub, J. (2012). How Innovative is your Company's Culture? *MIT Sloan Management Review,* Spring 2013.

Tellis, G. J., Prabhu, J. C., & Chandy, R. K. (2009). Radical Innovation Across Nations: The Preeminence of Corporate Culture. *Journal of Marketing, 73*(1), 3-23.

Goran, J., LaBerge. L., & Srinivasan, R. Culture for a Digital Age. *McKinsey Quarterly*, (July, 2017).

ITGI, I. (2003). Board Briefing on IT Governance. *Information Technology Governance Institute. Disponível em http://www. itgi. org*.

Markus, M. Lynne and Bui, Quang "Neo" (2012). Going Concerns: The Goverance of Interorganizational Coordination Hubs. *Journal of Management Information Systems*, Spring 2012, Vol. 28, (4) pp.163-197.

Goldsby, M. G., & Nelson, T. E. (2012). Entrepreneurial Design: A Design Based Theory of Entrepreneurship. *Journal of Business and Entrepreneurship*, *23*(2), 80-95.

Brown, Tim, Martin, Roger, Harvard Business Review, 00178012, Sep2015, Vol. 93, Issue 9.

Sutherland, J. (2014). *Scrum: The Art of Doing Twice the Work in Half the Time*. Crown Business.

Herkema, S. (2003), "A complex adaptive perspective on learning within innovation projects", The Learning Organization, Vol. 10 No. 6, pp. 340-6.

Thomke, S. (2001). Enlightened Experimentation: The New Imperative for Innovation. *Harvard Business Review*, *79*(2), 66-75.

Kelley, T. (2001). Prototyping is the shorthand of innovation. Design Management Journal, 12(3): 35-42 (Summer).

Lyytinen, Kalle & Robey, D (1999). "Learning Failure in Information Systems Development". *Info Systems Journal*, 9; pp.85-101.

Wylant, B.. (2008). Design Thinking and the Experience of Innovation. *Design Issues*, *24*(2), 3–14. Retrieved from http://www.jstor.org/stable/25224163

Howell, J. M. and C. A. Higgins (1990). Champions of Technological Innovation. *Administrative Science Quarterly*, 35, pp. 317-341.

Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of Transformational Leadership on Follower Development and Performance: A Field Experiment. *Academy of Management Journal*, 45, 735-744.

Faraj, S.; Sambamurthy, V. (2006), Leadership of Information Systems Development Projects. *Engineering Management*, Vol.53, No.2, 238 – 249.

Patton, M. Q. (1990). Qualitative Evaluation and Research Methods. SAGE Publications, Inc.

Sutherland, J. (2014). *Scrum: The Art of Doing Twice the Work in Half the Time*. Crown Business.

Fontana, A., & Frey, J. (1994). The Art of Science. *The Handbook of Qualitative Research*, 361-376.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.

Soens, K.M. and Kovacs, G. (2005). A content analysis of research approaches in logistics research. *International Journal of Physical Distribution and Logistics Management* Vol. 36, No. 5 PP 374-390

Neck, H. (2011). Cognitive Ambidexterity: The Underlying Mental Model of the Entrepreneurial Leader in *The New Entrepreneurial Leader*. Greenberg, D., McKone-Sweet, K. and Wilson, H.J., eds. San Francisco: Berrett-Koehler Publishers.

Burke, W. W., & Litwin, G. H. (1992). A Causal Model of Organizational Performance and Change. *Journal of Management*, *18*(3), 523-545.

O'Keefe, B and Paul, R.. (2001). Editorial volume 10, issue 1. *European Journal of Information Systems*, *10*(1), 1-1. doi:10.1057/palgrave.ejis.3000389.