SECRETLY SaaS-ing: Stealth Adoption of Software-as-a-Service

Research-in-Progress

Eruani Zainuddin
Queen’s School of Business
Queen’s University, Kingston, Canada
ezainuddin@business.queensu.ca

Abstract

Despite the wealth of research in innovation adoption, most studies assume innovation adoption to be a top-down process that is conducted with the knowledge of top management and all organizational units held responsible for managing the innovation function. Little is known about innovation adoption that is conducted in antithesis to these assumptions, or stealth adoption – i.e., innovation adoption by organizational unit managers conducted without the knowledge of top management and key internal stakeholders. We identify stealth adoption of Software-as-a-Service (SaaS) as the phenomenon of interest. We examine the organizational conditions in which stealth adoption would occur. We elaborate on organizational conditions using the structural and relational embeddedness perspectives. The primary outcome of our work is a multilevel conceptual model describing the structural and relational conditions that encourage stealth adoption. We also incorporate formal control mechanisms into this conceptual model.

Keywords: Innovation adoption, cloud computing, cloud adoption, software-as-a-service, cloud governance
Introduction

Researchers have examined the adoption factors for a myriad set of technological and administrative innovations in diverse contexts. Examples include the adoption of new organizational structures (e.g., Moch (1976) for inhalation therapy departments in hospitals), Information Technology (IT) (e.g., Chwelos et al. (2001) and Iacovou et al. (1995) for Electronic Data Interchange in organizations), quality control methods (e.g., Westphal et al. (1997) for Total Quality Management (TQM) in hospitals), as well as service delivery methods (e.g., Tung and Rieck (2005) for electronic government services in Singaporean businesses). Despite the diversity, there are two underlying assumptions common across these studies. First, the assumption that innovation adoption decisions are made in a top-down manner, where top management decides whether to accept or reject a particular innovation and organizational unit managers act according to the decision. Our assessment of this assumption is strengthened by Wooldridge et al.’s (2008) review of studies related to middle management in strategy and decision-making processes. The authors could not find any studies addressing middle management during innovation adoption. Second, the assumption that the adoption is known to all those typically held responsible for managing the particular innovation function (e.g., adoption of TQM is known by the quality control unit). Such assumptions are questionable when we consider the following excerpt from the practitioner literature, “The major challenge was that different business departments were bringing in these [Software-as-a-Service] systems; often with little or no reference to typical IT sourcing teams. With all sorts of services, employees are self-provisioning without any involvement from IT.” – (Computer World UK 2010).

The previous excerpt contradicts the two underlying assumptions in the extant innovation adoption literature. The excerpt infers innovation adoption that emerges from the operational level, with decisions being made by organizational unit managers rather than top management. Innovation adoption is also made without the knowledge of the focal organization’s IT unit, the internal unit held responsible for managing IT in organizations. We refer to this form of innovation adoption as stealth adoption. Early studies on computing technology adoption also reported on the stealth adoption of microcomputers, in which users adopted microcomputers without informing internal IT units (King 1983). However, considering that these adoptions had occurred when organizational IT policies are under-developed, we need to re-examine current stealth adoption that occurs under more developed organizational IT policies.

Stealth adoption could be both beneficial and harmful to organizations. For example, stealth adoption of SaaS (as in the excerpt above) could improve organizational performance, incur low upfront costs, and encourage faster utilization of technology by users. Nevertheless, stealth adoption of SaaS could result in several negative outcomes including: straining the current organizational networks, burdening the organization by overpaying for subpar IT services, and decreasing the standardization of organizational IT. Therefore, organizations need to be mindful of stealth adoption among their organizational units.

In stealth adoption, organizational unit managers decide whether to adopt a particular innovation. These organizational unit managers are operational, mid-level managers. Noda and Bower (1996) conducted a study on the strategic initiatives taken by mid-level managers in two telecommunications companies. The authors found that in one company “the growth potential of local exchange businesses” drove the mid-level managers there to pay more attention to traditional telecommunications businesses, while “the wide open space” of franchised territory and “the consequent disinterest of financial analysts in the company” led the mid-level managers in the other company to prioritize short-term net income and consider other new growth opportunities (p. 185). The top managers in each company held a certain level of discretion in designing the corporate context; top managers in the first company predicted the viability of traditional area, while top managers in the second company predicted the need to explore broader opportunities. The conclusion is that mid-level managers make decisions and take actions based on contexts, and these contexts are created by top management (see Burgelman (1983) for an empirical study with similar conclusion).

We form our research question based on two considerations. First, we address the theoretical gap in the extant innovation adoption literature. Available studies have not examined innovation adoption by organizational unit managers that is conducted without the knowledge of top management and other organizational units typically held responsible for the innovation function. And second, organizational unit managers make decisions based on the contexts provided to them by top management. For these
reasons, we frame our research question as such: Under what organizational conditions do organizational unit managers adopt an innovation without the knowledge of top management and other organizational units typically held responsible for the innovation function (i.e. stealth adoption)?

To answer the research question, we utilize the structural and relational embeddedness perspectives. The structural and relational embeddedness perspectives are utilized to explain organizational conditions in terms of network structure and quality of relationships, respectively. We also focus our work on stealth adoption of SaaS in lieu of the rampant stealth adoption of SaaS and the potential harm of such adoption to organizations.

**Conceptual Background**

We first establish three critical elements that serve as the conceptual background for our model: the definition of stealth adoption, the contribution of an embeddedness approach to explaining stealth adoption, as well as the context of this study (i.e., stealth adoption of SaaS). We finalize this section by discussing the theoretical boundaries of the conceptual model.

**The Definition of Stealth Adoption**

In colloquial terms, stealth refers to an act or action that is intended not to attract attention and escape observation (Merriam-Webster Dictionary, 2011). The word stealth has been used in two management disciplines – i.e., marketing and economics. Marketing researchers examine the phenomenon of stealth marketing, which is the deliberate act of entering, operating in, or exiting a market in a secretive or imperceptible manner, or an attempt to do so (Roy and Chattopadhyay 2010). For example, a company that is not doing well in a particular market may choose to stealthily exit the market to avoid scrutiny and negative publicity (Roy and Chattopadhyay 2010). On the other hand, economics researchers examine the phenomenon of stealth trading. Stealth trading is defined as the actions of investors trading their stocks gradually, such that their trades are not noticeable by others (Chakravarty 2001). Stealth trading occurs when investors have private information and try to profit before their trades fully reveal the private information to the public. The “dawn raid” of the London Stock Exchange in 1981 is an example of stealth trading in which the Malaysian government was able to gain control of British Plantation (Yacob and White 2009). Based on how the word stealth has been utilized in the marketing and economics disciplines, the integral components of stealth in management studies include: (1) an act that is taken by primary actors and is hidden from certain groups; (2) the groups in which the action is hidden from have interests in the matter; and (3) the action involves decision-making on the primary actor’s part (e.g., the decision to enter or exit certain markets, the decision to sell or buy certain stocks).

When we dissect the phenomenon of stealth adoption based on the integral components of stealth in management studies, stealth adoption relates to: (1) the act of adopting a particular innovation that is taken by organizational unit managers, who are the primary actors; (2) the groups in which the act is hidden from include top management and other organizational units that are typically held responsible for managing the innovation function (e.g., the organization’s internal IT unit is responsible for managing the technology innovation, quality control unit is responsible for managing the quality management innovation); and (3) the act involves the decision to adopt a particular innovation. Examples of stealth adoption include: (1) the adoption of an electronic cheque managing system by the warehousing unit without the knowledge of the top management, finance unit, and internal IT unit; and (2) the adoption of a quality management process by the human resource unit without the knowledge of the top management and the quality control unit. Stealth adoption does not necessarily imply a negative outcome to an organization, nor does it imply the specific intent of the organizational unit managers to defy authority. In fact, stealth adoption may prove to be beneficial to the organization (i.e., as in the case when the innovation improves organizational performance), or that the organizational unit managers may work under the (wrong) impression that they have the authority to decide on the matter. Furthermore, stealth adoption may in the future be accepted by top management and/or related organizational units when the adoption becomes known. Thus, the concise definition of stealth adoption is the decision to adopt a particular innovation as part of organizational operations by an organizational unit manager. Furthermore, the adoption is conducted in a manner such that it goes unnoticed by top management and other organizational units typically held responsible for managing the innovation function.
Innovation Adoption and the Embeddedness of Innovation Adoption

Innovation adoption refers to an organization's decision to make full use of an innovation as the best course of action available (Rogers 1995). Innovation adoption is often associated with innovation diffusion; however, the latter is concerned with the spread of innovation across organizations (Rogers 2003). Researchers have argued for the need to study adoption as a process and to include non-adoption behaviors during the decision stage (Hultman 2004). We agree with the need for a holistic and broad approach to innovation adoption research. Nevertheless, stealth adoption is a relatively new phenomenon, brought forth by the recent advancement in technology. This study is an initial step to examine stealth adoption, and consequently, a more concentrated approach is required. Thus, we focus our work on the decision-making stage of innovation adoption (rather than the overall adoption process) and exclude non-adoption behaviors.

We employ the embeddedness perspective to explain stealth adoption because both the embeddedness perspective and stealth adoption converge on the importance of context in influencing organizational unit managers' decisions. The key embeddedness argument is that actors' purposeful actions are based on context (i.e., forces and constraints) rather than straightforward economic transactions (i.e., costs versus benefits) (Hultman 2004). Actions are embedded in the concrete and enduring circumstances that impact those actions and outcomes (Dacin et al. 1999; Granovetter 1985). Meanwhile, stealth adoption by definition is innovation adoption conducted by organizational unit managers as the primary actors (see the section on The Definition of Stealth Adoption). Organizational unit managers, who are regarded as the mid-level managers within organizations, make decisions based on the context given to them by top management (Noda and Bower 1996). We therefore conclude that the embeddedness perspective is a suitable theoretical lens to explain stealth adoption.

We focus on structural and relational embeddedness for two reasons. First, both structural and relational embeddedness focus on the context imposed by top management. Structural and relational embeddedness refer to the focal unit's position relative to other units within an organization. This position is an outcome of the organizational structure (or hierarchy) and the resources allocated by top management. On the other hand, temporal embeddedness emphasizes the context framed by past experiences (i.e., how past experiences influence innovation adoption) (Hallen et al. 1991), and institutional embeddedness emphasizes the influences that are external to organizations (e.g., the influence of a regulatory body or competing organizations) (Kostova and Roth 2002; Strang and Meyer 1993). Second, prior studies have explained structural and relational embeddedness through the concept of control (Astley and Sachdeva 1984; Burt 2000). The explanatory mechanisms behind structural embeddedness include the control of information flow and ability to reprimand unsanctioned behaviors (Burt 2000). Meanwhile, the explanatory mechanism behind relational embeddedness includes informal or social control through strong relationships (Kostovo and Roth 2002) between organizational units. The concept of control is especially relevant in this study because stealth adoption reflects the level of control within an organization. Therefore, the use of structural and relational embeddedness approach allows for a better understanding of stealth adoption. We describe the context of this study, the stealth adoption of SaaS, in the following section.

Stealth Adoption of SaaS

SaaS is a new business model for selling and delivering software to users. SaaS involves the selling of software usage that is owned and managed by third-party vendors over the Internet. The SaaS market value reached $9.2 billion in 2010 (Da Rold and Ridder 2011), and industry experts estimate that this market value will grow between 30% and 50% annually (Candan et al. 2009; Makila et al. 2010).

Even though the stealth adoption of SaaS allows organizational unit managers to gain almost instantaneous access to software solutions, their actions could have detrimental consequences to organizations. First, organizations face the risk of having multiple software solutions accessed via their networks. This makes it more difficult for internal IT units to estimate and support the network requirements of organizations. Second, non-IT users may not have the expertise to monitor service quality of SaaS vendors. It is possible that organizations would end up paying for subpar services. And last, multiple and unmonitored software solutions imply less standardization of organizational IT. This issue is problematic because standardization is an important element to ensure organizational IT agility (i.e., the
extent to which IT could adapt to the changing needs of the business requirements) (Tiwana and Konsynski 2010). Overall, the negative effects of stealth adoption could undermine a well-designed IT strategy.

Our review shows that there are two studies that examine SaaS adoption factors – i.e., Benlian et al. (2009), and Xin and Levina (2008). Both studies examine SaaS adoption from an IT sourcing point of view, arguing that the adoption of SaaS is an IT sourcing decision and consequently, utilizing theories that answers the “make-or-buy” question (e.g., Transaction Cost Economics, Resource-based View). Although both studies provided us with insights into SaaS adoption, they do not address the issue of stealth adoption. We selected SaaS as the context of this study because of the rampant stealth adoption of SaaS and the relatively unexplored nature of SaaS in the extant literature.

Conceptual Model and Propositions

Prior studies that examine embeddedness in determining innovation adoption have mostly examined the embeddedness of an organization in its environment (i.e., inter-organizational structures and relations). This is consistent with the assumption that innovation adoption decision is made by top management for the whole organization, and thus, the focus is at the organizational level. In this study, we shift the focus from inter-organizational to intra-organizational structures and relations. This shift reflects stealth adoption which occurs at the organizational unit level, and consequently, the focus is at the organizational unit level. We also separate structural from relational embeddedness as originally envisioned by Granovetter (1992). Our view is that structural and relational embeddedness provide the controls that encourage/discourage stealth adoption. We display our conceptual model in Figure 1 and explain our propositions in the following section.

![Figure 1. Organizational Conditions for Stealth Adoption of SaaS](image-url)
Structural Conditions for Stealth Adoption of SaaS

In the context of structural embeddedness, stealth adoption of SaaS is influenced by the position of the focal organizational unit (i.e., the unit adopting the technology) and the position of the organizational unit held responsible for managing the innovation function (i.e., the internal IT unit). Prior studies have examined position in terms of network centrality (Burt 2000). There is also evidence that points toward network density within the organization (i.e., the significant ties among organizational units) as a factor influencing the occurrences of stealth adoption.

Network Centrality

Network centrality refers to the position of the focal actor within his/her environment. A high degree of centrality denotes that the focal actor is involved in many significant ties. These significant ties encourage the flow of information into the focal actor (information gain) as well as out of the focal actor (information leakage) (Harrigan 1986). A focal actor with many significant ties also attracts more attention by virtue of being in contact with various other actors (Burt 2000). With regards to the stealth adoption of SaaS, an organizational unit with low network centrality is more likely to engage in such form of innovation adoption. This is because an organizational unit with low network centrality faces less risk of information leakage (Harrigan 1986) and attracts less attention in their actions (Wasserman and Fraust 1994). Consequently, it is easier for this particular organizational unit to take certain actions without the knowledge of others. We can find support for this assertion in a study by Brass et al. (1998). The authors found that actors with low network centrality are more likely to engage in unethical behaviors. These actors’ actions are rarely communicated to their peers (less information leakage) and they are not under the “radar” of their superiors (less attention). Even though stealth adoption of SaaS does not come across as an unethical behavior, stealth adoption can be considered within a “grey” area because it does not follow the typical channel for innovation adoption. We therefore propose that,

Proposition 1a (P1a): With all else being equal, an organizational unit with low network centrality is more likely to engage in the stealth adoption of SaaS.

When the network centrality of the organization’s IT unit is low, other organizational units within the focal organization are more likely to engage in stealth adoption of SaaS. This is because an IT unit with low network centrality does not enjoy a high inflow of information, and consequently, the IT unit is not able to detect relevant actions such as stealth adoption. In addition, low network centrality implies that the IT unit is not a prominent unit within the organization (Galaskiewicz 1979). This prominence factor would act as a deterrent to stealth adoption in general. Other organizational units would be less likely to provoke internal IT, if internal IT is perceived to be a prominent unit within the organization. This is similar to competing firms that choose not to engage in competitive actions against other firms with high network centralities so as not to provoke the more prestigious firms (Gnyawali and Madhavan 2001). We therefore propose that,

Proposition 1b (P1b): With all else being equal, an organizational unit is more likely to engage in the stealth adoption of SaaS if the internal IT unit has a low network centrality.

Network Density

Network density refers to the extent to which all the actors within the network are interconnected (Gnyawali and Madhavan 2001). A high density network denotes many interconnections among its actors. The high interconnections among network actors promotes faster and higher rate of information flows, and facilitates effective sanctions (Burt 1998; Coleman 1990). The threat of sanctions is more effective in a dense network because the reputation effect of sanctions is amplified (Granovetter 1985). With regards to the stealth adoption of SaaS, an organizational unit located within a low density network (i.e., the number of interconnections among organizational units within the focal organization is low) is more likely to engage in such form of innovation adoption. The slower and more inefficient rate of information flows make it harder for the stealth adoption to become known. The reputation effect from being reprimanded due to stealth adoption is less severe in low density network. Brass et al. (1998) found that actors in low density network are more likely to engage in unethical behaviors because of the high surveillance and threat of sanctions. We therefore propose that,
**Proposition 2 (P2):** With all else being equal, an organizational unit within a low density network is more likely to engage in the stealth adoption of SaaS.

**Relational Conditions for Stealth Adoption of SaaS**

In the context of relational embeddedness, stealth adoption of SaaS is influenced by the quality of relationship between the focal organizational unit and IT unit. It is important to note that we view organizational and IT units within a particular organization as having a non-competitive relationship. Hence, the use of relational embeddedness to represent the dyadic relationship is more appropriate (as opposed to using structural properties such as structural equivalence or autonomy which represent a more competitive dyadic relationship). Based on our literature review, relational embeddedness is explained through trust, identification, and dependence constructs.

**Trust**

Trust refers to the common belief between the focal organizational unit and the IT unit that: (1) both sides make good efforts to behave in accordance with explicit rules and policies, as well as implicit norms; (2) both sides are honest in discussions; and (3) both sides do not take excessive advantage of the other (Kostovo and Roth 2002). Trust increases open communication between two communicating parties (Szulanski 1996). Studies in various disciplines have shown that trust increases communication, and consequently, encourages open communications between two parties. A few examples of such studies include: in healthcare between physicians and patients (Mechanic and Schlesinger 1996), in organizations between employers and employees (Mishra and Morrissey 1990), and in sourcing relationships between clients and vendors (Lee and Kim 1999). When the level of trust between the focal organizational unit and the IT unit is low, the two units will be less open in their communications with one another. This promotes the likelihood that the focal organizational unit to engage in the stealth adoption of SaaS. We therefore propose that,

**Proposition 3 (P3):** With all else being equal, when there is a low level of trust between a focal organizational unit and the IT unit, the focal organizational unit is more likely to engage in the stealth adoption of SaaS.

**Identification**

Identification is defined as the degree to which both the focal organizational unit and IT unit experience a state of attachment to one another. Both organizational unit and IT unit need to view themselves as units within the same organization; partly deriving their identities from this organizational membership (Kostovo and Roth 2002). When both organizational and IT unit identify with one another, these two units are more likely to work together to achieve similar goals (Strang and Meyer 1993). An example of an empirical study supporting this relationship was conducted by Dutton et al. (1994). The authors found that strong identification leads to cooperative and citizenship behavior. With regards to the stealth adoption of SaaS, a low level of identification between organizational unit and IT promotes the stealth adoption of SaaS. We therefore propose that,

**Proposition 4 (P4):** With all else being equal, when there is a low level of identification between a focal organizational unit and the IT unit, the focal organizational unit is more likely to engage in the stealth adoption of SaaS.

**Dependence**

Dependence is defined as the extent to which the focal organizational unit belief that it relies on the support of the organization’s IT unit for providing IT resources (Kostovo and Roth 2002). Dependence reflects non-symmetrical nature of the organizational-IT unit, to the point that dependence could also be seen as a source of power that the IT unit has over the focal organizational unit. When the focal organizational unit sees itself as being less dependent on the IT unit, it is more likely for the organizational unit to engage in the stealth adoption of SaaS. We therefore propose that,

**Proposition 5 (P5):** With all else being equal, when the focal organizational unit is less dependent on the IT unit, the focal organizational unit is more likely to engage in the stealth adoption of SaaS.
Implications of Formal Control Mechanisms

Our prior arguments highlight the idea of control behind structural and relational embeddedness. We further argue that the control from structural and relational embeddedness interact with formal control mechanisms in the organization. Because the focus of the conceptual model is on the stealth adoption of SaaS, the control mechanisms in this case relate to IT. Based on our literature review, we identify two relevant constructs – IT governance centralization and IT maturity.

IT Governance Centralization

IT governance relates to the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT (Weill 2004). IT governance is typically operationalized as the locus of IT decision making, where IT governance is considered as a single line spectrum from centralized to decentralized (Keen 1981). Most organizations are found to be highly centralized or highly decentralized in terms of their IT governance, with very few organizations employing a hybrid (in the middle) approach (Sambamurthy and Zmud 1999). A high degree of centralization in IT governance denotes that the locus of IT decision making is concentrated to several key figures within an organization. Typically, the key figures involve senior management and IT executives. Another aspect of highly centralized IT governance is that the rules and processes with regards to IT decision making is often clearly stated (Sambamurthy and Zmud 1999). The consequences of taking actions that do not follow the prescribed rules and processes are clear. We argue that clear rules and processes would undermine the effects of low network density by making the threats of sanctions more pronounced. Therefore, highly centralized IT governance is likely to weaken the relationship between low density network and the stealth adoption of SaaS. We therefore propose that,

Proposition 6 (P6): With all else being equal, centralized IT governance will weaken the relationship between low density network and the higher likelihood of an organizational unit to engage in the stealth adoption of SaaS.

IT Maturity

IT maturity relates to the technical IT architecture within an organization (Weill 2004). A high degree of IT maturity denotes that the IT architecture is highly modular and layered. This implies that new form of technology could be brought in easily and allows to simply “sit” on top of a certain layer. In other words, high IT maturity does not require complicated integration work; further lessening the impact of IT unit on the focal organizational unit. We therefore argue that a high degree of IT maturity strengthens the relationship between dependence and the stealth adoption of SaaS. When organizational unit managers can adopt SaaS without having to conduct complicated integration, this lessens the impact of dependence on IT unit. We therefore propose that,

Proposition 7 (P7): With all else being equal, more mature IT will strengthen the relationship between low dependence and the higher likelihood for an organizational unit to engage in the stealth adoption of SaaS.

Moving Forward

Two issues that will need to be resolved before moving forward in this study relate to the interaction effects in the model and relevant constructs from different theories/perspectives (e.g., the innovation diffusion theory and the technology adoption model (TAM)). For the former, we need to determine whether the control mechanisms would affect other relationships (e.g., IT centralization affecting the relationship between centralization and stealth adoption) and/or whether the control mechanisms influence stealth adoption in the direction as stated in the propositions (e.g., arguments could be made for IT maturity to decrease stealth adoption as opposed to increase stealth adoption as stated in P7). Meanwhile, for the latter, we need to determine the relevance of other constructs especially those that take into account the potential costs and benefits of technology adoption. Thus, we will conduct interviews to refine our conceptual model. We will also use the results of this qualitative study to develop measures and survey items for each construct.
Acknowledgements

The author would like to thank Jean-Baptiste Litrico for his valuable comments for the initial development of this work.

References


