

Internet Implementation Leapfrogging and Website Performance

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Abstract

Drawing upon the Diffusion of Innovations (DOI) theory, this paper invests the leapfrog phenomenon, particularly Internet implementation and its effects on website performance. This paper proposes a research agenda for investigating the Internet implementation stage among different adopter levels. Even though DOI covers many aspects of innovation adoption and implementation, implementation stage research remains sparse and perhaps no research has investigated the leapfrog phenomenon within DOI. This research agenda helps contribute, academically and practically, to these issues.

Keywords: leapfrogging, Internet implementation, website performance, adopter categories

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Introduction

In the exploration of website evolution, researchers investigate this innovation from different facets, often using the Diffusion of Innovations (DOI) theory by Rogers (2003). This theory offers a multi-perspective explanation on organizational adoption of innovations and innovation effectiveness throughout the organization (McGrath & Zell, 2001; Rogers, 2003). Additionally, defining the diffusion stages – adoption and implementation – is vital to diffusion research (Carter, Jambulingam, Gupta, & Melone, 2001). It is crucial to define the diffusion stages because different stages portray different diffusion findings (Carter et al., 2001).

Most Internet diffusion studies focus on the adoption stage, and factors related to website adoption such as perceived benefits, organizational compatibility, technical compatibility, organizational features and social pressure (Dholakia & Kshetri, 2004). These abundant adoption findings enhance diffusion research, but there is a need for implementation stage research (Fichman, 2004). This paper, helps contribute to the implementation stage research.

Website evolution studies focus on different implementation stages and their consequences. The evolution of websites usually progresses from basic to comprehensive website sophistication (Beatty, Hsim, & Jones, 2001; Hashim & Murphy, 2007). The sophistication often refers to adding website features over time, from providing basic information towards interactive and personalized features (Hashim, Olaru, Scaglione, & Murphy, 2006). However a recent study, suggests Malaysian hotels that were late to adopt websites leapfrogged the early adopters in their website feature (Hashim, Kassim, & Murphy, 2008).

The above findings reflect a leapfrog phenomenon in Internet implementation, whereby an organization or a country get ahead of the present state of the art through innovative, creates future in the present. (Hobday, 1995; Rosenkranz, 1997; Wu, Du, & Wei, 2004). Studies discuss this leapfrog phenomenon, especially in technology diffusion (Hobday, 1995; Rosenkranz, 1997; Wu et al., 2004). Research in various fields explores technology leapfrogging such as in manufacturing, airplane, energy technology and health (Amir, 2004; Ball, Weaver, & Abbott, 2003; Gallagher, 2006; Hobday, 1995). For example, an Indonesian airplane industry study suggested that leapfrogging in high technology implementation failed because of the over perception on a technological leapfrogging and political interference (Amir, 2004).

Meanwhile, study on electronic technology producers among East Asian latecomer firms suggested these firms tend to leapfrog in their strategies to develop electronic technologies (Hobday, 1995). It is argued that instead of started with the research and development (R&D) and design-led strategies, the latecomers leapfrogged to minor product innovations strategy based on incremental improvements to manufacturing

process (Hobday, 1995). The phenomenon seems crucial for survival in most competitive organizations across disciplines (Gallagher, 2006). Yet to the authors' knowledge, research on Internet leapfrogging is limited.

As a first step in helping address the lack of leapfrogging and Internet implementation research, this paper suggests a research agenda. The growing number of studies of websites features (Beatty et al., 2001; Hashim & Murphy, 2007; Law & Hsu, 2006; Murphy, Olaru, & Schegg, 2006) often lack examining relationships between Rogers (2003) five-adopter categories with consumer perceptions of website performance and satisfaction (Cheung & Lee, 2006; Huizingh, 2002). The five-adopter categories are innovators, early adopters, early majority, late majority, and laggard. Thus, the agenda addresses two research questions:

1. How different adopter categories reflect the leapfrog phenomenon in Internet implementation?
2. How is the relationship between the leapfrogged Internet implementation among the different adopter categories with website performance?

The following section reviews related literature followed by three research agenda and the contributions of this paper.

Literature Review and Research Agenda

Diffusion of Innovations Theory (DOI)

Innovations are new ideas, techniques, practices, objects, or strategies (Tornatzky & Fleischer, 1990). Innovations are subjective depending on the perception of an individual, group or organization as new means of solving problems or exploiting opportunities (Brancheau & Wetherbe, 1990; Rogers, 2003). A fundamental theory to explain innovations is the Diffusion of Innovations (Fichman, 2000; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003).

DOI has three levels of definitions (Rogers, 2003). First, it is an effort to forecast the pace and pattern in the dissemination of innovations among members of a social system. Second, DOI helps explain social changes that alter a social system's structure and function. Third, it describes messages about new ideas (Rogers, 2003). Besides three levels of definitions, there are two DOI streams, individual and organizational diffusion (Agarwal & Prasad, 1997; Hashim & Murphy, 2005; Rogers, 2003; Wolfe, 1994)

The organizational diffusion stream take a holistic perspective on innovation adoption and effective use throughout the organization (Choudrie & Dwivedi, 2005; Hashim & Murphy, 2007). Compared to individual diffusion, the organization-innovation decision is more complicated due to organization's complex structure (Rogers, 2003). Therefore, it is crucial to define the diffusion stages as *adoption* or *implementation*; different stages portray different diffusion findings (Carter et al., 2001).

The adoption stage refers to developing capabilities for using the innovation, such as training and hiring personnel, or acquiring the innovation. Research in this stage often investigates factors related to the adoption decision (Fichman, 2000). For instance, studies on the adoption of knowledge management technologies suggest two important factors namely organizational and technological factors, which consists of variables such as centralization, complexity, IT integration and IT competency (Ryan & Prybutok, 2001; Tornatzky & Fleischer, 1990). Meanwhile an environmental factor, IT consultant advice positively related to the adoption of data warehouse technology in Taiwan's banking industry (Hwang, Ku, Yen, & Cheng, 2004).

In contrast, the implementation stage relates to innovation use and organizational performance (Brynjolfsson & Hitt, 2000; Carter et al., 2001; Fichman, 2000; Zhu & Kraemer, 2005). For example, a study on successful implementation of a virtual reality system for internal design review in a construction organization related to consistent and good user-developer communications (Whyte, Bouchlaghem, & Thorpe, 2002). Furthermore, a study on Enterprise Resource Planning implementation suggested that consensus in organizational objectives and competitive pressure related to organizational performance (Bradford & Florin, 2003). Moreover, implementation stage research covers organizational implementation rates of an innovation (Cooper & Zmud, 1990; Fichman, 2000). For example, the implementation rates of Material Resource Planning among U.S. manufacturers depends on compatibility with current systems (Cooper & Zmud, 1990).

Due to the lack of implementation stage studies, researchers call for findings related to the implementation stage (Fichman, 2000). For example, post-adoption investigation should examine the effectiveness of innovation adoption throughout the organization (Fichman, 2000; Hashim & Murphy, 2007). In the hotel industry, Internet studies related to the implementation stage include the successful implementation of emails and websites (Frey, Schegg, & Murphy, 2003; Hashim & Murphy, 2005). However, based on the authors' knowledge, there is limited research on adopter categorization and Internet implementation.

Rogers (2003) five-adopter categories are innovators, early adopters, early majority, late majority, and laggards. Different adopter categories often reveal different innovation implementation patterns (Stafford, 2003). For instance, research on medium-large U.S. firms' adoption of corporate websites revealed that early adopters were more concerned on the compatibility of the Web with the existing technology and organizational norms than late adopters (Beatty et al., 2001).

Therefore based on the need of implementation stage studies and related the different adopter category, this paper puts forward the first research question:

Research Agenda 1: Investigate the relationship between different adopter categories with Internet implementation.

Internet Implementation and Leapfrogging

Research of evolving Internet use suggests similar frameworks to classify the implementation stages (Doolin, Burgess, & Cooper, 2002; Hanson, 2000; Kim & Galliers, 2004; Kowtha & Choon, 2001; Teo & Pian, 2003). The Internet implementation stages mainly portray websites on a development continuum (Kowtha & Choon, 2001) and usually evolving from just providing information to personalized services (Hashim & Murphy, 2007; Murphy et al., 2006).

For example, a business-to-business model proposes five stages of Internet adoption: an email address, basic website, website features to encourage prospecting, sales and secure online ordering, and supplier features (Teo & Pian, 2003). Meanwhile, a business-to-consumer website model proposes three stages: providing information, interactivity, and personalization (Doolin et al., 2002; Hanson, 2000). Finally, a hotel industry study suggests four stages namely simple online presence, interactive marketing, sales and transactions, and personalized and loyalty building features (Hashim et al., 2006).

However, recent research of Malaysian hotels suggests that the website features of late adopters leapfrogged the early adopters (Hashim et al., 2008). For instance, the late adopters used were more personalized and loyalty building features in their websites such as online reservations and loyalty features than just providing information. The findings suggest that Malaysia's hotel industry contradicts the normal sequence of Internet implementation. In other words, the situation reflects Malaysian hoteliers leapfrogging in the Internet implementation.

Studies in leapfrogging and ICT implementation cover issues such as supporting infrastructures, requirements and solutions, challenges, safety, and successful implementation (Gray & Sanzogni, 2004; Vatanasakdakul, Tibben, & Cooper, 2004). Among these studies, none discusses the leapfrogging phenomenon in the Internet implementation. There was no attempt in the studies to relate leapfrogging with the five innovation adopter categories. Therefore, this paper suggests:

Research Agenda 2: Examine the phenomenon on late adopters leapfrogging early adopters in the Internet implementation.

Leapfrogging and Website Performance

As stated earlier, implementation research investigates the effectiveness of innovation adoption throughout the organization (Fichman, 2000; Hashim & Murphy, 2007). It is crucial to conduct research on the performance of the innovation implementation (Fichman, 2004; Xiao, Jones, & Lymer, 2002).

Studies related to websites features and evolution (Hashim & Murphy, 2007; Hashim et al., 2006; Kowtha & Choon, 2001; Law & Hsu, 2006; Murphy et al., 2006) seem to lack examining relationships between the adopter categories and website performance (Kowtha & Choon, 2001; Law & Hsu, 2006). The investigation is important because

organizations differ in implementation and IT innovation performance (Fichman, 2004). In addition, the Internet leapfrogging implementation could reveal different website performance for different adopter categories. Therefore, research should give a complete model of Internet evolution, such as the leapfrog implementation within the five adopter categories and website performance.

Several measures could indicate website performance namely Web sales, number of visitors and satisfaction (Huizingh, 2002). Satisfaction measures reflect both managerial and user satisfaction with the website (Huizingh, 2002). Another approach of analyzing the website performance is using five marketing indicators of consumer awareness, popularity, contact efficiency, conversion, and retention (Steyaert, 2004). Similarly, website popularity variables such as Google PageRank, Alexa popularity rank and the number of incoming links would suggest website evolution and performance (Murphy, Hashim, & O'Connor, 2007; Murphy & Scharl, 2007). Thus, this paper suggests the third research question:

Research Agenda 3: Investigate the relationship between the Internet implementation leapfrogging with website performance

Conclusion

Academically, this study proposes a research agenda to help fill a gap in the innovation diffusion literature, the implementation Internet technology (Fichman, 2004). The leapfrog phenomenon observed in the adoption of the Internet technology in Malaysia's hotel sector (Hashim et al., 2008) exemplifies the need to investigate this leapfrog. Furthermore, there is limited literature discussing on the leapfrog phenomenon in the Internet diffusion compared to the other technologies.

For industry, few if any studies relate Internet leapfrogging implementation and website performance. Thus, the research agenda helps offer an insight to practitioners on successful Internet implementation based on the website performance (Huizingh, 2002). In conclusion, this study suggests a research agenda to add on the body of knowledge with an inclusive theory of Internet leapfrogging and successful websites implementation.

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