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Yurong Yao  
*Louisiana State University*

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# AN INTEGRATIVE MODEL OF CLIENTS' DECISION TO ADOPT AN APPLICATION SERVICE PROVIDER

**Yurong Yao**  
Louisiana State University  
[yyao1@lsu.edu](mailto:yyao1@lsu.edu)

## Abstract

*Application Services Providers (ASPs) exploit the economics of delivering commercial off-the-shelf software over the Internet to many dispersed users. This proposed study intends to develop an integrative model for ASP adoption decisions, which includes economic, strategic and social factors. This model will examine the individual effect of these factors and their interactions. The study will include both qualitative and quantitative techniques by employing case studies and a survey to empirically test the model. It will provide a valuable framework for understanding customers' ASP adoption decisions and help ASPs to reevaluate their marketing and application strategies.*

## Introduction

Since 1990, the explosion in Internet connectivity and increased bandwidth, coupled with the ubiquitous nature of computing, has made the delivery of software applications from remote data centers technologically feasible and economically attractive. An application service provider (ASP) is defined as a company that manages and delivers application capabilities to multiple entities from a data center across a wide area network (ASP Industry Consortium, 2001, p.8). The decision to adopt services provided by an ASP is a complex process, which requires a broad comprehensive consideration of various factors. As a new form of outsourcing, the ASP model differs from traditional IS outsourcing models with respect to vendor, client, and applications (software ownership, target customers, customization, production functions, and contract length) attributes (see Table 1). These differences are expected to result in decision models for ASP adoption that are distinct from those in traditional IS outsourcing.

However, few empirical studies have focused on the ASP adoption decision from a comprehensive view (Lee, et al., 2002). My research employs an integrative approach to investigate the important determinants of this decision from three perspectives, economic, social and strategic. Specifically, I will investigate the following questions: *What are the economic, strategic and social factors impacting customers' decision to adopt an ASP and what are the interactions among these factors?* This research will contribute to the literature by explaining customer attitudes towards an online application delivery from a more holistic view. In addition, it will help ASPs to understand the complex adoption decision process and adjust their business strategies to satisfy client requirements and increase customer usage.

## Theoretical Background

Principal outsourcing theories can be classified according to three perspectives: economic, social and strategic. Each theory sheds its unique insight on the ASP adoption decision. Based on the theoretical foundation described below, I have developed an integrative model for ASP adoption. I argue that economic, social and strategic factors will work both individually and interactively. The interactions will influence the relationship strength between some factors and the ASP adoption decision.

**Table 1. Summary of Characteristics of Traditional IS Outsourcing vs. ASP Business Model**

	Attribute	Traditional IS Outsourcing Model	ASP Business Model
Customer Characteristics	Target Clients	<ul style="list-style-type: none"> <li>Large organizations, (e.g., Fortune 500) with own IT departments</li> </ul>	<ul style="list-style-type: none"> <li>Initially, small or medium-sized organizations with low IT expertise</li> <li>Recently, larger organizations are adopting</li> </ul>
Vendor Characteristics	Vendor Characteristics	<ul style="list-style-type: none"> <li>Large corporations, with potential global span; outsourcing is part of their business</li> </ul>	<ul style="list-style-type: none"> <li>Most ASPs are small entrepreneurial firms, lacking name recognition: outsourcing is core revenue stream</li> <li>Some new ASPs are large companies; outsourcing is a small part of their business</li> </ul>
Product Characteristics	Functions Provided	<ul style="list-style-type: none"> <li>Application development</li> <li>Information utilities and business processes</li> <li>Operation of internal IT infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Web-enabled application delivery</li> <li>Productivity applications, data management, internet access</li> </ul>
	Extent of Customization	<ul style="list-style-type: none"> <li>High customization available</li> <li>Client-determined</li> </ul>	<ul style="list-style-type: none"> <li>Standard software packages</li> <li>Clients pay separately for customization</li> </ul>
	Resource Ownership	<ul style="list-style-type: none"> <li>Clients retain ownership of all or some hardware and software</li> <li>Clients retain control over custom-developed software</li> </ul>	<ul style="list-style-type: none"> <li>Vendors responsible for server hardware, and application licenses</li> <li>Clients only need web browsers</li> </ul>
Contract Types	Contract Types	<ul style="list-style-type: none"> <li>Case-by-case detail contract</li> <li>Long term (e.g. ten years)</li> <li>Strategic partnering “alliance”</li> </ul>	<ul style="list-style-type: none"> <li>Standard contracts</li> <li>Short term (one to three years)</li> <li>Initial payment and monthly usage fee</li> </ul>

### *Economic Perspective*

The economic perspective is concerned with the coordination and regulation of economic media in firms' transactions with one another by using transaction-cost and agency-cost theories. Transaction cost theory argues that production organization should balance production economics against transaction costs to achieve efficiency (Williamson, 1985). Three attributes (uncertainty, asset specificity and infrequency of contacting) will impact the transaction cost incurred between the two parties. High transaction costs will deter IS outsourcing (Grover, et al., 1998). Agency cost theory deals with the behavior and outcome contract of the relationship management. Agency costs contain three parts: the principal's monitoring cost of the agent's performance, the principal's residual cost, and the agent's bonding cost. Such costs are influenced by five factors: uncertainty, risk aversion, programmability, measurability, and length (Eisenhardt, 1988). Research has confirmed that financial slack, production advantages, transaction costs and agency costs are determinants influencing outsourcing decisions (Lacity and Hirschheim, 1993; Ang and Straub, 1998; Kern, et al., 2002). Due to the special features of the ASP business model, I argue that uncertainty, asset specificity and cost benefits are the three important factors impacting ASP adoption from the economic perspective.

**Uncertainty** refers to the amount of change in the environment (market, economy, industry and technology). Williamson (1975) argued that high market turbulence and frequent introduction of new technologies increase transaction costs. Changes in the nation-wide economy, industry demands and competition affect the IT investment and functional requirements (Nam, et al., 1996). Risks brought about by high uncertainty will deter outsourcing by increasing costs in contract negotiation, monitoring and coordination. However, short-term ASP contracts give clients the opportunity to frequently reevaluate an ASP's performance and force the ASP to pay more attention to service quality. It is often challenging for a company to focus on core business while still keeping up with rapidly changing technology, causing internal production costs to increase more rapidly than external ones. Thus, an ASP can effectively help clients quickly adapt to changing environments by performing their IT functions while reducing costs.

**Asset Specificity** refers to the uniqueness of products and application services acquired from ASPs. Zaheer and Venkatraman (1995) classified asset specificity into two categories: human asset specificity and procedural asset specificity. Ang and Straub (1998) include software and hardware asset specificity in procedure asset specificity. Highly customized applications demand special investments in hardware, software and extra application development effort. As it is difficult for an ASP to benefit from

economies of scale by delivering highly customized applications (Grover, et al., 1996), clients using ASP provided applications typically have to sacrifice economic benefits or flexibility. High asset specificity not only increases renting and transaction costs, but also reduces the likelihood of a client switching to another ASP.

**Cost Benefits** refer to the internal production cost (material, labor, and time) minus the external costs of adopting an ASP (including initial set-up fee, subscription cost, efforts spent on negotiation and monitoring, and switching cost). Customers' will most likely outsource an application to an ASP if outsourcing has a greater economic benefit than internal production. Ang and Straub (1998) empirically confirmed that, in the banking industry, the higher the production cost advantages provided by an external vendor, the higher the degree of IS outsourcing. Kern, et al. (2002) argue that the principal advantage of the ASP model is the predictable application usage costs. The low costs associated with the ASP model is cited as the key reason for attracting companies to adopt ASP model, despite the fact that few ASP customers are currently experiencing significant cost reductions (Jayatilaka, et al., 2002).

### ***Social Perspective***

Social exchange theory emphasizes the exchange relationship developed over time as well as the behaviors of the two specific actors within the relationship (Blau, 1964). Homans (1961) argued that trust will significantly influence the initialization and further development of an exchange relationship between two parties. This theory provides a useful framework to investigate evolving relationships between customers and an ASP (Lee, et al., 2002). Social exchange theory has been used by researchers to investigate the different antecedents of interorganizational relationships, such as trust, vendor capabilities, personal relationships, and reputation (Kern, 1997; DiRomualdo and Gurbaxani, 1998; Lee and Kim, 1999). In this study, I argue that trust based on social and personal relationships and an ASP's capability will influence a customer's ASP adoption decisions.

**ASP's Capability:** An ASP's capabilities consist of both business and technological capabilities. Business capability is the understanding of a client's business requirements, such as special industrial standards, business goals, organizational structures, internal management processes and IT requirements (Lee and Kim, 1999). Technological capability refers to the ASP's ability to deliver promised applications, provide 24/7 support and timely updates and ensure the security of data transfer and storage. DiRomualdo and Gurbaxani (1998) regarded an ASP's capability as a critical factor in the ASP vendor-client relationship. A customer's belief that an ASP is able to satisfy its requirements is dependent on the strength of the ASP's capabilities. This belief is essential for clients to develop trust in an ASP (Anderson and Narus, 1990). Beatty, et al. (1996) proposed that a client's trust in a vendor will increase when there is the perception of solid vendor capability, even without actual vendor experience.

**Social and Personal Relationship** refers to an informal relationship between individuals, which comes from normative exchange in previous activities (Kern, 1997). A close bonding between two firms will alleviate conflicts, produce more compliance in negotiating application services and increase the chances for the reuse of an ASP's applications. Trust evolves through gradual growth of knowledge and understanding of people during personal and social interactions (Blois, 1999). When the quality of application services does not vary, social networks will play an important role in initializing a contractual relationship (Rangan, 2000). Personal relationships between managers at a high level have been cited by most CEOs as a major mechanism in building inter-organizational trust, and subsequent business relationships (Henderson, 1990). Many ASPs form their initial customer base on a broad personal network of founders in a target industry.

**Trust** refers to a "firm's belief that another company will perform actions that will result in positive outcomes" (Anderson and Narus, 1990: p.45). Trust between organizations forms the basis of a business relationship (Blois 1999). In the context of ASP, trust has two levels of meaning. Taking the ASP business model as a whole, trust means that clients believe in the feasibility and benefits of an ASP business model. With regard to a specific ASP, trust refers to the belief that the ASP has both the intention and the ability to provide quality services (Morgan and Hunt, 1994). Marketing relationship research supports the idea that trust plays a critical role in establishing and developing an inter-organizational relationship (Morgan and Hunt, 1994). Increased trust between two parties can strongly encourage customers to start and continue a relationship with an ASP, resulting in further outsourcing success (Lee and Kim, 1999).

### ***Strategic Perspective***

Resource-based theory and resource-dependency theory form the basis of the strategic perspective. They examine outsourcing activities by balancing internal and external resources to achieve high strategic performance. Resource-based theory focuses on

a firm's internal resources and capabilities while resource-dependency theory examines external resources (Lee, et al., 2002). According to resource-based theory, outsourcing is taken as a strategic arrangement to help a company compensate for IS capability deficiency, while achieving its operative and productive goals, and further developing its competitive advantages (Grover, et al., 1996, 1998). Resource dependency theory argues that organizations will maintain powerful resources in-house and outsource weaker resources (Pfeffer and Salancik, 1978). Three resource dimensions (importance, discretion and alternatives) will impact a customer's dependence on agents, which further influences application outsourcing decisions (Pfeffer and Salancik, 1978). In this study, I argue that the removal of IT deficiencies and the importance of the application are important factors that influence ASP adoption decisions.

**IT deficiency removal** is the extent to which an organization needs to acquire external IT expertise to compliment its strategic development requirements. The initial target customers of ASPs are small and medium-sized enterprises that lack specific technology knowledge and an understanding of their IT requirements. Even large companies may not have sufficient knowledge about specific applications. Thus, outsourcing applications to an ASP becomes a good choice to realize strategic goals that would be difficult to realize with internal resources. By collaborating with an ASP, customers will have access to the newest technologies, can gain technical knowledge, bring product to market more rapidly and expand their own capability base (Yang and Huang, 2000). This is a fundamental way for clients to permanently improve IT proficiency.

**Application Importance:** Important applications are those impacting production and operations (Grover, et al., 1998). Deficiencies in such applications will significantly damage a company's competitive advantage and obstruct their operations. Outsourcing these applications will make clients more dependent on an ASP, which, in turn will increase switching costs. Thus, critical IS resources should be maintained in-house (Lee, et al., 2002). Even though the features of an ASP can reduce risk and increase the likelihood of outsourcing important applications, compared to traditional IS outsourcing (Lacity and Willcocks, 2001), clients may still keep core business applications in-house to maintain their competitive advantage.

### ***Moderating Effects***

Although economic and strategic factors individually affect the degree of ASP adoption, trust will moderate their respective effects upon the degree of ASP adoption. A client's initial trust in an ASP will alleviate the economic factors of ASP adoption (Kern, 1997). Zaheer and Venkatraman (1995) argued that trust, established before a formal contractual relationship, can reduce transaction costs, and lower monitoring and performance evaluation costs. Trust can reduce the external costs of ASP adoption thereby increasing cost benefits. Moreover, when there is little difference among the application services offered from several ASPs, clients will be likely to sacrifice cost benefits to go with an ASP that they trust. If customers strongly trust an ASP, they will believe that the ASP will protect their interests in uncertain environments and will be willing to outsource products with high asset specificity to that ASP.

Similarly, trust will influence the relationship between strategic determinants and the degree of ASP adoption. A client's strong trust in an ASP, based on social and personal relationships and on the ASP's capabilities, can raise that client's confidence in giving sensitive data to the ASP or in renting more important applications from the ASP in order to gain competitive strategic advantages (Lacity and Willcocks, 2001). Trust will also increase a client's confidence in an ASP's desire to deliver high quality products and services to compensate for a client's IT deficiency (Ganesan, 1994). Thus, a relatively high dependence caused by a customer's IT deficiency can be offset by the customer's trust in an ASP.

## **Research Model and Hypothesis**

Taking all these factors together, I developed an integrative model for ASP adoption (Figure 1). The dependent variable, the degree of ASP adoption, refers to the extent to which a company actually outsources its internal applications to an ASP (i.e., actual behaviors). I propose the following hypotheses:

- *Hypothesis 1: High uncertainty will increase the cost benefits associated with ASP adoption.*
- *Hypothesis 2: High asset specificity will reduce the cost benefits associated with ASP adoption.*
- *Hypothesis 3: The higher the costs benefits associated with ASP adoption, the larger the degree of ASP adoption.*
- *Hypothesis 4: A closer social and personal relationship will increase trust in an ASP.*
- *Hypothesis 5: The higher an ASP's business and technology capabilities, the higher the level of client trust.*
- *Hypothesis 6: The higher the level of client trust, the higher the degree of ASP adoption.*

- Hypothesis 7: The higher the application importance, the lower the degree of ASP adoption.
- Hypothesis 8: The higher the degree of IT deficiency removal, the higher the degree of ASP adoption.
- Hypothesis 9: Trust will moderate the relationship between cost benefits and degree of ASP adoption such that when trust is high there is a more positive relationship between cost and degree of ASP adoption.
- Hypothesis 10a: Trust will moderate the relationship between application importance and degree of ASP adoption such that when trust is high there is a more positive relationship between application importance and degree of ASP adoption.
- Hypothesis 10b: Trust will moderate the relationship between IT deficiency removal and degree of ASP adoption such that when trust is high there is a more positive relationship between IT deficiency removal and degree of ASP adoption.

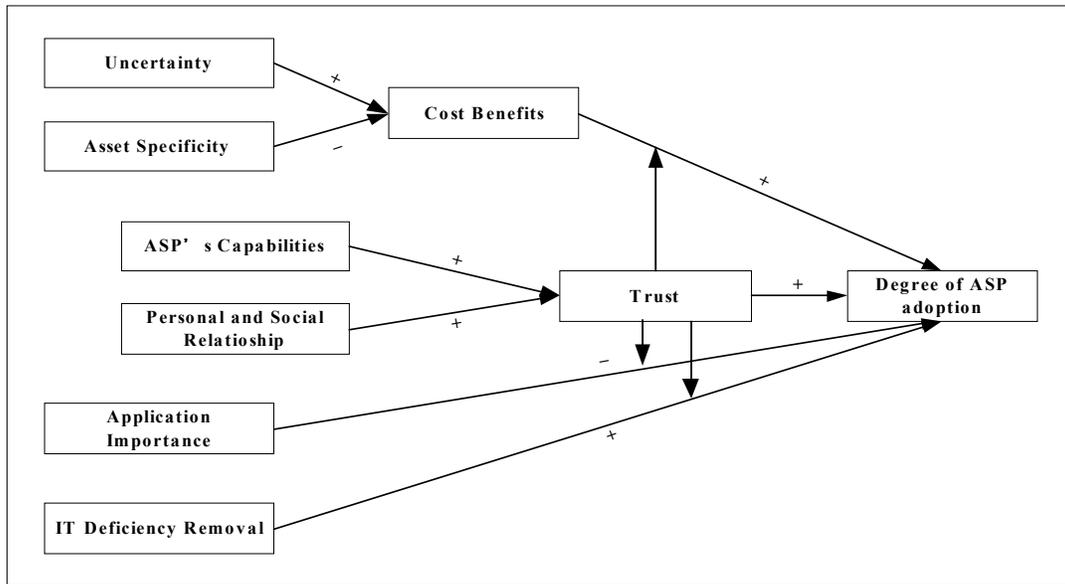


Figure 1. An Integrative Model for ASP Adoption

## Research Design

This research adopts a positivist approach. Both quality and quantitative techniques will be used to test the conceptual model. In the qualitative part, I conduct a case study in a large public university that is considering outsourcing an online education application to an ASP. Multiple semi-structured interviews are conducted with key decision makers in this outsourcing project, including CIO of computing center, technical manager and provost. These interviews will bring insights on understanding factors in ASP adoption decisions.

In the quantitative part, a self-administrated survey will be employed as the principal method. I have identified 20 ASPs with relatively large customer bases that are actively serving in their markets. I will contact all these ASPs and try to get their sponsorship on this research. After I get confirmation from these ASPs, the study sample will consist of decision makers for ASP adoption, such as CIOs and CEOs, in each ASP's customer organizations (approximately 800). Special attention will be given to the development and validation of the survey instrument. I have borrowed items from previously validated instruments to form the basis of my survey. Interviews are conducted among several practitioners and academic researchers to pretest the survey for content validity, face validity and reliability. After revision based on this feedback, the survey will be further pilot tested among executive MBA students. Confirmative factor analysis will be used to statistically check construct validity and reliability. The instrument will be revised based on this analysis. Then I will administer a web-based survey with five rounds of correspondence: pre-survey announcement, survey distribution, two follow-ups and thank you notice (Dillman, 2000). Fax and mail survey will be the alternatives for subjects who cannot be reached by email. Structural Equation Modeling will be used for data analysis.

## Conclusion

This study makes contributions to both researchers and practitioners. For researchers, this is the first time that the determinants of ASP adoption are empirically examined from an integrative perspective. This conceptual model contributes to the literature by presenting a broad perspective for understanding ASP adoption. The findings from the survey can elucidate the independent impact of economic, social and strategic perspectives as well as interactions among them for ASP adoption. For practitioners, this is an empirical study specifically focusing on the ASP market. Due to the unique features of the ASP business model, it can shed insight on special determinants of ASP adoption. Since ASPs are experiencing difficulty growing, this study can help them gain a better understanding of a client's concerns regarding ASP adoption and help them to make adjustments in their services in order to increase application usage.

## References

- ASP Industry Consortium. *Intelligent Enterprise*, 4(1), 2002, pp.8.
- Anderson, J. C. and Narus, J. "A model of distributor firm and manufacturer firm working partnerships," *Journal of Marketing*, 54, 1990, pp. 42-58.
- Ang, S. and Straub, D. "Production and transaction economies and information systems outsourcing: A study of the US banking industry," *MIS Quarterly*, 22(4), 1998, pp. 535-552.
- Beatty, S. E., Mayer, M., Coleman, J.E., Reynolds, K. E., and Lee, J. "Customer-sales associate retail relationships", *Journal of Retailing*, 72(3), 1996, pp. 223-248.
- Blau, P. M. *Exchange and Power in Social Life*, New York: John Wiley & Sons, 1964.
- Blois, K. J. "Trust in Business to Business Relationships; An Evaluation of its Status", *Journal of Management Studies*, 36(2), March, 1999, pp. 9-21.
- Dillman, Don A. *Mail and Internet Surveys: The Tailored Design Method*, second edition, New York: John Wiley & Sons, Inc, 2000.
- DiRomualdo, A. and Gurbaxani, V. "Strategic intent for IT outsourcing," *Sloan Management Review*, 39(4), 1998, pp. 67-80.
- Eisenhardt, K. M. "Agency-and Institutional-theory Explanations: The Case of Retail Sales Compensation." *Academy of Management Journal*, 31(3), 1998, pp. 488-511.
- Ganesan, S. "Determinants of long-term orientation in buyer-seller relationship," *Journal of Marketing* 58, 1994, pp. 1-25.
- Grover, B., Cheon, M. J., and Teng, J.T.C. "The Effect of Service Quality and Partnership on the Outsourcing of Information Systems Functions," *Journal of Management Information System*, 12(4), 1996, pp. 89-116.
- Grover, B., Teng, J. T.C. and Cheon, M. J. "Towards a Theoretically-based Contingency Model of Information Systems Outsourcing", In *Strategic Source of Information Systems: Perspective and Practices*, edited by Willcocks, L. P. and Lacity, M. New York: Wiley, 1998, pp. 79-102.
- Henderson, J. C. "Plugging into Strategic Partnerships: The Critical IS Connection", *Sloan Management Review*, Spring, 1990.
- Homans, G. C. *Social Behavior: Its Elementary Forms*. New York: Harcourt Jovanovich, 1961.
- Jayatilaka, B., Schwarz, A., and Hirschheim, R. "Determinants of ASP Choice: an integrated perspective". *Proceeding of the 36th Hawaii International Conference on Information Systems*, Hawaii, 2002.
- Kern, T. "The Gestalt of an Information Technology Outsourcing Relationship: An Exploratory Analysis," *Proceeding of the eighteenth International Conference on Information Systems*, 1997, pp.37-58
- Kern, T., Kreijger, J., and Willcocks, L. "Exploring ASP as sourcing strategy: theoretical perspective, propositions for practice". *Journal of Strategic Information Systems*, 11, 2002, pp. 153-177.
- Lacity, M. and Hirschheim, R. *Information Systems Out-sourcing Myths, Metaphors, and Realities*, New York: Wiley & Sons, 1993.
- Lacity, M. C. and Willcocks, L. P. *Global information Technology Outsourcing: In Search of Business Advantage*, New York: Wiley & Sons. 2001.
- Lee, J. N., Huynh, M. Q., Kwok, R. C. W., and Pi, S. M. "Current and Future Directions of IS Outsourcing", in: *Information Systems Outsourcing: Enduring Themes, Emergent Patterns, and Future Directions*, edited by Hirschheim, R., Heinzl, A. and Dibbern, J., Heidelberg: Springer, 2002.
- Lee, J. N., and Kim, Y. G. "Effect of Partnership Quality on IS Outsourcing Success: Conceptual Framework and Empirical Validation," *Journal of Management Information Systems*, 15(4), 1999, pp. 29-61.
- Morgan, R. and Hunt, S. "The commitment-trust theory of relationship marketing," *Journal of Marketing*, 58, 1994, pp. 3-23.
- Nam, K., Rajagopalan, S., Rao, H. R., and Chaudhury, A. "A Two-level Investigation of Information Systems Outsourcing," *Communications of the ACM*, 39(7), 1996, pp. 36-44.
- Pfeffer, J. and Salancik, G. R. *The External Control of Organization*, Boston: Pittman, 1978.

- Rangan, S. "The Problem of Search and Deliberation in Economic Action: When Social Networks Really Matters." *Academy of Management Review*, 25(4), 2000, pp.13-28.
- Williamson, O. E. *Markets and Hierarchies: Analysis and Antitrust Implications, A Study in the Economics of Internal Organization*, New York: The Free Press, 1975.
- Williamson, O. E. *The Economic Institutions of Capitalism*. New York: Free Press, New York. 1985.
- Yang, C. and Huang, J.-B. "A decision model for IS outsourcing." *International Journal of Information Management*, 20, 2000, pp. 225-239.
- Zaheer, A. and Venkatraman, N.V. "Relational Governance as an Interorganizational Strategy: An Empirical Test of the Role of Trust in Economic Exchange", *Strategic Management Journal*, 16, 1995, pp. 373-392.