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Innovation research in information systems: A commentary on contemporary trends and issues

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ABSTRACT

There is a need to unify the different strands of innovation research in information systems (IS) literature. We analyze 113 articles published over the past 15 years in top 10 IS journals. We classify the literature by (a) using the overall process spectrum of conceptualization from its innovation to its diffusion and (b) using the various theories of innovation referred to and validated in the articles. We identify that innovation diffusion theory is the most popular theory used by researchers. We conclude that future research must focus on the conceptualization and the generation phase of innovation through exploratory or empirical studies.

1. Introduction

Innovation has been an active area of research in almost all fields of scholarly research for many decades now [15]. Innovation has been linked to higher productivity, growth, and development of not only firms but also states and nations [42,70]. With that kind of impact, innovation has always been one of the most intriguing research topics for most management academicians as well as practitioners, and the field of information systems (IS) is no exception to this. With the information and communication technologies (ICT) becoming ubiquitous over the past few decades, the impact of ICT on all kinds of innovation is increasing [9]. In this context, innovation as a research context is of a very high value to IS researchers [138]. In this paper, we focus on the innovation research from IS researchers' point of view.

Our primary aim in this study is to understand and synthesize the developments in the field of innovation research in IS over the past decade and a half. Innovation research in IS has validated and led to further development of multiple theories over time including but not limited to innovation diffusion theory [108], social cognitive theory [14], technology acceptance model [32,126], unified theory of acceptance and use of technology [127], etc. These studies have used both qualitative and quantitative methods for exploratory as well as confirmatory research. The vast amount of literature and theoretical lenses necessitate the need to reflect back on the work produced so as to find the gaps in research. Along with synthesizing the available extant literature, we develop a framework inspired by the product life cycle model to depict the complete innovation cycle from conceptualization to creation of impact. We portray the vast array of literature on innovation based on this framework and identify the gaps where substantial contribution is still needed to better understand the cycle of innovation. Drawing on the innovation literature published in the past 15 years (starting from the year 2000) in the top 10 widely accepted IS journals, we first define the extent of IS research in innovation and propose a framework for analysis. Subsequently, we explain the process of conducting this literature review. We then go on to analyze the literature based on the framework and report the gaps before concluding with directions for future research in the final section.

This study contributes to the available scholarly literature on innovation in two ways. First, it synthesizes the contribution of research published in top IS journals over the past 15 years to the field of technological innovation in IS. Using an easily understandable framework, the organization of extant literature brings together many seemingly unconnected strands of innovation research in IS and helps provide comprehensive information about the research area. Second, the article, through its critical analysis of the literature, brings forth the unexplored territories of innovation research for IS researchers. It offers a plausible research agenda for

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both academicians and practitioners to further explore the field. We find in our critical analysis of the literature that although the area of innovation has received considerable attention on several aspects including adoption, assimilation, and diffusion of innovation (DoI) through various theoretical lenses, some practical and theoretical questions about the conceptualization and generation of innovative products and processes remain less explored and offer exciting opportunities for future researchers.

2. Innovation ecosystem and innovation cycle

Innovation is such a widely studied topic that there exist various acceptable definitions of the term "innovation" [15]. These multiple definitions draw from various theories and ideas. Baregheh et al. [15] identify innovation as a part of organizational change and state that innovation is tightly coupled with change. Dosi [34] defines innovation as new ideas that enable change of production. Rogers [109] draws from the Schumpeterian view and defines innovation as "introduction of a new product or a 'qualitative change' in a product, a process that is new to an industry, the opening up of new markets, or the development of new sources of supplies, or some other significant changes in industrial organizations" [108], p. 6. Fagerberg [42] defines innovation as a first attempt to carry out in practice a new idea for a product or a new process. We use the definition of Dosi [35] and define innovation as "a process of putting to use new ideas to enable change of processes of organization that constitutes of three overlapping stages, i.e., invention, implementation and diffusion."

To understand the complete context of innovation research, it is necessary to explore the way the innovation ecosystem is organized and understood. In their authoritative literature review of ICT innovations for emerging economies, Xiao et al. present a simplified framework for the innovation ecosystem. This framework can help us visualize the various constituent processes and modules of innovation. They categorize innovation as a three-phase cycle of designing, diffusion, and impact [138], as shown in Fig. 1.

Although the above framework offers a very good starting point for understanding the different aspects of innovation, the three-phase archetype represents a simplistic understanding of the innovation ecosystem. To understand the finer details of the innovation ecosystem, we expand the ecosystem into its finer constituents. Klepper's (1996) work on product life cycle links the innovation to product life cycle equating and finding the impact of product and process innovation at different stages of the product life cycle. This conceptualization indicates that the innovation life cycle has stages analogous to the product life cycle beginning at the conceptualization and ending at impact where it again reinforces the eventual conceptualization of the next phase of innovation. The net-enabled business innovation cycle (NEBIC) indicates that emerging IT can affect the business innovation cycle at its various stages. Thus, it can have a profound impact on one of the multiple stages of research including conceptualization, adoption, or assimilation [141]. Fig. 2 characterizes the flow of product and process innovation at various stages of the product development cycle, in turn acting as a very good initiation point for depicting the innovation life cycle [124]. The process of innovation cycle can, therefore, be visualized as a multistage process [73]. The processes can range from the conceptualization of innovation, its generation, and adoption by few experienced users to its potential diffusion within the organization and finally the analysis of its impact and the resultant changes in the firm.

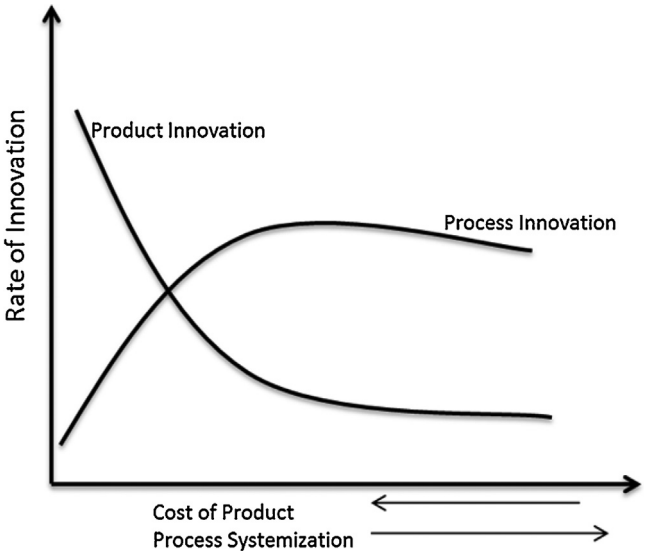

Fig. 2. Product life cycle and innovation.
Adapted from [124]

Based on the seminal work on innovation cycle in firms, we divide the complete innovation cycle into five stages as shown in Fig. 3. Although there may exist a certain degree of overlap between the five stages, the framework can be used to easily explain and characterize the different activities associated with the innovation cycle. We use the framework shown in Fig. 3 to classify the literature on innovation in IS according to the stages where it is positioned. The analysis is also accompanied by theoretical and methodological characterization that is used to further the understanding of the respective stages of the innovation cycle.

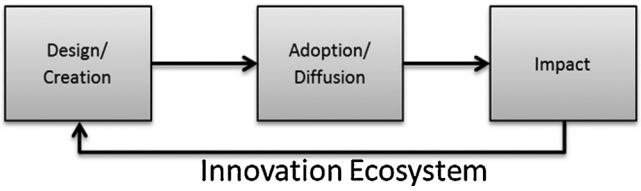

Fig. 1. A simplified view of the framework for ICT innovation.
Adapted from [138]

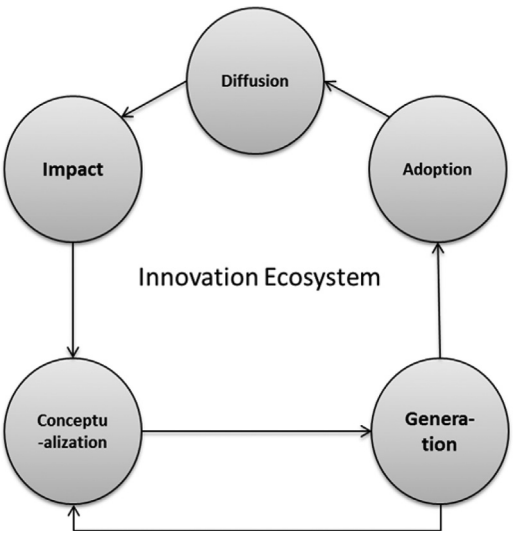

Fig. 3. A granular view of the innovation ecosystem.