DETERMINANTS OF ASSIMILATION OF OPEN SOURCE ENTERPRISE APPLICATIONS: PLURAL INVESTIGATION USING DIFFUSION OF INNOVATION THEORY

Abstract:

Open Source Software (OSS) are known to be innovative, largely due to their community based open and collaborative nature. However community driven OSS generally do not take any responsibility for providing services, which remains an important concern for professional organizations intending to use OSS. As a response, OSS phenomenon has undergone a significant transformation, whereby commercial organizations have shown considerable interest in engaging in OSS related activities. This has led to the emergence of commercially supported OSS i.e. open source enterprise editions.

Assimilation of open source server and operating system software has been studied extensively, but their findings may not necessarily hold true for application software in general and the Open Source Enterprise Application (OSEA) in particular. This is because the impact of servers and operating systems is largely constrained to the information systems department, while the implementation of enterprise applications affect organizations on a much larger scale as the user base is directly affected by the changes. This study will perform plural investigation to discover the determinants of assimilation of OSEA with the help of diffusion of innovation theory and technology-organization-environment (TOE) framework. The results will furnish new insights for the OSEA users, service provider and consultants.

1. INTRODUCTION

Open Source Software (OSS) has led to a paradigmatic shift in development, acquisition and usage of the software. This has been made possible due to unique licensing scheme of OSS that requires the source code to be publically available as well as open to modifications (Lerner & Tirole, 2005; Bouras et al. 2013; Lakhani & Von Hippel, 2003; Von Hippel, 2005; Von Hippel & Von Krogh, 2003; Singh & Phelps, 2012; Waring & Maddocks, 2005; Feller & Fitzgerald, 2000). Openness of source code enables the developers of OSS community to have complete freedom to show their creativity skills which helps in driving innovation (Bouras et al. 2013; Hwang, 2005; Setia et al. 2012).

Looking at the responses of user organisations, meteoric rise of OSS does not look surprising. In a Forrester survey, an impressive 92% of the respondents told that their expectations were matched or exceeded using OSS (Cnet, 2008), while a Gartner survey found that OSS provide competitive advantage and that a significant number of companies use OSS in mission critical environments (Eweek, 2011). Better quality software, along with cost of ownership, has become one of the prime reasons for adoption of OSS while innovation is going to remain the area of focus in the future as well (Blackduck, 2013).

Opposed to earlier days, when free software was only of research interest, today, it has penetrated the commercial organisations (Von Hippel & Von Krogh, 2003). However if an organization adopts OSS, service will be an important concern as organisations need to fix responsibility and open source community may not be able to provide appropriate and timely support because of a plethora of reasons (Lerner & Tirole, 2005; Bouras et al. 2013).

Today the open source phenomenon has gone through a significant transformation whereby commercial organizations have shown significant interest in engaging in OSS related activities (Fitzgerald, 2006; Agerfalk & Fitzgerald, 2008; Von Hippel and Von Krogh, 2003) which has led to the emergence of commercially supported OSS i.e. open source enterprise editions (Deodhar et al. 2012; Riehle, 2012; Bonaccorsi et al. 2006; Campbell-Kelly & Garcia-Swartz, 2010; Hemphill, 2006).

An IDC report revealed that many large vendors have started supporting OSS to earn revenues via support route. Contrary to earlier scenario, where companies preferred OSS only for operating system, companies are now readily adopting middleware and applications (ITPRO, 2009). Although, at organisation level, adoption of OSS has been studied fairly well for servers and operating systems (Platform) layer (Dedrick & West, 2003, 2004, 2007; West & Dedrick, 2005, 2006; Ven & Verelst, 2011), there is quite limited understanding of adoption of open source enterprise edition software at application layer (Ven & Verelst, 2011), which encompasses what we call Open Source Enterprise Applications (OSEA) in this study.

Given the lack of literature on OSEA and increase in their adoption in organizations, it is important to gain a clear understanding of why organizations use OSEA. This study will facilitate gaining in-depth understanding of the factors influencing assimilation of OSEA which is the objective of this study.

2. LITERATURE REVIEW

2.1 Service Concerns and Commercialization

The companies providing proprietary software also provide extensive manuals, multichannel professional support and the efforts to make the software as user friendly as possible (Sen, 2007). On the other hand, though the OSS license provides the freedom to share the source code but it does not take any responsibility of providing services to the customers. This is the reason why adopters of OSS seek informal support from community members (Lerner & Tirole, 2005; Bouras et al. 2013). Delone (2003) identified service quality as a determinant for the success of an information system.

Open source phenomenon has gone through a noteworthy transformation from free software to the commercialized one (Fitzgerald, 2006). The collaboration between IT companies and open source communities lead to the development of software to serve the needs of commercial organizations. Such IT companies encourage their IT experts to work on OSS projects during their working hours (Fitzgerald, 2006; Agerfalk & Fitzgerald, 2008). Community of volunteer developers work on the development of OSS and software companies provide support and services (Fitzgerald, 2006). The OSS solutions that are backed by the support from universities or commercial organizations present less risk because of their adoption history and availability of documentation (Bouras et al. 2013). Therefore, commercialized OSS or open source enterprise edition has begun to be considered as a competitor to proprietary software with acceptance of OSS by mainstream commercial organizations (Sen, 2007).

2.2 Open Source Software Adoption

Tornatzky & Fleischer (1990) articulated that the technological, organizational and environmental factors influence the assimilation of technology innovation in organizations. Authors have so far worked on elaborating this framework in the context of OSS (Chau & Tam, 1997; Dedrick & West, 2004; Glynn et al. 2005; Ven & Verelst, 2011).

Pioneer study on the exploring factors affecting adoption of Unix based open systems was done by Chau & Tam (1997). Dedrick & West (2003, 2004, 2007) and West & Dedrick (2001, 2005, 2006) conducted study into open source platform adoption such as Linux. Consistent with Rogers (1983) and Tornatzky & Klein (1982), they found relative advantage (cost and reliability), compatibility (technology, skills and task), complexity and trialability as the technological factors impacting adoption of open source platform. Glynn et al. (2005)

conducted an empirical research on adoption of OSS. Technological benefits of OSS such as ability to tailor to precise needs and transparency were found to have impact on OSS adoption. On the other hand, Ven & Verelst (2011) found that availability of source code doesn't impact assimilation while conducting an empirical investigation into the assimilation of open source server software (operating system, web server and mail server). Larsen et al. (2004) conducted an exploratory case study in three Danish organizations. They discovered that software cost and the availability of support impact the adoption decision.

3. DISCUSSION OF THE PROPOSAL

In the past few years, a considerable number of studies have explored the phenomenon of adoption of OSS, each study encompassing different context and scope. Authors have varyingly focussed on learning the open source platform adoption such as Linux (Dedrick & West, 2003, 2004, 2007; West & Dedrick, 2001, 2005, 2006), assimilation of open source server software such as mail server, web server and operating system (Ven & Verelst, 2011), Unix based open systems (Chau & Tam, 1997) and adoption of OSS in the software-intensive organizations (Hauge et al. 2010; Morgan & Finnegan, 2010).

Most of the prior studies are qualitative and exploratory in nature and provide rich insights into the phenomenon of assimilation of OSS based operating system and servers. The studies focussed on operating system and server software because they were considered to be more mature, familiar and therefore widely utilized.

Ven & Verelst (2011) articulate that their discoveries on open source server and operating system software may not necessarily hold true for the open source enterprise applications. This is because the impact of servers and operating systems is largely constrained to the information systems department, while the implementation of enterprise applications affect organizations on a much larger scale as the user base directly experiences the changes brought in by their implementation.

Given the current trend, more and more organizations are going to embrace OSEA, while we still do not have a clear answer to what are the determinants of the assimilation of OSEA and their effects. The paucity of literature on enterprise applications creates a gap in extant literature.

Growing importance of service element of OSS has encouraged the researchers to understand the collaboration between commercial organizations and open source communities (Fitzgerald, 2006; Agerfalk & Fitzgerald, 2008), organizational practices for commercially supported OSS products (Deodhar et al. 2012), structural description of single-vendor supported open source business models (Riehle, 2012), factors and motivations behind adopting hybrid business or both source business models (Bonaccorsi et al. 2006; Campbell-Kelly & Garcia-Swartz, 2010; Hemphill, 2006). These studies are specifically from the perspective of organizations providing commercially supported OSS. Thus, in spite of major developments in the field of commercially supported OSS (enterprise edition), there is still lack of clarity on user organizations' view on OSEA.

A majority of the information systems research treat assimilation as a single stage phenomenon (Chau & Tam, 1997; Zhu et al. 2003; Gibbs & Kraemer, 2004; Hong & Zhu, 2006; Kuan & Chau, 2001; Xu et al. 2004; Wang et al. 2010). Hsu et al. (2012) utilized two stages of assimilation for understanding the diffusion of information security innovations. Adoption is described as a stage at which organizations consider the adoption of an information system or is likely to adopt it. Adoption is the organizational mandate for change and may lead the organization start using that system (Zmud, 1982). Assimilation is the stage at which organization has the formal policy and processes in place regarding the usage of that particular information system (Hsu et al. 2012). It is the point at which an innovation gets embedded within the organizational activities (Fichman & Kemerer, 1999). Using these two stages in our research will potentially furnish new insights into understanding the phenomenon of assimilation of OSEA.

4. RESEARCH OBJECTIVE

This research proposal envisages the investigation of the following research objective:

To conduct a study to explore the determinants of adoption and assimilation of OSEA

5. RESEARCH QUESTIONS

Following research questions will help in fulfilling the aforementioned research objective:

RQ1: What factors impact the diffusion of OSEA?

RQ2: How do these factors impact the adoption and assimilation of OSEA?

6. RESEARCH METHODOLOGY

The research questions of the study provided direction for the appropriate methodological design in the study. In light of the aforementioned research questions, plural investigation with QUAL/QUAN sequence will be employed in the study. For qualitative study, data would be collected by interviewing IT decision makers such as CIOs, CTOs or IT heads in different organizations. For the quantitative data analyses purpose, data would be collected using survey research technique. This would involve the administration of a survey instrument to those organizations that have employed OSEA in their business processes. In addition to inferential statistics, multivariate data analysis technique will be employed for the analysis.

7. EXPECTED FINDINGS

In the literature, authors have focussed on assimilation of largely open source server and operating system software. This study would broaden the research horizon by analysing OSEA. Moreover, studying assimilation as a two stage phenomenon (adoption and assimilation) would potentially provide additional meaningful insights. This study would provide future researchers as a base for investigation of adoption and assimilation of specific OSEAs, useful in their own context. The results would help understand the relationship of control variable organization size with adoption and assimilation of OSEA.

8. DISCUSSION AND CONCLUSIONS

Based on discussions in initial sections of this paper, one can conclude that the trend is towards growth of extensive assimilation of OSEA in the organizations. As a result, there is a need to conduct an empirical research on the factors that affect adoption and assimilation of OSEA in the organizations. This study will find TOE factors from the qualitative study and then further test them using quantitative study.

This study will not only be relevant for user organizations that want to benefit by assimilating OSEA, but it will also provide useful information to the OSEA vendors. The user organizations will get aware of the factors that it should concentrate on while forming IT assimilation strategy. Further the OSEA vendors will get acquainted with the factors on which they should concentrate more in order to enhance the organization wide usage of their software. This research will also be useful for service providers for designing IT services

strategies. Results will also be relevant for the consultants as this study will help them correctly recommend the use of OSEA as per the requirements of the organizations.

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