

# Adoption Trends in Application Service Provisioning: An Exploratory Field Study of Small and Medium-size Enterprises

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## Abstract

*This paper describes an exploratory field study on the adoption of Application Service Provisioning (ASP) in Small and Medium-sized Enterprises (SMEs). Rooted in Merton's Motivation-Ability model of innovation, and based on an integrated multi-theoretical framework, several factors are identified, which drive and enable ASP adoption. The results of the survey indicate that the primary drivers for ASP adoption in SMEs are improved operational excellence, focus on core competency, easy access, and flexible deployment. Critical enabling factors of ASP adoption involve application service security, service level management, SME trust in ASP, and quality of application service. The findings provide support for the research model, i.e., both motivation and maturity factors play a pivotal role in ASP adoption. Moreover, whereas the first wave of ASP was characterized by a strong 'technology-push', currently, a 'SME Technology-Pull' characterizes ASP adoption. The paper concludes by discussing several important lessons and presents a model for strategic ASP alignment.*

## Keywords

IT innovation adoption, IT outsourcing, Application Service Provisioning (ASP), Small and Medium-size Enterprises (SME).

## 1. Introduction

*“ASPs will save your business money and time by relieving the headaches associated with the purchase of software: large up-front costs, IT support, investment risks, outdated software, inaccessible information and much more. Explore our resources and discover how ASPs will dramatically reduce your technology budget while increasing business productivity”*

- <http://www.asp.com>, October 15, 2002

*Application Service Provisioning* (ASP<sup>1</sup>) can be seen as the next strategic innovation on the IT sourcing horizon. Heralded as the ‘IT silver-bullet solution’ for Small and Medium-sized Enterprises (SMEs) in particular, the adoption of ASP as an IT sourcing option is attracting much attention and speculation. The ASP model presents multiple users, subscription-based access over an (open) electronic network to centrally managed applications. With promises of improved efficiency, effectiveness and flexibility, application service providers (ASPs) are intensively targeting SMEs. Anecdotal evidence suggests, however, that SMEs are not adopting the ASP model as forecasted (Figure 1). In an initial study, Seltsikas & Wendy (2002) report that out of a sample of 250 SMEs, 70% claimed they had never heard of the term ‘ASP’, and only 6% stated that they had adopted an ASP model.

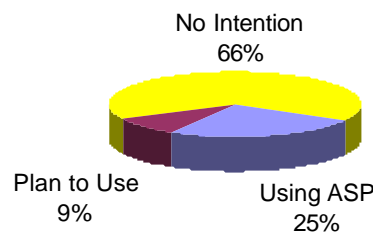


Figure 1. ASP Usage (eMarketer, 2000).

Concerted and empirical efforts to understand ASP adoption by SMEs, and the development of SME-ASP relationships have been noticeably absent in IS research, with the exception of a few recent studies (e.g., Currie, 2000; Jayatilika et al., 2002; Klueber, 2002; Kern & Krijger, 2001; Seltsikas & Currie, 2002; Tamm & Gunther, 2000; Yao & Murphy, 2002). There is a fundamental need for business-relevant empirical research on ASP adoption in SMEs. From a research perspective, the challenge is how to develop frameworks and management tools that organize and guide research efforts, and provide relevant insights and practices for understanding and managing ASP.

This paper describes an exploratory field study of ASP adoption among SMEs in the Netherlands. The research design is descriptive, geared at identifying and exploring ASP adoption trends in SMEs. The research objectives are to gain an understanding of ASP adoption trends in SMEs, and identify the strategic factors that enable and/or inhibit ASP adoption and relationship-building. Our primary research questions are:

*How and why are SMEs adopting the ASP model?*

*What are the strategic drivers and motives for ASP adoption?*

*What are the main factors that enable or inhibit ASP adoption in SMEs?*

The remainder of this paper is structured as follows. In Section 2, the theoretical background of this study is outlined. Drawing from an extensive survey of the literature, this paper develops a multi-theoretical framework, consisting of different motivation- and maturity-factors. The research design and methods are described in Section 3. The main findings of this study are discussed in Section 4. This paper concludes with a discussion of the major implications for practice and future research (Section 5).

<sup>1</sup> In this paper, ‘ASP’ refers to the action of providing application services. ‘ASPs’ is used to denote the suppliers of application services.

## 2. Theoretical Background

In this section, we present a brief description of the ASP phenomenon (Section 2.1) and describe the research model (Section 2.2)

### 2.1 Introduction to ASP

Based on a shared, contractual, one-to-many model of (commodity) application services, ASPs exemplify how organizations are acquiring strategic resources to respond to the challenging demands of the increasingly globalized and digital economy. Kern & Krijger (2001) conclude that the ASP phenomenon describes a paradigm shift in how organizations are procuring the necessary resources and competencies to respond effectively to the increasing market demand of being ‘e-business’ ready.

While different definitions exist (see Figure 2), the concept of ASP proposes (a) the delivery of application services over an electronic network in (b) a one-to-many (customers) model, with (c) a subscription-based ‘pay-as-u-use’ fees, according to (d) customer-specific service guarantees. ASPs can be either internally or externally focused, and can provide either industry-specific (vertical) or generic (horizontal) application services, thus providing four distinct types of application services: (i) internal-vertical, (ii) external-vertical, (iii) internal-horizontal, and (iv) external-horizontal (Eisenmann, 200; Seltsikas & Currie, 2002). In practice, ASPs can opt for a hybrid approach.

ASP Consortium	Industry	ASPs are service organizations that deploy, host, manage and enhance software applications for customers at a centrally managed facility, offering application availability, performance and security. End-users access and use these applications remotely using Internet or leased lines.
Gartner		ASPs are organizations that deliver the application functionality and associated services across a network to multiple customers using a pay-as-you-go model.
IDC Research		ASPs provide a contractual service offering to deploy, host, manage and rent access to an application from a centrally managed facility. ASPs are responsible for either directly or indirectly providing all the specific activities and expertise aimed at managing a software application or set of applications.
Meta Group		ASPs implement, host and manage a wide range of applications for multiple clients networked into a central processing facility. Pricing is usually charged on a per user-per month basis.
Giga		A third party hosting the application(s) of more that one company.

Figure 2. Definitions of Application Service Providers.

The ASP model is particularly relevant to SMEs, who traditionally have struggled with attaining sufficient strategic resources to develop and sustain competitive advantage. ASPs provide SMEs with the required resources to become competitive, without incurring significant extra costs, and to increase their strategic flexibility. The realization of any type of benefit, however, is dependent upon the motivation and abilities of both SMEs and ASPs. Consequently, value drivers and propositions for ASP adoption can incur significant strategic risks, if and when, motivation and abilities are discordant.

Table 1. Drivers and Risks of ASP Adoption (Adapted from Jayatilika et al., 2002; Kern & Krijger, 2001; Klueber, 2002).

Type	Value Drivers	Strategic Risks
<b>Business</b>	Operational excellence Focus on core competencies  Reduced need to develop ICT skills	Cost-inefficiencies High level of ASP dependency; Low level of SME control High level of ASP dependency; Low level of SME control
<b>Technical</b>	Easy and efficient access to, and use of new applications and services Flexible deployment Application standardization	Low quality of ASP service; High ex-post ICT costs Low level of application integration by ASP Low level of customization by ASP

## 2.2 A Motivation-Maturity Perspective of ASP Adoption

Innovation theory (Rogers, 1995) and ICT innovation studies focusing on inter-organizational relationships (Reich & Benbasat, 1990; O'Callaghan et al., 1992; Saunders & Clark, 1992; Premkumar & Ramamurthy, 1995; Iacovou et al., 1995; Hart & Saunders, 1997; Ramamurthy et al., 1999) indicate that different factors impact the adoption of ICT-based innovations. These factors are often categorized as 'perceived benefits', 'external pressure', and 'organizational readiness' (Chwelos et al., 2001).

Based on Merton's (1957) *motivation-ability* model of innovation, and previous studies (Cheon et al., 1995; Kern & Krijger, 2001; Seltsikas & Currie, 2002; Jayatikala et al., 2002; Yao & Murphy, 2002), we distinguish between *motivation* (i.e., strategic drivers) and *maturity* (i.e., ability) for both SMEs and ASPs. In this sense and based on Chwelos et al. (2001), this study focuses on 'perceived SME benefits', 'external ASP pressure', 'SME organization readiness', and 'ASP

These factors are based on different economic and organization theories, including *Transaction Cost Theory* [TCT] (Williamson, 1996); *Resource Dependency Theory* [RDT] (Pfeffer & Salancik, 1978); *Agency Theory* [AT] (Jensen & Meckling, 1976); *Resource Based Theory* [RBT] (Wernerfelt, 1984; Grant, 1991); *Network Theory* [NT] (Johanson & Mattson, 1987); *Institutional Theory* [IT] (DiMaggio & Powell, 1983); *Organization Theory* [OT] (Lawrence & Lorsche, 1969; Daft, 1998). Based on the foregoing theories and an extensive review and analysis of previous studies, the following motivation and maturity factors are identified (see Table 2).

**SME Motivation** describes the motivation, rationale and value drivers for ASP adoption. These include both business and technical value drivers (See Table 1). Whereas TCT suggests that ASP adoption leads to lower transaction-costs for commodity services, RBT predicts that ASP adoption leads to a reduced focus on non-core activities, and the need for ICT skills. RDT cautions, however, about the inherent dependency and loss of control in ASP adoption. Alternatively, RDT suggests that ASP adoption can lead to improved access and use of new applications and services.

**ASP Motivation** describes the external pressures for ASP adoption. These include the dependency on the ASP and the power of the ASP. RDT suggests that the external dependency of SMEs encourages ASP adoption, and transfers the locus of control and power to the provider. IT suggests that in dynamic environments, such as the ICT industry, organizations exhibit strategic mimicking behavior, in which organizations attain legitimacy by carrying out activities that are deemed suitable by institutional constituents (e.g., business federations and trade associations). This 'bandwagon' effect describes why organizations engage in activities simply because other organizations do, and provides a possible explanation for the rise, fall and rise of the ASP model.

Whereas drivers of ASP adoption describe the motivations for adopting an ASP model, *maturity depicts the ability and level of readiness to implement and exploit an ASP model*. Maturity thus describes SME-specific and ASP-specific 'maturity factors' that enable and/or inhibit ASP adoption. Based on the motivation-ability model (Merton, 1957), the research model (see Figure 3) describes how both drivers and levels of readiness impact ASP adoption by SMEs.

Table 2. Summary of ASP Adoption Factors.

	SME Motivation Factors	SME Maturity Factors	ASP Motivation Factors	ASP Maturity Factors
<b>TCT</b>	Lower transaction costs for commodity application services	Low uncertainty	Low asset specificity of application service provisioning	Quality of service, the level of security, and the level of application integration
<b>RDT</b>	Improved access to, and use of new applications and services	Management of partnership dependency	External dependency encourages ASP adoption, and transfer of the locus of control and power to the provider	Enter into exchange relationships to obtain critical resources that cannot be generated internally
<b>AT</b>	Low outcome uncertainty; Clear benefits; Risk aversion	Designing and managing service level agreements necessary for avoiding conflict and wrong expectations; Agency relationship	Low outcome uncertainty; Clear benefits; Risk aversion	Providing and managing professional and reliable application services; Principle relationship
<b>RBT</b>	Reduce focus on non-core activities; Reduced need for special ICT skills	External relationship-building capability	Competency and capability to provide application services on-demand	Provide knowledge-intensive application services, which are valuable and unique to SMEs
<b>NT</b>	Share knowledge and leverage expertise	Low partnership uncertainty and high levels of trust among stakeholders in a network enables ASP adoption	Leverage ASP resources	Credibility and market reputation
<b>IT</b>	Strategic mimicking behavior	Level of ambiguity; Industry legitimacy	Strategic mimicking behavior	Level of ambiguity; Industry legitimacy
<b>OT</b>	Top management strategic intentions and thrusts	Internal coordination and partnerships	External coordination and partnerships	Development and education of ASP professionals

**SME Maturity** describes the level of organizational readiness in adopting and exploiting ASP. These (internal) organizational features include professional relationships between business and ICT managers within the ‘user’ organization, mature service level management practices, and trust in the services and expertise of a provider. Adoption of complex innovations requires collaboration across functional lines within organizations. If internal relationships between business and ICT managers are fraught with conflict, the external relationship with a provider is unlikely to succeed (Peterson, 2002). NT suggests that low partnership uncertainty and high levels of trust among stakeholders in a network enables ASP adoption. Alternatively, high partnership uncertainty and lack of trust inhibits ASP adoption. From an AT perspective, designing and managing service level agreements (SLAs) is necessary for avoiding conflict and wrong expectations between SMEs and ASPs. AT also states that high outcome uncertainty, i.e., uncertainty whether the claimed advantages can be realized, will inhibit ASP adoption by SMEs.

**ASP Maturity** describes the level of ASP readiness and ASP expertise in providing application services. These factors include the quality of service, the level of security, and the level of application integration, and depict the basic operational requirements for establishing a professional relationship with, and providing added-value to SMEs (Seltsikas & Currie,

2002). From a RDT perspective, SMEs will enter into exchange relationships with others to obtain critical resources that cannot be generated internally. However, this requires competency and professional capabilities on the side of ASPs. RBT suggests that ASPs need to provide knowledge-intensive application services, which are valuable and unique to SMEs. Furthermore, credibility and market reputation are important factors that increase an SME's belief that the ASP will provide the application services according to specifications (Yao & Murphy, 2002).

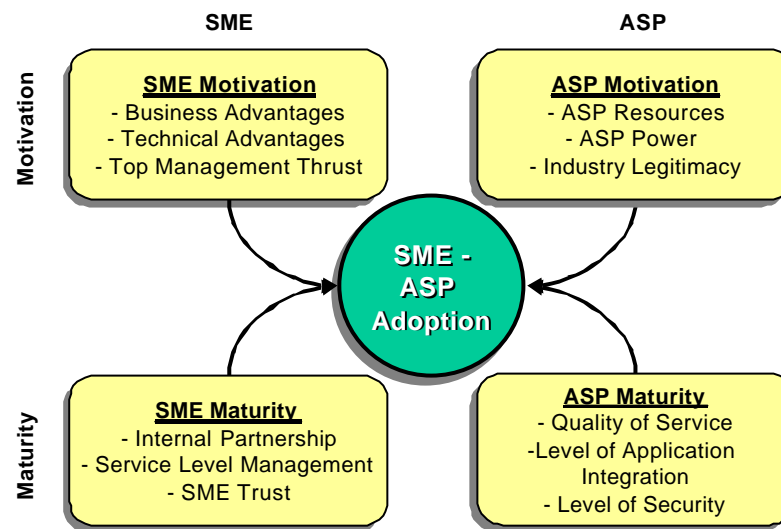


Figure 3. Research Model.

### 3. Research Methodology

The objective of this research is to gain in-depth understanding of the motivation and abilities of SMEs in adopting ASP, specifically, horizontal, internally-oriented ICT applications, and in particular, Office Productivity Applications (OPA). OPAs are non-organization specific, commodity applications, which are more likely to be outsourced to an ASP, due to the (relatively) low complexity and low asset specificity (Kern & Krijger, 2001; Lacity & Willcocks, 1996).

For data collection, 150 structured interviews were conducted by telephone over a period of four months (between November 2001 and February 2002). All interviews were conducted in the Netherlands. In Europe, Dutch SMEs are recognized and well known for their entrepreneurial and innovative spirit, and the fastest growth in employment (OECD, 1998; CEC, 2002).

With regard to IT outsourcing, studies indicate that Dutch SMEs are relatively active, with up to 45% of SMEs making extensive use of external IT vendors and suppliers (Oracle, 2002). Over the past year, the Dutch ASP market has experienced an impressive growth, with currently approximately 40 active ASPs (see Appendix A). However, anecdotal evidence indicates that whereas over 65% of SMEs have heard of the term 'ASP', less than 10% have implemented an ASP model (Oracle, 2002). This low level of ASP penetration combined with the Dutch SME entrepreneurial context underscores the relevance and importance of this study.

SMEs were selected from a financial research database (REACH; <http://www.bvdep.com>) containing all relevant contact information and company data. SMEs were purposefully selected based on size (between 50 and 199 employees) and successful financial operations (revenue growth 1999 - 2001). In total, 72 usable responses were collected across different industries, across different management functions in SMEs (See Tables 3 & 4). Non-usable responses were due to the adoption of external and/or vertical ASPs (46 responses) and non-cooperation (32 responses).

Each telephone interview lasted between 20 and 35 minutes, and addressed the drivers, risks, enablers, and inhibitors of ASP adoption. For each of the dimensions, the question was asked to what extent the value drivers, strategic risks, enablers and/or inhibitors have/had an impact on ASP (non-) adoption.

Table 3. ASP Adopters and Non-Adopters.

Sector	ASP Adopters	Non-Adopters
Banking	4	6
Construction	3	8
Entertainment	1	3
Health Care	1	5
Insurance	6	3
Manufacturing	2	10
Publishing	1	5
Retail	2	5
Utilities	1	6
<b>TOTAL</b>	<b>21 (29%)</b>	<b>51 (71%)</b>

Table 4. Respondents.

Sector	#
CEO	32
ICT Director	8
Business Manager	19
ICT specialist	5
Department Manager	8
<b>TOTAL</b>	<b>72</b>

The motivation and maturity factors were operationalized based on a review of literature and previous studies (see Section 2). The extent to which the value drivers and/or strategic risks played a role in the decision to adopt ASP was measured using a Likert-scale ranging from 1 (not important) to 5 (extremely important). The importance of the individual motivation and maturity factors was measured using a Likert-scale ranging from 1 (not important) to 10 (extremely important). The impact of the individual motivation and maturity factors was measured using a Likert-scale ranging from 1 (no impact) to 5 (high impact).

## 4. Results

The results of the ASP survey are presented in this section. Specifically, the value drivers and strategic risks associated with the adoption of ASP by SMEs are presented (Section 4.1), as well as the perceived importance and impact of motivation and maturity factors in ASP adoption (Sections 4.2 and 4.3).

### 4.1. Value Drivers & Strategic Risks: ASP Adopters & Non-Adopters

Respondents were asked what the main value drivers and strategic risks are in their adoption of ASP. Distinction was made between business drivers/risks (see Figure 4) and technical drivers/risks (see Figure 5).

The results indicate that ASP adopters and non-adopters have significantly ( $p < .01$ ) different views with regard to business value drivers and strategic risks. In general, ASP adopters rate value drivers relatively high, and higher than their non-adopter SME counterparts. The drive for operational excellence, the focus on core competence, and the reduced need for ICT skills are reported as very important. However, only operational excellence and reduced need for ICT skills are significantly different ( $p < .01$ ) across ASP adopters and non-adopters.

With regard to strategic risks, non-adopters rate potential cost-inefficiencies, high level of ASP dependency and low level of control as moderate to very important risks, and inhibitors of ASP adoption. These risks are rated significantly ( $p < .01$ ) lower by ASP adopters. Interestingly, while both ASP adopters and non-adopters view the high level of dependency as a risk, only non-adopters associate this with the potential loss of control.

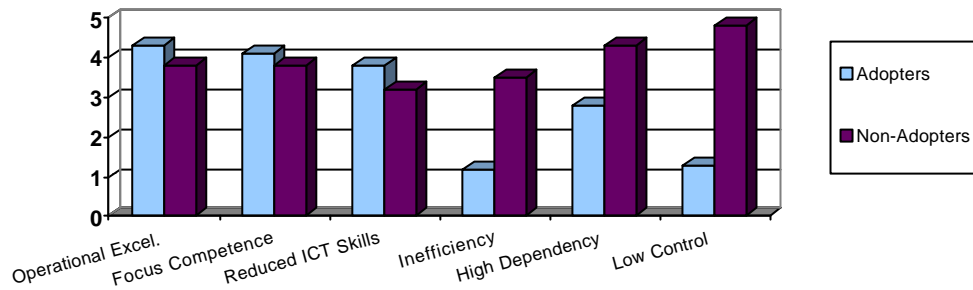


Figure 4. Business Value Drivers & Strategic Risks among ASP Adopters and Non-Adopters.

The results also indicate that ASP adopters and non-adopters have significantly ( $p < .01$ ) different views with regard to technical drivers and risks. In general, ASP adopters rate technical drivers relatively high, and higher than their non-adopter SME counterparts. The drive for access to, and use of new applications, flexible deployment, and standardization are reported as very important. In comparison, non-adopters rate these technical drivers as significantly lower ( $p < .01$ ). Both ASP adopters and non-adopters report application standardization as a moderately important driver.

Similar to the business risks, non-adopters rate low quality of service, low application integration and low degree of application customization (i.e., technical risks) as moderate to very important risks, and inhibitors of ASP adoption. These risks are rated significantly lower by ASP adopters ( $p < .01$ ).

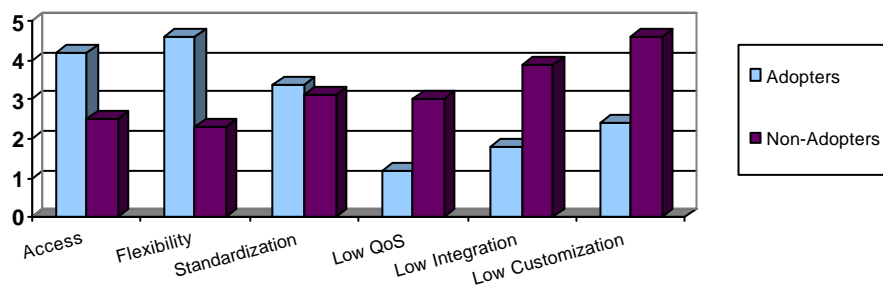


Figure 5. Technical Drivers & Risks among ASP Adopters and Non-Adopters.

## 4.2. Importance of Motivation-Maturity Factors in SME ASP Adoption

In the second part of the survey, respondents were asked to rate (on a Likert-scale from not [1] to strategic [10]) the importance of 12 factors. The 12 factors represent the different motivation and maturity factors outlined in the research model.

Table 5. Importance of Motivation and Maturity Factors in SME ASP Adoption.

Factor	Rank	Mean
ASP Security	1	9,1
Business Advantages	2	8,4
Service Level Management	3	8,2
Technical Advantages	4	8,0
SME Trust	5	7,9
ASP QoS	6	7,8
Top Management Thrust	7	7,7
ASP Resources	8	7,7
ASP Integration	9	7,7
ASP Power	10	7,4
Internal Partnerships	11	7,1
Industry Legitimacy	12	4,4
<b>Other Factors:</b>		
ASP Credibility & Reputation	Mean: 7,9	61% (44 SMEs)

The results indicate that SMEs perceive ASP security as the most important factor, followed by business advantages, service level management, and technical advantages (Table 5). These factors represent SME motivation, SME maturity, and ASP maturity. Factors rated as moderately important include: SME trust, ASP QoS, and top management thrust, ASP resources, and ASP integration. The findings also indicate that industry legitimacy is

perceived as relatively unimportant. Thus, ASP adopters - within this sample - do not experience strategic mimicking behavior as a dominant ASP driver.

The interviews also explored whether there were any other factors - besides the 12 previously identified in the literature review - that were considered important as either a motivation and/or maturity factor in ASP adoption. Of the 72 surveyed SMEs, 61% indicate that the credibility and reputation of a service provider is very important in considering the adoption of ASP.

### 4.3. Impact of Motivation-Maturity Factors on SME ASP Adoption

In the final part of the survey, the study explored the impact of motivation and maturity factors in the adoption of ASP by SMEs. Respondents were asked to rate the impact of the 12 identified factors.

With regard to the motivation factors, respondents indicate that both SME and ASP drivers have a significant to strategic impact on the adoption of ASP (see Figure 6). In general, SME drivers have a more strategic impact on ASP adoption, in comparison to ASP drivers, though there are no significant differences. Business and technical advantages are rated as 'high impact' factors, followed by top management thrust, ASP resources and power. Similar to the findings on the importance of motivation factors, SMEs regard industry legitimacy as having a relatively low impact on the adoption of ASP.

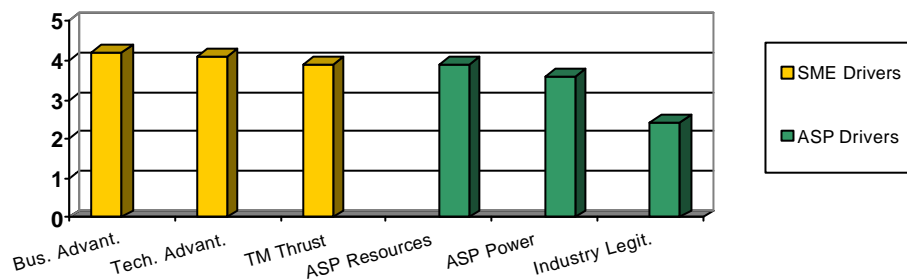


Figure 6. Impact of Motivation Factors in SME ASP Adoption.

On the impact of maturity factors, SMEs regard all factors as having a significant to strategic impact on ASP adoption, with a tendency towards ASP maturity (see Figure 5). ASP security and service level management are regarded as the strategic factors, followed by SME trust, ASP quality of service, and ASP integration.

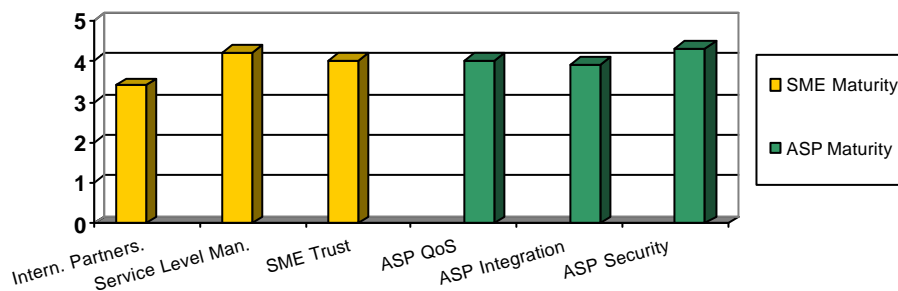


Figure 5. Impact of Maturity Factors in SME ASP Adoption.

To explore the relationships between motivation and maturity factors, and the adoption of ASP by SMEs, correlation analysis was conducted (Table 6). The findings indicate that there are several significant ( $p < .01$ ) and non-significant ASP adoption correlates. All relationships are positive. Significant ASP adoption correlates are found for: ASP security, business advantages, service level management and SME trust. The first three of these factors are also ranked as the three most important factors, thereby providing support to the importance of these factors.

Table 6. ASP Adoption Correlates.

Factor	ASP Adoption Correlates
ASP Security	.79*
Business Advantages	.63*
Service Level Management	.74*
Technical Advantages	.61
SME Trust	.71*
ASP QoS	.49
Top Management Thrust	.45
ASP Resources	.46
ASP Integration	.45
ASP Power	.37
Internal Partnerships	.41
Industry Legitimacy	.24

(\* Significant correlation:  $p < .01$ )

The interviews also explored the level of perceived added value (on a scale from 1 [no added value] to 5 [high added value]) of ASP adoption amongst SME adopters. The results indicate that on average SMEs are satisfied with the services provided by an ASP ( $M = 4.2$ ;  $SD = 1.09$ ).

## 5. Conclusions & Directions

This paper described an exploratory field study of ASP adoption among SMEs. The research was geared at identifying and explaining ASP adoption trends in SMEs. The research objectives were to gain an understanding of ASP adoption trends in SMEs, and identify the strategic factors that enable and/or inhibit ASP adoption.

The research indicates that SMEs do adopt and are adopting the ASP model, but only if the (perceived) benefits outweigh the (perceived) risks, and SMEs and ASPs are organizationally mature. With regard to the importance of factors, SMEs identify ASP security as the most important factor, followed by business advantages, service level management, and technical advantages. These factors represent the motivation of SMEs and the maturity of SMEs and ASPs. More specifically, they involve operational excellence, focus on core competence, and reduced need for ICT skills; improved access to, and use of new

applications and services and flexible deployment; top management thrust and support for ASP, service level management, and trust in ASP; and ASP credibility, quality of service, application integration and security.

With respect to ASP non-adoption, the following factors were found to inhibit the adoption of ASP by SMEs. These factors involve the (perceived) business and technical risks associated with ASP adoption and include:

- Potential cost-inefficiencies and high ex-post (hidden) costs;
- High dependency on the ASP;
- Low level of control, and loss of SME control;
- Low credibility of the ASP;
- Potential lower quality of service;
- Low level of application integration, security, and customization.

The findings indicate that SMEs need to consider both motivation and maturity factors in deciding whether to adopt or not to adopt an ASP model. Moreover, SMEs need to manage the risks associated with an ASP model, by analyzing their own motivation and level of readiness for adopting ASP, as well as the ASPs' drivers and maturity level. For ASPs, the results suggest that they need to focus not only on the business and technical advantages for their SME clients, but also on their role and responsibility in the client relationship. Developing adequate 'in-house' capabilities - e.g., quality of service, application integration and security - and attaining and sustaining a credible, legitimate position in the market, are critical aspects for the survival and success of the ASP model.

Taking these different factors into account, and building forth on the results of this study, we develop a strategic ASP alignment model (see Figure 8), which integrates the different factors in the adoption of ASP. The strategic ASP alignment model distinguishes between SME-specific and ASP-specific factors (vertical orientation), and differentiates motivation from maturity factors (horizontal orientation). Within each of the four quadrants, specific factors are described, which are critical to the successful adoption of an ASP model.

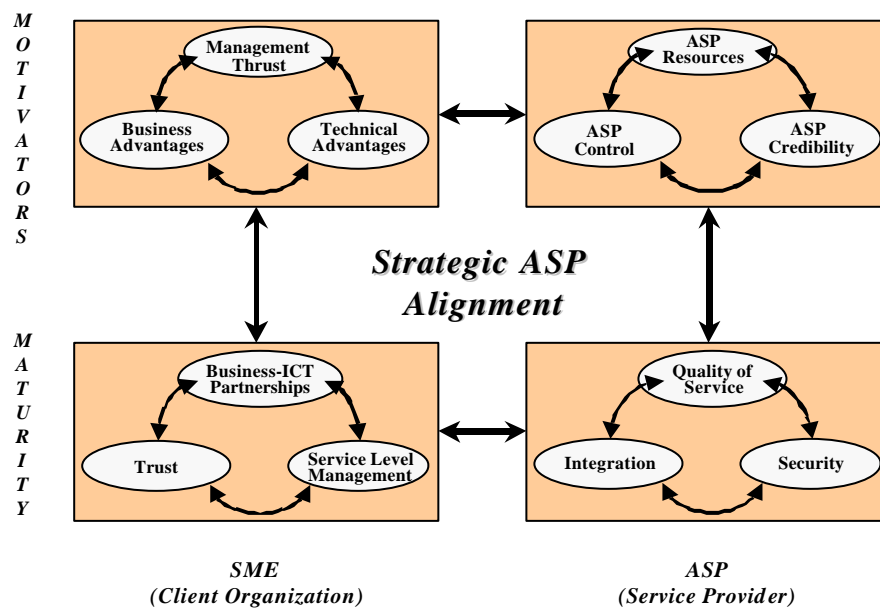


Figure 7. Strategic ASP Alignment Model.

Moreover, the strategic ASP alignment model emphasizes not only the four quadrants and the related factors, but more importantly, the interrelationships between the quadrants, and the integration of different (client-provider) perspectives. Horizontally, the strategic ASP alignment model depicts the integration of drivers and strategic motives of SMEs and ASPs. Vertically, the model describes the integration of drivers and organization and technical capabilities to realize the ASP potential. The strategic ASP alignment model thus provides a holistic perspective on ASP adoption, and can assist both client organizations, as well as service providers in the adoption and exploitation of an ASP model.

The results and conclusions drawn from this study should of course be interpreted within its boundaries. This study is limited by its exploratory nature, small sample, and consequently, its limited external validity and the ability to generalize. These limitations, as well as the preliminary findings of this study should therefore provide interesting avenues for future research.

Research should focus on the empirical, rigorous validation of the research model and the strategic ASP alignment model across a larger sample of (international) SMEs. Furthermore, the explicit perspective of ASPs should be included in future research. Alternatively, future research could also focus on testing this model in large(r) organizations, and explore other types of application services, i.e., externally-oriented, industry-specific applications. Moreover, conducting several in-depth, longitudinal studies on the adoption and exploitation of the ASP model would add considerable validity to the strategic ASP alignment model.

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## Appendix A. List of Active ASPs in the Netherlands 2002 (Source: [www.aspforum.nl](http://www.aspforum.nl))

**Company**  
**Location**  
**Application Services**  
**Other Services**

[4sure IT](#)

Security  
Hardware Vendor

[7x24](#)

Amsterdam  
Finance & Administration, Marketing,

[Abaque IT Services](#)

Voerendaal  
Website Services/e-Commerce

[Acriter BMS](#)

Houten  
Document/Knowledge Management, Customer Relationship Management (CRM), Project management & Collaboration  
ISV Software Vendor

[AddVision](#)

Lisse  
e-Learning

[Administratie.nl](#)

Wijk bij Duurstede  
Finance & Administration

[Anna PA](#)

Virtual Office & Collaboration

[Applify](#)

Delft  
Website Services/e-Commerce  
ICT Systems Integration, Consulting

[Asp4all](#)

Huizen  
Website Services/e-Commerce

[Bixyte](#)

Delft  
Marketing, Customer Relationship Management (CRM),

[Biz Machine](#)

Rotterdam  
Website Services/e-Commerce

[Bouw ASP](#)

Almere  
Vertical: Construction & Engineering

[CDG-Europe](#)

Zoetermeer  
Application Servers & Middleware, Website Services/e-Commerce,  
ICT Systems Integration, Consulting, ISP/Hosting

[CMG](#)

Finance & Administration

[Compersonal](#)

Maarsse  
Website Services/e-Commerce  
ISP/Hosting

[Connor Software](#)

Oudewater  
Finance & Administration  
ISP/Hosting

[Coor](#)

Amsterdam  
Process Automation

[De Billing ASP](#)

Waddinxveen  
Billing & Payment

[Cubic International](#)

Amersfoort  
Website Services/e-Commerce, Marketing & Call Center,  
ISP/Hosting,

[Deloitte & Touche](#)

Amsterdam  
Finance & Administration

[e-Bee Solutions](#)

Breda  
Customer Relationship Management (CRM), Website Services/e-Commerce,

[ITurnTV](#)

Zwaag  
CRM, logistiek, ERP, Website development, Content management  
Hosting

[KPN Telecom](#)

Utrecht  
Website Services/e-Commerce

[KPN-Qwest](#)

Hoofddorp  
Application Servers & Middleware

[Monidee Finance](#)

Huizen  
Finance & Administration

[Multrix](#)

Amsterdam  
Finance & Administration  
ISP/Hosting

[NetFuel](#)

Rotterdam  
Project Management

[NP AdminOnline](#)

Delft  
Finance & Administration

[Project Place](#)

Amsterdam  
Project Management

[Pyramaz](#)

Utrecht  
Procurement & SCM

[QuayOne](#)

s'Hertogenbosch  
Enterprise Resource Planning (ERP), Enterprise Suites, Database & Content Management  
ISP/Hosting, Consulting

[Shop Solution](#)

Nieuwegein  
Website Services/e-Commerce

[Siennax](#)

Amstelveen  
Application Servers & Middleware, Messaging & Email, Billing & Payment  
ICT Systems Integration, Consulting

[Terrazur](#)

Barneveld  
Website Services/e-Commerce  
ICT Systems Integration, Consulting, ISP/Hosting

[TTYL](#)

Amsterdam  
Messaging & Email

[Unit4-Agresso](#)

Sliedrecht  
Enterprise Resource Planning (ERP), Finance & Administration,

[VercomNet](#)

Maastricht  
Vertical: Healthcare,  
Vertical: Hospitality

[Website Onderhoud](#)

Noordwijkerhout  
Website Services/e-Commerce