Organizational Challenges for Innovation in Information Systems

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ORGANIZATIONAL CHALLENGES FOR INNOVATION IN INFORMATION SYSTEMS

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ABSTRACT
In this paper, using the governance, resources and processes model for an organization, we examine the organizational challenges for innovation in information systems in each of the three areas of this model. Information systems are a great tool to support innovation to improve the processes and activities in an organization to achieve a competitive edge. We review the role of leadership (governance), intellectual capital (resources) and organizational culture (processes) on incremental and radical innovation in information systems. The existing research suggests that a democratic organizational culture fosters organizational learning and innovation whereas a hierarchical culture acts as a barrier. In information systems, the three phases of innovation include the concept, development and commercialization. The organizational challenges associated with the concept phase of the innovation in the information systems are reviewed. To explore the organizational challenges in the development and commercialization phases in terms of governance, resources and processes, a qualitative research proposal is presented.

Keywords
Innovation, information systems, process development

INTRODUCTION
Information Systems bridge business and computer science. Information systems cover a range of strategic, managerial and operational activities involved in gathering, processing, storing, distributing and using of information. Information systems are a portfolio of computer-based applications or “apps”. Information systems are implemented within an organization for the purpose of improving the effectiveness and efficiency of that organization. An innovation in information systems is a new computer-based application that leads to a new service, product or process that is put into practice. For example, transaction processing systems, information management systems, decision support systems and executive support systems used in an organization to support workers, middle managers, senior managers and executives respectively. In this paper, we review the governance, resources, and processes model for an organization. Organizational factors that promote innovation are reviewed including the role of leadership, organizational culture and intellectual capital on incremental and radical innovation in information systems. The intellectual capital consists of organizational learning, knowledge sharing and knowledge management. We will look at the three phases of innovation in information systems – concept, development and commercialization. The challenges associated with the concept phase (Hannola and Ovaska, 2011) of the innovation cycle are reviewed and we propose a qualitative research design to answer the research question, “What are the organizational challenges for development and commercialization phases in terms of governance, resources and processes?”

GOVERNANCE, RESOURCES AND PROCESSES MODEL FOR AN ORGANIZATION
Using the conceptual framework of governance, resources and processes for an organization (Chandan and Banto, 2011), one can analyze the organizational challenges for innovation in information systems, Figure 1. Governance includes leadership and managers. Resources include employees, intellectual capital and information systems. Processes include the organization’s operations. Using the resources and processes, an organization has to produce an output that is higher than the input to stay in business. A truly innovative organization aims for innovation in leadership, management, employees, information systems and operations leading to an enhanced financial performance of the organization.
ORGANIZATIONAL CULTURE AND INNOVATION IN AN ORGANIZATION

Organizational culture represents the way the employees and management carry out the organizational processes. Innovations in an organization can be enhanced by viewing innovation as a discipline rather than a matter of mere inspiration (Drucker, 2002). Innovation should be managed like any other corporate function by systematically analyzing seven areas of opportunity - unexpected occurrences, incongruities, process needs, changes in the industry structure, demographic changes, changes in perception, and new knowledge. Unexpected occurrences, incongruities and process needs are internal to the organization.

Innovation in an organization has to be managed and measured so that the organization can benefit from it. Management needs to build-in the “thinking time” that is critical to innovation. The leaders play multiple roles to create a culture that facilitates exploration and exploitation activities in the form of incremental and radical product and process innovation. The strategic leadership directly impacts on a knowledge sharing culture, which directly impacts on innovation ambidexterity (Lin and McDonough III, 2011). The seven innovation rules for the leadership include emphasis on the Innovation strategy and portfolio decisions, integration of innovation into business mentality, alignment of the amount and type of innovation to the company’s business, balancing the natural tension between creativity and value capture, neutralizing organizational antibodies, recognizing that the basic unit of innovation is the network that includes people and knowledge both inside and outside the organization and creating the right metrics and rewards for innovation (Davila et al., 2006).

A superior innovation performance requires a focus both on the individual and the organization. Eight elements of organizational innovative cultures include innovative mission and vision statements, democratic communication, safe spaces, flexibility, collaboration, boundary spanning, incentives, and leadership (Dombrowski et al., 2007). Transformational leadership and competitive, performance-oriented organizational culture lead to organizational innovation (Sarros et al., 2008). Innovation-supportive culture includes three dimensions of organization values – value profiles, value congruence and value practice interactions (Khazanchi et al., 2007). Relatively higher levels of debate and lower levels of conflict are more conducive to organizational creativity and innovation (Isaksen and Ekvall, 2010). A balanced linear/nonlinear thinking style by organizational leaders and employees leads to an innovative corporate culture (Vance et al., 2008). A “jugad” strategy of innovation is useful for innovations in a resource-constrained and chaotic environment typical of emerging economies. This involves non-linear and fluid mindset involving frugality, inclusivity, collaboration and adaptability (Radjoe et al., 2012). Figure 2 illustrates the relationships between organizational culture, learning and innovation.
The organizational culture determines the intellectual capital, which consists of knowledge acquisition and organizational learning. In today’s knowledge-based economy, intellectual capital has become a critical resource for an organization’s competitive advantage. Organizational culture also contributes to organizational performance and innovation. Knowledge-intensive industries include high tech manufacturing industries like electronics, aerospace and biotechnology. Knowledge-intensive service industries include education, communication, and information services. There is a positive relationship between organizational culture and organizational learning and a positive relationship between organizational learning and innovation, Figure 2. A positive correlation was also found between knowledge acquisition and organizational learning (Liao et al., 2011). Innovation is influenced by the strategic knowledge management and has a positive impact on organizational performance (Lopez-Nicolas et al., 2011). Supportive culture and innovative culture had significantly positive effect on knowledge acquisition and diffusion. Knowledge storage, knowledge acquisition and knowledge diffusion had significantly positive effect on administrative and technical innovation (Chang and Lee, 2007).

Organizational culture is one of the important inputs to effective knowledge management and organizational learning. Organizational learning is positively associated with technical innovation. To enhance innovation, both flexibility focus and external focus are necessary. A democratic cultures enhances the development of new products or services, hierarchical organizational culture inhibits product innovation (Naranjo et al., 2010). Adhocracy culture fosters both organizational learning and innovation whereas hierarchy culture inhibits them both (Sanz-Valle, Naranjo-Valencia and Perez-Caballero, 2011). Organizational culture is a clear determinant of innovation strategy (Naranjo-Valencia, Jimenez and Sanz-Valle, 2011). Organizational learning culture has a very strong positive direct effect on innovations as well as moderate positive indirect impact via innovative culture (Skerlavaj Song and Lee, 2010). As technologies get more and more complicated, networks have become more and more prominent in affecting the innovation process leading to collective innovation (Zhong and Salih, 2010). Information systems innovation can be enhanced using competitive intelligence (Nemutanzhela and Iyamu, 2011).

**THREE PHASES OF INNOVATION IN INFORMATION SYSTEMS**

Information system development is a behavioral process where human and organization elements influence the final design. Innovation in information systems is a major driving force for growth and success of an organization. Managing the innovation in information systems involves creating the appropriate climate that people can share and build upon each other’s ideas and suggestions. One has to enhance the positive contribution from the debate climate and control the negative dimension of the conflict dimension.
Innovation life cycle includes invention, application of the invention to a specific problem, coming up with a solution and implementing the solution. A linear model for innovation process for information systems can be divided into three phases: concept, new product/process development and commercialization. Each of the three phases of innovation has unique and overlapping challenges. The concept phase is the period between identifying an opportunity and judging it to be ready for development. Problems in the concept phase have a large impact on the effectiveness of the information systems development process. Eight challenges in the concept phase of innovation in information systems have been identified (Hannola and Ovaska, 2011). They include management, poor communication, cooperation (governance issues); human constraints, lack of resources (resource issues); inadequate processes, volatility, distributed development (process issues).

The cognitive and behavioral human constraints include working and long-term memory, motivational aspects, selective perception, anchoring, adjustment, representativeness, satisfying and availability (Pitts and Browne, 2007; Valenti, Panti and Cucchiarelli, 1998). Inadequate processes refer to dealing with the ambiguity, informality, incompleteness and inconsistency in the concept phase. Volatility refers to the change in requirements. Distributed development refers to the distribution of the requirement process across functional, organizational and geographic boundaries. In information systems development, agile approach has become more popular than the traditional bureaucratic and slow methods like ISO 9000. The basic premise in an agile method is that a small, collocated team working closely together with customers can create a high-value product cost effectively with frequent short iterations.

In this paper, we propose a qualitative research methodology to explore the challenges involved in the second and third phase of the innovation in information systems – new product/process development and commercialization. The research questions are: “What are the organizational challenges in terms of governance, resources and processes for the innovation in the information systems during the development and commercialization phases of innovation”. A case study approach using semi-structured interviews will be used to probe the challenges with employees and managers. During the semi-structures interviews, open-ended questions will be used regarding organizational challenges in terms of governance, resources and processes during the development and commercialization phases. The principles of data analysis in the grounded theory will be used. The analysis will include open, axial and selective coding. Similar challenges will be grouped under categories. Each category will be assigned a descriptive title. Open coding will be continued until no new categories are found. During axial and selective coding, the relationships between categories will be investigated and a conceptual model will be developed for the organizational challenges in terms of governance, resources and processes for development and commercialization phases.

Thirty employees and thirty managers in software R&D organizations of AT&T, Verizon, CISCO, IBM and Alcatel-Lucent will be interviewed using open-ended questions regarding organizational challenges in terms of governance, resources and processes during development and commercialization phase as perceived by them. Based on the analysis of the semi-structured interviews, a conceptual model for organizational challenges during the development and commercialization phases will be developed.

In summary, innovation in information systems needs to be managed like any other corporate function, e.g. marketing or sales. One has to be vigilant for new concepts, develop them and commercialize them to gain the competitive edge. In a resource-constrained and chaotic environment like emerging markets, one needs to consider non-linear and fluid mindset involving frugality, inclusivity, collaboration and adaptability for innovation. Wei and Wang (2010) suggest that both market-driven strategic actions such as organizational responsiveness and market-driving strategic actions such as innovation strategy can lead to competitive marketing advantage and superior financial performance. Building on the eight challenges identified in the concept phase of innovation (Hannola and Ovaska, 2011), we propose a qualitative research methodology using semi-structured interviews to explore the challenges in terms of governance, resources and processes associated with the development and commercialization phases of innovation in the information systems. Based on this study a conceptual

Figure 3: Three Phases of Innovation in Information Systems (Hannola and Ovaska, 2011)
model will be developed. The innovation mantra seems to be “stay loose” to conceptualize and “hang tight” to develop and commercialize.

REFERENCES
