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Explaining Software as a Service Outsourcing: Economic and Social Considerations

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Abstract:

Software as a service (SaaS) offers an innovative way to deliver software over the Internet to distributed organizations. While more and more SaaS providers are joining the market and competition among providers becomes more intense, we need to understand the considerations of potential clients. Built on transaction cost theory and social exchange theory, this study empirically investigates, with a national survey of IT/IS executives, the role of economic factors and the impact of social relationships on the economic factors in firms' deciding to adopt SaaS. We found that cost savings are a critical consideration in SaaS and that social relationships exert a strong, positive direct impact on cost savings and positively moderate the impact of cost savings on SaaS. This paper expands our theoretical understanding of the SaaS phenomenon and provides some managerial insights.

Keywords: Software as a Service, IT Outsourcing, Cost Savings, Social Relationships.

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1 Introduction

Software as a service (SaaS) refers to the remote delivery of software applications as a service to clients through networks (Benlian, Koufaris, & Hess, 2011). The SaaS model has made the delivery of software services from remote data centers technically feasible and economically attractive. For examples, Google hosts many applications for its users remotely, Adobe has moved its software delivery to SaaS on a subscription basis, and Salesforce.com successfully delivers its customer relationship-management services to numerous clients online. Gartner (2016) has estimated that global SaaS spending will reach US$37.7 billion in 2016, which would be a 30 percent increase since 2015 (Gartner, 2016). This increasing trend looks to continue to 2020.

SaaS changes how companies use software. SaaS's one-to-many model gains economies of scale by providing standard applications to multiple clients (Garrison, Kim, & Wakefield, 2012). SaaS providers typically take full responsibility for purchasing software, maintaining applications, and making updates, whereas clients may require only a Web browser to access the applications via the Internet. The provider commonly charges a fixed minimum cost for the service plus a variable fee based on usage time or activities (Susarla, Burla, & Whinston, 2009).

The SaaS model can serve companies of all sizes in many industries and software categories (Benlian et al., 2011). SaaS provides services covering a wide range of applications, including enterprise application software (e.g., netsuite.com, salesforce.com, SAP by design), email and communication software (e.g., Google Sites, Google Docs, Cisco's WebEx), and e-commerce packages (e.g., SiteGround.com). The SaaS market is becoming intensely competitive. Since providers have significant concerns over how to attract and retain clients, we strongly need to better understand why clients decide to engage in using SaaS (Garrison et al., 2012; Lacity, Khan, Yan, & Willcocks, 2010, Benlian et al., 2011).

While an extensive body of research literature has studied traditional outsourcing adoption (Lacity & Hirschheim, 1993), few studies have focused specifically on SaaS (Benlian & Hess, 2011). In information systems (IS) research, SaaS research falls under the outsourcing category. SaaS and traditional outsourcing share some similarities, such as both having external providers to handle a client's internal business. However, the SaaS business model differs from the traditional IS outsourcing model in significant ways, such as the use of a flexible and open platform, online hosting, uniform delivery mechanisms, and usage-based services fees (Yao & Murphy, 2005, Demirkan, Cheng, & Bandyopadhyay, 2010). With such differences, we would expect the decision to adopt traditional outsourcing and the decision to adopt SaaS to vary. As one of the top five investments in IT delivery, SaaS calls for a better understanding of the clients' decision process via empirical investigation of a parsimonious set of essential factors (Kappelman, McLean, Johnson, & Gerhart, 2014).

Executives have commonly listed economic considerations as one of the top concerns regarding remote hosting (Benlian et al., 2011; Lacity et al., 2010). Possible economic improvements over internal production make hosting activities financially attractive and justifiable (Ang & Straub, 1998). With the significant differences from traditional outsourcing, we would expect the impact of cost concerns on SaaS to change. It also would be valuable to understand the antecedents of cost concerns. More specifically, service-oriented business transactions based on co-creation imply that the relationship between transactional parties (SaaS provider and client) is a critical component to assess (Vargo & Lusch, 2004). A strong personal and/or business relationship between managers of the two parties could influence the atmosphere and efforts in contract negotiation and service hosting, which may influence the client's assessment of cost savings (Gao, Liu, & Qian, 2016). The interactions between social relationships and economic factors may help explain the different motivators for adopting SaaS. These practices stimulate the need to better understand the social, personal connections in the business environment and their interaction with the economic factors when firms decide whether to adopt SaaS.

Few empirical studies have investigated the direct and indirect influences impinging on economic factors in the SaaS context, and fewer still have examined the interactions of social relationships with cost concerns. In this study, we fill in this gap and answer empirically the following research questions:

RQ1: Which economic factors directly impact a company's intention to outsource to a SaaS provider (i.e. the company's "SaaS outsourcing intention") and what antecedents affect the economic factors?

RQ2: How do social relationships have direct and moderating impacts on the economic factors?

This paper proceeds as follows. In Section 2, we review the relevant literature on important factors associated with SaaS outsourcing decisions. In Section 3, the research model is developed and the hypotheses are formed. In Section 4, we discuss the research method and data collection process. In Section 5, we present the results from an empirical survey with a national sample of IS executives. In Section 6, we discuss our findings and, in Section 7, discuss the contributions and the limitations of this research. Finally, in Section 8, we conclude the paper.

2 Literature Review and Theory

IS outsourcing research has addressed a wide variety of issues. Among these issues, factors that influence a firm's decision to adopt IS outsourcing (e.g., application characteristics, provider competence, client-provider relationships, institutional and peer influences, and contract negotiation) have received considerable attention (Lacity & Hirschheim, 1993; Ang & Cummings, 1997; Rai, Keil, Hornyak, & Wüllenweber, 2012). Other studies have investigated additional aspects of SaaS. Here, we summarize some of the literature on SaaS (see Table 1).

Research continues toward better understanding why companies choose to adopt SaaS (Watjatrakul, 2005; Benlian et al., 2011). Although SaaS and traditional outsourcing have a similar purpose (i.e., to reduce costs, to compensate for internal capability deficiencies, to focus on core business, or to leverage external intelligence), traditional outsourcing and SaaS also differ in several significant ways:

First, traditional outsourcing providers typically provide software or products on a case-by-case basis, whereas the SaaS provider generally provides a standardized application service to multiple customers to gain economies of scale. Second, traditional outsourcing providers tend to offer applications, IT infrastructure management, or software development either at a client companies' site or their own site, whereas the SaaS provider tends to focus only on online services. Third, in traditional outsourcing, clients own the core software or hardware, whereas the SaaS provider is responsible for all hardware and software maintenance, updates, and data storage at the hosting site. Fourth, traditional outsourcing contracts tend to be long (e.g., five to 10 years), whereas SaaS contracts are relatively short (e.g., two to three years).

Table 1. Summary of Selected Literature on SaaS

Topic	Paper	Focus
Concept and technology	Armbrust et al. (2010)	Define cloud computing and the associated challenges.
Decision making	Benlian, Hess, & Buxman (2009)	Examine the impact of application specificity, adoption uncertainty, strategic value, inimitability, attitude towards SaaS adoption, and subjective norm on adoption decision.
	Benlian & Hess (2011)	Explore perceived risks (beliefs regarding the performance risks, economic risks, strategic risks, security risks and managerial risks) and perceived opportunities (cost advantages, strategic flexibility, focus on core competencies, access to specialized resources and quality improvements).
	Lee, Park, Lim (2013)	Discover that the investment on software quality yields higher software quality and higher social welfare under SaaS model than perpetual licensing model.
Performance evaluation	Chou & Chiang (2013)	Evaluate the performance of SaaS solution through the balanced scorecard method (e.g., learning and growth, internal business processes, customer performance, and financial performance).
	Benlian, Koufaris, & Hess (2011)	Develop SaaS quality measurement, including rapport, responsiveness, reliability, features, security, and flexibility.
	Demirkan et al. (2010)	Evaluate four coordination strategies in SaaS supply chain management.
	Susarla, Barua, & Whinston (2010)	Examine multitasks, architecture, and task disaggregation on the performance of SaaS.
	Susarla et al. (2009)	Examine the impact of service quality, responsiveness, and security on trust and usage satisfaction.

The above comparisons point to important differences in the structure, offerings, and terms that traditional outsourcing and SaaS models offer. The change in ownership, services type and features, and contact length will impact the contract discussion and mediate the risks associated with outsourcing transactions. For example, compared with case-by-case software outsourcing, standard application hosting can shorten the time for contract negotiations to reduce costs and possibly switch to another provider. As such, given these differences and SaaS's increasing importance, we need to examine SaaS.

To understand the SaaS model's growth potential and limitations, we need to better understand the reasons why companies intend to outsource applications to a SaaS provider. With this study, we fill this gap by empirically exploring the economic and social-relationship considerations that play an important role in why companies intend to use SaaS.

2.1 Economic Considerations

Transaction cost theory (TCT) concerns the coordination and regulation of economic activity in organizations' transactions with one another (Lacity & Hirschheim, 1993; Ouchi & Bolton, 1988). TCT, which Williamson (1985) originally developed, identifies two types of costs: production costs and transaction costs (Ouchi, 1977. Production costs are internal costs incurred when an organization produces its goods/services in-house, which includes costs associated with workers, raw materials, and machine operations. Transaction costs are external costs with material and services exchanges, such as those associated with the search for providers, negotiation, assessment, and contract enforcement.

In SaaS, production costs reflect the costs the client incurs when it develops, maintains, and delivers the applications internally. Transaction costs occur when a client searches for a provider, negotiates contract terms, and monitors the service-delivery process. A company's decision to outsource IS hinges on how it analyzes the balance between internal production costs and external transaction costs. TCT provides a framework to evaluate external outsourcing alternatives, and researchers have used it extensively to study IS outsourcing and hosting services (Ang & Straub, 1998; Jayatilaka, Schwarz, & Hirschheim, 2003; Susarla et al., 2009). Most CIOs agree that economic considerations have high priority and weight in evaluating whether to outsource to a SaaS provider (Benlian & Hess, 2011).

TCT assumes that specialization increases an organization's production efficiency (Ouchi, 1977). A SaaS solution will reduce a firm's production costs as long as the SaaS provider produces IS products and services more efficiently. However, transaction costs may increase if the cost of contract negotiation increases, the uniqueness of required assets increases, or environmental uncertainty increases. Thus, in this study, we focus on cost savings and its three antecedents as the most compelling economic factors: uncertainty, asset specificity, and functional complexity.

2.2 Relationship Considerations

The literature in marketing has long argued the importance of customer relationship management in business collaborations (Cannon & Perreault, 1999; Palmatier, Dant, Grewal, & Evans, 2006; Gao et al., 2016). Simply put, SaaS is not a one-time economic transaction. It involves two parties' collaborating over the entire contract period (Demirkan et al., 2010; Han, Lee, & Seo, 2008). We also expect that the social interaction between provider and client before the contract is signed exerts a certain weight in the latter's intention to outsource to a SaaS provider.

Social exchange theory focuses our attention on the dynamic relationship between the client and service provider prior to any outsourcing decision (Lee & Kim, 1999). The theory emphasizes the social aspects of an exchange relationship and the behaviors of the actors in the relationship (Blau, 1964). In the exchange relationship, transactions that involve the transfer of resources between two or more parties for mutual benefit (Cook & Emerson, 1987); non-economic factors such as trust, power, and distance in inter-organizational relationships (Dyer & Singh, 1998); or business friendship (Gao et al., 2016) play an important role in achieving a successful exchange relationship. In the SaaS setting, social relationships refer to the friendship development between the managers of the providers and client companies in the business context. Before the two parties have formal legal bonding, the social relationships become an important resource to exchange valuable but subtle information, such as possible incentives with other clients, and smooth the contract negotiation (Ingram & Roberts, 2000; Price & Arnould, 1999).

Different from other non-economic factors that influence formal collaborations, social relationships are usually initiated much earlier and they impact client companies' decisions about whether to outsource to a SaaS provider before writing a contract. Surprisingly, few studies have investigated the social

relationships between managers in the SaaS setting and particularly the way they interact with economic factors. The decision to outsource applications to a SaaS provider depends on a reliable relationship between client and provider. Thus, in this study, we explore the impact of social relationships on economic determinants in the SaaS setting.

3 Research Model

Integrating transaction cost theory and social relationships, we argue that cost savings critically influence whether a company will choose to outsource to a SaaS provider and that social relationships influence this economic impact.

3.1 Cost Savings

Cost savings refer to the variety of cost advantages a company experiences from outsourcing applications to a SaaS provider instead of developing and maintaining them internally. Positive cost savings result when the external hosting costs are lower than internal production costs. The company might first estimate the initial set-up investments, subscription fees, and contract negotiation costs. Additionally, the company should include the costs incurred for searching for a provider, resolving conflicts, monitoring performance, and negotiating contract renewals (Lacity & Willcocks, 2001). Second, the company also should evaluate the internal production costs, which include the required internal development, software and hardware acquisitions, operations, maintenance, and updates. Finally, the company calculates the differences between these two sets of cost estimates, which could be more complex if considering the investment's value over time.

SaaS has the potential to change the balance between production costs and transaction costs. Since hosting providers can deliver standard services at scale, SaaS providers' external production can be more economical than client companies' internal production, and, by adopting SaaS, client companies can simultaneously reduce transaction costs (Tiwana & Bush, 2007). The SaaS model suggests a cost structure of low set-up and recurring predictable usage costs, which brings a strong economic advantage to clients (Susarla et al., 2009). In addition, since SaaS provides relatively standard applications and the contracts tend to be short, clients have the flexibility to switch to other providers when the providers do not provide satisfactory services or when the contracts expire (Benlian & Hess, 2011), and the costs to search for an appropriate provider are generally low (Jayatilaka et al., 2003). With the positive net cost savings, clients are likely to outsource to SaaS providers. Therefore, we hypothesize:

H1: Greater cost savings are associated with a greater SaaS outsourcing intention.

3.2 Environmental Uncertainty

Environmental uncertainty refers to the external environment's variability, such as market fluctuations, technology advances, economic trends, and industry-specific dynamics. Research has found environmental uncertainty to significantly influence IT investment decisions (Barthélemy, 2001). As environmental uncertainty in the business environment increases, costs tend to increase, but the opportunities to reduce production costs may increase as well (Williamson, 1985). Firms can consider environmental uncertainty an opportunity to shift costs from internal, organizational production costs to external, market transaction costs. Because of the special features associated with the SaaS model (e.g., short term, performance-based contracts, and precise billing and usage tracking), firms could save more in production costs than they incur in transaction costs.

SaaS providers usually deliver standard applications to a large number of clients, whereas clients can relatively easily find an alternative provider with reasonable searching and switching costs. The expenses associated with the SaaS model are predictable in that they are based on fixed monthly fees and variable usage fees (Susarla et al., 2009). Hence, in a dynamic and uncertain environment, the increase in transaction costs may not be high. However, internal costs associated with sustaining the required infrastructure and related staff competencies increase and can be significant (Ang & Cummings, 1997). Furthermore, the SaaS model provides companies with greater organizational flexibility and lesser production costs because they outsource many administrative activities (i.e., software upgrades, version management, and technical support) to the SaaS provider. That is, operationally, the SaaS business model allows for lower contract-monitoring costs and more precise billing from usage tracking (Susarla et al., 2009). In a highly uncertain environment, a firm that can search the external opportunities, enter into short-term contracts, and assess other transaction costs (e.g., switching costs) will enjoy higher overall

cost savings. Thus, we expect that firms will find the overall cost savings from using a SaaS provider in times of environmental uncertainty to be attractive. SaaS is flexible and adaptive to change. Therefore, we hypothesize:

H2: In the SaaS context, greater environmental uncertainty is associated with greater cost savings.

3.3 Asset Specificity

Asset specificity refers to the uniqueness of products and services that clients require from a SaaS provider. Zaheer and Venkatraman (1995) divide asset specificity into two categories: human and procedural. Human asset specificity refers to the extent to which SaaS providers need professionals' experience and expertise to meet special client demands. Procedural asset specificity refers to the extent to which SaaS providers customize the applications to satisfy clients' specific requirements. Software or hardware asset specificity, classified as procedural asset specificity, refers to the extent of software or hardware uniqueness that a SaaS provider needs to support its applications (Williamson, 1985).

Applications high in asset specificity require significant investment in hardware and/or software and, in many cases, application design and configuration. High asset specificity tends to increase the transaction costs of the outsourcing arrangement because the greater the asset specificity, the fewer the suppliers that will have these special resources (Barthélemy & Geyer, 2005). When the suppliers are few, the price competition decreases and the cost increases. In other words, when asset specificity is high, SaaS providers are in a position to negotiate higher prices. Applications high in asset specificity may not exist at all in the external market, or they will be too expensive and require too much adaptation or coordination with the client's internal systems.

Although applications with high asset specificity could also lead to high internal production costs, those internal assets would at least be more controllable. Since a company typically knows its own internal application requirements and business processes better than a service provider does, a client firm may find it more cost effective and easier to produce applications high in asset specificity internally (Susarla et al., 2009). Therefore, we hypothesize:

H3: In the SaaS context, greater asset specificity is associated with lower cost savings.

3.4 Functional Complexity

Functional complexity refers to the extent of complexity in software, hardware, and knowledge requirements that provide a firm's information system functions. Complexity lies in the diversity of business functions or IS functions, such as scope, user levels, and variety of applications and systems (Ang & Cummings, 1997). Additionally, firms may introduce complexity by adapting the IT to different local environments.

The applications or services may be standard, but the total complexity (e.g., volume of the application demands and various local environment adaptations) significantly increase the production cost in handling the demands internally. The company has to invest additional infrastructure and hire more developers or support staff. Since SaaS providers usually have experience and expertise implementing, inter-operating, and adapting to a variety of IS contexts, they can likely manage complex applications more effectively and efficiently than can clients themselves. For companies with multiple sites, the SaaS model also allows different users to access the same servers/products from everywhere with 24/7 support. Rather than hire the expertise to develop the applications in-house and develop the supporting infrastructure with high production costs, the organization would do better to incur transaction costs by outsourcing to a SaaS provider. Therefore, we hypothesize:

H4: In the SaaS context, greater functional complexity is associated with greater cost savings.

3.5 Social Relationships

Social relationships refer to informal relationships between one or more individuals at the client company with one or more individuals at the SaaS provider. In business settings, these individuals refer to the managers involved in making transaction decisions. These individuals develop relationships prior to the formal agreement through normative exchanges (Limam & Boutaba, 2010) and generally evolve after the client has made a decision to proceed.

The social relationships we examine in this study differ from purely personal relationships that emphasize emotional needs. Sharing some similarity with business friendships, these social relationships may emerge as a personal relationship between individuals of two organizations but are developed under the inter-organizational business environment (Gao et al., 2016). They occur between service providers and customers, merchandise suppliers and clients, or insurance agents and clients (Price & Arnould, 1999). In most cases, the two parties of a social relationship share the same interests or desire for similar benefits. This relationship can be generated and developed via various formal or informal social situations before the contract is signed, such as the provider's visit to client companies, business-associated workshops, conventions, trade shows, and so on. In SaaS settings, the managers from both the SaaS provider and client firms typically have some opportunities to encounter and develop social relationships to become more familiar with each other.

The social relationships in the business environment can directly impact a client firms' economic considerations in deciding whether to outsource to a SaaS provider. A close social friendship between managers from both firms will help form a comfortable environment to negotiate the terms of the service contract. Both parties will better understand the other party's concerns and more greatly tolerate error (Gao et al., 2016). Even during the service-delivery period, closer social relationships can help alleviate problems that could occur through misunderstanding and, thus, expedite problem solving (Rangan, 2000). Hence, social relationships can significantly reduce the effort and time both parties spend in negotiation, performance monitoring, and problem solving, which results in greater cost savings for both firms. SaaS usually has a relatively short-term contract, and a close relationship can help save negotiation costs in contract renewals as well. SaaS providers could pass some cost savings to client companies with which they have reliable collaborations.

Additionally, with close relationships between two managers, it is easy for client managers to make the commitment to a relatively long-term collaboration even though the two firms might still review/renew the service contract on a yearly basis. The service provider can better predict the service demands of its clients and arrange their production and employees to meet the demand. Through well-planned operations management, a service provider could save more in production costs internally and pass some of these savings to clients via more appealing prices in the renewed contract. Therefore, we hypothesize:

H5: In the SaaS context, a closer social relationship between a provider and client firm is associated with higher cost savings.

Although managers of two independent companies may initiate a relationship from a purely personal friendship, its embeddedness in the business context cannot ignore economic implications (Ingram & Roberts, 2000). Marketing research has long ago discovered that the development speed and depth of any inter-company relationship relies on the relative balance between cost and reward (Morgan & Sawyer, 1967). When the two parties achieve higher rewards than costs, they will have a stronger desire to maintain and, perhaps, deepen the relationship (Morgan & Sawyer, 1967). They can develop such a desire long before the reward actually materializes.

When initiating a relationship, the two parties can form expectations for the possible rewards and cost. When the two parties establish the social friendship and want to have a future collaboration, both will try to act favorably to each other. In other words, both parties expect the other party to make favorable arrangements to show their sincerity and enable the transaction (Gwinner, Gremler, & Bitnet, 1998). The favorable arrangements may include giving greater price discounts on services, providing additional user accounts, assigning more experienced service representatives to solve problems, upgraded facilities to host the services for the client, or giving higher priority to the problems of the client. These favorable arrangements can lead to direct or indirect cost savings. Given a good social relationship, the client company will weigh more heavily these potential economic benefits and, thus, be more likely to outsource their applications to the SaaS provider. Thus, when the social relationships deepen over time, both parties will expect greater economic rewards, and the impact that cost savings have on whether a firm intends to outsource to a SaaS provider will strengthen. Hence, we argue:

H6: Social relationships moderate the relationship between cost savings and the intention a client firm has to outsource to a SaaS provider such that, when a provider and client firm have a closer social relationship, cost savings have a higher impact on the client firm's intention to outsource to a SaaS provider.

Appendix A summarizes the operational definitions of the factors and key literature we used to develop the model we present here. Based on the above arguments, we develop a conceptual model that presents the factors we hypothesize to influence a company's intention to adopt SaaS (see Figure 1.)

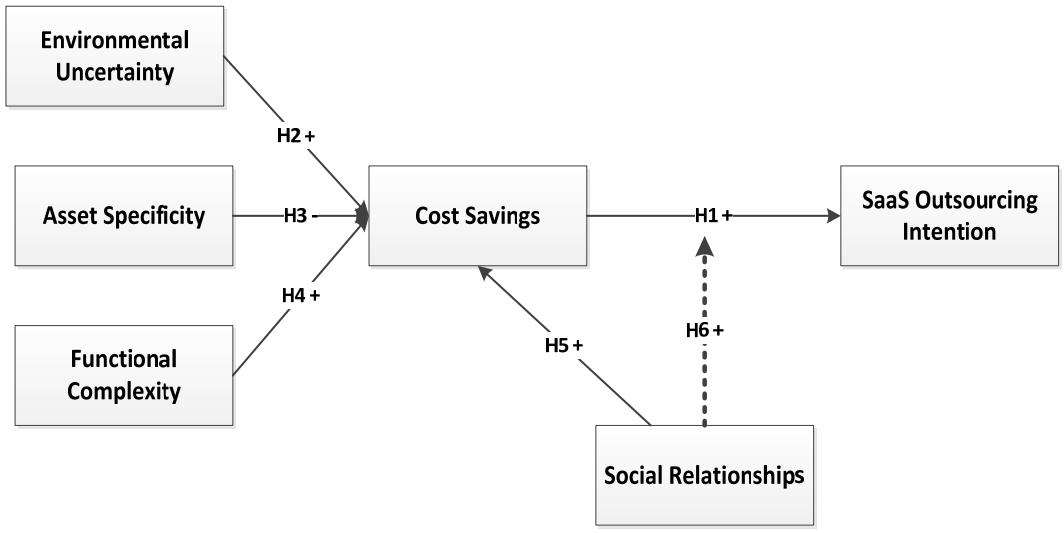

Figure 1. SaaS Outsourcing Intention Model

4 Research Methodology

To provide a methodologically rich analysis of firms' SaaS outsourcing intention, we conducted a mixed-methods study (i.e., we used both quantitative and qualitative research methods). We used field interviews to broaden our knowledge of firms' SaaS outsourcing decisions in an organizational context and to both clarify the constructs we formulated for the theoretical model and refine the survey items we developed for the quantitative portion of the study. We also conducted a national survey to test the model. Table 2 presents the research methodology and detailed processes we followed in this study, including the samples used in each step.

The qualitative pilot study involved an outsourcing project in which a university evaluated the SaaS business model alternative to deliver a course-management system. Each interview involved a key decision maker (see Table 2) and lasted approximately one hour. These interviews confirmed our belief that most of the factors specified in the decision model did influence a firm's decision to outsource to a SaaS provider. We used the findings to develop and refine the survey instrument for general SaaS outside the academic computing context.

For the quantitative study (see Table 2), we conducted the pretest among practitioners directly involved in hosting SaaS services in two industries (i.e., finance and hospitality), scholars from a local university. The pilot study participants were EMBA and MBA students from a large local university and IT professionals from local technology associations. We conducted the final formal study on American computer executives that we randomly selected from a national dataset maintained by a third party.

4.1 Instrument Development

We borrowed most measures from previously validated instruments and modified them as necessary for the SaaS provider business model. Specifically, we borrowed the measurements for uncertainty from Miller and Friensen (1982) and Zaheer and Venkatraman (1995), the measurements for asset specificity from Zaheer and Venkatraman (1995), the measurements for functional complexity from Ang and Straub (1998), and the measurements for cost savings from Ang and Straub (1998) and Grover, Cheon, and Teng (1996). We developed only the questions for social relationships. Based on Cook and Emerson (1987), Henderson (1990) and Kern (1997), we developed the three questions to reflect the definition of social relationships and the degree of closeness of this relationship. The first two questions measured the general social relationship and personal relationship between the managers, while the last question measured the degree of closeness regarding the social relationship between managers in the two companies.

Table 2. Research Methodology and Process

Qualitative pilot study	Goals	• Gain insight on firms' SaaS outsourcing decision. • Clarify the constructs and questionnaire. • Provide possible explanation for findings from the survey studies.
	Setting	• Case interview: outsourcing decision of a course-management system in a university.
	Instrument	• Interview questions validation: two academic scholars.
	Participants	• Interviews with five key decision makers: two IT managers at office of computing service, director of the center for excellence in learning and teaching, director of computing services at a business school (a major provider client), and provost.
Quantitative survey study	Goals	• Develop a valid and reliable measurement. • Test the SaaS model.
	Pretest	• Interview nine practitioners and five scholars to test the questionnaire o Nine practitioners: marketing manager and IT manager of SaaS client company (i.e., banking), director of SaaS provider for major enterprise applications, three directors of marketing and SaaS development from a global IT products and services company, founder of an SaaS provider in the hospitality industry, and a CIO and CTO of a SaaS provider for finance services. o Five academic scholars from the management, marketing, and IS disciplines.
	Pilot Test	• Conduct a survey among a convenience sample of business professionals with four to 25 years of experience: o Six executive MBA students: senior management level in their organizations. o 36 professional MBA students: middle management level in their organization. o 22 IT professionals from two technology associations in charge of technology adoption decisions in their organizations.
	Formal Surveys	• Conduct the survey among randomly selected 1000 top American computer executives (effective response rate of 12%). o Survey distribution: use physical mail. o Each participant has three options for survey fill-in and return: Web, physical mail, and fax. • Five-step survey administration. o Pre-notice, survey distribution, two rounds of reminder (email or postcard), telephone reminder, thank you notes.
	Data analysis	• Missing value analysis and response bias analysis. • Two-step WarpPLS approach: measurement model and structural model.

The dependent variable, SaaS outsourcing intention, refers to extent to which a company intends to outsource the software applications it uses to a SaaS provider. We conceptualize this construct from three perspectives: operational, functional, and financial (Ang & Straub, 1998). The operational perspective refers to the way one manages IT applications: from partial to total outsourcing (Ang & Straub, 1998). The functional perspective refers to the scope of applications that a company plans to outsource to a SaaS provider; such applications could include finance and accounting, human resource management, or sales force support (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004). The financial perspective examines the extent to which a company intends to outsource to a SaaS provider strictly in terms of financial investment. A company may look at how much of the total application portfolio it plans to outsource relative to the total value of its IT application portfolio (Benlian et al., 2009). Although many studies show that intention may or may not result in actual behavior (e.g., Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003), we argue that we need to understand intention since a stronger intention to use leads to a stronger likelihood of usage.

Academic scholars and industry practitioners involved in service-adoption decisions in five different organizations reviewed our initial questionnaire, and we modified the questions based on their feedback. We then conducted a pilot survey among practitioners who had four to 25 years of work experience (see Table 2). We collected 40 complete questionnaires from the prospective SaaS users. We conducted a factor analysis. Based on the results, we extensively modified the measurement items and survey instructions. Through this iterative process, we established the necessary confidence to move forward with the survey study.

4.2 Data Collection

We conducted a self-administered survey among a national sample of top computer executives (TCEs) at randomly selected organizations in the United States across different industries. We randomly selected the name and physical mailing address of 1000 IS executives from a private list maintained by a marketing research firm. The participants targeted in the survey were upper management decision makers in their organizations.

Since we only had access to physical mailing addresses for the TCEs, we employed a physical mail survey as the major method. However, we gave every participant the choice of three options (Web, mail, and fax) for completing and returning the questionnaire. We adopted the total design method, the data-collection procedure that Dillman (2000) recommends. We conducted multiple steps: pre-notice, survey distribution, two rounds of reminders, and thank you notes. To encourage participation, after the first round postcard reminder, we contacted non-respondents by telephone.

5 Results

Due to the inaccuracy of physical mailing addresses, we successfully delivered only 782 initial surveys and obtained only 93 questionnaires in return. Of these 93 questionnaires, only 80 came from prospective clients who had been considering a SaaS solution for their organization but had not yet made a decision. Appendix B shows their demographic information.

We used an extrapolation method to assess non-response bias. We designated the midpoint of the data-collection as the cutoff point to distinguish early respondents from late respondents (Churchill & Iacobucci, 2009). We found no significant demographic differences between early and late respondents at the 0.05 alpha level. The distribution ratio in this sample was approximately the same as that in the whole population for the categories of city size, IT professionals, and industries; therefore, we assumed this data set to adequately represent the sample.

5.1 Measurement Model

We next analyzed the measurement model. Table 3 presents the final loading and weight of each item on its specified construct. All items had loadings higher than 0.7. Composite reliability of each construct was higher than 0.9. Average variance extracted (AVE) for all constructs was larger than 0.5 (see Table 2). We determined reliability to be better than adequate.

In the measurement model, we found that change of business practice (EU5) and change of customer requirement (EU6) appeared to reflect internal environmental change associated with specific companies and could be viewed as a micro-perspective. The remaining items appeared to represent a more macro-level perspective, such as economic and market change. After careful reflection, we determined that distinguishing this greater granularity in our constructs made sense and could reveal greater insights into the environmental uncertainty. Hence, we created two distinct environmental uncertainty constructs: EUMA (macro-level) and EUMI (micro-level).

We also analyzed cross-loadings and AVEs to determine the discriminant validity of the measurement. Each item loaded higher on the construct that each we intended it to measure than it did on all other constructs. This cross-loading check indicated that all indicator items loaded strongly on their specified constructs. Thus, these results support discriminant validity (see Table 4).

Table 3. Measurement Model: Loadings, Weights, and Composite Reliability

Construct	Structural model			
	Variable	Weight	Loading	Composite reliability
Environmental uncertainty-MA (EUMA)	EU1	0.270	0.875	0.944
	EU2	0.288	0.933	
	EU3	0.282	0.912	
	EU4	0.271	0.878	
Environmental uncertainty-MI (EUMI)	EU5	0.517	0.966	0.966
	EU6	0.517	0.966	
Asset specificity (ASS)	ASS1	0.279	0.889	0.940
	ASS2	0.276	0.878	
	ASS3	0.284	0.904	
	ASS4	0.282	0.898	
Functional complexity (FUN)	FUN1	0.273	0.869	0.940
	FUN2	0.282	0.897	
	FUN3	0.284	0.905	
	FUN4	0.282	0.896	
Cost savings (COS)	COS1	0.220	0.784	0.915
	COS2	0.232	0.840	
	COS3	0.248	0.849	
	COS4	0.241	0.839	
	COS5	0.243	0.837	
Social relationships (REL)	REL1	0.376	0.916	0.928
	REL2	0.367	0.894	
	REL3	0.367	0.892	
SaaS outsourcing intention (INTENT)	ADPPERC	0.357	0.840	0.944
	ADPBUDG	0.355	0.906	
	APPGEN	0.356	0.912	

Table 4. Correlations between Latent Constructs and Square Root of AVE

	AVE	EUMA	EUMI	ASS	FUN	COS	REL	INTENT
EUMA	0.810	**0.900**						
EUMI	0.933	0.657	**0.966**					
ASS	0.796	-0.088	-0.231	**0.892**				
FUN	0.796	0.060	0.045	0.030	**0.892**			
COS	0.712	0.133	0.311	-0.414	0.270	**0.844**		
REL	0.812	0.285	0.455	-0.042	-0.137	0.174	**0.901**	
INTENT	0.799	0.174	0.418	-0.328	0.152	0.492	0.337	**0.894**

Note: the diagonal elements are the square root of the variance shared between the constructs. Off-diagonal elements are the correlations between constructs.

We statistically tested for common method bias in two different ways in the data sets. First, we applied Harman's one-factor test (Malhotra, Kim, & Patil, 2006). The results from the exploratory factor analysis showed that no single factor emerged from unrotated factor solutions. In the sample of prospective users, the first item explained only 17 percent of the total variance, while the second variable explained 16 percent of the total variance. There was no dominant factor regarding explanation power. Second, we employed the marker variable method (Lindell & Whitney, 2001). We used the lowest correlation variable among all the zero-order correlations as an estimate of common method variance. After we excluded this common method variance, all corrected correlations between predictors and dependent variables remained statistically significant. After conducting these tests, we were confident that common method bias was unlikely to be a serious concern in this study.

With these assessments, the measurement model showed that the survey instrument satisfied the requirements for various validity checks.

5.2 Structural Model

We further tested the hypothesized paths in the structural model by using WarpPLS (Kock & Lynn, 2012). WarpPLS can capture the variance explained by not only linear relationship but also curvilinear relationships, such as U- or S-shaped relationships.

Figure 2 illustrates the structural path diagram with corresponding path coefficients. As hypothesized, cost savings showed a very strong positive influence on SaaS outsourcing intention. Thus, we found support for H1. The results also show that all the antecedents of cost savings had significant relationships with it and that environmental uncertainty, asset specificity, functional complexity, and social relationships explained 45 percent of its variance. Micro-environmental uncertainty associated with internal requirement changes had a strong positive impact on cost savings, whereas macro-environmental uncertainty associated with external industry change showed a negative impact on cost savings. Thus, our results partially support H2. Additionally, as hypothesized, high asset specificity (ASS) decreased the cost savings associated with SaaS, whereas high functional complexity (FUN) increased the cost savings associated with SaaS. Thus, our results support H3 and H4.

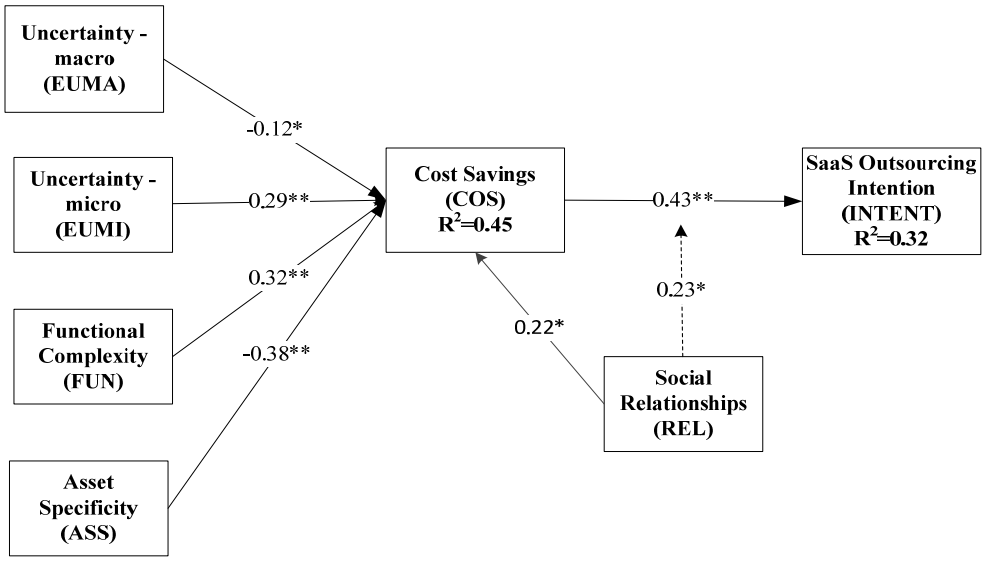

Figure 2. SaaS Outsourcing Intention Model[1]

We also tested the impact of social relationships on cost savings. It exerted a significant and positive impact on cost savings as hypothesized. Figure 2 shows the moderating relationship between cost savings and social relationships as a dotted line. The path coefficient of the interaction construct was significant at the 0.05 level. The proportion of variance explained (R-squared) added by this interaction item was 0.04 and effect size f2 was 4.5 percent. Thus, these results support H5 and H6. With the

[1] Asterisks indicate significance of paths: ** P < 0.01, * P < 0.05.

interaction effect, the total variance explained for SaaS outsourcing intention in this model was 32 percent (see Figure 2).

Additionally, we tested control variables: industry and company size. Industry had a significant impact on SaaS outsourcing intention (i.e., companies in service industries tended to have a higher intention compared with the companies in manufacturing industries). Company size also showed a significant relationship (i.e., small and large companies tended to have higher intention while medium-sized companies had lower intention).

6 Discussion

By combining transaction cost theory with social relationships, we extend previous studies by exploring the impact of cost savings on SaaS outsourcing intention and the role of social relationships in economic considerations. The results show that cost savings play a significant role in shaping SaaS outsourcing intention, which is consistent with previous studies on outsourcing (e.g., Ang & Straub, 1998; Benlian et al., 2011). Our results from the qualitative pilot study further illustrate this finding. In one company that adopted a cloud-based course-management system to replace its self-developed system, the CIO claimed the essential reason for the replacement was the pressure of increasing internal hosting costs, such as the high investment in hardware, software, and IT professionals:

> *The usage is increasing so quickly, the extended enterprise edition applications need at least 8 more servers to run. [We] will have to buy more computer servers. It is a huge amount of money. Also, if we buy more servers, we would need to hire more IT professionals to maintain these servers and run the applications.*

By contrast, one can see the SaaS hosting costs as more manageable. One can shift the potential hardware costs and human capital costs to a SaaS provider (Zaheer & Venkatraman, 1995). Hence, although one cannot perfectly predict the long-term economic benefits, perceived cost savings in the short-term are attractive to potential clients. Our study confirms that, for prospective SaaS users, their anticipation of cost savings positively influences their intention to outsource to a SaaS provider.

Although most previous studies recognize the importance of economic factors (e.g., Ang & Straub, 1998; Benlian et al., 2011), few have studied the impact of social relationships on economic concerns in the SaaS context. We found that close relationships tend to influence prospective clients' intention to outsource to a SaaS provider through direct and indirect impacts on cost savings. In fact, many SaaS providers owe their early success to a deep and broad social and personal network. Such a relationship can help reduce the information asymmetry that exists between clients, improve their communication, reduce effort in negotiating and problems solving, and culminate in a greater SaaS outsourcing intention. A closer relationship assures a client of the provider's credibility. Many small or medium-sized companies lack the ability to assess a SaaS provider's technical expertise. Highly capable SaaS providers may provide a better cost savings and high-quality services compared with other providers due to economies of scale.

Additionally, our results confirm that when client companies and SaaS providers have formed a friendly relationship, client companies tend to emphasize the economic benefits of SaaS. With a close personal relationship, SaaS providers are more likely to "go the extra mile" to take care of their customers. By combining cost savings and social relationships, we extend previous studies by drawing attention to social relationships and providing a more comprehensive framework to analyze the economic concerns of SaaS. The results also suggest that managers of SaaS providers should deliberately extend their personal network through various social events, which can possibly form a potential customer pool. Customers with high expected economic benefits from friendly providers are more likely to convert into real users of SaaS services.

We also examined the antecedents of environment uncertainty, asset specificity, and functional complexity on cost savings. Although previous studies have presented a unified view of environmental uncertainty (Ang & Cummings, 1997), we discovered two distinct types: micro-environmental uncertainty (i.e., company or intra-company level) and macro-environmental uncertainty (i.e., industry level).

Macro-environmental uncertainty associated with the market and the economy can affect (expected) cost savings. As the market grows increasingly uncertain, clients who cannot or do not wish to search the market, make effective contracts, and monitor those contracts can expect low cost savings from a SaaS provider, and they may, thereby, choose to not outsource. On the other hand, an unstable market also

makes it harder to survive as a SaaS providers because they also have to make efforts to meet changing requirements, such as governmental regulations or industry standards. The increasing costs on the provider's side may pass to the clients and diminish the cost savings in our SaaS model.

Micro-level uncertainty pertains to a firm's internal variability of strategic or operational software requirements, which may lead to higher production costs if it does not have the requisite skills. Therefore, the decision to outsource or not depends on 1) the quality and variability of required software and expertise both inside and outside the firm and 2) its ability and willingness to incur and save transaction costs versus its ability and willingness to incur production costs. The SaaS model can help client companies to enable their internal functions to scale up or down more flexibly when their internal requirements are unpredictable and, thus, save costs.

Our understanding of environmental uncertainty in the SaaS context suggests that one might expect a SaaS provider to obtain greater interest from companies that experience significant internal change (e.g., from rapid growth, a merger or acquisition, or significant technological innovation). Customers that use SaaS services can achieve strategic flexibility in application usage with lesser internal investment.

Furthermore, our findings suggest that higher asset specificity may lead to reduced cost savings—possibly because fewer providers will offer the specific asset, which will increase price competition. This argument is also consistent with our observations in industries where known SaaS success generally involves packaged solutions that are generic and do not require significant customization. A company we interviewed in the pilot study adopted a standard version of the software service to avoid high customization costs and maintenance fees. Although the company lost the potential advantages of integrating the adopted system with their internal systems, the company increased its cost savings. Consistent with the findings from previous studies (e.g., Miranda & Kim, 2006; Ang & Cummings, 1997), we also found that high complexity leads to more outsourcing because of high human capital and financial capital investment in training and retaining employees to replace internally developed and possibly idiosyncratic applications. This finding implies that SaaS prospects seek cost savings by outsourcing complex or commodity applications to a qualified SaaS provider. We advise SaaS providers to investigate carefully what applications a significant number of customers need and to develop fruitful long-term relationships with clients. It also implies that SaaS providers can arrange some sort of attractive trial offer so that they can ensure profits by delivering the applications to a critical mass of customers. Longer-term contracts could be warranted to lock-in clients after such a trial offer.

7 Contributions and Limitations

7.1 Contributions

SaaS, which is a relatively new method to deliver and use software, has become an attractive option to many companies. However, we lack understanding about users' needs (Susarla et al., 2010). In this paper, we investigate client firms' intention to outsource to a SaaS provider. We combine transaction cost theory and social relationships to develop a framework to capture some important factors that impact SaaS outsourcing intention. Our results indicate that cost savings are a dominant factor to many clients when they consider the SaaS model. At the same time, social relationships significantly impact the effect of cost savings and directly changes the client company's expected cost savings. In this study, we also identify the factors associated with environment and applications that help client companies achieve greater cost savings.

Our results contribute to both research and practice. For researchers, our study contributes to theory development by combining transaction cost theory and social relationships in the same model to provide a deeper understanding of clients' concerns. By identifying the differences between traditional outsourcing and SaaS, we build a model to specifically understand the economic factors in the SaaS setting. Our study confirms the impact of economic factors on SaaS outsourcing intention and the usefulness of transaction cost theory (Ang & Straub, 1998; Benlian & Hess, 2009). Our study goes beyond previous studies that use only an economic perspective and explores the role of social relationships in shaping the economic considerations. IS research has tended to neglect social relationships. The results reveal that managers' social and personal relationships with clients companies can effectively change how clients assess economic rewards from SaaS and make a more favorable decision. Hence, we contribute to the academic literature by recognizing the importance of social relationships in understanding cost

considerations and forming a simple yet useful model to examine SaaS outsourcing intention. The empirical investigation further confirms the significance and validity of our approach.

For practitioners, this research provides a succinct guide for SaaS providers to better understand their potential customers' needs and deliver applications to meet them. SaaS providers should consider building positive social and personal contacts between managers through trade shows, exhibitions, and other networking activities. This observation goes against the generic grain of the "utility computing" concept. We would also encourage SaaS providers to carefully consider their process for signaling their credibility and expertise to their prospective clients. Such validation may occur through the simple sharing of success stories. In this way, the SaaS provider could play an active role to improve the prospective client's level of confidence in the SaaS model and, therefore, influence the SaaS outsourcing decision. The model's antecedents that influence cost savings suggest the specific factors client companies are likely to consider when deciding whether to use SaaS. Commensurately, SaaS providers need to carefully choose the right applications to offer. Complex but commodity applications could be the best candidates. The mixed impacts from environmental uncertainty indicate that the SaaS model may help to accommodate clients' needs in an uncertain market if they are willing and able to exploit them. This finding also calls for further research to clarify the impacts from economic environmental uncertainty and whether there are additional mediating/moderating variables or situational contingencies that mitigate the environmental uncertainty.

7.2 Limitations and Future Research

As services and applications expand to Web and mobile service technology development, open source platforms, and packaged yet configurable software, SaaS decision factors will need to evolve. We will need to continue these inquiries regarding SaaS and related developments. We hope our research encourages managers of SaaS providers to rethink how they determine their software service offerings and pursue prospective users.

With that said, our research has several limitations. We administered our survey to a cross-industry population. We would encourage further studies to focus on a particular industry to control for any possible industry effect. One author learned from the CIO of an US$8 billion dollar company that they determined that 98 percent of all core functions in their organization, with the exception of production, could be standardized across their three quite different business divisions. As asset specificity decreases, we may see SaaS outsourcing accelerate rather quickly in such an organization. We need further studies to determine how much different industries accept and implement business process standardization.

We also used a relatively small sample size, which we attribute to the nature of C-level executive participants who are extremely busy. Methodologically, in order to expand on our findings and to improve the generalizability of our results, we need subsequent studies with a larger sample size.

It would also be interesting to conduct longitudinal case studies among a group of prospective users to clearly explore the different impacts of these determinants on the outsourcing decision between actual users and non-users.

8 Conclusion

In this paper, we explain the economic considerations that clients face when choosing whether to outsource to a SaaS provider. We also examine how social relationships influence this decision. Building on previous studies, we combine transaction cost theory and social relationships to develop an integrated model for SaaS outsourcing intention. The empirical results from a national sample of prospective clients confirm the importance of cost savings in choosing whether to outsource to a SaaS provider and reveal the special role of social relationships. Close social relationships not only have a significant direct impact on cost savings but also enhance these savings' influence on SaaS outsourcing intention. Companies that face high internal uncertainty (e.g., changing organizational demand but low external uncertainty) can achieve high cost savings through SaaS. Our findings also suggest that SaaS providers should consider offering complex but standard applications to large or small companies. Further, our results extend our understanding of economic factors in SaaS and reveal the importance of social relationships in influencing cost concerns, which provides valuable suggestions to practitioners.

The SaaS market has grown rapidly and has played an important role in turning software into services. In this dynamic market, clients need to evaluate various options and manage their resources efficiently in

order to maintain a competitive advantage. As such, we need to understand the factors that influence whether firms choose to outsource to a SaaS provider. Our study provides a foundation for others to further study this important phenomenon.

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Appendix A

Table A1. Summary of the Constructs and Relevant Literature

Factors	Operational definition	Relevant literature
SaaS outsourcing intention	A company's perceived intention to outsource applications to a SaaS provider.	Davis(1989), Ang & Straub (1998), Grover, Cheon, & Teng (1994)
Environmental uncertainty	The unpredictability of change associated with the external environment, such as market fluctuations, technology advances, economic trends, and industry-specific influences.	Williamson (1985), Zaheer & Venkatraman (1995), Ang & Cummings(1997)
Asset specificity	The degree of uniqueness of human skill and expertise and the technical infrastructure (software and hardware) required to deliver the client's functions.	Williamson (1985), Grover et al. (1996), Grover, Teng, & Cheon (1998), Ang & Straub (1998)
Functional complexity	The extent of complexity in software, hardware, and knowledge requirements to provide IS functions for the organization.	Zaheer & Venkatraman (1995)
Cost savings	The cost advantage a company anticipates when it compares internal production costs associated with not adopting a SaaS provider to the external costs associated with adopting a SaaS provider.	Ang & Straub(1998), Kern & Willcocks (2002), Jayatilaka et al.(2003)
Social relationships	An informal relationship between one or more individuals at a client company with one or more individuals at a SaaS provider.	Cook & Emerson (1987), Henderson (1990), Kern (1997)

Appendix B

Table B1. SaaS Survey Participants Demographics

	Category	Number	%
Positions	Executive manager	38	47.5
	Functional manager	7	8.75
	IS/IT manager	35	43.75
No. of employees	Less than 20	12	15
	20–99	15	18.75
	100–500	15	18.75
	More than 500	38	47.5
No. of IT professionals	Less than 10	31	38.75
	11–30	17	21.25
	31–50	13	16.25
	More than 50	19	23.75
Outsourcing experience	No	39	48.75
	Yes	39	48.75
	not report	2	2.5
In-house maintenance experience	No	53	66.25
	Yes	26	32.5
Gross revenue (USD)	not report	1	1.25
	Less than $5 million	17	21.25
	$5 million–$10 million	5	6.25
	$10.1 million–$20 million	7	8.75
	$20.1 million–$50 million	6	7.5
	$50.1 million–$100 million	10	12.5
	$100.1 million–$500 million	12	15
	$500.1 million–$1 billion	8	10
	more than $1 billion	11	13.75
	not report	4	5
Industry	Banking/finance/accounting	8	10
	Manufacture	22	27.5
	Healthcare/medical	2	2.5
	Real estate/legal	5	6.25
	Government (federal, state, local)	4	5
	High Tech	14	17.5
	Education	3	3.75
	Communications	3	3.75
	Publishing/public relation	4	5
	Wholesale/retails/distribution	3	3.75
	Marketing/advertising/entertainment	6	7.5
	Other: aerospace and defense, energy, insurance, research, business services, transportation/utility	6	7.50
	10,000–49,999	13	16.25
	50,000–99,999	9	11.25

Table B1. SaaS Survey Participants Demographics

City size	100,000–249,999	8	10
	250,000–499,999	12	15
	500,000–999,999	16	20
	1,000,000 or more	21	26.25
Total		80	100.00

Appendix C

Table C1. Questionnaire Items

Construct	Item	Wording
Environmental uncertainty		*Please estimate the extent to which you can predict changes in the following:*
	EU1	The overall economy/market.
	EU2	Market share of competition in our industry.
	EU3	Supply of labor / materials in our industry.
	EU4	Introduction of new products in our industry
	EU5	Business practices needed for us to remain competitive in our industry.
	EU6	Customer requirements/needs in our industry.
Asset specificity		*Please state your agreement/disagreement with each of the following statements. To handle our business application, we require that our SaaS provider:*
	ASS1	Make a substantial investment in equipment tailored to our needs.
	ASS2	Make great efforts to customize software for our applications.
	ASS3	Possess specialized technical knowledge.
	ASS4	Possess specialized business knowledge.
Functional complexity		*Compared to our competitors:*
	FUN1	Our company uses more hardware platforms and multiple systems configurations
	FUN2	Our company's software portfolio is more sophisticated/complex.
	FUN3	Our data processing operations are more complex.
	FUN4	We need more specialized IS functions to operate our business.
Cost savings		*We expect that using SaaS will:*
	COS1	Reduce our costs of training new and/or existing information systems personnel.
	COS2	Reduce the costs of modifying existing applications.
		In our firm's opinion:
	COS3	It is cheaper to monitor our SaaS provider than to manage our own data processing facilities.
	COS4	It is cheaper to extend an application with our SaaS provider than with traditional software vendors.
	COS5	It will require a minimal amount of time and effort to negotiate a contact, e.g. conditions, or prices, with our SaaS provider.
Social relationships		*We must have had:*
	REL1	Social contacts with our SaaS provider.
	REL2	Personal contact with the founder/CEO of our SaaS provider.
	REL3	A close personal relationship with the managers of our SaaS provider.
SaaS outsourcing intention	ADPGEN	Among all applications in your company, what functional scope of applications will be outsourced to SaaS?
	ADPPERC	Among applications that could be outsourced, what percentage of them will be outsourced to SaaS?
	ADPBUDG	Among IT budget for applications that could be outsourced, what percent is used for SaaS services?

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