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Enterprise 2.0 post-adoption: Extending the information system continuance model based on the technology-Organization-environment framework

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ABSTRACT

This paper extends the IS continuance model to improve our understanding of the determinants of E2.0 post-adoption. Our proposed research model incorporates four constructs into the IS continuance model: firm size, firm scope, subjective norms and competitive pressure from the perspective of organizational and environmental context based on the TOE framework. Results from a survey of customers of Mingdao, a leading Enterprise 2.0 platform in China, support our model. The research findings show that organizational and environmental context factors, including subjective norms and competitive pressure, significantly influence enterprises' intentions to renew their E2.0 service in addition to technology perceptions. Perceived usefulness and satisfaction are no longer the strongest predicators of continuance usage in the context of enterprise systems. The theoretical and managerial implications of these results are discussed.

1. Introduction

In recent years, Web 2.0, one of the most significant information technology innovations in the Internet Age – spearheaded by such applications as Facebook, LinkedIn, and Twitter – has rapidly permeated people's lives (Ajjan & Hartshorne, 2008; Chua & Goh, 2010; Levy, 2009; O'Reilly, 2006; Shin, 2010; Cheung, Chiu, & Lee, 2011; Chen, Yen, & Hwang, 2012; Wang, Jung, Kang, & Chung, 2014; Cristina and Jesús-Nicasio. 2016). A growing number of business companies have begun to apply various Web 2.0 applications to support regular business operations, such as internal communication, team collaboration, project management and information sharing. However, consumer-market, individual-based Web 2.0 applications are not well suited to the enterprise context, due to such problems: compatibility, security, scalability and functionality (Dawson, Hough, Hill, Winterford, & Alexandrov, 2009; McAfee, 2009). Correspondingly, Enterprise-level 2.0 applications (E2.0) have been designed and developed by adapting the technologies and philosophies of individual-level Web 2.0 applications to specific business requirements (e.g., Yammer, Jive, Socialcast of Chatter and Mingdao) (Leonardi, Huysman, & Steinfield, 2013). In this research, Enterprise 2.0 applications are defined as a set of online applications, built on the cloud computing Web 2.0 infrastructure, to help firms to improve business performance. Examples of benefits of the applications of E2.0 include rapid and agile online collaborations (Boulos, Maramba, & Wheeler, 2006; Miles, 2009), knowledge management (Paroutis & Saleh, 2009; Zhao & Chen, 2013), and emergency response capabilities (McAfee, 2006, 2009).

Compared to Web 2.0 usage in consumer markets, companies usually bear the monetary cost of E2.0 use. To leverage fully the considerable role of E2.0 in improving competitive advantages, an organization should insist on long-term use. However, a large number of E2.0 platforms still face difficult challenges in survival, owing to a low free-to-paid conversion rate (Mangiuc, 2011). There is currently little understanding of the factors influencing E2.0 post-adoption. This study focuses on the research question of why some companies continue renewing E2.0 (i.e., E2.0 continuance usage) while others do not. While prior studies on Web 2.0 continuance usage (e.g., Chen et al., 2012; Yoon & Rolland, 2015) can contribute to understanding the continuance of E2.0 to some

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degree, there is still a need for a systematic investigation and theorizing of the salient factors that influence E2.0 continuance from an enterprise rather than individual context. Compared to the continued adoption of Web 2.0 that is mainly determined by factors related to individuals' cognitive beliefs (e.g., subjective norms) and experience-specific affect (e.g., satisfaction), it is plausible that the continuance adoption of E2.0 may be viewed as an enterprise-level economic decision and should be determined by enterprise-related (e.g., firm size) as well as individual-based factors. Moreover, the significance of these individual-based factors in determining enterprise system continuance usage (i.e. E2.0 in this case) may change due to the differences between enterprise system and consumer software. For instance, the continued adoption of Web 2.0 has no financial cost to individual users while firms that use E2.0 pay a monthly or yearly enterprise license fee based on the number of users. Moreover, the implementation of E2.0 is likely to significantly influence business performance and employees' working styles from different perspectives such as communication and project management. Thus, the adoption and implementation of an enterprise system is mainly determined by the management team of a firm, particularly in small-and-medium-sized enterprises (SMEs).

Our study is arguably one of the first attempts to explore E2.0 post-adoption. With the development of cloud-based platform infrastructures, the utilization of E2.0 as a catalyst for strengthening businesses' competitive advantages has received notable attention from both academia and practitioners. According to TechNavio's analysts, the compound annual growth rate (CAGR) of E2.0 market reaches 31 percent over the period 2012–2016 and firms increase their business developmental activities through implementing E2.0 infrastructures (Research & Markets, 2013). However, existing E2.0 studies predominantly focus on describing the implementation strategy (Alqahtani & Alwadainm, 2015), E2.0 functions (Paroutis & Saleh, 2009; Zhao & Chen, 2013), functions of knowledge management (Alqahtani & Alwadainm, 2015; Bruno, Marra, & Mangia, 2011; Louw & Mtsweni, 2013), and challenges and risks (Kuettner, Diehl, & Schubert, 2013; McAfee, 2009). Only a few studies have empirically examined initial adoption behavior toward E2.0 (e.g., Lin, Lee, & Lin, 2010; Wang et al., 2014). Lin et al. (2010) develop a value-based adoption model (VAM) and show that perceived benefits and perceived costs can significantly influence the value perceived by managers of adopting E2.0. However, the respondents for the study are 80 part-time MBA students rather than real E2.0 users, which may influence the external validity of the research findings. Wang et al. (2014) apply UTAUT to propose a research model that incorporates context-specific variables for enhancing the prediction of individuals' adoption intentions toward enterprise 2.0 applications. A professional E2.0 platform, Clearvale was used as the research context, and employees of seven companies that use the platform's trial version were invited to participate in a paper-based questionnaire. Their research findings suggest that some general information system (IS) adoption factors are still significant in the E2.0 initial adoption context including perceived usefulness and perceived ease to use.

Nevertheless, prior research does not elaborate upon users' cognitive beliefs emerging after their initial usage of E2.0, which potentially influence their subsequent continuance decisions but not their prior acceptance decisions. The purpose of the study is to solve this puzzle and address the question: what factors impact upon the successful continuance adoption of E2.0? Specifically, what are the factors that influence enterprises to continue purchasing E2.0 services? To disentangle this problem, it is imperative to incorporate not only technology-level factors from the IS continuance literature, but also new constructs and relationships that capture the complex nature of enterprise-level economic decisions. To fill this research gap, a conceptual model is developed by extending Bhattacherjee's (2001) IS continuance model to the E2.0 post-adoption context based on the Technology–Organization–Environment (TOE) framework (Tornatzky, Fleischer, & Chakrabarti, 1990), which was originally developed for understanding enterprise-level information technology (IT) innovation adoption. This is in line with our research purpose. The TOE framework has been extensively used as a theoretical framework in prior studies of enterprise-level IS innovation, including material requirement planning (MRP) (Cooper & Zmud, 1990), electronic data interchange (EDI) (Kuan & Chau, 2001; Lacovou et al., 1995), open systems (Chau & Tam, 1997), e-commerce adoption (Gibbs & Kraemer, 2004; Hsu, Kraemer, & Dunkle, 2006; Teo, Ranganathan, & Dhaliwal, 2006; Zhu, Kraemer, & Xu, 2003), e-procurement (Soares-Aguiar & Palma-dos-Reis, 2008), enterprise resource planning (ERP) (Pan & Jang, 2008), knowledge management systems (KMS) (Lee, Wang, Lim, & Peng, 2009; Lin, 2014a) and software-as-a-service (SaaS) (Yang, Sun, Zhang, & Wang, 2015). As these organizational and environmental factors are crucial to understand an enterprise's economic decision, TOE serves as an appropriate theoretical base for us to extend the IS continuance model through introducing specific context factors that are noteworthy for understanding E2.0 post-adoption.

The paper is organized as follows. Section 2 first presents the theoretical background to our study, including the conceptual model of E2.0 post-adoption, its theoretical foundation and hypotheses. The methodology is then discussed, followed by the results of testing the theoretical model. Finally, the paper rounds off with a discussion of major findings, limitations and practical implications.

2. Theoretical background

2.1. IS continuance model

Bhattacherjee (2001) develops an IS continuance usage model adapted from the Expectation-confirmation theory (ECT) (Oliver, 1980) that has been widely used in the marketing discipline to examine the influence of consumers' satisfaction on their intention to continue using an adopted technology (Chou & Chen, 2009; Lin, 2012) as shown in Fig. 1, in the IS continuance model, IS continuance behavior is determined by two post-consumption variables including perceived usefulness and satisfaction. In order to adapt ECT to the IS continuance, Bhattacherjee (2001) makes several theoretical adaptions. First, two pre-consumption antecedents of confirmation including perceived performance and expectation are removed because Bhattacherjee (2001) proposes that their effects are captured within the confirmation and satisfaction constructs. Second, Bhattacherjee (2001) adds an ex post expectation variable, perceived usefulness, because ex post expectation is especially important for IS products or services, where initial expectations often change with time. Following prior studies on IS initial adoption (e.g., Davis, 1989; Karahanna & Straub, 1999), Bhattacherjee (2001) argues that it is plausible that perceived usefulness had a constant influence on subsequent IS continuance usage decisions and thus theorizes perceived usefulness as an additional determinant of satisfaction. Third, the IS continuance model proposes that the usefulness-intention relationship originally developed by the technology acceptance model (TAM) (Davis, 1989), in the initial adoption context is also likely to exist in the continuance context because human continuance intention can be viewed as a series of usage decisions that are independent of timing or behavioral stages (Roca, Chiu, & Martínez, 2006). Thus, perceived usefulness should directly influence IS continuance intention in addition to having an indirect effect on IS continuance intention via satisfaction.