Does Software-as-a-Service (SaaS) has a role in IT-enabled Innovation? – An Empirical Analysis

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Does Software-as-a-Service (SaaS) has a role in IT-enabled Innovation? – An Empirical Analysis

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ABSTRACT
Software-as-a-Service (SaaS) models are gaining acceptance but their business value has largely been conceptual or anecdotal. In this paper, we empirically examine the role of SaaS in IT-enabled innovation of the firms and the role of organizational complementarities in augmenting the impact. We argue that SaaS can support IT-enabled innovation and that complementarities like learning from past sourcing experience, IT architectural flexibility and process management maturity reinforce the benefits.

Using a large cross-sectional dataset of U.S. firms, we empirically establish an association between SaaS adoption and IT-enabled innovation. We find that complementarities like organizational learning, IT architecture flexibility and process management maturity enhance the value further. This study is one of the first to our knowledge to empirically show the business value of SaaS in general and the potential for innovation related benefits in particular. It further highlights the role of organizational assets in value maximization.

Keywords
SaaS, Cloud Computing, IT-enabled Innovation, Complementarities, Organizational Learning, Outsourcing, Service Oriented Architecture (SOA), IT Architecture Flexibility, Process Management Maturity

INTRODUCTION
Software-as-a-Service (SaaS) is gaining acceptance as a business applications delivery model. SaaS is defined as standard software owned, delivered and managed remotely by service providers (Gartner, 2012). Customers are availing SaaS for benefits including cost efficiencies, new functionality and new opportunities. For example, organizations are subscribing to Salesforce’s Customer Relationship Management (CRM) functionality under SaaS model. Quintiles, a pharmaceutical major, has floated a spin-off, Infosario, to host its internal software portfolio as a service for external drug makers to use Quintiles’ expertise to govern their own drug development cycle (Hoover, 2011).

Gartner Inc., a leading analyst firm, has forecasted that SaaS market would reach $12.1 billion in 2011 and a projected $21.3 billion by 2015 (Gartner, 2011). Despite the potential and the increasing adoption, there is scant empirical research, to our knowledge, on what and how SaaS can generate business value for adopting organizations. Much of the existing literature is conceptual or analytical. Though conceptual studies are important, empirical studies are required to validate theoretical viewpoints and to develop a deeper understanding of the phenomenon (Whitaker, Mithas and Krishnan, 2009). Evidence on positive impact may allay some of the fears around emerging technologies. The 2010 Davos World Economic Forum meeting highlighted the benefits of cloud based technologies and has called exploring cloud technologies to deliver higher order benefits that transcend beyond cost efficiencies (World Economic Forum, 2010). This echoes with past calls in IS research to highlight the transformational effect of IT and its real contributions (Agarwal and Lucas, 2005).

Our study attempts to examine the business value and transformational potential of SaaS. Our main objective is to improve the understanding on business value of SaaS by specifically focusing on IT-enabled innovation and highlight the differential effect of organizational complementarities in enabling innovation. We ask the following questions: Does SaaS have a role in firms’ IT-enabled innovation? If so, do organizational complementarities augment this effect?

The contributions of this paper are multifold. This is one of the first papers, to our knowledge, to empirically validate a model of business value from SaaS and the transformational potential of SaaS in IT-enabled innovation. In doing so, it highlights
the role of organizational complementarities in value maximization. Using a large sample provides better generalizability of conclusions beyond evidence from single instances.

THEORY AND RESEARCH MODEL

Literature Review (Abbreviated)

The opportunities from cloud technologies like SaaS have been discussed in literature. Cusumano (2010) highlighted how SaaS can be the new platform for computing. McAfee (2011) called cloud based models as having the ability to create a profound shift in how computing power is consumed. Aral, Sundararajan and Xin (2011) presented qualitative evidence on the competitive advantage from cloud technologies and how complementarities augment the benefits. Xin and Levina (2008) developed a conceptual model on SaaS adoption factors. Koehler, Anandasivam, Dand Weinhardt (2010) was an exception with empirical evidence on consumer preferences for service attributes in cloud computing. Despite the qualitative evidence and conceptual frameworks, there is a gap in empirical research, to our knowledge, on the business value of SaaS and the transformation potential it carries. Our study is an attempt to address this gap in research about the business value SaaS. In this study, we focus on IT-enabled innovation as the measure of business value. We adopt the definition of IT-enabled innovation from past research as the creation and adoption of something new that creates business value and this includes new products, services or processes (Teo, Ranganathan, Srivastava and Loo, 2007).

Hypothesis Development

The emphasis on systems and process capabilities in creating value from IT investments was investigated from organizational capability perspective in past research (Gold, Malhotra and Segars, 2001). Complementarity between IT systems and organizational processes was instrumental in increased productivity and organizational performance (Aral and Weill, 2007). In addition, process management capabilities were found to be an enabler of effective inter-firm collaboration. Within the inter-firm partnering arrangements, the ability of firms to learn from one partnership to apply it in other partnering situations was studied from a capability perspective (Whitaker, Mithas and Krishnan, 2010). As SaaS adoption shares some characteristics of partnering arrangements and that organizational capabilities play a role in effective inter-firm collaboration, we hypothesize the relevance of systems, process and organizational learning capabilities in SaaS sourcing arrangements.

Role of SaaS in Innovation

Information Technology provides the infrastructure upon which other business functions and processes depend (Lewis and Byrd, 2003). IT infrastructure is an important capability that enables valuable dynamic capabilities and it allows an organization to use its resources efficiently (Mithas, Ramasubbu, Krishnan and Sambamurthy, 2005; Teece, Pisano and Shuen, 1997). The sophistication of IT infrastructures was found to significantly impact IT assimilation and integrating IT into business strategies (Armstrong and Sambamurthy, 1999). IT infrastructure capabilities have an important impact on the speed and nature of business process change (Broadbent, Weill and St.Clair, 1999). IT capability has been found to be critical for responding to opportunities and for addressing the changing dynamics in relationships (Sambamurthy, Bharadwaj and Grover, 2003). Thus IT capability supports sensing and responding in competitive environments (Haeckel, 1999).

Ross, Beath and Goodhue (1996) advocated that firms should develop an effective IT capability that has an ability to control IT-related costs, deliver systems when needed and affect business objectives through IT implementations. This echoes with the needed ability of the firms to dynamically reconfigure their resources to be able to innovate in today’s market (Prahalad and Krishnan, 2008). Consistent with this discussion on how IT capability was envisioned, we argue that SaaS applications by nature of service delivery have necessary characteristics for controlling IT-related costs, deliver systems as needed and the ability to dynamically reconfigure IT capabilities on-demand. We suggest that on-demand capacity procurement in SaaS positions them to create a business infrastructure that can shape a firm’s capacity to launch frequent and competitive actions (Sambamurthy et al. 2003).

Based on the above discussion, we argue that SaaS based service procurement models creates flexibility and new capabilities in organizations and thus enable the administrative capacity to respond to market and innovate. Thus we hypothesize:

\[ H1: \text{Use of SaaS is positively associated with a firm’s IT-enabled innovation capability.} \]

Organizational learning is a dynamic capability wherein firms acquire knowledge and use it to build higher order capabilities that enable competitive advantage (Bhatt and Grover, 2005). Organizations build technical and business capabilities by learning from doing and use this learning in future endeavors (Sambamurthy and Zmud, 1997). For example, Neo (1988)
found that new IT implementations are more likely to be successful if the firm has gained expertise in implementing similar systems in the past. Once a firm gains experience with an activity, the firm systematizes the activities by developing routines for future usage. To exemplify, experience with sourcing from vendors equips firms with sourcing experience, ability to develop routines around successes and use them in future sourcing. In a similar vein, organizations engaged in offshore IT outsourcing (ITO) learn from the experience of dealing with international teams and are more likely to engage in outsourcing other activities like business processes (BPO) (Whitaker et al. 2010).

We extend the concept of organizational learning from other sourcing contexts to SaaS. We posit that organizations with learning from ITO and BPO would have learned about vendor relationship management and would be in a better position to apply them to the SaaS sourcing. This is a reasonable expectation as SaaS shares some characteristics with ITO and BPO including working with external vendors, contractual obligations and the nature of some of the common risks associated with sourcing (Xin and Levina, 2008). Notwithstanding the concerns exclusive to SaaS, we posit that firms with ITO and BPO experience would be able to better coordinate and absorb external vendors’ SaaS delivery into their internal operations as these firms are in a better position to coordinate with SaaS vendors due to the contextual learning from ITO and BPO. Consistent with the above discussion, we hypothesize.

**H2: Past outsourcing experience of the firm positively moderates the relationship between SaaS adoption and a firm’s IT-enabled innovation capability.**

Enterprise IT architecture is a critical foundation on which businesses can design and implement business strategy (Smith and McKeen, 2006). A firm with mature IT architecture focuses on creating modular software architectures and leverages IT architecture to align IT and business strategy (Ross, 2003). This alignment focuses on IT components that enable critical business processes and the software modularity in turn enables flexibility and agility. Firms with mature architectures develop standardized interfaces so that they can readily absorb customized or industry-standard components and integrate third-party offerings better (Ross and Beath, 2006). Such firms would have adopted standardization to develop standard interfaces that can be readily integrated with external providers. Standardization also allows isolating individual business processes that could be outsourced and thus avail vendor’s best practices (Xin and Levina, 2008).

Service-Oriented Architecture (SOA) approach is changing how internal and external systems interact (Laplante, Voss and Zhang, 2008). In SOA, the basic element is a service (Papazoglou and Georgakopoulos, 2003). A SOA enhances the flexibility and modularity of business processes and provides the ability to seamlessly integrate business processes across business units and partners (Lim and Wen, 2003; Prahalad and Krishnan, 2008). By exposing business services in an organization to external partners, SOA offers ways to integrate data and processes across organizations. Two aspects of SOA are relevant to enterprise architecture in SaaS scenario. First, the existence of SOA facilitates designing of modular business processes and this modular design in turn enables flexibility and agility (Prahalad and Krishnan, 2008; Ross and Beath, 2006). Second, using common standards in messaging in combination with SOA enables standardization in inter-organizational linkages and this standardization allows firm to develop interfaces for seamless integration with external providers (Gosain, Malhotra and El Sawy, 2005; McAfee, 2005; Ross and Beath, 2006).

Based on the above discussion, we suggest that firms with strong internal IT architecture flexibility as in SOA will be better positioned to integrate SaaS offerings into their internal systems. For example, RiskMetrics Group sells its SOA based risk-analysis software under the SaaS model. RiskMetrics Group is itself a customer of Salesforce corporation and due to the internal SOA competence in product development, it could apply the competence to better integrate Salesforce applications with its on-premise Epicor accounting system and customer-facing information systems (Henschen, 2006). We further suggest that the internal architecture flexibility can create organizational agility towards competitive advantage (Ross, 2003). Thus we hypothesize,

**H3: Higher internal IT architecture flexibility positively moderates the relationship between SaaS adoption and a firm’s IT-enabled innovation capability.**

Process formalization has contributed to successful implementation of information systems (Raymond, 1990). Organizations with higher degree process formalization are more likely to successfully adopt and implement IT innovations (Ein-Dor and Segev, 1978). Integrated processes enhance the level of fit between internal business processes and the prospective innovation. Thus the level of risk in adopting innovations is lowered, thereby contributing to more successful outcomes (Chang and Chen, 2005). In outsourcing context, it was shown that higher process management maturity in organizations is
related to more efficiency and less ambiguity in vendor management and thus avoiding unexpected risks (Martin, Beimborn, Parikh and Weitzel, 2008). A reasoning for this is that firms with better process capabilities can codify the process management activities and possess capability to successfully coordinate the transfer of business processes to external providers (Whitaker et al. 2010).

As SaaS involves external sourcing, we argue that firms with higher process management maturity are better positioned to maximize the gains from SaaS procurement for two reasons. First, higher process management maturity allows working effectively with external vendors and minimizes risks in engagement. Second, process management maturity prepares the firms to better integrate external innovations into internal operations and enhances the fit between existing internal processes and external innovations. Based on this, we hypothesize that:

**H4:** Higher process management maturity positively moderates the relationship between SaaS adoption and a firm’s IT-enabled innovation capability.

### RESEARCH DESIGN AND METHODOLOGY

Data for our study comes from the Annual InformationWeek 500 surveys. InformationWeek is a leading IT publication and previous academic studies have used InformationWeek survey data (Bharadwaj, Bharadwaj, and Konsynski, 1999; Mithas, Krishnan, and Fornell, 2005). The original dataset had 509 firms. After dropping incomplete observations and removing outliers per Cook’s distance, (Long and Freese, 2003), the final sample comprised of data from 243 firms. Table 1 describes the variables used in our model. Table 2 provides the descriptive statistics and correlations.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innov (Dependent Variable)</td>
<td>A binary variable indicating whether the organization has patented, trademarked or copyrighted any IT architecture, product, service, or IT-driven business processes in the past 1 year. Survey respondents were asked the question for which the response was binary. Consistent with the definition of firm-level IT-enabled innovation described in Tee et al. (2007).</td>
</tr>
<tr>
<td>SaaS</td>
<td>A binary variable indicating if the firm has adopted SaaS. Survey respondents were asked if their firm has adopted SaaS or not.</td>
</tr>
<tr>
<td>OutsourcingExp</td>
<td>A 2-item summative index indicating if the firm is using IT outsourcing and/or Business Process Outsourcing services from vendors. Survey respondents were asked if their firm is involved in ITO or BPO. A similar measurement approach was used in Whitaker et al. 2010.</td>
</tr>
<tr>
<td>ProcMaturity</td>
<td>A 3-item summative index describing the firm’s process management practices.</td>
</tr>
<tr>
<td>ITArchFlex</td>
<td>A 2-item summative index indicating the level of SOA and Web Services adoption in the organization. Survey respondents were asked if the firm deploys SOA or Web Services applications using SOA, UDDI, and XML. A similar measurement approach was used in Kumar, Dashkimourothy and Krishnan (2007).</td>
</tr>
<tr>
<td>FirmSize (Control Variable)</td>
<td>This is the natural log of annual revenues of the firm in the previous fiscal year.</td>
</tr>
<tr>
<td>NewProj (Control Variable)</td>
<td>Share of IT budget allocated to new projects. Cherven, Whitaker and Krishnan (2009) suggested that firms with more investments in new projects are likely to be more innovative.</td>
</tr>
<tr>
<td>Manufacturing (Control Variable)</td>
<td>A binary variable representing if a firm is in the manufacturing sector at the 2-digit NAICS level (Manufacturing = 1 for firms in manufacturing). Firms in the manufacturing sectors are at the forefront of SaaS adoption (Computer World, 2010).</td>
</tr>
<tr>
<td>ITSector</td>
<td>A binary variable representing if a firm is in the IT industry at the 2-digit NAICS level. (ITSector = 1 for firms in IT industry). Firms in the IT industry are at the forefront of SaaS adoption (Computer World, 2010).</td>
</tr>
</tbody>
</table>

Table 1: Description of variables in the empirical model
Empirical Model

We developed a cross-sectional model to test our hypotheses. As innovative firms may be more likely to adopt new technologies first, we accounted for endogeneity in SaaS adoption (Saldanha and Krishnan, 2009). To control for this endogeneity, we followed recommendations in Bharadwaj, Bharadwaj, and Bendoly (2007), Saldanha and Krishnan (2009) and Shaver (1998) to use Heckman two-step estimation approach (Heckman, 1979). As a first step in this estimation, we ran a probit regression of SaaS variable on all control variables and then included the inverse mills ratio generated in this step as a control variable in our main empirical model. Controlling for endogeneity using the two-step estimation gives consistent estimates (Heckman, 1979; Shaver, 1998).

Our dependent variable (Innov) is a binary indicating whether the organization has patented, trademarked or copyrighted any IT architectures, products, services, or IT-driven business processes in the 12 months. Since the dependent variable is binary, we use logistic regression for estimation. Logistic or probit models are used in binary choice models (Greene, 2008). We control for share of IT investment in new projects, Firm Size and Manufacturing and IT sector industries at the 2-digit North American Industry Classification System (NAICS) level. We controlled for Manufacturing and IT Sector industries as these industries were at the forefront of SaaS adoption (Computer World, 2010).

The empirical model is as follows:

\[ P(\text{Innov}) = \beta_0 + \beta_1 \text{(SaaS)} + \beta_2 \text{(OutsourcingExp)} + \beta_3 \text{(ProcMaturity)} + \beta_4 \text{(ITArchFlex)} + \beta_5 \text{(SaaSxOutsourcingExp)} + \beta_6 \text{(SaaSxProcMaturity)} + \beta_7 \text{(SaaSxITArchFlex)} + \beta_8 \text{(FirmSize)} + \beta_9 \text{(NewProj)} + \beta_{10} \text{(Manufacturing)} + \beta_{11} \text{(ITSector)} + \beta_{12} \text{(InvMill)} + e \]

Econometric Robustness Checks

The White’s test for heteroskedasticity (\(p=0.10, \chi^2 = 85.2\)) failed to reject the constant variance of the error term and heteroskedasticity is not a serious problem with our data. We tested for multicollinearity by computing variance inflation factors (VIF) and condition indices. The highest VIF was 8.94, which was below 10 indicating no serious problem (Gujarati, 2008). However the condition number was 26.68 and condition numbers beyond 20 may indicate a problem as they may result in ill-conditioned matrices (Greene, 2008). To avert problems with multicollinearity, we mean-centered the variables before interaction. Centering does not change the estimated effects of variables and the effect of marginal increase in the centered version of a variable is same as effect of a marginal increase in uncentered variable (Franzese and Kam, 2003). Our final estimation after mean centering had a highest VIF of 5.63 and condition number was 19.614, both within prescribed limits. The link test to check for specification errors produced significant linear predicted value (\(p=0.001\)) and insignificant linear predicted value squared (\(p=0.245\)). The linktest has failed to reject the assumption about correct model specification. As we used summative measures, tests for reliability of survey measures are not applicable (Jarvis, MacKenzie and Podsakoff, 2003).
RESULTS – SAAS IN IT-ENABLED INNOVATION

Results of our model are presented in Table 3. Model 3 is the full model with interactions. The Wald Chi-square statistic of the full model with interactions is 38.40 (p<0.001) indicating that we can reject the null hypothesis that the coefficients are jointly zero. The positive and marginally significant coefficient ($\beta_1=0.64$, p=0.09) in Model 2, the model without interactions, provides initial evidence that SaaS can support IT-enabled innovation. Quantitatively, a unit increase in SaaS is associated with an increase in the odds in favor of an IT-enabled innovation by $\exp(0.64) = 1.90$.

In Model 3 which is our full estimation model with interactions and the focus of this study, the positive and significant coefficient ($\beta_1=3.374$, p<0.001) of SaaS adoption provides support for the hypothesis 1 that SaaS can be instrumental in supporting IT-enabled innovation. The coefficient on SaaS has increased in magnitude and significance in the presence of interactions. This suggests substantial increase in odds in favor of an IT enabled innovation when SaaS is deployed. The results further show the interaction term of SaaS and OutsourcingExp is positive and significant ($\beta_3=1.265$, p=0.015) and the interaction term of SaaS and ProcMaturity is positive and significant ($\beta_5=1.407$, p=0.026) thus rendering support for hypotheses 2 and 4 on the role of complementarities in augmenting the impact. The interaction between SaaS and IT architectural flexibility is positive and marginally significant ($\beta_7=1.643$, p=0.07) and partially supports the hypothesis 3 about complementarity between SaaS and architectural flexibility. Table 3 provides the results from our model estimation.

<table>
<thead>
<tr>
<th>Dependent Variable: Innov (1-0) (A binary variable indicating whether the organization has patented, trademarked or copyrighted any IT architecture products, services, or IT-driven business processes in the 12 months prior to the survey)</th>
<th>Logit Model 1 (Controls without focal variables)</th>
<th>Logit Model 2 (All variables without interactions)</th>
<th>Logit Model 3 (Full model with interactions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SaaS</td>
<td>0.64$^*$</td>
<td>3.374****</td>
<td>3.374****</td>
</tr>
<tr>
<td>OutsourcingExp</td>
<td>0.201</td>
<td>0.58**</td>
<td>0.58**</td>
</tr>
<tr>
<td>ProcMaturity</td>
<td>0.18$^*$</td>
<td>0.91**</td>
<td>0.91**</td>
</tr>
<tr>
<td>ITArchFlex</td>
<td>-0.336</td>
<td>0.385</td>
<td>0.385</td>
</tr>
<tr>
<td>SaaS x OutsourcingExp</td>
<td>1.265***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SaaS x ProcMaturity</td>
<td>1.407***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SaaS x ITArchFlex</td>
<td>1.643*</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>FirmSize</td>
<td>0.142</td>
<td>-0.018</td>
<td>-0.018</td>
</tr>
<tr>
<td>Newproj</td>
<td>-0.001</td>
<td>0.052</td>
<td>0.052</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.68**</td>
<td>-1.05</td>
<td>-1.05</td>
</tr>
<tr>
<td>ITsector</td>
<td>-0.501****</td>
<td>-0.501****</td>
<td>-0.501****</td>
</tr>
<tr>
<td>Inverse Mills Ratio</td>
<td>-4.624</td>
<td>-8.024</td>
<td>-8.024</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.075**</td>
<td>1.32</td>
<td>1.32</td>
</tr>
<tr>
<td>Loglikelihood</td>
<td>-1.1456</td>
<td>-1.557</td>
<td>-1.557</td>
</tr>
<tr>
<td>Wald Chi-square</td>
<td>23.15</td>
<td>23.15</td>
<td>23.15</td>
</tr>
<tr>
<td>Prob&gt; Chi-square</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>McFadden’s pseudo R-square</td>
<td>0.0442</td>
<td>0.0744</td>
<td>0.0744</td>
</tr>
</tbody>
</table>

N=243. SaaS, OutsourcingExp, ProcMaturity and ITArchFlex are mean-centered before interaction. Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%; **** significant at 1%.

Table 3 – Empirical Estimations
DISCUSSION AND IMPLICATIONS

Our study examined the business value of SaaS and how organizational assets can complement SaaS in value creation. We found that SaaS can in fact be associated with IT-enabled innovation and firms are leveraging SaaS to create business advantage. The impact of SaaS on innovation is more pronounced when SaaS adoption is combined with organizational complementarities and this study provides evidence about the complementarities between IT resources and organizational resources (Aral et al. 2011; Brynjolfsson, Hofmann and Jordan, 2010). The complementarities used in our research are in fact the existing organizational assets and thus show how new resources can co-create value along with existing assets. The statistical significance of the interaction between SaaS and outsourcing experience and between SaaS and process management maturity highlight the reinforcing effect. The marginal significance of interaction between SaaS and IT architecture flexibility to some extent deviates from our hypothesis. One possible explanation may be that though mature architectures are helping better integration of new technologies into the organization, firms may just be learning how to combine them to put to strategic use. As SOA and SaaS are relatively new phenomenon, firms may be at early stages of realizing value from their co-existence.

From research perspective, this study is one of the first to highlight the business value of a new class of IT and particularly its innovation benefits. It thus is one of the first steps in addressing the calls about the true benefits SaaS can deliver beyond cost advantages. This study further shows how technical and organizational architectures should combine to foster business value. We hope that this study prompts more research into establishing business value and examining the transformational potential of emerging technologies and looking into mechanisms of value creation. We believe that it is important to empirically establish value from emerging technologies when questions arise about IT commoditization. From the managerial perspective, our study prompts managers to think beyond cost efficiencies in SaaS adoption and explore the higher order benefits SaaS can offer (World Economic Forum, 2010). It also highlights the enabling conditions that an organization has to create to realize value from SaaS adoption and cautions that mere adoption of SaaS without organizational changes may not be beneficial (Brynjolfsson et al. 2010).

LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES

This study has three primary limitations. Because of the cross-sectional data, our findings are associational in nature and do not imply causality. Future research may use longitudinal datasets and modeling techniques like propensity scores to examine causality between SaaS and business value. Second, our data pertains to large US firms which may be more innovative than, for example, firms in other geographies and our findings may not be generalizable to other contexts though they are still assuring than anecdotal evidence. In addition, our dataset comprises of large firms and future research may explore the Small and Medium Enterprise (SME) context. Third, we use cross-sectional data to examine the role of organizational assets but these assets evolve overtime. Hence future research may use longitudinal data to better understand how the co-evolution of SaaS and organizational assets impacts business value over time.

Given the emerging nature of SaaS, we foresee several future research opportunities. Researchers can investigate other forms of business value like market-centric or partner-centric capabilities that SaaS can deliver. Investigating the impact of other organizational characteristics like IT-business alignment and relationship management is an additional area to explore. While our study focuses on the moderating role of organizational complementarities, future research may investigate the mediation mechanisms that create higher order capabilities (Mithas, Ramasubbu and Sambamurthy, 2011). With SaaS creating new models of service subscription and licensing, studying the opportunities, challenges and constraints in SaaS model vis-à-vis traditional IS implementations can yield interesting results.

CONCLUSION

SaaS is gaining increasing acceptance and is thereby changing how IT is delivered and consumed. Despite the potential benefits of this new IT phenomenon, the focus is still on cost-efficiencies. The existing literature highlights isolated instances of success from SaaS but is still devoid of generalizable conclusions about the benefits. Our study, to the best of our knowledge, is one of the first to highlight the innovation potential in SaaS that transcends cost-efficiencies. It attempts to show the business value in SaaS and how firms can leverage the complementarities between existing organizational assets.
and emerging opportunities to create strategic advantage. In doing so, we find evidence that SaaS can enable innovation when it receives necessary organizational support.

REFERENCES


Long, J. and Freese, J. (2003) Regression models for categorical dependent variables using stata, Stata Press, College Station, TX.


