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Application Service Providers (ASP) Adoption in Core and Non-Core Functions

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Abstract: *With the further improvement in internet bandwidth, connection stability and data transmission security, a new wave of Application Service Providers (ASP) is on his way. The recent booming on some models such as Software Application as Service (SaaS) and On-Demand in 2008, has led to emergence of ASP model in core business functions. The traditional IS outsourcing covers the non-core business functions that are not critical to business performance and competitive advantages. Comparing with traditional IS outsourcing, ASP is a new phenomenon that can be considered as an emerging innovation as it covers both core and non-core business functions. Most of the executives do not comprehend the difference and similarity between traditional IS outsourcing and ASP mode. Hence, we propose to conduct a research so as to identify the determinants (cost benefit, gap in IS capability complementing the company's strategic goal, and trust to ASP's service and security level) and moderating factors (management's attitude in ownership & control, and company aggressiveness) of ASP adoption decision in both core and non-core business functions.*

Keywords: *Application Service Providers (ASP), cost benefit, gap in IS capability, trust, ownership & control, company aggressiveness*

1. Introduction

The traditional model for enterprises in applying Information Technology requires deploying in-house installation. Enterprises purchase the software license and install the IT infrastructure locally at their own facilities. In the late 1990s, Application Service provider (ASP) offered a new way of acquiring IT applications. By using ASP model, enterprises use the ASP vendor hosting software applications including systems support and on-going operations through centrally-located services via the data line or Internet in a rental or lease agreement (Peterson and Fairchild 2002). Unfortunately, ASP was not well accepted and the market has not expanded as expected in the beginning of 2000. It could possibly due to the communications' bottleneck which is highlighted by the expensive virtual private network (VPN). Moreover, many executives may not understand clearly the services and benefits offered by ASP. Seltsikas and Currie (2002) conducted a study to evaluate the ASP model for SMEs. The results indicated that 70% of the SMEs were not familiar with the term and that only 6% indicated that their organizations used the ASP service.

With the further improvement in Internet bandwidth, connection stability and data transmission security, a new wave of ASP model such as the recent booming Software Application as Service (SaaS) and On-Demand in 2008 has emerged into the market. According to Gartner Group (2007), the ASP market will reach US$19.3 billion by 2010. He also forecasts that the ASP as much as 25% of new business software will be delivered through SaaS. AMR Research (2007) estimated that the SaaS revenue will grow at more than 20% compared to traditional software.

Traditional IS outsourcing normally covers the non-core business functions that are not critical to business performance and competitive advantages. Compared with traditional IS outsourcing, ASP is a new phenomenon that can be considered as an emerging innovation. One of the most significant characteristics of ASP is that it generally covers both core and non-core business functions.

Yao and Murphy (2002) stated that the ASP business model differs from the traditional IS outsourcing model in significant ways, including software and hardware ownership, target clients, customization, production

functions, and contract length. However, many executives in business still can not distinguish clearly the difference and similarity between traditional IS outsourcing and ASP model.

Core functions are critical to an organization in making business decision. They affect business performance, create competitive advantage, drive future growth, innovation and rejuvenation, as well as contribute to financial results. Hence, it is important both academically and practically to understand why companies adopt ASP for their functions (both core and non-core ones). As ASP is getting more important in the future, we believe that it is worthwhile to conduct a research to understand and identify the determinants and moderating factors of ASP adoption decision in both core and non-core business functions.

2. Classification of Core and Non-core Functions in ASP Model

For the classification of core business functions and non-core business functions, Alexander and Yong (1996) classified core functions based on the following definitions:

1. Activities are related to daily operations which generate major value for the business.
2. Activities are critical to business performance.
3. Activities create current or potential competitive advantage.
4. Activities drive the future growth, innovation or rejuvenation of the enterprise.

Based on this set of definitions, a trading firm may view the operations in handling the logistics of products for its clients as core function but not necessary the same for a marketing firm. A hi-tech company specialized in innovative product development views technology development and designers' innovation as its core function and definitely not a support (non-core) function. In carrying out this research study, our respondents will classify core and non-core functions based on this set of definitions.

3. Theoretical Framework

Based on economic perspective, cost savings is considered the foremost predictor in ASP outsourcing (Lacity and Hirschheim 1993). Bennet and Timbrell (2000) stated that ASP vendors can pass cost savings on to clients if they achieve sufficient number of clients, use templates and deploy staff effectively across their client base. Cheon, et al., (1995) and Lee, et al., (2002) stated that Transaction Cost Theory provides a framework to evaluate internal production versus external outsourcing alternative. Owing to economies of scale on the ASP vendor, ASP business model offers a solution that can decrease the production cost as well as the business operating costs of clients. Williamson (1981) believed that companies are more likely to outsource if the relative cost advantage is high.

According to Ang and Straub (1998) and Jayatilaka et al., (2003), cost benefit is regarded as the cost advantage gained by adopting the ASP business model. It is through the comparison of the external cost with the internal production costs associated with not adopting an ASP. Kern, et al., (2002) stated that predictable monthly fees are the principal advantage of the ASP business model. Jayatilaka, et al., (2003) stated that the low cost associated with the ASP business model is cited as the key reason for companies to adopt the ASP.

A positive cost benefit results when the external subscripting costs in the adoption of ASP business model are less than the internal development and operating costs due to not adopting an ASP. Companies tend to adopt ASP in both core functions and non-core functions when the perceived cost benefit is high. Hence, we deduce the following propositions.

P1a: Perceived higher cost benefit associated with ASP adoption will lead to a higher degree of ASP adoption in non-core functions.

P1b: Perceived higher cost benefit associated with ASP adoption will lead to a higher degree of ASP adoption in core functions.

According to Resource Dependence Theory, Pfeffer and Salancik (1978) stated that an organization will relatively depend on its outsourcing vendor strategically. There are three critical components affecting the degree of dependence, i.e. importance, discretion and alternatives. Due to the inherent nature of IS application in those non-core functions, which are less complex and less asset specific, the cost advantage naturally may have a stronger influence to affect companies in adopting ASP service. In the aspects of adopting ASP in core functions, because of the high complexity, asset specificity and importance of IS applications, it is believed that higher contract maintenance cost is required which will shed financial doubt in cost advantage. Hence, we deduce the following proposition.

P1c: Perceived higher cost benefit associated with ASP adoption will have a stronger influence to the degree of ASP adoption in non-core functions than that of core functions.

According to Resource-based Theory and Resources Dependency Theory, from strategic perspective, Kern et al., (2002) stated that using an ASP is a strategic decision enabling an organization to overcome internal resources or time constraints to carry out its business strategy, and to fill any potential gaps in its IS resources and capabilities. Grover et al., (1994) stated that gap in IS capabilities (i.e. IS investment, IS knowledge and IS staff) can be measured by gaps between the expectation and perception of clients' resources and capabilities.

In the late 1990s, the introduction of ASP business model aimed to serve those small and medium-sized enterprises (SME) that were lack of specific financial investment, IT knowledge, and IT professional staff. Recently, owing to the ever emerging and fast changing technology in IT

applications, even large companies may not have sufficient knowledge of some specific applications. This lack of IT knowledge in forefront IT innovation becomes a driver for the ASP adoption.

When a company believes that ASP services would fulfill its internal IT deficiency (i.e., lack of investment in software and hardware, lack of knowledge of handling applications and lack of qualified IT professionals) which would complement its strategic goal, then the company is more willing to pursue this business relationship. The following propositions are stated.

P2a: Perceived bigger gap in IS capabilities which would complement its strategic goal will lead to a higher degree of ASP adoption in non-core functions.

P2b: Perceived bigger gap in IS capabilities which would complement its strategic goal will lead to a higher degree of ASP adoption in core functions.

According to Resource-based Theory, organizations can gain a competitive advantage by adopting ASP business model so as to source specific resources. These kinds of benefits are usually obtained by adopting the ASP in core business functions that can create potential competitive advantages to the client.

Kern and Krejiger (2001) stated that the exchange relationship between ASPs and clients results in a degree of dependence that differs from case to case and is based on the applications and services sourced from an ASP. In general, ASP adoption in core functions has stronger effect in removal of IS deficiency. Enterprise applications refer to those IS solutions that are high asset specificity such as ERP, logistics and manufacturing system, finance and accounting system, and sales automation system. Comparing the core functions and non-core functions, these kinds of enterprise applications are more company specified or industry specified. Strategically, the potential gain in complementing the company's strategic goal by reducing gap in IS capabilities in core functions is much higher than those in non-core functions.

With the understanding that improved IT performance is postulated to be one of the usefulness antecedents. We have the proposition that the effect of perceived bigger gap in IS capabilities associated with ASP adoption will have a stronger influence to the degree of ASP adoption in core functions than that of non-core functions.

P2c: Perceived bigger gap in IS capabilities associated with ASP adoption will have a stronger influence to the degree of ASP adoption in core functions than that of non-core functions.

According to Social Exchange Theory, for outsourcing decision, Lee and Kim (1999) have adopted a social perspective to investigate the relationship between clients and vendors affecting the adoption and success of IS outsourcing. The results showed that the level of trust between clients and vendors can affect the adoption and success of IS outsourcing. Deutsch (1958) concluded that trust is a set of expectations that lead to behavioral intentions that involve potential loss, because of the absence of control over those upon whom one depends.

Kern (1997) argued that the outsourcing to an ASP vendor is not a simple one-time transaction, before establishing a formal contractual relationship with that vendor, personal and social bonds are essential for building a client's initial trust in a vendor. Similarity, Lacity and Willcocks (2001) stated that a personal relationship between clients and an ASP vendor will lessen conflict and support continuing accommodation for an ASP engagement.

In ASP adoption decision process, trust is a critical concept in social exchange theory. Trust is defined as a client's belief that an ASP vendor will have the capability and intention to deliver application services as promised. McKnight (1998) stated that trust consists of two major components: (a) beliefs dealing with competence (ability), benevolence, honesty (integrity), and predictability, and (b) trusting-intentions. Elangovan (1998) mentioned the opportunistic betrayal and believed that trust consists of benevolence and integrity alone. Examining trust in social exchanges, Blau (1964) also concluded that trust contains three distinct beliefs: integrity, benevolence, and ability.

In the context of ASP adoption decision, McKnight (2000) believed that initial trust in the ASP vendor will significantly affect clients' intention to start the relationship with an external vendor. While personal and social bonds are critical for developing initial trust in an ASP vendor, an ASP's capability (in terms of trust to ASP's service and security level) forms clients' initial trust in an ASP vendor and further develops the relationship between the clients and vendors. Thus the propositions are:

P3a: A higher level of trust to ASP's service and quality level associated with ASP adoption will result in a higher degree of ASP adoption in non-core functions.

P3b: A higher level of trust to ASP's service and quality level associated with ASP adoption will result in a higher degree of ASP adoption in core functions.

Besides the main effects which have been described in above sections, we also propose two moderation effects: (1) management attitude towards ownership and control and (2) business aggressiveness, which may explain the variation of ASP adoption in general. Management's attitude in ownership and control refers to the attitude of management team in dealing with the extent of ownership and control over the IS assets and functions (DiRomualdo and Gurbaxani, 1998). IS ownership and control is the state or fact of exclusive rights and control over IS property, which may be hardware, software, telecommunication infrastructure, data center, and IS staff.

In fact, there are a lot of obstacles to ASP adoption related to management's attitude in ownership and control of IS asset and function. Lacity and Hirschheim (1995), and Lacity and Willcocks (1998) conducted studies to examine

the outsourcing risks such as loss of control and dependency of IS assets with the adoption of IS outsourcing model.

We believe that the Asian and Chinese culture might have shaped the adoption decision in ASP. According to Redding (1995), Whitley (1992) and Harjani (1999), Chinese Family Business has some characteristics of a high degree of family ownership and control with strong tendency of purchasing property under family control, and risk management by limiting commitment (i.e. risk aversion against trust). According to Poon and Yu (2006), the majority of companies in the Asia-Pacific region is owned or operated by people who are heavily biased towards the indigenous Asian cultures. They have the traditional thinking to purchase, own and control the IS assets and function by themselves. They are concerned with the data security and service level provided by ASP vendors. This is one of the major obstacles to convince this kind of businessmen to adopt the ASP model.

In this study, we have the propositions that the management's attitude in ownership and control of IS asset and function has a moderating effect to the trust to ASP's service and security level in ASP adoption in both core and non-core functions.

P4a: Management's Attitude in Ownership and Control will moderate the relationship between trust to ASP's service and security level and the degree of ASP adoption in non-core functions such that when the company prefers better ownership and control in IS function, there is a more negative relationship between trust to ASP's service and security level and the degree of ASP adoption in non-core functions.

P4b: Management's Attitude in Ownership and Control will moderate the relationship between trust to ASP's service and security level and the degree of ASP adoption in core functions such that when the company prefers better ownership and control in IS function, there is a more negative relationship between trust to ASP's service and security level and the degree of ASP adoption in core functions.

Aubert and Croteau (2005) investigated the links between IS outsourcing and business strategy. They suggested that there is a need for scrutinizing the adoption of IT outsourcing with the business strategy. Taking into account the strategic type of the organization can enable a finer analysis of ASP adoption decision. Company business strategies can be categorized in many ways and one popular method is based on their degree of aggressiveness.

According to Porter (1980), the idea of "two generic strategies" introduced overall cost leadership and differentiation as the two major strategies for companies to gain competitive advantages. For overall cost leadership, aggressive companies require aggressive construction of efficient-scale facilities, tight cost and overhead control, avoidance of marginal customer accounts, and vigorous pursuit of cost reduction in core business functions and non-core business functions.

In general, companies with aggressive business strategy aim to create competitive advantage in cost leadership and are more willing to adopt ASP when the cost benefit is high. With this overall cost leadership strategy, we have the propositions that companies with strong business aggressiveness strategy will generate more positive relationship between cost benefit and the degree of ASP adoption.

P5a: Company aggressiveness will moderate the relationship between cost benefit and the degree of ASP adoption in non-core functions such that when the company is more aggressive in business strategy, there is a more positive relationship between cost benefit and the degree of ASP adoption in non-core functions.

P5b: Company aggressiveness will moderate the relationship between cost benefit and the degree of ASP adoption in core functions such that when the company is more aggressive in business strategy, there is a more positive relationship between cost benefit and the degree of ASP adoption in core functions.

Porter (1980) stated that, in addition to cost leadership, differentiation creates something that is perceived industry-wide as being unique. Approaches to differentiating can take many forms: design or brand image, technology, features, customer service, dealer network, or other dimensions. Differentiation, if achieved, is a viable strategy for earning above-average returns in an industry because it creates a defensible position for coping with the Porter's (1980) five competitive forces, albeit in a different way than cost leadership. Companies with aggressive business strategy will try to create more differentiation by using more new technology. This includes ASP service to remove IS deficiency (gap in IS capabilities) so as to create competitive advantages for achieving better service quality, customer satisfaction and brand loyalty. In general, companies with more aggressive strategy are more sensitive to the quality.

In case the ASP vendor can make up the difference in IS deficiency complementing the company's strategic goal, its influence to enhance the competitive advantages of the company will be influential and this will eventually affect the degree of ASP adoption in both core functions and non-core functions. Thus the propositions are:

P6a: Company aggressiveness will moderate the relationship between gap in IS capabilities and the degree of ASP adoption in non-core functions such that when the company is more aggressive in business strategy, there is a more positive relationship between gap in IS capabilities and the degree of ASP adoption in non-core functions.

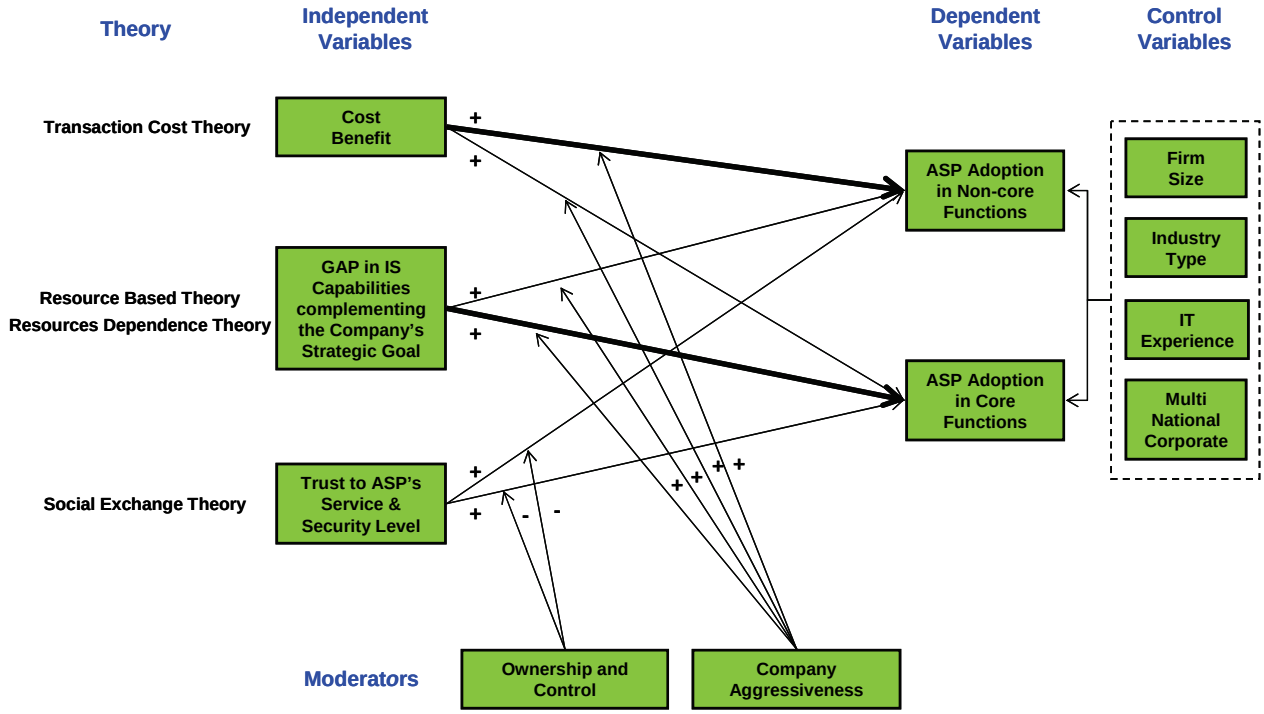

Fig. 1. The Theoretical Model of ASP Adoption in Core and Non-core Functions

P6b: Company aggressiveness will moderate the relationship between gap in IS capabilities and the degree of ASP adoption in core functions such that when the company is more aggressive in business strategy, there is a more positive relationship between gap in IS capabilities and the degree of ASP adoption in core functions.

For a clear understanding on the proposed framework as depicted in Figure 1, we need to control for other relevant factors such as firm size, industry type, IT experience and multi-national corporate.

4. Conclusion

This study proposes the antecedents (i.e. cost benefit, gap in IS capability complementing the company's strategic goal, and trust to ASP's service and security level) of ASP adoption decision for both core and non-core business functions. It also postulates cost advantage and gap in IS capability have stronger effect in ASP adoption for core functions than for non-core functions, and vice versa. Moreover, the moderating effect of management's attitude in ownership and control and company aggressiveness may be important to explain variations among companies on their intention to adopt ASPs.

This research will contribute in both theoretical and practical aspects. Theoretically, the study extends our understanding on the economic, strategic and social relationship theories under the context of ASP adoption. Moreover, it also broadens the knowledge of ASP adoption decision by incorporating the comparative dimensions of core and non-core business functions. Practically, the study offers business and IT executives a practical and comprehensive framework in making ASP adoption with considerations of outsourcing types by categorizing into core and non-core functions. The study also enables ASP vendors a better understanding of clients' decision in ASP adoption so that vendors can align their marketing strategies, product development strategies and social networking strategies to match the purchasing behavior of their potential clients.

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