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ASP effects in the small sized enterprise: a case of Bizmeka of Korea Telecom

Abstract   An application service provider (ASP) is a business model providing information technology (IT) enabled solutions to customers over the Internet. Utilizing an ASP model, small and medium-sized enterprises (SMEs) can acquire affordable IT solutions. Korea Telecom (KT), a leading IT company in Korea, provides an ASP service called Bizmeka to SMEs. In this study, we identify factors influencing the perceived benefits of Bizmeka usage. We also examine the relationship between the perceived benefits of Bizmeka usage and customer satisfaction. Based on the results of our survey, we found the following factors to be important in determining customer satisfaction with ASPs: cost and time impact of the ASP, maintenance impact of ASP, and the security risks involved with the ASP are important factors affecting customer satisfaction.

1. Introduction

There is no doubt that information technology (IT) is necessary for all organizations to compete in today's business environment. The effective use of IT has become a critical element for the success of organizations. IT is transforming the nature of products, processes, companies, industries, and even competition itself (Porter and Miller 1985). Moreover, IT has a powerful effect on competitive advantage, based in either cost or differentiation. IT also presents significant potential for making quantum leaps in productivity and increasing the ability to maintain a competitive advantage (Service and Maddux 1999).

However, traditional IT implementation requires a large, ongoing investment in technology and personnel to update and run the IT infrastructure, which can prove to be costly and time-consuming. In the case of small and medium-sized enterprises (SMEs), most firms require the functionality of mid-range information systems. However, many have been forced to use a combination of paperwork and basic software because they cannot afford expensive, overly sophisticated IT. Moreover, most SMEs do not have the IT talent or resources to deploy such software (Dewire, 2000).

Recently, the Application Service Provider (ASP) has emerged as a solution for SMEs in the implementation of IT. The monthly fees charged by ASPs to host IT services depend on many factors, including the size of the customer' databases and number of users who will access the application. ASPs can be a cost-effective alternative for implementing IT (Truby 2002). According to Fox (2004), small companies who could not normally afford access to enterprise applications used by their larger competitors are finding ASP to be an attractive option for their IT needs.

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To examine the benefits of ASP usage in SMEs, we studied Bizmeka, a successful ASP model of Korea Telecom (KT). The purpose of this study is to investigate which factors affect the perceived benefits of Bizmeka usage in an SME context. The relationship between perceive benefits of Bizmeka usage and customer satisfaction is further studied and implications of ASP usage for small sized companies are discussed based on the empirical results.

2. Review of relevant literature

2.1 ASPs

In 1999, a new software business model sprang up, the Application Service Provider. ASPs, sometimes called "On-demand software," provide a centralized repository of software applications which individual firms can "borrow" or "rent" for use on their own computers (Afuah and Tucci 2000). ASPs also offer one-size-fits-all, hosted software solutions that provide high-end and expensive software on a pay-as-you-go basis to small sized companies that cannot afford to purchase it outright. ASPs provide software applications, hardware, servers, operating systems, email, systems management, accounting programs, and Internet-based applications, all via the Internet (Fontana 2001). ASPs are generally one of, or a combination of, four different types: application or software provider, hardware provider, network service provider, and marketing or application provider. Figure 1 shows the typical members of an ASPs coalition.

Insert **Fig. 1** ASP business model

ASPs aim to reduce the cost and hassle of owning, managing, and maintaining technology for their customers by "renting" IT service (Bianchi 2000). An ASP either owns the software or has a contractual agreement with the software vendor to license it. Customers gain access to the applications and services without making investments in license fees, hardware, and staff. The applications are managed from a central location, the ASP site, rather than the customer's site (Dewire 2000). Customers can pay a relatively small fee (based on the frequency of usage), which is far less than the cost of software customized for a single customer (Tiernan 2001). ASPs provide software to many different companies, using licensing fees to offset the costs of software development.

According to a survey of 164 businesses by International Data Corporation (IDC), 34.6 % of businesses used ASPs because of cost savings, while 15.6 % cited lack of in-house expertise as the reason they used ASPs (Jennifer 2004). In another survey, this one by InformationWeek Research in 2000, 655 IT professionals noted freeing up IT staff and fast time-to-market as two of the top reasons for using ASPs. In addition, many respondents were satisfied (59%) or very satisfied (37%) with their ASP services. Only 4 % were dissatisfied with their ASP services. Table 1 shows the key reasons why companies use ASP services.

Insert **Table 1** Why ASPs are used

To remain competitive, companies have to upgrade their IT and business applications on a regular basis. Most companies upgrade their computer applications every 12 to 24 months (Holohan 2000). With an ASP, customers do not need to upgrade their software or applications, as the ASPs provide maintenance services (Shutovich 2001). Therefore, customers can avoid new investments in hardware and software that might become out-dated quickly (Reed 2000). Using ASP services also removes the burden of installing and maintaining IT systems (Gurley 1999).

2.2 KT Bizmeka

Bizmeka is the ASP business model of Korea Telecom, the largest telecommunication company in Korea. KT first introduced ASP services for SMEs in 2001. Bizmeka provides SMEs with necessary e-business solutions, content, and training services through the e-Portal Internet on a lease basis, allowing for a one-stop business solution. Figure 2 contrasts the structure of the traditional IT market with the Bizmeka market. In the traditional IT market, there is no intermediary. Independent vendors and customers seek each other out directly. In the Bizmeka market, the e-Portal provides a central point in the value system where buyers and sellers can find each other. The hub can reduce the number of contacts (Afuah and Tucci 2001)

and act as an intermediary between vendors and customers. Based on this business model, the revenue of Bizmeka is increasing at an average annual growth rate of 55% and it is estimated to comprise 4 % of KT's revenue in 2007. The total sales of Bizmeka reached approximately 100 million dollars in 2007 (ETNews.co.kr 2008). Figure 3 shows the success of Bizmeka based on the amount of revenue and the number of subscribers.

Insert **Fig. 2** Market structure of traditional IT and Bizmeka

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Insert **Fig. 3** KT Bizmeka revenue and subscriber growth

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3. Research design and methodology

3.1 Research variables and hypotheses

This study measures customers' perceived benefits of ASP usage and the relationship between perceived benefits and customer satisfaction in a SME context. Based on a literature review and an expert interview, we identify factors that affect the perceived benefits of ASP usage in SMEs. The variables affecting perceived benefits are 1) the cost & time effect of ASP,

2) the dependency on legacy systems, 3) the maintenance effect of ASP, and 4) the security risk. The variable of perceived benefits is considered to be an antecedent of customer satisfaction. Based on these variables, hypotheses are developed.

3.1.1 Cost & time effect of ASP

Many researchers stated that the main effect of using the ASP model is a reduction in costs and time spent with regards to IT. Thus, in this study, reducing the cost and time involved is viewed as one of the key factors influencing the perceived benefits of ASP usage. In terms of reducing costs, renting software applications over the Internet involves relatively low capital expenditures (Castellani 2000; Matthews 2002). ASPs are believed to create a cost savings of 20 to 50% (Tebboune 2003). A significant effect of outsourcing IT functions and adopting a rental model is a reduction in capital spending for IT (Singh et al. 2004). The ASP model lowers the cost by sharing the system with many users and capitalizing on economies of scale (Raisinghani 2001). ASPs reduce implementation costs by 40% when compared to in-house solutions (Thyfault 2000). ASPs usually provide application services for a fixed monthly fee (Madden 2000).

Saving time is another important element of IT outsourcing. ASP services require less time to install and implement when compared to in-house systems (Mears 2001). ASPs minimize time-to-market on new innovations through scalable IT resources and infrastructure (Matthews 2002). Certain ASP solutions can be made operational in a matter of hours or days.

Companies can also use ASP services for a test solution before the implementation of a full IT solution (Boyle 2002).

H1. The greater the cost & time effect of ASP, the greater the perceived benefits of ASP services.

3.1.2 Dependency on legacy systems

Most SMEs that do not use ASP services develop their own in-house server-based information systems. Companies continuously invest time and financial resources to maintain and upgrade legacy systems, resulting in a dependency on these systems. Despite the availability of more cost-effective approaches to IT, approximately 80% of companies' IT is provided by legacy systems (Zoufaly 2002). As a company depends more on its legacy systems, they would perceive fewer benefits of ASP services. This leads to the following hypothesis:

H2. The greater the dependency on legacy systems, the lesser the perceived benefits of ASP services.

3.1.3 Maintenance effect of ASP

In an ASP environment, customers do not need to buy, install, or customize software programs (Shutovich 2001; Soliman et al. 2003). Thus, ASPs remove the burden of maintenance for the customers (Gurley 1999). In an ASP arrangement, the monthly fee includes the use and maintenance of the software, as well as updates (Savarese 2003; Boyle 2002). ASPs can update

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and improve applications regularly without the need to send additional software to customers. Based on the literature review, the following can be hypothesized.

H3.The greater the maintenance effect of ASP, the greater the perceived benefits of ASP services.

3.1.4 Security risk

From a customer's perspective, one of the risks of using ASP services is security. According to Kuong's (2002) study, both current and prospective ASP customers are concerned about ASP security. Some of the risks associated with ASPs include loss of control over the company's data and exposure of company's data to the ASP's other customers (Cisco.com 2007). "Mission-critical" (Trembly 2000) data, which is very important to a company's business practices, could be sold by ASPs (Torode 2000). While it may provide reliable operations in its area of expertise, the security of the ASP may viewed as ineffective or weak. To address these security problems, ASP security provisions should be documented in "Service Level Agreements" (SLAs), fully backed by ASP security standards and practices (Rogers and Smith 2001; Kuong 2002). This leads to the following hypothesis:

H4. The greater the security risks of ASP, the lesser the perceived benefits of the ASP services.

3.1.5 Perceived benefits of ASP usage

As a new business model, ASP alleviates much of the stigma associated with the traditional method of implementing IT within a company. There are many benefits to using ASPs. The benefits can be categorized into three perspectives: operational benefits, economic benefits, and strategic benefits. Operational benefits include improvements in productivity, more effective operations, improved customer service, and better collaborations. According to Soliman et al. (2003), ASPs may provide accurate and high quality information to their customers and create a collaborative environment where users communicate and share their information. This results in enhanced productivity, more effective management, and improved customer satisfaction. Some economic benefits to the customers include revenue growth and cost savings. ASPs generate their recurring revenues from long-term contracts, which allow the ASPs to provide their customers an alternative to expensive software licenses (Gurley 1999). As with traditional IT outsourcing, ASPs help customers reduce total costs and balance cash inflows and outflows by reducing up-front costs (Smith and Kumar 2003). From a strategic perspective, using the ASP model gives a company the ability to focus on its core competence (DePompa 2003). ASPs provide the company with new alternatives to the age-old time-to-market challenge, while enabling them to continue managing their core businesses (Ahmed 2002). ASPs provide companies with the scalability they need to meet business growth, while maintaining a focus on their core competencies (Curtis and Alphonso 2000), resulting in improved competitiveness in the market. Using ASP models and process standardization as the starting point in an internal net-based application strategy is likely to save vast amounts of time and allow staff to focus on the issues that matter most (Turner 1999).

3.1.6 Customer satisfaction

Customer satisfaction comprises a substantial body of work in the consumer behavior context (Oliver 1993; Oliver and DeSarbo 1988, Spreng et al. 1996; Tse and Wilton 1988). Satisfaction can be defined as an evaluation process (Fornell 1992; Oliver 1980) or a response to an evaluation process (Howard and Sheth 1969; Tse and Wilton 19880). According to Susaria et al. (2003), satisfaction in ASP usage "reflects the process of aspects of using ASPs rather than a one time end result, such as financial outcomes realized on deploying ASP." Customer satisfaction is one of the consequences of perceived benefits (Williams 1995). The relationship between customer satisfaction and perceived benefits has been studied for decades. Many previous studies (Chircu and Kauffman 2000; Melville 2004; Subramani 2004; Standing and Lin 2007) have empirically proved that perceived benefits have a strong and significant impact on satisfaction. The more benefits percieved by the users or customers, the more satisfied they will be overall. Thus, the fifth hypothesis is:

H5. The greater the perceived benefits of ASP, the higher the level of customer satisfaction.

Figure 4 shows the research model for this study

Insert **Fig. 4** Research model

3.2 Research methodology

3.2.1 Data collection

     The population for this study comes from the customer list of KT Bizmeka. From the list of customers, 2000 companies were randomly selected. Out of those, 1200 questionnaires were mailed to companies that fit the requirements of the survey (i.e. size of firm, length of time as a customer). No follow-up mailing was used in this study. Each respondent was asked to fill out the survey questionnaire and return it directly to the KT Bizmeka business division.

3.2.2 Instrument design

     A literature review and interviews with IT experts were used to develop the questionnaire. The questionnaire was composed of three sections. The first section asked for general information about the customer company. The second section included questions about the cost and time effect of ASP, dependency on legacy systems, maintenance effect of ASP, and security risk. The third section included questions about the customer's perception in regard to the benefits of ASP usage through Bizmeka and their overall customer satisfaction with Bizmeka. A five point Likert-style scale was used, ranging from 1 = 'Strongly Disagree' to 5 = 'Strongly Agree.'

3.2.3 Statistical tool

To evaluate the suggested hypotheses, various statistical methods were employed. A simple correlation analysis was used to test the fifth hypothesis. Since prior studies already established a causal relationship between the perceived benefit of ASP and customer satisfaction, it was only necessary to reveal a significant relationship between the two. To test Hypotheses 1 through 4, multiple regression was utilized. In addition, exploratory factor analysis was applied to reduce the number of variables and to extract factors relevant to our research context. All the analyses were performed with SPSS 15.0.

4. Analysis and results

4.1 Demographic information and descriptive statistics

Of the 1200 questionnaires distributed, 82 questionnaires were returned. This result in a response rate of 6.83%, shows lower than the typical response rate. Table 2 provides information regarding the size of customer companies. The average number of employees among customer companies was 144.7. The smallest company had two employees, whereas the largest company had 1450 employees. As the table indicates, the most frequently reported size for customer companies was 11 to 50 employees (42.68%), followed by fewer than 10 employees

(37.80). Approximately 80.48% of responding customer companies had fewer than 50 employees. This means that most Bizmeka's customer firms are small companies.

Insert **Table 2** Size of company

4.2 Factor analysis

Empirical research examining factors affecting the perceived benefits of ASP is scarce. Thus, we relied mainly on interviews with ASP experts in the development of the instrument. Some of the questionnaire items were derived from the literature. Since there is no valid instrument for measuring the factors that influence the perceived benefits of ASP, we took an exploratory approach to identify the relevant factors. To estimate number of factors (Tabachnick and Fidell 2006), we performed principle component analysis (PCA) with Varimax rotation by maximizing the variance of loadings in factors across variables.

Based upon a scree test, we could extract four factors in the first attempt at PCA. Having indentified the number of factors in the data set and having removed cross-loading items, we performed a second PCA with Varimax rotation, with four factors. The final results of the PCA and questionnaire items for each construct are presented in Table 3 and Table 4, respectively.

Insert **Table 3** Component loading on four factors

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Insert **Table 4** Questionnaire items for each construct

After four factors were extracted, we needed to examine whether the grouped variables in each factor were actually measuring the intended construct consistently. Cronbach's α was used to evaluate the reliability of the measures. Only one item loaded on the security risk factor. The reliability of the other three factors, cost & time effect of ASP ($\alpha = .868$), dependency on legacy system ($\alpha = .616$), and maintenance or upgrade effect of ASP ($\alpha = .633$), were all above the desired level of 0.6 to 0.7 (Nunnally 1978; Flynn et al. 1990).

4.3 Hypotheses test and multiple regression

As a result of the factor analysis, we identified four factors that affect customers' perceived benefits of ASP usage. For the next step in the analysis, we were interested in how those four factors would account for the perceived benefits of ASP usage. We used a standard multiple regression with the four factors as independent variables and perceived benefit of ASP as the dependent variable. Since each factor was represented by several variables, as shown in Table 4, we employed summated scaling to obtain factor scores.

As presented in Table 5, omnibus F-test ($F(4,77) = 32.471$, $p < 0.001$) for the overall model fit indicated that the dependent variable, perceived benefits of ASP, and least-squares

combination of the predictor variables (cost & time effect of ASP, dependency on legacy systems, maintenance effect of ASP, and security risk of ASP) are correlated significantly. R^2 also indicates that the suggested model explains about significant portion, about 62.8% of the total variance of the dependant variable.

Insert **Table 5** Macro-level results of multiple regression

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Insert **Table 6** Micro-level results of multiple regression

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Table 6 presents the micro-level results of the multiple regression, the unstandardized coefficients and intercept, the standardized regression coefficients of each predictor variables, which shows that only three of the independent variables contributed significantly to prediction of the dependent variable, perceived benefit of ASP by customer. Even though the results enable us to formulate a prediction model for perceived benefits of ASP usage, we are more interested in testing the proposed hypotheses using the regression results.

The first hypothesis states *the greater the cost & time effect of ASP, the greater the perceived benefits of ASP services* and claims a positive relationship between two variables. The Wald statistic reveals a significant effect of the independent variable on the dependant variable with t-

value of 7.680 and a positive sign for the parameter estimate. Hence, we conclude that the first hypothesis is supported. Likewise, the third hypothesis, a positive relationship between maintenance effects of ASP and perceived benefits of ASP, is also supported (t-value = 6.271, p < 0.001). The fourth hypothesis, a negative relationship between the security risk of using ASPs and the perceived benefits of ASPs, was also supported (t-value = -8.072, p < 0.001)

The final step of the analysis was to evaluate the fifth hypothesis, which states '*the greater the perceived benefits of ASP, the higher the level of customer satisfaction*'. The relationship was measured by examining the correlation coefficient between the summated scaling score of perceived benefits of ASP and customer satisfaction. The result shows a significant correlation (r = 0.688, n = 82, p < 0.001) between the two variables at the 0.001 level. The second hypothesis was not supported (parameter estimate=.077 and p=.101) A summary of the tests is presented in Table 7.

Insert **Table 7** Summary of hypothesis tests

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5. Conclusion

The main purpose of this study was to identify the key factors that influence customers' perceived benefits in using ASP services. To achieve this research goal, we used the case of the ASP business model, Bizmeka of KT in Korea. Although the sample size was small, we found

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significant results with regards to the benefits of ASP usage with an exploratory approach. Based on the results of this study, the saving cost & time effect of ASP, the maintenance effect of ASP, and the security risk effect of ASP are very important factors that influence customers' perceived benefits and satisfaction in ASP usage.

5.1 Discussion

ASPs provide an alternative with low initial costs, low cost of ownership, and more predictable IT expenses to SMEs, especially those that simply cannot afford to purchase IT solutions outright. In terms of IT implementation time, ASP services can drastically reduce the time it takes to implement IT solutions for SMEs. Deployment of ASP services over the Internet can be accomplished in a few days, allowing customers to accelerate time-to-market. Therefore, customers or users perceive the benefits of ASP services to be reducing the total cost and implementation time.

The maintenance effect of ASPs was found to be the second influential factor in regards to customers' benefits and satisfaction. The effects of ASP maintenance include upgrading, back-up, customization, information sharing with vendors, and training. Because the maintenance of the technology is managed by ASPs, customers can use applications easily and access information anytime, anywhere. Therefore, customers do not need to hire their own IT experts to manage the system or update the software. ASP services enable customers to scale their software applications up or down based on their needs. Thus, customers can reap various benefits by having maintenance that is managed by ASPs.

Based on the results of this study, security is the single greatest risk in ASP usage. Security risks include the loss of control over systems, network connection, and data, resulting in hidden costs if disaster strikes. Security issues can arise when using an ASP as a result of the requirements inherent in an ASP model. The ASP system must be accessible to ASP customers, which also makes it vulnerable to security threats (i.e. hackers on the Internet). Customers' perceptions of the security risks involved in ASPs have also been influenced by reports in the media that emphasize the relative immaturity of many ASP applications, reducing the perceived benefits of ASPs.

The only variable which was found to have no effect on customers' perceived benefits of ASP usage was their dependency on legacy systems. In general, companies with a greater dependence on their own legacy systems perceive less benefit from using ASPs because of the compatibility problem. However, small companies with limited IT resources and infrastructures have less of a dependence on legacy systems. In conclusion, ASP is the most appropriate business solution for SMEs, especially small companies that are facing issues of cost, time, and maintenance in IT adoption.

5.2 Contributions and future study

This study has both practical and academic implications. From a practitioner viewpoint, we argue that companies providing ASP services should focus on SMEs as their target customers and provide lower cost, faster, and more reliable ASP services, such as Bizmeka of KT. From a researcher perspective, there are few studies on ASPs relating to perceived benefits, perceived

risks, customer satisfaction, and customer behavior. Therefore, researchers can overcome the limitations of this study and explore the ASP research domain. Based on the results of this study, we can further develop this research domain in various ways, such as cross cultural studies to compare ASP business models across countries and longitudinal studies to examine the long term effects of ASP services.

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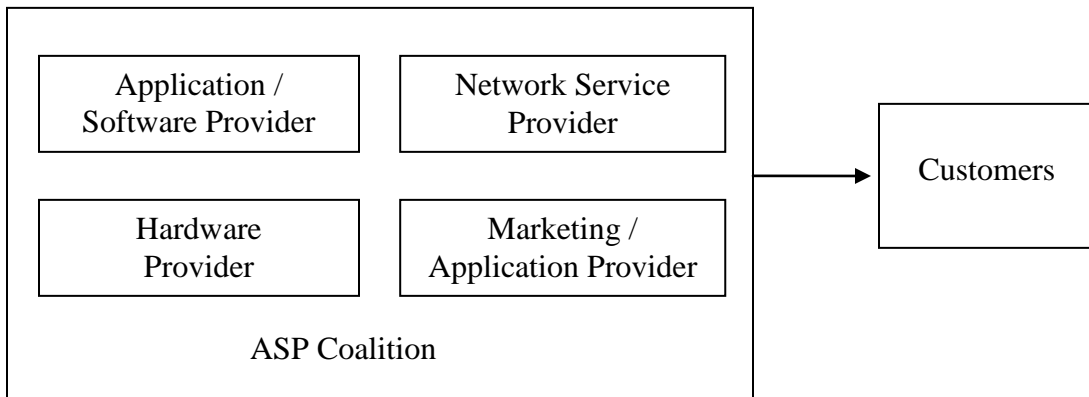Zoufaly F (2002) Issues and challenges facing legacy systems. Developer.com
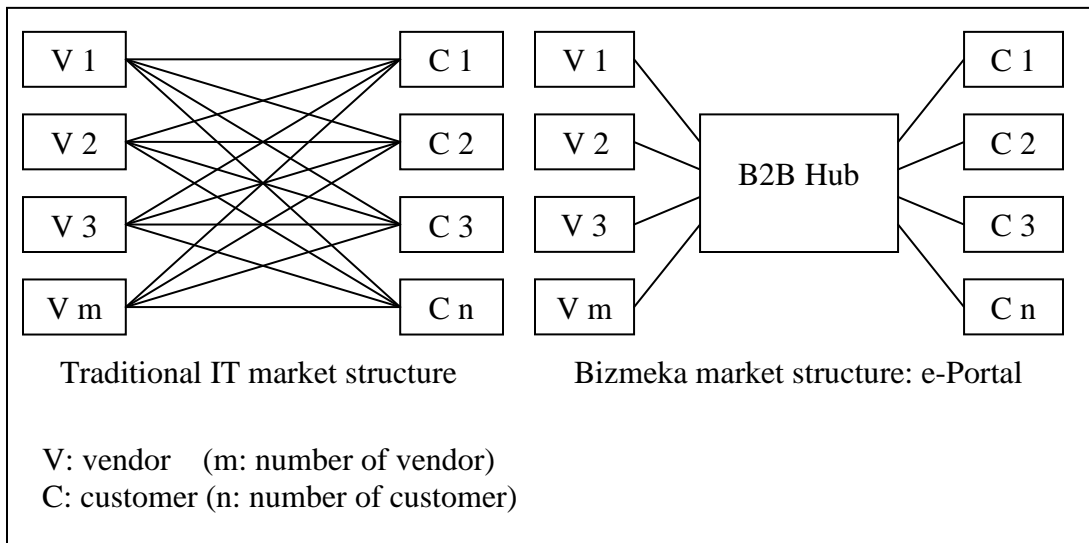
FIGURES

Fig. 1 ASP business models

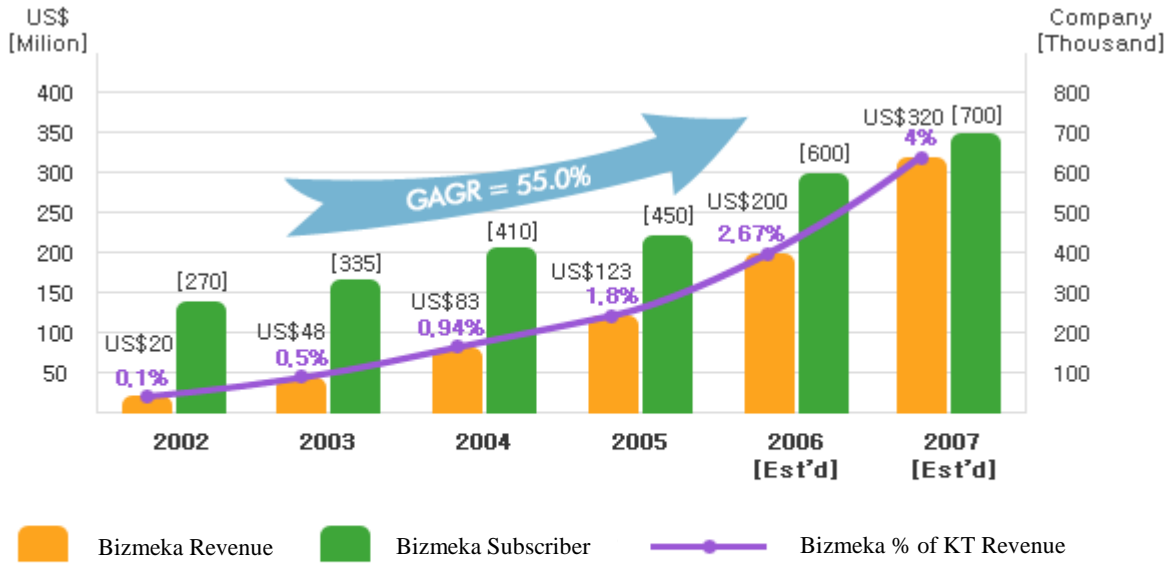**Fig. 2** Market structure of traditional IT and Bizmeka

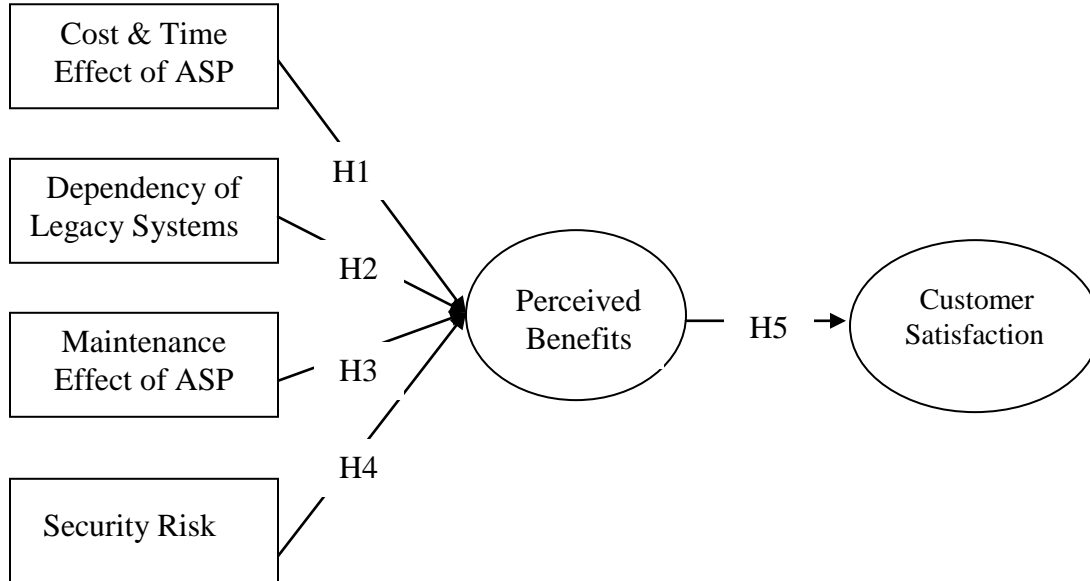**Fig. 3** KT Bizmeka revenue and subscriber growth

Bizmeka.com (2007)

Fig. 4 Research model

TABLE LIST

Table 1 Why ASPs are used

Key reasons
1. Predictable costs
2. Guaranteed performance levels
3. Free up IT staff to focus on internal issues
4. ASP has special expertise
5. Quicker to implement a hosted application
6. Automatic upgrades for software
7. Guaranteed uptime
8. Lack of internal resources or IT staff
9. Security concern
10. Try out software before buying
11. Leasing is more cost-effective than buying
12. Automatic increases in bandwidth as needed
13. Company preference to outsource

Klein (2000)

Table 2 Size of company

Minimum	Maximum	Mean	Standard Deviation
2.00	1450.00	144.60	393.25

Number of Employees	Frequency	Percent (%)
10 or fewer	31	37.80
11 – 50	35	42.68
51 – 100	5	6.10
More than 101	10	12.20

N = 82

Table 3 Component loading on four factors

Measurement Item	Component			
	1	2	3	4
a309	.815	.265	-.099	-.144
a310	.786	.090	-.210	.239
a313	.915	.086	-.075	.119
a314	.753	-.035	.053	.323
a304	-.079	.806	.051	.050
a305	.058	.619	.196	.009
a322	-.066	.087	.732	.094
a324	-.012	-.049	.806	.056
a311	.075	.134	-.124	.877
% of Variance	28.006	14.298	12.939	12.408
% of Cumulative variance	28.006	42.304	55.243	67.651

Table 4 Questionnaire items for each construct

Construct	Item	Question
Cost & Time effect of ASP	a309	How easy is it to predict future IT costs of your company when using ASP?
	a310	Do you think that ASP reduced the time for implementation of IT for your business processes?
	a313	Do you think ASP reduces the risk of IT implementation so that your firm can save money and time?
	a314	Do you think using ASP can be a suitable adaptation test in a way of building your own IT systems?
Dependency on legacy system	a304	Have you ever considered building your own systems rather than to outsource the IT?
	a305	If funds allow, would you consider building your own IT systems in your organization?
Maintenance effect of ASP	a322	Are you willing to upgrade or customized ASP services to fit your business process at some additional costs?
	a324	Do you think you need a functional unit in your company which is exclusively responsible for ASP operation?
Security risk of ASP	a319	Do you think ASP use exposes a high risk of security breach due to its heavy dependency on Internet for delivering services?

Table 5 Macro-level results of multiple regression

		Analysis of Variance			
Source	df	Sum of Squares	Mean Squares	F-Value	Prob. > F
Model	4	27.189	6.797	32.471	<0.0000
Error	77	16.119	0.209		
Corrected total	81	43.308			
R-Square	0.628		Std. error of est.	0.458	
Adjusted R^2	0.608		Dependent Mean	3.403	

Table 6 Micro-level results of multiple regression

Variable	Parameter Estimates					
	Unstandardized estimate	Std. Error	Standardized estimate	t-value	Sig.	Tolerance
Intercept	1.606	0.425		3.775	0.000	
Cost & time Effects	0.638	0.083	0.551	7.680	0.000	0.938
Dependency on legacy systems	0.077	0.046	0.119	1.662	0.101	0.951
Maintenance effects	0.331	0.053	0.461	6.271	0.000	0.894
Security risk	-0.578	0.072	-0.597	-8.072	0.000	0.883

Table 7 Summary of hypothesis tests

Hypothesis	Result
H2. The greater the cost & time effect of ASP, the greater the perceived benefits of ASP services.	Supported
H2. The greater the dependency on legacy systems, the lesser the perceived benefits of ASP services.	Not Supported
H3.The greater the maintenance effect of ASP, the greater the perceived benefits of ASP services.	Supported
H4. The greater the security risks of ASP, the lesser the perceived benefits of ASP services.	Supported
H5. The greater the perceived benefits of ASP, the higher the level of customer satisfaction.	Supported