

UNDERSTANDING THE SERVICE COMPONENT OF APPLICATION SERVICE PROVISION: AN EMPIRICAL ANALYSIS OF SATISFACTION WITH ASP SERVICES¹

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Abstract

In spite of the promise and potential of improving the way organizations develop, operate and maintain information technology (IT) applications, application service providers (ASPs) have fared poorly in terms of attracting a large client base. Anecdotal evidence in the business press points to limited satisfaction among users of ASP, which calls for an assessment of determinants of satisfaction with ASP. In this paper, we draw upon the consumer satisfaction paradigm widely employed in marketing literature to analyze post-usage satisfaction with ASP services. We develop a conceptual model of satisfaction with ASP and empirically test the predictions using data from 256 firms using ASP services. Expectations about ASP service have a significant influence on the performance evaluation of ASPs, and experience-based norms have only limited significance in explaining satisfaction with ASP. We also find empirical support for the influence of performance and disconfirmation on the satisfaction with ASP. Implications for both ASPs and organizations adopting ASP services are discussed.

Keywords: Management Information Systems, satisfaction, expectation disconfirmation theory, empirical research, path analysis, causal models, applications software

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Application Service Providers: Promise and Reality

Dramatically reduced network cost due to the Internet and virtual private networks (VPN), the ever increasing supply of bandwidth, and advances in the security of Internet based transactions have led to the emergence of application service providers (ASPs), a new category of IT service firms. The Application Service Provider Consortium defines an ASP as an organization that "manages and delivers application capabilities to multiple entities from a data center across a wide area network (WAN)." User organizations can get access to software applications from one or more ASPs over the Internet for a subscription fee. A key selling point of ASP services involves a shorter time period required to install and implement new software applications (Mears 2001). For businesses plagued by high turnover of information technology (IT) staff, inadequate organizational resources to maintain and upgrade existing IT applications, and large capital requirements for major IT implementation projects, the ASP business model could be an attractive alternative with its off-the-shelf IT applications subscription approach (Vizard 2000). Sophisticated ASPs have gone as far as offering enterprise resource planning, electronic commerce, and supply chain applications, which may involve integration with existing information systems in a user organization (Paul 2000).

While the ASP model has the potential to fundamentally change the manner in which IT services are provided to user firms, to date ASPs have had a lackluster record in signing up customers (Caulfield 2000). Moreover, several customers of ASPs are unsatisfied (Ferengul 2002) with their service, which questions the viability of the ASP business model. Evidence points also to the fact that ASPs themselves have had to rework their service strategies in response to market demand (Pring 2002). It has been long recognized that

market success depends on designing services to match customer needs (Heskett et al. 1990) and that customer satisfaction has a positive impact on market share and profitability (Anderson and Sullivan 1993). Satisfied customers are more likely to engage in positive word of mouth (Anderson et al. 1994; Howard and Sheth 1969), thus lowering the cost of attracting new customers (e.g., Anderson et al. 1994, Fornell 1992). Satisfaction plays an important role in building other important assets for the firm, such as brand equity (Keller 1993), and leads to long-term continuation of relationships (Anderson and Narus 1990). A focus on satisfaction is important for ASPs if they have to retain existing customers as well as attract new customers. This calls for an assessment of the determinants of consumer satisfaction (throughout the paper we use the terms satisfaction and consumer satisfaction interchangeably) with ASP and an evaluation of the effectiveness of the ASP mode of service delivery over the Internet. This research analyzes the determinants of satisfaction in ASP service provision, which are important to both ASPs and end-user organizations in understanding the value drivers in the ASP business model. We combine insights from theoretical traditions such as the literature on IT adoption, outsourcing, and consumer satisfaction to develop a conceptual model of satisfaction with ASP services. Besides the theoretical contributions, an understanding of what users value in ASPs as well as the factors contributing to the success of ASP initiatives is vital both for organizations implementing ASP solutions and for the ASPs themselves.

Our analysis shows that the satisfaction with an ASP is negatively affected by the disconfirmation effect, but positively influenced by the perceived provider performance and prior systems integration, which is a measure of integration of organizational systems prior to using ASP services. Further, perceived provider performance is positively influenced by the functional capability of the ASP and the quality assurance by the ASP, but negatively influenced by the prior systems integration. These findings suggest that, to be successful, ASPs must strive to reduce the disconfirmation effect faced by adopting organizations

and to enhance the perceived quality of their solution, possibly through partnerships with leading IT vendors. Further, ASPs must improve the integration of their offerings with existing applications in user organizations, which may require alliances with IT firms that specialize in integration services.

The balance of the paper is organized as follows. In the second section, we present an overview of satisfaction research and outsourcing, and outline the research hypotheses from the literature on satisfaction. In the third section, we discuss the model and present the constructs used to analyze the satisfaction process with ASP. The fourth section discusses the data collection and analysis. In the fifth section, we present a discussion of results and in the sixth section we identify future directions of research.

Understanding Satisfaction with ASP

Satisfaction and IT Outsourcing

The IT outsourcing literature has analyzed the outsourcing process in two distinct but related streams: outsourcing success (e.g., Grover et al. 1996; Lee and Kim 1999; McFarlan and Nolan 1995) and the determinants of IT outsourcing (e.g., Chaudhury et al. 1995; Grover and Teng 1993; Loh and Venkatraman 1992). In analyzing the ASP phenomenon, our research follows the precedent of studies that focus on outsourcing success, in that we evaluate satisfaction with ASP rather than determinants of end-user utilization of ASP services. A study of the determinants of satisfaction in IT outsourcing, and especially in the ASP business model, is relevant for several reasons.

IS research on user satisfaction posits that user satisfaction is one of the most important measures of information systems success (DeLone and McLean 1992; Ives and Olson 1984). When

implementing a new system, the satisfaction with the system indicates the users' understanding of the system and success (Baroudi and Orlikowski 1988). Satisfaction with a new service forms an important part of the organizational assimilation process (Cronin and Taylor 1992), since the moderating effect of experience with the service can provide an evaluation for making subsequent judgments (Pieters et al. 1995). Diffusion theorists (e.g., Rogers 1983) have pointed out that in the early maintenance stage prior to routinization, there is a higher probability of disenchantment leading to discontinuance, and that makes it imperative to examine the satisfaction with a new business model such as ASP. It has been posited that service expectations play a critical role in the evaluation of outsourced IT services (e.g., Teng et al. 1995). Therefore, a focus on the criteria that dictate choice of a specific sourcing option does not adequately reflect expectation initiated performance comparisons and performance judgments and their role in the formation of satisfaction with the IT service provider (for the case of high technology products, see Gardial et al. 1994). Satisfaction has been found to have a strong link with repurchase intentions (Anderson and Sullivan 1993), customer retention rate (Rust et al. 1995) and customer retention (Bolton 1998), making it imperative for an IT solution provider to understand the determinants of satisfaction of firms outsourcing IT services. As the ASP business model transforms software into a service, the consumer satisfaction paradigm can provide rich insights into the processes that affect a user's post-usage cognitive evaluation of a service (e.g., Oliver 1996).

Satisfaction has been defined in the literature as "a judgment that a service provided a pleasurable level of consumption-related fulfillment" (Oliver 1996). Anderson and Sullivan (1993) posit that satisfaction can be "broadly characterized as a post-purchase evaluation of product quality given pre-purchase expectations." The expectation-disconfirmation paradigm (Oliver 1977, 1980) posits that consumer satisfaction results from a comparison of expectations, which are a set of beliefs about desired attributes of a product or service, with the actual consumption experience.

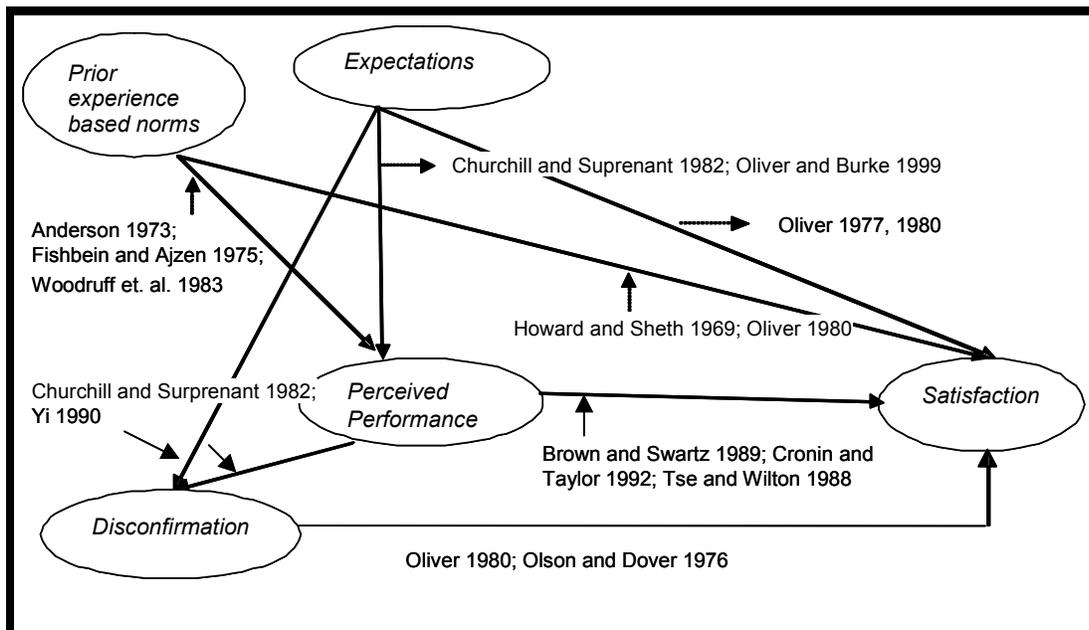


Figure 1. Prior Constructs from Satisfaction Literature

However, subsequent research has found that satisfaction is also influenced by a pre-experience comparison standard and the extent to which this is disconfirmed (Howard and Sheth 1969; Olashavsky and Miller 1972; Wilton and Tse 1983; Woodruff et al. 1983). Research also suggests that in addition to disconfirmation with respect to pre-experience standards, satisfaction is influenced by perceived performance of a product or service (Churchill and Suprenant 1982; Cronin and Taylor 1992; Tse and Wilton 1988). Therefore, the satisfaction evaluation arises out of a complex process of simultaneous interactions that involves multiple comparison standards (Oliver 1989; Tse and Wilton 1988). In our research, we look at the influence of expected service and prior experiences as well as the perceived provider performance on satisfaction. We summarize the key constructs and posited relationships from the satisfaction literature in Figure 1.

Satisfaction and the ASP Business Model

Although ASP can be considered another option of outsourcing, there are key differences between the service provision of ASPs and traditional outsourcing. Software development outsourcing discussed in the management information systems (MIS) literature (e.g., Loh and Venkatraman 1992) generally refers to situations where the company contracted with outsourcing providers to develop software or bought generic applications. However in conventional outsourcing of IT, the solution is hosted on the company's servers and the corporate IT department had the final accountability for the IT services (Cross 1995; Cross et al. 1997). An ASP, on the other hand, renders software as a service, providing applications and the IT infrastructure and support services to customers on a subscription basis (Donahue 1999), and bears the

responsibility for efficient provision of these services. Another key differentiator in the ASP mode of IT service delivery is the nature of services that are outsourced. In earlier analyses of outsourcing, the focus was on outsourcing of specific IS functions such as systems development, systems operation, systems management, and end-user support (Brown and Magill 1994; Loh and Venkatraman 1992). However, in the ASP business model, the ASP combines several software capabilities and roles such as development, management, and support, highlighting the need to study the multifaceted nature of ASP usage. A corporate IT user accessing the IT application hosted by the ASP is therefore in a "service encounter" (Bitner et al. 1990), which is defined in the literature as "a period of time during which a consumer directly interacts with a service [with the ASP]" (Shostack 1985).

The nature of service provision by ASPs (i.e., hosting software applications over the Internet) necessitates software delivery options unique to the ASP model. ASPs rely on a variety of technical service guarantees to signal the quality of their services (Jude and Meachim 2000). While these guarantees are important in choosing an ASP in the first place, service guarantees are also used to make attributions for failure or success after service has been experienced (e.g., Kashyap 2001). Similarly the users of ASP may acquire expectation standards about the capability of the software applications hosted by the ASP through the influence of diverse sources such as the business press, other corporate ASP users, external consultants, or the ASP's own marketing campaign, and these expectations act as comparative references for performance judgments (e.g., Oliver and Burke 1999).

Another distinguishing feature of the ASP model is that the relationship between the ASP and the end-user organization is one that needs to be sustained over a long period of time, akin to a continuous service provider (Bolton and Drew 1991; Oliver 1989) discussed in the services marketing literature. With potentially low switching costs in the ASP business model (e.g., Downes et al. 1998), users' assessment of performance and

disconfirmation in the service encounter can be important factors in switching services. The service exchange process should elicit in the ASP's users a commitment to the service provider, which necessitates an understanding of the evaluation of the service encounter. It has been posited that in an exchange relationship, a comparison level, which is an evaluation of the working partnership in comparison with similar experiences (e.g., Anderson and Narus 1990), dictates the assessment of results. An evaluation of a service encounter is a result of multiple comparisons including the prior experiences of users (e.g., Brown and Swartz 1989).

It is critical, therefore, to understand several aspects of the service encounter that can affect the user's evaluation of the ASP's service such as expectations, prior usage-based norms, and disconfirmation in the service encounter, which are constructs discussed in the satisfaction literature. We, therefore, look at a theoretical framework that evaluates the effect of perceived performance and disconfirmation, which are theoretical constructs derived from the satisfaction literature (e.g., Bitner et al. [1990] in discussing service encounter satisfaction) on the satisfaction with ASP.

A Model of Satisfaction Determinants

Defining the Satisfaction Construct

There is a substantial body of research on consumer behavior that focuses on testing models of consumer satisfaction (e.g., Oliver 1993; Oliver and DeSarbo 1988; Spreng et al. 1996; Tse and Wilton 1988). However, there is also a lack of definitional and methodological standardization (Peterson and Wilson 1992) as to what constitutes satisfaction, including whether satisfaction is a process or an outcome (Yi 1990). We follow the precedent of consumer satisfaction definitions that have either emphasized satisfaction as an evaluation process (e.g., Fornell 1992; Oliver 1980) or a response to an evaluation process (e.g., Howard

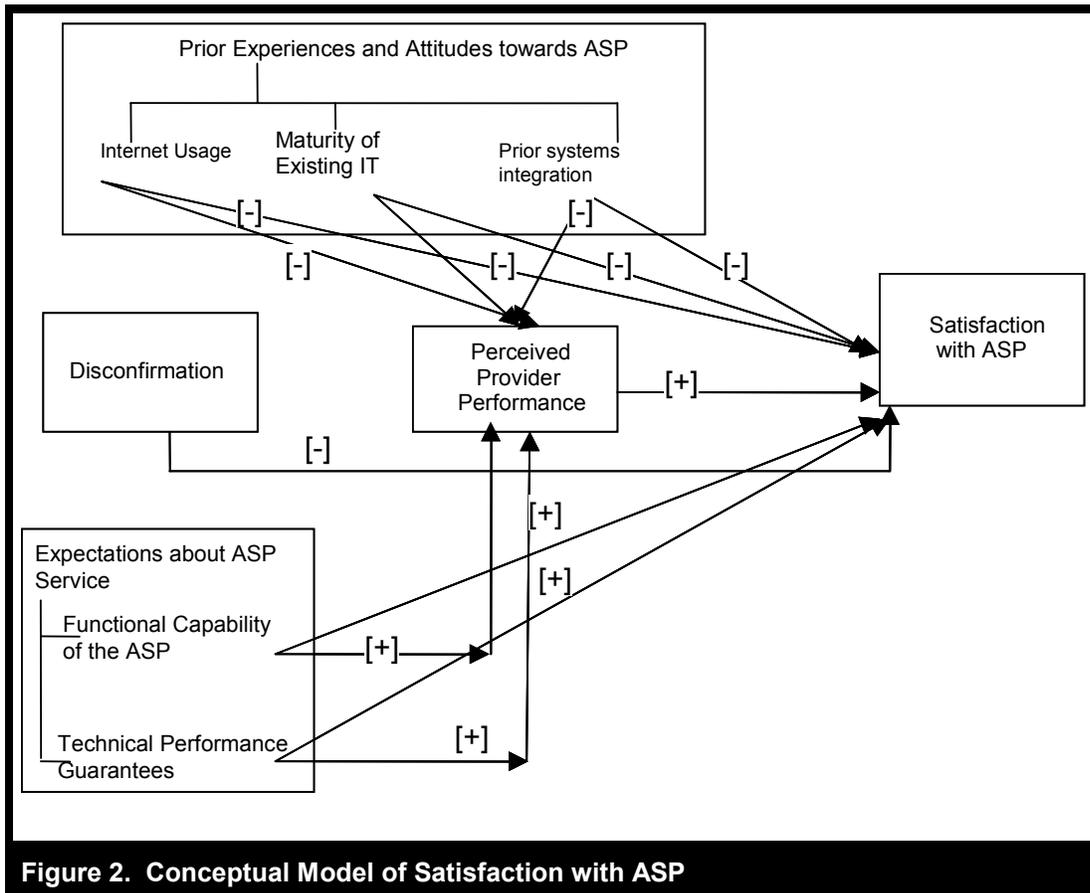


Figure 2. Conceptual Model of Satisfaction with ASP

and Sheth 1969; Tse and Wilton 1988). This is in line with our context of analyzing satisfaction with ASP usage in the organization, which reflects the process aspect of using ASP rather than a one-time end result, such as financial outcomes realized on deploying ASP.

We develop a model of satisfaction with ASP within the service encounter framework developed by Bitner (1990) and the conceptualization of service provider performance (Bitner et al. 1990; Churchill and Surprenant 1982). Satisfaction with ASP is evaluated after the organization has been using the ASP's services for a period of time. Satisfaction is not a unidimensional construct (Oliver 1980) and the literature suggests that it can be measured as a "latent construct with multiple indicators at the attribute level" (Oliva et al. 1992). Service encounter satisfaction reflects

the consumer's feelings about the interaction with the firm, which can be multiple instances where the customer interacts with the service provider (Bitner and Hubbert. 1994; Oliva et al. 1992). Further, the service encounter satisfaction results from events and behaviors during that definable period of time (Bitner 1990; Bitner et al. 1990). Therefore, we follow the precedent of defining satisfaction as "a positive affective state resulting from the appraisal of all aspects of a firm's working relationship with another firm" (Anderson and Narus 1990). We conceptualize satisfaction with the ASP as a single construct that is similar to the overall service satisfaction (e.g., Bitner and Hubbert 1994) construct in that we capture the satisfaction of users with the working relationship with the ASP as well as satisfaction with the ASP's service. We depict the satisfaction formation process in Figure 2.

The Role of Perceived Provider Performance

The consumer satisfaction literature posits that perceptions of performance are compared with the expectations about a service, and this leads to satisfaction (Rust and Oliver 2000; Zeithaml et al. 1993). Perceived provider performance is the perception of the user's experience with the service (Spreng et al. 1996), here the experience with the ASP, and is influenced by the expectations of users (e.g., Churchill and Surprenant 1982). In the post-usage evaluation, the perceived performance along the dimensions of the desired attributes of the service can have an important role in mitigating disconfirmation (LaTour and Peat 1979) and thereby will have a positive impact on satisfaction (Cadotte et al. 1987; Churchill and Surprenant 1982).

In our conceptualization of perceived provider performance, we rely on the attribute-level conceptualization of the perceived performance as an antecedent of satisfaction (Gardial et al. 1994; LaTour and Peat 1979; Mittal et al. 1999; Oliver 1993). Perceived provider performance is determined by consumers' beliefs about performance dimensions of the ASP. The perception of an ASP's performance results from an evaluation of the ASP's service along the dimension of desirable performance attributes. Apart from cost savings resulting from using an ASP's service, there are other factors that can add value to an organization such as the speed with which the ASP can offer implementation of needed IT services (e.g., Greengard 2000) and access to superior technological capabilities (e.g., Apicella 2001).

In our initial qualitative survey (discussed later), we assessed end-user perceptions of expected service benefits from using an ASP's service. The construct *perceived provider performance* was designed with the feedback about desirable performance attributes of the ASP from our survey and the construct is intended to measure the perceptions of service after usage along the dimensions of desirable performance attributes. In evaluating new services such as ASP services,

learning from experience is an important motive for use and good performance implies satisfaction, regardless of prior expectations and disconfirmation.

H1: The *perceived provider performance* has a positive impact on the *satisfaction with ASP*.

Expectations About ASP Service: The Effect of Technical Guarantees and Functional Capability of the ASP

Expectations about performance of a service are derived from expectancy theory (Tolman 1932), and represent consumers' inferences about anticipated performance (Churchill and Surprenant 1982). Prior literature on satisfaction posits that expectations have a positive impact on perceptions of provider performance (Anderson et al. 1994; Cadotte et al. 1987; Swan and Trawick 1981). As the ASP model is relatively new, the end-user organizations of ASP services do not have sufficient experience with the ASP to form expectations based on the service delivery of the ASP. The literature on new product and service adoption posits that when there is uncertainty regarding the quality of a product or service, the consumer may rely on extrinsic cues, such as reputation (Grewal et al. 1998) or product warranties (Shimp and Bearden 1982), to form an expectation about the service.

In consumer satisfaction literature, expectations have been conceptualized either solely as pre-usage beliefs about a service (e.g., Olson and Dover 1976) or as a combination of beliefs and evaluation of beliefs. Thus expectations can deal with identification of attributes (Bearden and Teel 1983; Westbrook 1987; Westbrook and Reilly 1983) as well as an evaluative assessment of how good or bad the occurrence is (Churchill and Surprenant 1982; Oliver 1980; Tse and Wilton 1988). We follow the former approach. In conceptualizing expectations, researchers have characterized expectations as "idealized standards" or adequate expectations (Parasuraman et al. 1991;

Teas 1994; Woodruff et al. 1983, Tse and Wilton 1988). Desired service expectations represent a combination of a “can be” standard and a normative “should be” standard (Parasuraman et al. 1991) and adequate service expectations (Zeithaml et al. 1996), which represent the predicted service a consumer thinks she will receive. The former is normative while the latter reflects service expectations specific to a provider. Research suggests that predicted service expectations are more likely influenced by circumstances specific to consumers and, therefore, more likely to be changeable than desired service expectations (Parasuraman et al. 1991). Further, ideals as standard may evoke a contrast effect on the evaluation of experience (Tse and Wilton 1988), whereas an expectation that reflects adequate service or predicted service may evoke an assimilation effect in that users can modify expectations when disconfirmed (Oliver and Burke 1999; Pieters et al. 1995). Since assimilation effects influence the evaluation of new services, we have conceptualized expectations as idealized expectations. Prior literature also indicates that, in order to posit a link between expectations and disconfirmation, expectations need to be measured on an objective level of desirable attributes (Churchill and Surprenant 1982 citing Oliver 1977). Since our study does not rely on objective descriptors to assess expectations, we do not posit an association between expectations and disconfirmation.

Technical Service Guarantees

Reliability and performance form important determinants of customer satisfaction with software products (Kekre et al. 1995). In the ASP model of service delivery, a critical aspect of the ASP service is to ensure reliability, guaranteed availability (Apicella 2001), and application response (Lee and Siewiorek 1998). ASPs need to guarantee performance comparable to client-server computing over a local area network (LAN) by designing a multiuser accessible system that is portable for use over the Internet, and that can handle security and access control across multiple administrative domains (Kapadia and Fortes

1999). For efficient application service provision over the Internet, the ASPs should have network platforms that support quality of service (QoS) based routing methods and standards (Erfani et al. 2000). ASPs have to back their solution with effective service-level agreements (SLAs) that can guarantee network reliability, application reliability, and scalability of the software (Hayes 2000).

Consumer satisfaction literature suggests that consumers form expectations based on their perceptions about whether the desired attributes of the service can be provided (Olashavsky and Miller 1972). The literature on warranties has posited that warranties influence consumers by representing assurances about the quality and value of the product and service (e.g., Shimp and Bearden 1982). Once users acquire expectations from a standard, these serve as comparative referents for performance judgments (Oliver and Burke 1999). Users similarly make inferences about the ASP's performance based on the technical service guarantees offered by the ASP, which then serve as an expectation against which performance and disconfirmation judgments are made.

H2a: The **technical service guarantees** of an ASP have a positive impact on **perceived provider performance**.

Further, consumer satisfaction research suggests that consumers may infer satisfaction from procedures that are set up to resolve customer problems (e.g., Bitner et al. 1990), that is, effective SLAs and service processes of the ASP (Borck 2000). ASPs may use service guarantees to inform users that they are responsible for certain aspects of their service; the service guarantees can, therefore, serve to heighten user awareness and lead the users to attribute service success to the ASPs. It has been posited that there is higher satisfaction with external sources when individuals attribute success to these sources (Oliver and DeSarbo 1988). Research suggests that the concept of fairness is central to customer evaluations of equity in transactions with firms (Oliver and Swan 1989); service guarantees can impact the level of satisfaction of the consumer

depending on perceptions of outcome equity (Oliver 1993).

H2b: The **technical service guarantees** of an ASP have a positive impact on the **satisfaction with ASP**.

Functional Capability of the ASP

Capability of a software provider in terms of functionality of the software has been identified as a factor gauging satisfaction (Kekre et al. 1995; Krishnan et al. 1999). At the time of our survey, most ASPs were new companies with relatively unproven solutions (Wittman 2000); therefore, the users of an ASP form expectations about the ASP's service based on perceptions about the functional capability of the ASP. The image of a company (Bessom and Jackson 1975; Booms and Bitner 1981) is an integral part of how potential users may view a service company, in this case the ASP. As the ASP is a relatively new model, potential users of an ASP know that they would be taking a risk transacting with a financially unsound ASP. The stability and financial soundness becomes another component by which consumers can infer the functional capability of the ASP. Consumers form expectations about the ASP's service based on the functional capability of the ASP, which then serves as an expectation standard against which subsequent performance judgments are made.

H2c: The **functional capability** of the ASP has a positive effect on **perceived provider performance**.

Research on services marketing posits that users of a service make attributions about the nature of service delivery from cues that suggest competence and efficiency of the service provider (Bitner 1990; Folkes 1988; Folkes et al. 1987). When users of a service perceive that the service provider is stable, competent, and in control of the service, their attributions cause higher satisfaction from the service (Folkes et al. 1987; Weiner 2000). In a high contact transaction service such as ASP, the expectation inducing cues about the

service play a critical role in satisfaction judgments (e.g., Bitner 1990).

H2d: The **functional capability** of the ASP has a positive effect on the **satisfaction with ASP**.

Prior Experience of the Firm: The Effect of Prior Internet Usage, the Maturity of Internal IT, and Prior Systems Integration

Experience-based norms are the standards that consumers rely upon to assess performance, which is different from the *desired attributes/expectations* in that these norms represent a pooling of prior experiences and represent desired performance and not desirable attributes of the product or service (e.g., Cadotte et al. 1987). Researchers have posited that experience-based norms can be measured through scales that objectively assess the level of an attribute (Cadotte et al. 1987); a norm could be thus the typical performance of a particular service (i.e., a sampling of performance of a service) or a performance evaluation (Cadotte et al. 1987). It has also been posited that the experience-based norm is a comparison standard evocative of other situations that the user has experienced, that is, a comparison of performance across use situations (Gardial et al. 1993).

Consumers derive a level of comparison from prior experience with similar services, or by a comparison of capabilities of the service with alternative services (LaTour and Peat 1979). Satisfaction involves evaluation, which is the result of a comparison process (Cadotte et al. 1987; LaTour and Peat 1979), and including experiences with similar services and prior experiences of consumers is illuminating of the "sequence of judgments leading to choice of standards for evaluating perceived provider performance" (Cadotte et al. 1987). A user's satisfaction with the ASP is a result of her evaluation of the ASP's service as a comparison with prior experiences.

Prior Internet Usage

Prior experience causes consumers to form norms, which serve as frames of reference to evaluate satisfaction (e.g., Cadotte et al. 1987; LaTour and Peat 1979). The ease with which an organization could use the ASP's services depends on its familiarity with similar services; prior Internet usage in the corporation will serve as a norm to evaluate satisfaction. Consider, for instance, a user who faces problems when transacting on the application hosted by the ASP. Rather than call the corporate IT department, the user would have to navigate the ASP's automated help desk system; that is, the user would have to rely on the Internet for guidance. The ASP business model of service delivery over the Internet implies that the user's prior experience with the Internet would help her attain a level of comfort with the ASP.

A consumer's breadth of experience causes her to form standards about the performance achievable (Cadotte et al. 1987) in a service encounter. A user's increased familiarity with a service results in expertise (Alba and Hutchinson 1987; Russo and Doshier 1983) and results in higher demands upon the service. A higher Internet usage in the organization leads to high familiarity with the Internet and this will have an impact on the perception of ASP services. When a user in a corporation accesses IT applications through an ASP's service, therefore, familiarity with the Internet causes a negative impact on the satisfaction with the ASP.

H3a: **Prior Internet usage** has a negative impact on **perceived provider performance**.

Research posits that when a high familiarity user enters into an interaction with a service provider, there is a history of a (potentially) larger number of satisfying experiences (Peterson and Wilson 1992) with similar services (i.e., a larger sample of satisfying experiences that guide future satisfaction judgments). It has been posited that high familiarity users have higher evaluative standards about performance (e.g., Anderson and Sullivan

1993); familiarity with similar services can lead to lower satisfaction with the service.

H3b: **Prior Internet usage** has a negative impact on **satisfaction with ASP**.

Maturity of Internal IT

In evaluating the performance of a product or service, consumers rely on standards based on their previous experience (Cadotte et al. 1987, Woodruff et al. 1983). A user's attitude toward technology influences the extent to which consumers interact with technology-based services (Dabholkar 1996; Voss et al. 1998). Further, a strong and powerful internal IT group may perceive a loss of control (e.g., Newman and Sabherwal 1996) and this erodes the support for the ASP initiative. In operationalizing this construct, we have relied on prior literature on satisfaction (e.g., Cadotte et al. 1987) where the beliefs of the users are elicited on key performance attributes that indicate the user's assessment of the maturity of the internal IT group.

Based on their previous experiences with internal IT, corporate IT users can form expectations on desired performance with a service such as ASP. When the internal IT group has considerable investment in capabilities that lead to maturity in delivering needed IT capabilities, it may be detrimental to the success of the outsourcing process (Richmond et al. 1992) since the users have very high expectations about the performance of the ASP. A mature internal IT group leads to higher expected service from the ASP, and a lower evaluation for the ASP's service.

H3c: **Maturity of internal IT** has a negative impact on the **perceived provider performance**.

The resource-based view of the firm posits that a firm's distinctive competencies are a source of competitive advantage (Barney 1986; Mahoney and Pandian 1992). Information technology is a valuable organizational capability and can be a source of competitive advantage for the organi-

zation (Bharadwaj 2000; Jarvenpaa and Leidner 1998). When evaluating the satisfaction with the ASP, the end users compare the capabilities conferred by the ASP to those conferred by the internal IT. The norms applied to evaluate ASPs are a result of a pooling of prior experiences of the user (e.g., Swan and Oliver 1989; Woodruff et al. 1983), here the experience with internal IT. The more mature the internal IT group, and the higher the firm specific resources that they can provide, the more demanding the users in the organization are with respect to the ASP's services. The effectiveness of the ASP in delivering needed IT capabilities is, therefore, measured against the maturity of the internal IT group.

H3d: **Maturity of internal IT is negatively linked to satisfaction with ASP.**

Prior Systems Integration

The modes of IT governance in an organization can be influenced by multiple contingencies such as corporate governance, firm size, and external influences (Sambamurthy and Zmud 1999), which impose requirements on the design of information systems. Structural contingencies may dictate a high degree of interconnectedness in the IT infrastructure of an organization (Rathnam et al. 1995). The mode of IT governance, therefore, introduces the need for operational compatibility (e.g., Torantzky and Klein 1982) within internal IT systems in the organization. When an organization that is using ASP evaluates the performance of the ASP, the the ASP's operational performance (in terms of prior systems integration) is compared with its prior experience of the IT infrastructure required to support integrating capabilities (e.g., Broadbent and Weil 1999). We have, therefore, drawn upon prior work that measured systems integration in the organization to design the construct prior systems integration (e.g., Barua et al. 2001).

Following the comparison level theory (Thibaut and Kelly 1959), it has been posited that comparison level serves as an indicator of perceived performance (LaTour and Peat 1979). ASP users'

attitudes toward systems integration are anchored in their experiences; an organization that values integration within its internal IT systems and has a high degree of prior systems integration (i.e., systems integration in the organization prior to implementing ASP services) will likely apply the same standards in evaluating the ASP services. We conceptualize the construct *prior systems integration* as an experience based norm that weighs an organization's need for systems integration, as measured by the internal IT infrastructure designed to integrate capabilities, against the performance of the ASP and influences the satisfaction with ASP.

H3e: **Prior systems integration has a negative impact on the perceived provider performance.**

It has been posited that customers assess a service in terms of normative standards that are the *desired* service attributes (Boulding et al. 1993; Parasuraman et al. 1991); desired service attributes in turn depend on prior experiences of customers (Parasuraman et al. 1991). Even though companies may find enormous benefits from the ASP's services, there may be a significant erosion of the value provided by an ASP if there is a lack of architecture and standards that can enable ASP to easily integrate with internal applications in the organization (Landgrave 2002), a point that is not often emphasized by proponents of the off-the-shelf application rental model. It has been well documented that nonintegrated systems affect the performance of the organization (Lee and Billington 1993). Prior to implementing ASP services, if the organization has a highly integrated IT structure, the introduction of ASP can introduce coordination problems making it difficult to integrate information processed by the ASP into the organizational processes. End users' attitudes toward integrative IT capabilities are anchored in their previous experiences in that the existing technologies in the organization create an experience-based norm that affects the evaluation of satisfaction with the ASP.

H3f: **Prior systems integration has a negative impact on the satisfaction with ASP.**

The Disconfirmation Experience

In the consumer satisfaction framework, the consumer's post-purchase response is an evaluation of the discrepancy between prior expectations and actual product performance (Olashavsky and Miller 1972; Oliver 1980; Woodruff et al. 1983). There have been different ways of operationalizing disconfirmation in the literature: disconfirmation can be the objective discrepancy between the expectation and performance (e.g., Olashavsky and Miller 1972), the inferred disconfirmation, calculated as the difference between pre-usage ratings and post-usage ratings (e.g., LaTour and Peat 1979), or perceived disconfirmation, which represents a subjective evaluation of the discrepancy between performance and evaluation (e.g., Churchill and Surprenant 1982).

We adopt the view of disconfirmation as a subjective evaluation, while also investigating the multiple standards of comparison in satisfaction formation (Tse and Wilton 1988). The objective approach is considered less appropriate for measuring satisfaction (Yi 1990), since prior empirical research has found that measuring perceived disconfirmation or subjective rather than inferred disconfirmation minimizes consistency bias (Swan and Trawick 1981) and does not suffer from methodological problems such as lack of reliability (Prakash and Lounsbury 1983). Subjective disconfirmation represents a distinct cognitive state resulting from the comparison process and preceding the satisfaction judgment and is posited to have an independent effect on the satisfaction of the consumer (Oliver 1980). Therefore, we have characterized disconfirmation as an independent variable since specifying (subjective) disconfirmation as a function of the other independent variables may induce overspecification of the model (e.g., Tse and Wilton 1988). Oliver (1977) posits that there is no association between expectations and disconfirmation when the measure used is subjective disconfirmation, and this has been supported by other studies of satisfaction (e.g., the videodisc player experiment in the study by Churchill and Surprenant [1982]). Perceived disconfirmation can be measured at an attribute level and measured on a "better than

expected—worse than expected" scale. A higher rating indicates a negative disconfirmation effect, which negatively impacts satisfaction.

H4a: **Disconfirmation** has a negative effect on the **satisfaction with ASP**.

It has been posited that positive and negative evaluations have an asymmetric effect on satisfaction (Anderson and Sullivan 1993; Mittal et al. 1998; Oliver 1993). Prospect theory (Kahneman and Tversky 1979) postulates that peoples' judgments display loss aversion: the alternatives that a person faces are reducible to a series of prospects that are evaluated independently on the basis of an S-shaped value function and the function is steeper in the negative than in the positive domain. Negative information is more perceptually salient than positively valenced information, is given more weight than positive information, and elicits a stronger physiological response than positive information (Peeters and Czapinski 1990). Thus the negative disconfirmation effects should have a stronger impact on satisfaction than positive impact of perceived provider performance.

H4b: **Disconfirmation** effects have a greater impact on **satisfaction with ASP** than **perceived provider performance**.

Research Method, Data Collection and Analysis

Initial Qualitative Survey and Instrument Design

Exploratory Investigation

In the first phase of the research, unstructured questionnaires were mailed to firms that had outsourced to ASPs. The objective of the survey was to investigate user experiences with ASPs to understand the following questions:

- What are the key performance attributes of ASPs that are considered desirable by firms?
- In evaluating experience with ASPs, are there any discrepancies between expectations and performance? What are the attributes on which the ASP performs worse than anticipated?
- Before using an ASP's service, what are the criteria that are used to evaluate the ASP?
- What are some of the prior experiences of the firm that are likely to hinder or help the firm's experience in using the ASP's services?

The feedback about key performance attributes was used to design the perceived provider performance construct. The disconfirmation construct was designed based on the attributes resulting from worse than expected performance of the ASP. It has been posited that disconfirmation for continuously provided services will not operate unless there are changes that are outside the range of experience based norms (Oliver 1989). Therefore, to measure disconfirmation, we assessed departures from normal service (e.g., Bolton and Drew 1991) as well as attribute level disconfirmation (e.g., Churchill and Surprenant 1982), which is posited to confirm or contradict the attributes of expectations and performance evaluations. For example, one of the items queries the respondents on the implementation period, since a long implementation period erodes the advantages of rapid implementation and low costs of implementation (which are the perceived performance attributes). The common criteria used to evaluate the ASP could be classified into the functional capability of the ASP and the technical service guarantees that the ASP provides. The commonly cited prior experiences were prior Internet usage, concerns about prior systems integration, and maturity of internal IT, which form the basis of our prior experience-based norms construct.

Questionnaire Design

The questionnaire was designed using the feedback from the participants in the user attitude survey according to the accepted principles of survey design (Dillman 1978). A professional data collection organization was deployed to collect data from the organizations adopting ASP. The questionnaires were mailed to a random sample of 1,100 firms. The usable sample contained 256 data points, indicating a response rate of 25 percent, which is an acceptable rate of response according to the principles of survey design. To address biases in size of the end-user companies, the questionnaire was administered only to mid-market companies (businesses with 100 to 1,000 employees worldwide). To minimize respondent bias, the recommended method is that key informants participating in the survey be those who participate in decision making related to the topic of the survey (Phillips and Bagozzi 1986). We, therefore, specified that respondents should be individuals who are involved with the corporate IT group or functional specialists who use IT. To enforce accuracy in reporting, the criterion was that all end-user respondents had to be familiar with the term *application service provider* in order to participate in the survey. We defined an ASP as *any company that provides access to remotely hosted IT applications over a wide area network (WAN), a virtual private network (VPN), or over the Internet. These services may include financial and accounting applications, IT networking applications, and customer relationship management* (definition adapted from Wainwright 1999). The survey instruments are presented in the appendix.

Analyzing the Measure Validity and Reliability

Reliability of the Measures and Respondent Bias

A confirmatory factor analysis was performed using SAS to establish reliability. Two measures of reliability using confirmatory factor analysis can

be the indicator reliability (Long 1983) and the composite reliability (Fornell and Larcker 1981). These measures have frequently been used to test model reliability (e.g., Raghunathan et al. 1999). The indicator reliability is measured by the square of the standardized factor loadings, which reflects the percent of variation that is explained by the construct it measures. The indicator reliabilities varied from 0.254 to 0.945, and so the composite reliability of the indicator variables was assessed. The composite reliability (Werts et al. 1974), which reflects the internal consistency of the indicators, was above 0.7 for all the constructs except prior systems integration, which attained the recommended value of 0.6 for newly developed scales (Nunnally 1978). These statistics are shown in Table 1.

Testing for Bias: The survey population was IT departments and senior business managers of companies that had adopted ASP systems. A total of 256 usable responses were obtained. Since the data sample was collected from IT users as well as business users, the sample was tested for bias. The two-sample Kolmogorov-Smirnov Z test (Anderson 1958) found no bias between the responses of the two samples.

The fact that there is no bias between samples drawn from MIS departments and business users should not be seen as a departure from MIS literature that has identified the critical importance of the need for multiple users or organizational stakeholders to be involved in organizational systems development (Ravichandran and Rai 2000). Since we are concentrating on medium-sized businesses, there is likely to be less divergence in opinion about IT service attributes. For larger organizations, there is a greater diversity in opinion about the execution of various IT functions, and business users will have different objectives and expectations from IT users.

Testing for Validity

A recommended method to examine the validity of constructs is by assessing the convergent and discriminant validity, which can be established at the multi-method level of analysis by measuring

the degree of agreement in responses of the informants to different survey items (Phillips and Bagozzi 1986). Convergent validity of an indicator is used to assess whether individual scale items are related. A confirmatory factor analysis was performed to test for validity (Bagozzi 1980). The *t* values for all of the factor loadings exceeded the critical value of 3.29, at a *p* level of 0.01, except one item from the scale, prior systems integration, which was dropped from the analysis. Thus the measures support convergent validity (Anderson and Gerbing 1988).

Discriminant validity is used to assess if there is a high correlation between instruments used to measure different constructs. Since we have eight constructs, the χ^2 test is a satisfactory predictor of discriminant validity (Anderson et al. 1987). Using confirmatory factor analysis, the χ^2 of the unconstrained model is recorded, which is 688.2249 with degrees of freedom 469. Constrained models were specified where the covariances across a pair of factors were constrained to be 1. In each case, the difference in χ^2 values between the constrained model and unconstrained model is greater than 10.827, which at a degree of freedom 1 supports significance at a *p* value of 0.001, indicating that the survey items demonstrate discriminant validity.

Assessing Potential over Identification Issues

If the model being tested is over-identified, we may not be able to estimate the model completely. One approach to deal with this problem is to test the over-identifying restriction as a null hypothesis (Kenny 1979). Since we were able to estimate the complete model, we did not have to eliminate any conditions specified. Another recommended method is to check if removing the over-identifying restriction changes significant predictions of the model (Duncan 1975). We tested a path model that depicts perceived provider performance as an independent construct but uncorrelated with other independent constructs, while satisfaction with ASP is the only dependent construct. While the estimates were different, the results (i.e., the effects

Table 1. Scale Development

Constructs	Indicators	Std. Loading	Std. Error	T value	P value	Indicator reliability	Composite reliability
Perceived provider performance	PERF1	0.670	0.078	11.60	<0.01	0.449	0.87
	PERF2	0.711	0.097	12.56	<0.01	0.505	
	PERF3	0.638	0.066	16.92	<0.01	0.408	
	PERF4	0.898	0.061	17.62	<0.01	0.806	
	PERF5	0.829	0.075	15.60	<0.01	0.687	
Maturity of internal IT	MAT1	0.8807	0.116	17.76	<0.01	0.776	0.94
	MAT2	0.956	0.092	20.42	<0.01	0.914	
	MAT3	0.921	0.107	19.13	<0.01	0.848	
Prior Internet usage	INT1	0.604	0.128	9.89	<0.01	0.365	0.82
	INT2	0.826	0.104	14.81	<0.01	0.682	
	INT3	0.807	0.134	14.40	<0.01	0.648	
	INT4	0.682	0.101	13.06	<0.01	0.457	
	INT5	0.508	0.101	13.06	<0.01		
Prior systems integration	SYSINT1	0.2659	-dropped-	-----	-----		0.60
	SYSINT2	0.504	0.174	6.08	<0.01	0.254	
	SYSINT3	0.652	0.174	6.89	<0.01	0.425	
	SYSINT4	0.568	0.129	5.62	<0.01	0.323	
Disconfirmation	DISCONF1	0.556	0.111	8.97	<0.01	0.309	0.83
	DISCONF2	0.717	0.113	8.81	<0.01	0.296	
	DISCONF3	0.776	0.108	12.39	<0.01	0.514	
	DISCONF4	0.791	0.097	12.07	<0.01	0.494	
	DISCONF5	0.917	0.107	12.64	<0.01	0.529	
	DISCONF6	0.657	0.110	11.01	<0.01	0.431	
Satisfaction with ASP	SATIS1	0.772	0.113	12.33	<0.01	0.596	0.80
	SATIS2	0.729	0.085	16.04	<0.01	0.532	
	SATIS3	0.770	0.080	10.23	<0.01	0.592	
	SATIS4	0.623	0.109	10.75	<0.01	0.388	
	SATIS5	0.648	0.106	13.12	<0.01	0.420	
Functional capability of the ASP	CAP1	0.972	0.141	13.12	<0.01	0.945	0.76
	CAP2	0.667	0.123	9.76	<0.01	0.445	
	CAP3	0.478	0.124	6.71	<0.01	0.228	
Technical service guarantees	TECH1	0.716	0.083	7.16	<0.01	0.513	0.72
	TECH2	0.621	0.083	7.33	<0.01	0.386	
	TECH3	0.667	0.081	9.78	<0.01	0.445	

of all the constructs on satisfaction with ASP) were similar to the structural model with perceived provider performance as a dependent construct. This mitigates concerns about possible over-identification in the model.

Model Estimation and Goodness of Fit

The model investigated had eight constructs. Each of the constructs was measured by at least three indicator variables. The model was estimated using AMOS 4.0 and provides a reasonably good fit for the data.

In most empirical analyses, it is a common practice to look for a model with a relatively low χ^2 to degrees of freedom ratio (Raghunathan et al. 1999), rather than an insignificant value. The discrepancy defined as the χ^2 to degree of freedom was 1.045, and statistically significant. The χ^2 is $N - 1$ times the minimum value of the fit function and tends to be large in large samples if the model does not hold.

We, therefore, considered an incremental fit index, the Tucker Lewis index (Tucker and Lewis 1973), which is a non-normed index (i.e., which is not constrained to lie between 0 and 1) and represents the improvement in the proportion of total covariance among observed variables explained by the estimated model over that explained by the baseline model. We also estimated a non-centrality based parameter, the comparative fit index, which accounts for the fact that a perfect fit is unlikely in the population since some variables are inevitably left out of the model (Bentler 1990). The comparative fit index provides an estimate in the reduction in model misfit of the estimated model relative to a baseline model. The root mean square error of approximation (RMSEA) (Browne and Cudeck 1993) is a fit measure that takes account of the error of approximation in the population and the precision of the fit measure itself. The Tucker Lewis index for our model was 0.951, the comparative fit index was 0.953, and the RMSEA 0.013, which are in line with the

recommended values of RMSEA below .06 (Hu and Bentler 1999) and Tucker-Lewis Index values of .95 or higher. The estimated path model is depicted in Figure 3.

Findings from the Study

The results of the path analysis are listed in Table 2. Our empirical analysis shows that

1. Perceived provider performance has a significant positive relationship with satisfaction, validating H1.
2. Technical service guarantees have a significant positive impact on perceived provider performance, validating H2a.
3. Technical service guarantees do not have a significant impact on satisfaction, contradicting H2b.
4. Functional capability of the ASP has a significant positive relationship with perceived provider performance, validating H2c.
5. Functional capability of the ASP has a significant positive impact on satisfaction, validating H2d.
6. Prior Internet usage and maturity of internal IT were not found to be significant predictors of either perceived provider performance or satisfaction; our analysis does not find empirical support for H3a, H3b, H3c, or H3d.
7. Prior systems integration has a negative impact on perceived provider performance, validating H3e.
8. Prior systems integration has a significant positive relationship with satisfaction, reversing the causality of H3f.
9. Disconfirmation has a significant negative impact on satisfaction with ASP, validating H4a.

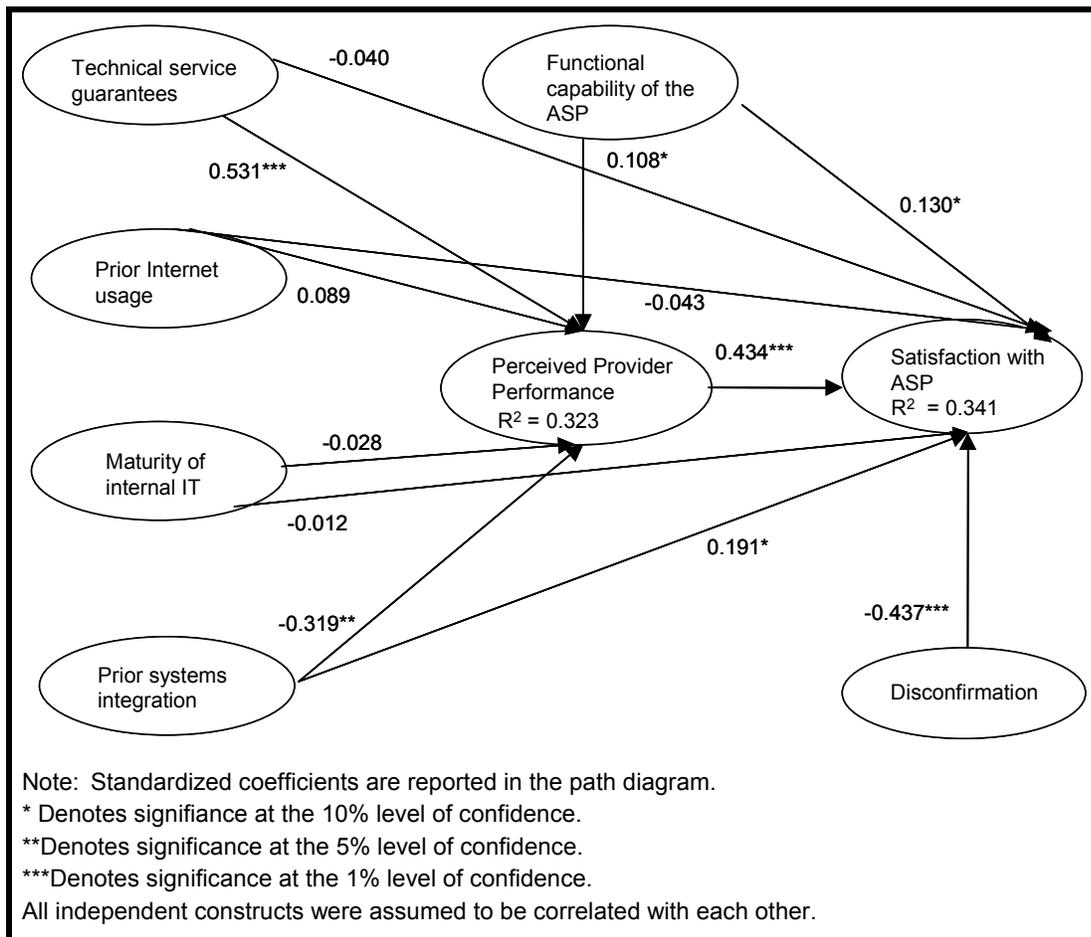


Figure 3. Path Model

10. A one tailed t test reveals that disconfirmation has an effect of higher magnitude than perceived provider performance on the satisfaction with ASP, validating H4b.

Discussion of Results

Implications from Findings

In our analysis, we have attempted to synthesize the ASP service delivery context with literature on the effects of prior attitudes, expectations, per-

ceived provider performance, and disconfirmation on the satisfaction process. Our validation of H1 and H4a can be explained in light of prior literature on consumer satisfaction, which investigates the effect of performance and disconfirmation on satisfaction evaluations. Similarly, our validation of H3e is in line with consumer satisfaction literature on the effect of experience-based norms on performance evaluations.

H2a indicates a need for critical evaluation of software delivery metrics, which can be of importance not only in ASP initiatives, but also in e-commerce and customer relationship manage-

Table 2. Parameter Estimates of the Path Analysis

Dependent Construct	Independent Construct	Coefficient	Std. Coefficient	Std. Error	T	P	R ²
Perceived Provider Performance	Prior systems integration	-0.306	-0.319	0.103	-2.986	**	0.319
	Functional Capability of the ASP	0.067	0.108	0.049	1.787	*	
	Technical service guarantees	1.002	0.531	0.228	4.388	***	
	Prior Internet Usage	0.073	0.089	0.065	1.129		
	Maturity of IT	-0.186	-0.028	0.545	-0.341		
Satisfaction with ASP	Perceived Provider Performance	0.626	0.434	0.140	4.465	***	0.355
	Disconfirmation	-0.438	-0.437	0.091	-4.829	***	
	Prior Internet Usage	-0.051	-0.043	0.090	-0.571		
	Maturity of IT	-0.119	-0.012	0.799	-0.149		
	Functional Capability of the ASP	0.117	0.130	0.069	1.704	*	
	Technical service guarantees	-0.109	-0.040	0.297	-0.368		
	Prior systems integration	0.265	0.191	0.153	1.732	*	

*denotes significance at the 10% level of confidence
 ** denotes significance at the 5% level of confidence
 *** denotes significance at the 1% level of confidence

ment initiatives. In the technological environment that is characterized by uncertainty (e.g., vulnerability to security lapses and network failures, uncertain application delivery over the Internet), even if the ASP offers 99 percent reliability, at key moments the firm may be unable to access critical applications. It is critical, therefore, that the ASPs invest in tools and systems that can ensure reliable and adequate service and meet the promised performance to their clients.

H2c reinforces the conclusions of prior literature that has posited that efficient project management

(Nidumolu 1995), and reliability and quality (Kekre et al. 1995) are critical to user firms. The functional capability of an ASP, as inferred by users, has an important role in the perceived performance of the ASP, which influences subsequent judgments about satisfaction and reuse of the ASP. H2a and H2c are both significant, a finding that needs to be differentiated from the findings of the consumer satisfaction literature, which has found mixed support for the effect of service expectations on perceived provider performance. H2b is not significant, in line with empirical literature on satisfaction that has found that

expectation has weak or insignificant effect on satisfaction (Cadotte et al. 1987; Oliver 1980; Pieters et al. 1995; Tse and Wilton 1988). A likely explanation could be that the expectation effect is being filtered through performance effects on satisfaction outcomes. H2d is significant, indicating that the effect of functional capability on satisfaction points to the importance in understanding attributions made by the consumer on realization of satisfaction.

Our research, in contrast, finds only marginal impact of experience-based norms (H3e and H3f are significant, while the others are not) on performance evaluation as well as satisfaction. H3e indicates that the need to be compatible with existing applications limits the extent to which ASP-managed IT processes can be integrated with the IT processes in the user organization and, therefore, lessens the enhanced technological capabilities that an ASP can confer. The fact that prior systems integration has a positive effect on satisfaction, reversing the causality of H3f has to be interpreted in terms of assimilation effects in the satisfaction process (e.g., Pieters et al. 1995). The learning implicit in using a new service such as ASP and an understanding of attainable norms in the performance of ASP can lead to a positive impact on satisfaction. Further, users may assign different weights to dimension-specific operation of expectancy disconfirmation and perceived performance (e.g., Oliver and Burke 1999). Decomposing attributes along specific dimensions can reveal their differing impacts on satisfaction and performance.

The fact that some experience-based norms are not significant (H3a, H3b, H3c, and H3d are not validated) may indicate that ASP users do not consider some of their prior experiences to be appropriate use situations (e.g., Cadotte et al. 1987) within which an ASP's performance may be assessed. Adopters of innovations experience overt behavior changes favoring the use of the innovation (Agarwal 2000; Rogers 1983), suggesting that the consumers evaluate an innovation such as the ASP model of IT service delivery over the Internet in a manner different from their prior experiences. It has been posited that the imple-

mentation process of new technologies spans several stages such as initiation, adoption, adaptation, acceptance, routinization, and infusion (e.g., Cooper and Zmud 1990; Kwon and Zmud 1987). However, in a company's transition to ASP services, several different processes such as confirmation and routinization operate simultaneously, which suggests a need for further exploration of referent norms used to evaluate satisfaction with ASP.

We hypothesize (H4b), following prospect theory, that the disconfirmation effect has a higher magnitude than the perceived provider performance on the satisfaction outcome. Our analysis reveals that the disconfirmation effects have a higher magnitude than the perceived performance and the difference is statistically significant. An explanation can be provided by principles of mental accounting (Thaler 1985) that suggest that consumers use various implicit methods to assign resources to different mental accounts. The disconfirmation that consumers face relates to a process deficiency (Bitner et al. 1990), that is, the delivery of the core service may have some flaws. This is different from an outcome failure (Gronroos 1988; Parasuraman et al. 1985) where the service provider may not fulfill the basic service need. Our finding may indicate a positive perception about the fulfillment of the basic service need but a discontent with the process aspects of service delivery. The services marketing literature does not indicate which types of failures have more influence on satisfaction judgments (Smith et al. 1999), but it is reasonable to assume that process failures are perceived to be less serious than outcome failures. Thus even though the disconfirmation effects outweigh the effects of performance on satisfaction, our finding implies a degree of satisfaction with the basic service delivered by the ASP. Further, it has been posited that for a continuously provided service, disconfirmation represents an evaluation of disruptions from normal service (e.g., Bolton and Drew 1991). Our finding indicates the need for ASPs to set up efficient service recovery mechanisms, and indeed efficient recovery mechanisms offer a way for providers to convert service failures into opportunities for increasing satisfaction (e.g., Bitner 1990).

Literature has posited that for high involvement products and services, performance effects should dominate disconfirmation (Oliver and Rust 1997; Yi 1990). Our finding indicates that this is not so and there is no confirmation effect (Oliva and Oliver 1995; Woodruff et al. 1983) that can cause a reinforcement of the decision to use the ASP's service. This implication is not very positive for ASPs. Marketing literature suggests that for frequently used services, companies must strive to keep their brands in the forefront of the consumer's mind (Rust and Oliver 2000). Unless ASPs continually provide benefits to their users, the satisfaction with an ASP's service may decay gradually over time, making it likely that consumers switch providers.

Implications for IS Literature

The functional capability of the ASP is similar to the capability construct of Kekre et al. (1995) and similar to the competence factor highlighted in service quality literature (e.g., Zeithaml 1990). Reliability has been similarly analyzed in the IS literature, but in our discussion we introduce a different dimension of reliability—that of technical service guarantees ensuring service over the Internet. The availability of tools to track performance of SLAs makes it possible for ASPs to offer technical service guarantees such as SLAs. This suggests that with improved measurement of performance, managers can avail themselves of markets for IT needs, such as using ASP services for needed IT capabilities rather than in-sourcing IT. This contrasts with prior literature (Poppo and Zenger 1998), which argues that changes in measurement accuracy do not affect the choice between firm and market performance.

One of the critical reasons that ASPs may be preferred over internal sourcing is the rapidity of implementation and the ability of the ASP to provide best of the breed IT capabilities, thus reducing the complexity and uncertainty associated with software development. However, organizations also face a lot of external uncertainty that results in volume and behavioral uncertainty in their processes (e.g., Balakrishnan

and Wernerfelt 1986), which in turn implies uncertainty in their demands of IT capabilities needed from the ASP. The disconfirmation effect in using ASP services can partly arise from the transaction uncertainty in using the ASP's service. Indeed, our conceptualization of disconfirmation reflects this concern for scalability and customer support within the organization. The negative effect of disconfirmation on satisfaction implies the need for a coordinated relationship between the ASP and the organization.

ASPs have internalized specialized IT activities such as maintenance, support, and hosting software, which can be a source of routines that yield valuable capabilities (e.g., Kogut and Zander 1992 1996). The perceived provider performance construct captures the enhanced value to the organization in accessing the specialized IT capabilities of the ASP. Thus our work can provide a knowledge-based explanation for using ASP services.

The literature on contracts stresses the need for vendor reputation as a mechanism to mitigate the asymmetry of information in the outsourcing process. By focusing on the role of SLAs and functional capability of the ASP in the satisfaction with ASP, this research highlights the contracting aspects in the ASP service delivery model. Contracts between ASPs and firms need to be sensitive to the added dimensions of uncertainty and service assurance (e.g., Shavell 1984) apart from other considerations discussed in the outsourcing literature.

Conclusions and Directions for Future Research

In this paper, we developed and empirically tested a model of satisfaction with ASP in terms of prior organizational attitudes, expectations about the service, the disconfirmation, and perceived provider performance. By positing a service framework of evaluation of IT service initiatives and by analyzing in terms of the consumer satisfaction disconfirmation paradigm, we try to look more closely at the service delivery of the ASP solution.

Our findings indicate a need for ASPs to facilitate integration with existing IT in client organizations, ensure superior performance delivery, emphasize rigorous enforcement of SLAs, and ensure that their application meets standards of software capability. The fact that ASPs are not evaluated on some of the prior experiences of the organizations is a favorable finding, since it suggests that firms that are Internet savvy or that have a strong IT department are not going to have unreasonably high expectations from the ASPs.

A related area of exploration is an analysis of how organizational users form expectations about an ASP's services. The literature on outsourcing posits that the trade press, discussions with peers, consultants' forecasts, and the business strategy pursued by the company (Lacity and Hirschheim 1994) can contribute to the formation of expectations in the outsourcing context. As the IT outsourcing literature has documented, management defines the scope of the outsourcing and the sourcing criteria, while the IT department can provide insights on the technological reasons for outsourcing and judge the success of the outsourcing project in terms of performance outcomes that are met (Lacity and Willcocks 1998). Expectations that need to be realized in the outsourcing context may reflect the consensus among the different stakeholders in the organization (Lacity and Willcocks 1998). The antecedents and the process of expectation formation are an interesting avenue for future research.

Prior research on customer satisfaction with software products (Kekre et al. 1995) has posited that concerns about reliability may be stronger at lower levels of satisfaction whereas the capability plays a significant role at higher levels of satisfaction. An empirical estimation of threshold levels in the satisfaction formation can be immensely valuable to ASPs in designing their offerings to improve value to users

The three ring model of service (Clemmer 1992) suggests that consumers may conceptualize the service of the ASP as consisting of basic service, service support, and enhanced service. Our conceptualization of expectation-based norms

focuses on expectations about basic service. As the ASPs mature in their service, we could observe expectations about higher order attributes, such as integration with other applications and expectations about superior performance, migrate into the zone of basic service, raising expectations from ASP services. Future research can analyze the subjective weighting of critical service attributes by means of a longitudinal analysis to determine the process of assigning attribute weights over time.

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Appendix

Survey Instruments

Initial Unstructured Questionnaire

- Q.1 Are you familiar with the term application service provider (ASP)? How would you define an ASP?
- Q.2 Is there a common set of criteria that your company uses to evaluate ASPs, regardless of the specific application being considered for outsourcing? (IF YES) What is that criteria?
- Q.2 Is the Return on Investment (ROI) strictly financial, or are there other benefits that justify the decision to outsource an application to an ASP?
- Q.3 What are the internal factors that constitute a barrier to outsource to an ASP?
- Q.4 Does your company currently use the Internet to transact with customers and / or suppliers?
- Q.5 Does your company currently use the Internet in organizational processes?
- Q.6 What do you perceive to be the drawbacks in outsourcing to ASPs?
- Q.7 When did you decide to outsource to an ASP? Do you intend to continue outsourcing to an ASP for the next 12 months? (IF YES) Why do you want to continue using ASP services?
-

Final Questionnaire

- Question 1 Are you someone who works for or involved in decisions regarding the business applications for your company?
- Question 2 Are you familiar with the term "application service provider"?
- Question 3 How would you define an application service provider?
- Question 4 How would you describe your current occupation? Choose from below:
MIS: IT, Computer, Networking
Non-MIS Executive
Director, Manager, Supervisor,
Staff (Describe the department associated with and job title) _____

When did your organization implement ASP services?

I Perceived Provider Performance

How much do you agree or disagree from your experience with an ASP that the following objectives have been achieved?

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
Low implementation and service costs	1	2	3	4	5	6	7
Access to best technology	1	2	3	4	5	6	7
Better maintenance support	1	2	3	4	5	6	7
Ability to implement IT solutions rapidly	1	2	3	4	5	6	7
Ability to integrate information from various functional applications	1	2	3	4	5	6	7

II Satisfaction with ASP

How much do you agree or disagree with the following statements indicating your company's satisfaction with the ASP and indicate your desire to continue using an ASP?

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1 My company's senior management is satisfied with security and privacy offered by the ASP	1	2	3	4	5	6	7
2 My company's senior management is willing to share workload and information with an ASP	1	2	3	4	5	6	7
3 My company's MIS department is satisfied with the security and privacy offered by the ASP	1	2	3	4	5	6	7
4 Our MIS is willing to share workload and information with an ASP	1	2	3	4	5	6	7
5 Overall, I am satisfied with the ASP's way of implementing IS projects	1	2	3	4	5	6	7

III Prior Internet Usage of the Organization

Please answer these questions about the Internet capabilities of your organization prior to implementing ASP services.

Please choose between these responses:

0%	1
1% – 25%	2
26% – 50%	3
51% – 75%	4
76% – 100%	5

Questions		Value				
1	Of your company's revenues, what percentage is generated from direct online orders?	1	2	3	4	5
2	What percentage of your procurement of MRO items (e.g., supplies, maintenance, etc.) is done online?	1	2	3	4	5
3	What percentage of your production goods (e.g., raw materials or components for manufacturers, finished goods for distributors and retailers) is procured online?	1	2	3	4	5
4	What percentage of service requests is resolved electronically?	1	2	3	4	5
5	What percentage of your new customers was acquired online?	1	2	3	4	5

IV Prior Systems Integration

How much do you agree or disagree with the following statements about your company's installed technological systems, prior to outsourcing?

Questions		Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1	Our systems allow continuous monitoring of order status at various stages in the process	1	2	3	4	5	6	7
2	Our systems can easily transmit, integrate, and process data from suppliers, vendors, and customers	1	2	3	4	5	6	7
3	Employees can easily retrieve information from various databases for decision support	1	2	3	4	5	6	7
4	Data is easily shared among internal systems in my company	1	2	3	4	5	6	7

Note: The first item was dropped since it did not have a significant t value

V Maturity of Internal IT

How much do you agree or disagree with the following statements about the advantages of internal development of IT systems as opposed to ASPs?

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1 Internal development offers a better way than ASP to get needed IT functionality	1	2	3	4	5	6	7
2 Internal development is better than ASP if we want to be less vulnerable to network failures	1	2	3	4	5	6	7
3 Internal development offers less of a threat of IT solution being obsolete than ASP	1	2	3	4	5	6	7

VI Disconfirmation

From your experience with ASP, how much do you agree or disagree that outsourcing to an ASP was better or worse than expected for the following factors? Strongly disagree indicates better than expected and strongly agree indicates worse than expected experience with ASP

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1 Long implementation period	1	2	3	4	5	6	7
2 Overlap of existing capabilities	1	2	3	4	5	6	7
3 Obsolete IT solution	1	2	3	4	5	6	7
4 Vulnerability to network problems	1	2	3	4	5	6	7
5 Security record of ASP	1	2	3	4	5	6	7
6 Loss of control over information	1	2	3	4	5	6	7

VII Functional Capability of the ASP

How much do you agree or disagree that the following factors are important when you decide to outsource business applications to a specific application service provider?

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1 ASPs should support all our business application outsourcing needs	1	2	3	4	5	6	7
2 ASPs should be profitable and stable companies	1	2	3	4	5	6	7
3 ASPs should have experience in my industry or vertical market	1	2	3	4	5	6	7

VIII Technical Service Guarantees

How much do you agree or disagree the following technical service guarantees are important for you when you decide to contract out services to a specific application service provider?

Questions	Strongly Disagree	Disagree	Slightly Disagree	Neither disagree nor agree	Slightly Agree	Agree	Strongly Agree
1 ASPs should have tracking tools and systems to prove SLA (Service Level Agreements) achievement	1	2	3	4	5	6	7
2 ASPs should have SLAs on network reliability and security.	1	2	3	4	5	6	7
3 ASPs should have SLAs on application response time	1	2	3	4	5	6	7