다차원 ASP 서비스 품질 평가와 고객만족, 인식된 기업성과에 미치는 영향에 대한 연구

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A Study on the Evaluation of Multi-dimensional ASP Service Quality and Its Effects on User Satisfaction and Perceived Firm Performance

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■ Abstract ■

Quality has long been considered as an important factor in creating competitive advantage, and researches on quality have not been limited to off-line products but actively extended to e-services and information goods. However, given the nature of multi-dimensional aspect of quality, the systematic study on the quality of online service is still in its early stage. Especially, studies on the quality of ASP services have been rare in academic and professional journals despite the growth of ASP industry in its size and the rapid expansion in the range of application. In this paper, we clarified the multi-dimensional quality aspects of the ASP service using a Garvin's framework (1984) which encompasses the service aspects of products, and developed a measurement model for ASP service quality. Then we empirically tested the effects of ASP service quality on user satisfaction and perceived firm performance using the data from 240 Korean small firms with less than 50 employees that had experienced the ASP service. Our results show that there are positive relationships among ASP service quality and personal performance, user satisfaction and perceived firm performance, and that product and service-related aspects of ASP service exert differential effects on performance measures so that the product-related aspects of the ASP service such as performance, features, reliability and conformance are considered to be more important in evaluating benefits from ASP services. Contrary to the approaches in literature where only the quality of online services is evaluated, our results emphasize the importance of differentiating product and service-related aspects of ASP service and provide a basis for more comprehensive evaluation of ASP service quality.

Keyword : ASP, Small Firm, Perceived Firm Performance, User Satisfaction, Garvin's Dimensions of Quality, Service Quality

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1. Introduction

Quality has long been considered as an important factor in creating competitive advantage and researches on the issue of quality are not limited to off-line products but are being actively extended to e-services and information goods [23, 64, 65, 119]. For those online goods, the quality of service is a multi-dimensional notion and is influenced by the composition of various elements in service rendering process such as system, network, distribution, and customer service so that seamless integration of all aspects of service is an essential factor for online firms to succeed [26]. However, the systematic study on the quality of online service is still in its early stage [43, 89, 100]. As a result, despite the importance of the issue, there have not been many researches on the issue except for a few studies that have been conducted to identify and understand the customers' cognitive process on e-services [26, 115] and to measure the quality utilizing the fractional quality indexes such as reliability, timeliness and usability [93].

Recently, Application Service Provider (ASP) industry is getting attention from marketplace as this industry continues to grow in its size and the range of application is expanding rapidly. ASP service can be defined as an information system outsourcing service between organizations through which the service provider offers application services such as ERP (Enterprise Resource Planning) to the service recipient through a single contact point while keeping all the telecommunication hardware, software and consulting system necessary for operation and maintenance of information system in a remote service provider's site [105]. Although ASP service model has its root in information system outsourcing, they have differences in that the ASP-based outsourcing provides a packaged service related to the software application whereas the selective outsourcing provides a part of information system function [59]. In addition, the ASP service providers develop, maintain and operate the application and important criteria for selecting ASP service application are data handling, service provision and compatibility. Due to these distinguishing characteristics, ASP is a kind of the third wave outsourcing called 'netsourcing' and is a one-to-many information system that is generally applicable to the small and medium-sized firms [30].

As more firms participate in the ASP business and offer a variety of application solutions, the ASP model becomes a practical tool for the small and medium-sized firms that have limited capabilities to develop or purchase information system independently [42]. Therefore, if those small and medium-sized firms and ASP service providers are to successfully create competitive advantages, the former should be able to evaluate the quality of ASP service properly and the latter should understand which aspects of the quality affect the user satisfaction, loyalty, and firm performance. However, the ASP model has unique characteristics that other online or traditional services do not possess; it consists of application product itself and services that are detailed in so called "service level agreement." Thus, when assessing the quality of ASP service, applying an existing tool that is designed to evaluate the product or service aspect individually can be misleading and it is necessary to adopt a tool that can consider both product and service attributes in order to properly evaluate the quality of ASP service.

In the current study, we propose a model that is based on a conceptual framework on quality proposed by Garvin [49], the eight dimensions of quality, to evaluate the quality of ASP service and to explore its effects on user satisfaction, loyalty, and firm performance. In his framework, Garvin considered not only the characteristics of products but also those of services related to the products in understanding quality. Therefore, Garvin's framework is the most appropriate one that captures the nature of ASP service quality embracing both the product and the service aspects. Given that the previous studies on the evaluation of ASP service quality have focused primarily on service aspect of the ASP model, the current study also has its value as an exploratory study to evaluate comprehensively both the product and the service aspects of the ASP model.

In Korea, the number of small companies with less than 50 employees amounts to about three millions, accounting for 99% of all companies, 68% of the total employments and 30% of GDP [68]. In the U.S., the small companies that have less than 500 employees occupy 99.7% of all companies, 53.7% of the total employments, 48% of GDP, and they account for more than 50% of new technology development and 96% of companies that are exporting to oversee [36, 86]. In case of Japan, the small and medium-sized companies account for as much as 99.7% of the whole companies (small companies occupies 87.9%) and the effects of IT investment on these firms are considerable for the Japanese economy [73]. The total number of the companies in EU and Swiss amounts to twenty millions and 95% of them are small firms with less than 50 employees, offering one third of job opportunities in their economies [41]. While the small companies play an essential role in creating innovative products and services and in generating new job opportunities, the systematic analysis of successful Web utilization by those firms is still in a premature stage [86] and academic researches on IT utilization by those firms are not up to the mark [79].

As lack of resources put the small firms in inferior positions in untilizing information technology that is knowledge-and capital-intensive, they may loose their competitiveness relative to big firms that can afford to hire IT experts and to internalize the advances in information technology. Thus, they have to rely on outside channels to utilize the information technology effectively in many cases. Paradoxically, however, it is the small firms that can benefit more from potentials of IT for their survival and growth in the future [58]. In particular, Internet can be a crucial tool for the small firms to explore new marketplace and to enhance the operational ability, and thus to overcome the limit of the company size and to secure the competitiveness in marketplace [91]. In fact, dramatically improved computing power per unit IT price and development of applications suitable for the small company users for the past 20 years have put them in better position in absorbing benefits of information technology. In case of small and medium-sized firms in U.S., the rate of Internet connectivity, web sites and E-commerce utilization have been continuously improved [36]. Nevertheless, small firms in general are lacking IT knowledge and experiences and their weak financial structure put them at a risk when they fail to process informatization. Therefore, a guideline for the successful IT adoption is desperately necessary for the small companies [34].

The objectives of the current research are as follows; 1) to clarify the multi-dimensional quality aspects of the ASP service, 2) to develop a tool to evaluate the ASP service quality, 3) to evaluate the quality level of the ASP service provided for the small company users, and 4) to verify the relationship of the quality with the personal performance, user satisfaction, firm performance, and customer loyalty. In this paper, we define the personal performance as a job-related personal productivity and firm performance as an overall one such as profit growth and/or cost reduction. The rest of this paper is organized as follows. In §2, we provide a literature review and articulate why the multi-dimensional framework on quality proposed by Garvin [49] is suitable to evaluate the quality of ASP service. In §3, we present a research model and develop a set of hypotheses based on the model. In §4, we explain the details of questionnaire, sampling procedure and data collection method. In §5, we discuss the reliabilities and validities of the evaluation procedure and present results from hypotheses tests. In the last section, we discuss implications and limitations of the current study and directions for the future study.

2. Literature Review

2.1 Models for Evaluation of Product and Service Quality

Researches on the concept of quality and evaluation of the quality began its stream with tangible products [62]. However, as the economic size of service industry has outgrown that of manufacturing industry, increasing amount of attention has given to understanding the quality of service. Nevertheless, the distinguishing characteristics of service such as intangibility, heterogeneity, perishability, and inseparability make it difficult to define and evaluate the quality of service [29, 48, 83].

Furthermore, the producers of manufacturing or service goods cannot influence the consumers buying behavior unless they can meet the customers' expectations on quality [49]. Therefore, they should be able to evaluate and explain how the customers think of the products. To this end, they should understand the customer perception as well as the objective characteristics of the manufacturing and service goods [108]. However, as Garvin [51] pointed out, the quality perceived by customers contains attributes that are as many as the various definitions available in literature and is difficult to evaluate through a single indicator. Thus, it is necessary to evaluate the quality of products or services from a multi-dimensional perspective [51, 108]. In this regard, Parasuraman et al. [82] presented SERVQUAL model to evaluate service quality and Garvin [50] presented a conceptual, eight-dimensional model to evaluate product quality.

Parasuraman et al. [83] proposed an evaluation model that takes into consideration the definition and the various characteristics of service quality. They argued that service quality should be evaluated based on the comparison between what customer think should be provided and what is provided actually. That is, service quality should be evaluated based on the gap between the expected level and the perceived level of service by consumers. They suggested tangibility, reliability, responsiveness, competence, courtesy, credibility, security, accessibility, communication and understanding of customer needs as the pri-

mary factors to form expectation and perception of consumers on the provided service. Then they found an inter-relationship among the ten factors and subsequently developed SERVQUAL model with reduced number of factors [81, 82]. In its final form, SERVQUAL model is composed of 22 questions in five factor categories such as tangibility, reliability, responsiveness, assurance and empathy.

SERVQUAL model has attracted significant attentions from marketing and service operations areas, but such a gap-based method to evaluate service quality has been under academic debates [27, 118]. Furthermore, the model has been used in a wide range of industry fields and many researchers have revised the questionnaire items in SERVQUAL model in order to consider the unique characteristics of different services. Therefore, it is necessary to carry out literature review with much care before applying SERVQUAL model to different settings.

In a similar vein, Garvin [49] proposed eight dimensions of quality that comprehensively capture the concept of product quality (see <Table 1>), which decomposes the concept of quality into details in order to examine the various quality aspects related to the products. In particular, he insisted on considering service quality as well as product quality in evaluating goods. His attempt was to integrate the concept of product quality and service quality that had been unconsciously fragmented. He argued that in order to evaluate product quality, one needs to consider not only the quality of product itself but also the quality of the related service features such as instruction manual, repair service, brand image and corporate image. As the constituting dimensions, Garvin proposed the performance derived from the essential functionalities, additional features that enhance the performance, reliability, conformance, durability, serviceability such as supporting activities for proper usage and after-sales service, aesthetic aspects such as appearance and impression, and perceived quality.

The quality dimensions proposed by Garvin embrace not only different frameworks on quality, that is, performance quality (performance, reliability, and durability), conformance quality (conformance), and service quality (features, aesthetics, serviceability) but also the objective characteristics that can be assessed by consumers and subjective characteristics reflecting the consumers' overall preferences for goods [63]. Furthermore, performance quality is determined

〈Table 1〉 Garvin's Eight Dimensions of Quality

Category	Concept
Performance	Primary operating characteristics of the product.
Features	Secondary characteristics that supplement the basic functioning of the product.
Reliability	The consistency and stability of performance within a specified time period.
Conformance	The degree to which a product's design and operating characteristics meet established standards.
Durability	The amount of use one gets from a product before it deteriorates.
Serviceability	Speed, courtesy, competence, and ease of repair.
Aesthetics	Individual judgment and preference of appearance, feel, smell, sound, or taste of product.
Perceived quality	Indirect evaluation of quality such as reputation, advertising, brand and company image.

by design quality, conformance quality determined by manufacturing quality, and service quality determined by diverse factors such as repair, parts availability, and skill of service work force [74]. Therefore, Garvin's framework is also very useful in spelling out the three traditional approaches through which quality has been defined. The three ones are product-based approach focusing on performance, features and durability, user- based approach centering on aesthetics and perceived quality, and manufacture-based approach centering on conformance and reliability [49].

2.2 Models for Evaluation of Information System Quality and ASP Service Quality

SERVQUAL model and SERVPERF model that has its root in SERVQUAL model have widely been used in evaluating service quality of information system. The main difference between the two is that the former evaluates the quality based on the difference between the expectation and the performance perception of customers whereas the latter evaluates the quality based on the performance perception. However, both of them emphasize only the service aspects of information system. Furthermore, SERVQUAL model has revealed many problems [27, 114]. The existing literature also indicates that the measures in SERVQUAL model are not good-for-all ones of service quality and they should be revised based on the service type before they are applied [8, 19, 22].

While ASP service is emerging as a core of IT outsourcing, it has not succeeded in convincing service users in terms of reliability and availability, for which many firms have hesitated to adopt it [55, 102, 113]. Although it is important to define the quality of ASP service and to understand the determinant factors to enhance user satisfaction, the prior studies on ASP service have mainly focused on the issues such as cost, effectiveness, selection of service provider and contractual aspects. Therefore, a proper tool to evaluate overall quality of ASP service providers should be developed [25, 103].

From the ASP service provider's perspective, however, quality is the essential factor to widen the range of application and to ensure the success of ASP business. Soliman [106] considered product quality as one of the crucial factors that have a vital influence on the success of global information system through ASP. In addition, Chen and Soliman [25] argued that service quality and user satisfaction should be evaluated during "Evaluation Activity," one of the important activities in ASP-based outsourcing. In fact, the information system managers should assess the service quality offered by the service providers from the viewpoints of tangibility, reliability, responsibility, assurance and commitment [89]. Furthermore, firms should hold consistently high quality of information goods and services as a powerful mean to enhance their effectiveness and efficiency [66].

However, as stated previously, the ASP service has the product features as an application for users and the service features including various supporting activities during the service adoption, delivery and usage. In other words, the ASP service has both the physical aspects provided to users through network and terminal (screen configuration of application, easiness to use and the composition of processing results) and the service aspects (training support on the application

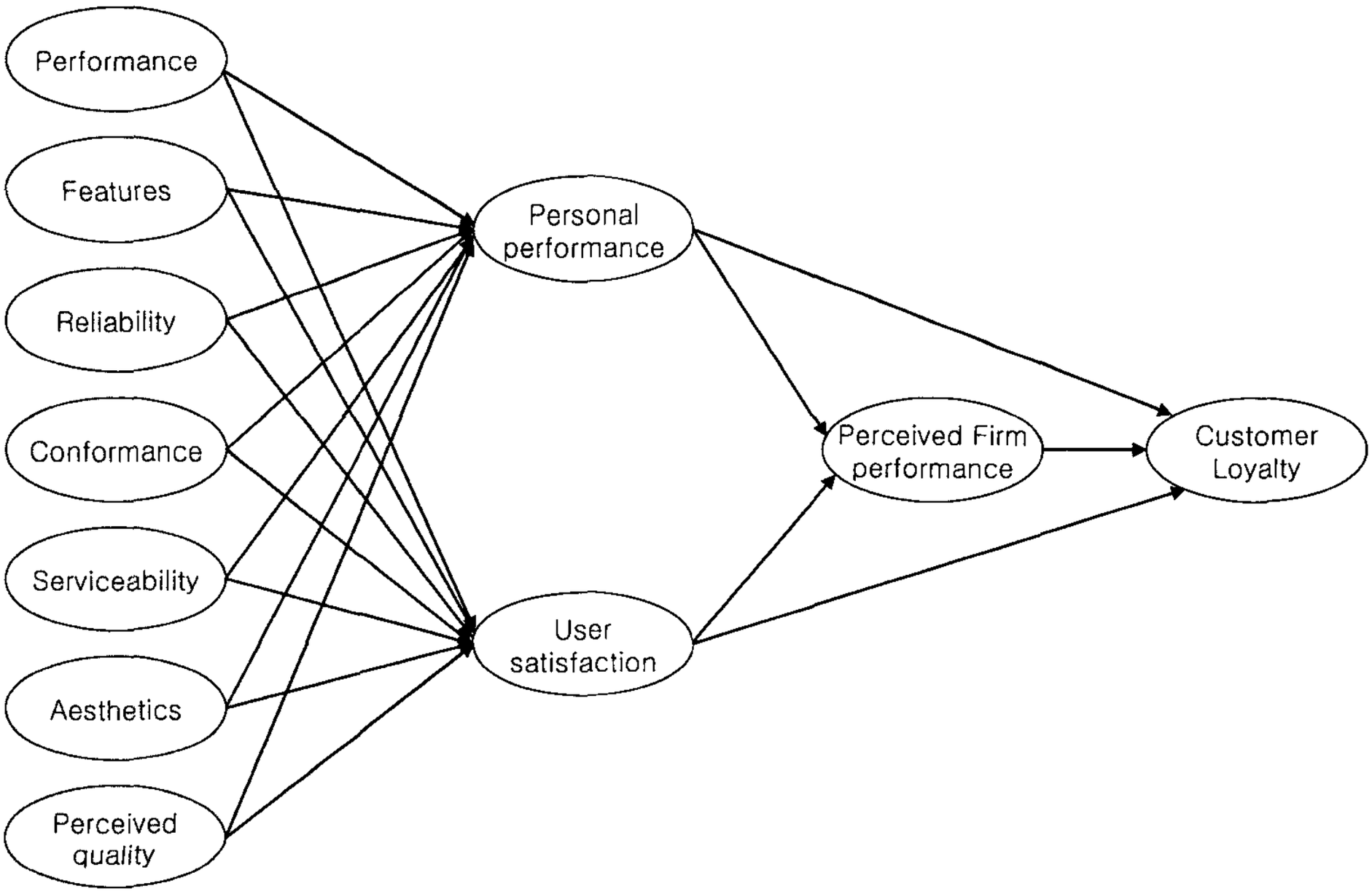
usage, convincing the effect of adoption, problem solving during usage). Therefore, it would be desirable to consider both aspects in order to comprehensively evaluate the quality of ASP service. Parasuraman at al. [83] and Harvey [56] already pointed out the issue that the service-generating process is difficult to isolate from the product itself and the two factors interplay a crucial role in supporting the transactions between the offline sellers and customers in marketplace. Therefore, the multi-dimensional approach for quality proposed by Garvin can be a proper conceptual tool to evaluate the ASP service quality because it considers both the product and the service-related quality while reflecting only the performance aspect and excluding the expectations on quality that can be subjective. Garvin's eight quality dimensions effectively cover different aspects of quality, which allows us to explain the different facets of ASP service quality collectively.

3. Research Methodology

3.1 Research Model

In the paper, we propose a research model as in [Figure 1] in order to evaluate the ASP service quality and to understand the effects of the ASP service quality on personal performance, user satisfaction, perceived firm performance and customer loyalty.

As in the model, the ASP service quality is evaluated based on Garvin's framework and then the relationship of the quality performance with personal performance and user satisfaction is verified. Next, the effects of personal performance and user satisfaction on the perceived firm



[Figure 1] A Research Model on the Relationship between ASP Service Quality and Performance

performance are verified. Finally, the relationship between perceived firm performance and customer loyalty is verified. Although some previous researches suggest that user satisfaction may not have a direct effect on firm performances [5], we hold a view in the current study that the user satisfaction as well as the personal performance has the direct effects on the perceived firm performance. Note in the model that among the eight dimensions of quality proposed by Garvin [49], 'durability' is not applicable dimension in evaluating ASP service quality so that it is not considered in our model in [Figure 1]. Also note detail arguments for that exclusion in §3.1.1.

In the model, Garvin's eight dimensions of quality are employed in order to define the ASP service quality and the underlying theoretical foundation of SERVPERF model is utilized to evaluate the ASP service quality. The methodology underlying SERVPERF model is employed instead of SERVQUAL model, because the respondents of questionnaire are the ASP service users in small firms for whom the notion of ASP service quality is relatively new, and the Expectation-Performance Gap Theory of SERVQUAL model has been criticized for its difficulty in fully reflecting the quality since the respondents may confuse attitude with satisfaction [19, 27].

The current research is different from the existing researches on user information satisfaction [10, 11, 37] in that it evaluates the user satisfaction using the quality of information, user attitude and the effects of information system. Although the tool for evaluation of user information satisfaction examines the quality of information products and the customer's attitude toward services simultaneously, it is designed to evaluate the quality of information output generated from the inside of firm rather than the quality of the application products and the related service that are offered by the outside provider.

On the other hand, the model in [Figure 1] is similar to that of Stank et al. [107] in that the quality exerts an effect on the user satisfaction and customer loyalty. However, our model differentiates performance into personal performance and perceived firm performance, and evaluates the ASP service quality from a collective perspective rather than from a relational or operational perspective. The operational definitions of ASP service quality factors and measurement variables are provided in <Table 2>.

3.1.1 ASP Service Quality Factors

In this research, Garvin's eight dimensions of quality are revised and applied under the careful consideration of the characteristics of ASP model and research environment. A couple of points are worth to note. First, among the factors suggested by Garvin, durability is excluded because the ASP service is the digital product as a software which has an unlimited physical life span unlike the physical product whose durability is very important to customers. Therefore, we do not consider durability as a quality dimension applicable for the ASP service.

Second, most of the ASP service providers in Korea are big carriers (KT, Hanaro Telecom, and Dacom) that seem to have good corporate image and high level of reliability relative to the small client firms. However, as the ASP service is not fully matured, it is necessary to identify how well the small firms understand the ASP model and how they use it. For that reason, the level of understanding, need and recognition of the risk of

〈Table 2〉 ASP Service Quality Factors and Measurement Variables

Concept	Factor	Operational definition	Measurement variable	Reference
ASP service quality factors	Performance	Primary operating characteristics of ASP service	Existence of sufficient functionalities Suitable to handle my work Request for proper data entry	[32, 94, 117]
	Features	Secondary characteristics of ASP service	User friendliness Easy to learn how to use Easy to use Ability to correct operator's mistakes	[32, 80, 94, 117]
	Reliability	The consistency and stability of ASP service performance within a specified time period	Frequency of disorders Processing speed Stability of system	[32, 101]
	Conformance	The degree to which the outputs of ASP service consistently correspond to the user needs	Consistency Accuracy Satisfying my needs Suitable for our work process	[33, 80, 94]
	Serviceability	Ability to respond the problem during the use of ASP service	Proper problem solving ability Respond within reasonable time Providing right service personnel Rapid repair Safe recovering from the errors during use	[60, 65, 103]
	Aesthetics	Appropriateness of ASP service screen display, configuration, font size	Easy configuration Proper form to use Clear color and font Well structured form	[33, 80, 94]
	Perceived quality	Perception of users to the ASP service	ASP service enhances the efficiency of work ASP service has the risk to leak information ASP service is well known The needs for ASP service adoption is well known	[71, 109]
Performance factors	Personal performance	Improvement of user performance perceived by the individual users	Efficient supporting of work process. Systematic arrangement of work data. Reduction of repetitive work	[32, 33, 101]
	User satisfaction	User satisfaction with the overall ASP service	Degree to which the service meets the expectation Active utilization of provided service information Overall satisfaction with the service Satisfaction with user training and education program Reasonable service price	[32, 80, 82, 101]
	Perceived Firm performance	Improvement of firm performance perceived by the user	Increased sales Increased number of customers Reduced cost	[6, 14, 32, 45]
	Customer loyalty	Intention to continuously use and to recommend it to others	Continuous use Intention to recommend to others	[4, 28, 99]

information exposure and potentiality to enhance the work effectiveness gets more importance instead of the image or reliability of the ASP service providers. Third, as the data center of the ASP model is located outside the user company and the service is provided to users through network, the quality and security of network are considered as the essential factors to determine the user satisfaction. For example, the security problem is primary reason that companies are reluctant to adopt the ASP service [55, 98]. Therefore, in our study, the stability of network is measured in terms of "processing speed" item in the reliability factor and security is measured in terms of "risk of leaking information" in the perceived quality factor.

Fourth, the five factors in SERVQUAL except for tangibility are reflected in the serviceability factor in our model. When it comes to service in general, users can interact with the service provider and observe the facilities of service providers. However, in case of the ASP model, the service is provided through network and the interactions are taking places electronically so that users rarely face the service providers nor observe the physical facilities. Therefore, tangibility is not an applicable factor in the ASP model.

3.1.2 Personal Performance and Firm Performance

To measure personal performance, one can consider the degree of improvement in productivity that result from the use of ASP service. First, quality has a positive influence on personal productivity [67] so that users of high quality ASP service can improve job productivity. Hence, we define personal performance as personal productivity related to job. In addition, survey items such as 'efficient supporting of work process', 'systematic arrangement of data related on sales and transactions', and 'reduction in repetitive work' are employed in order to evaluate personal productivity.

The existing researches have also proven that quality improves business profits [2, 15, 57, 92]. In addition, quality helps to increase the demand for products [92], which reduces the unit cost of sales, manufacturing and marketing through the economies of scale [69]. Therefore, one can use cost and profit indicators as general indexes of firm performance. However, when it is difficult to obtain proper data about these indexes, one can rely on responses to questionnaires that are based on perceived performance as secondary measures. In small firms, it is not easy to obtain objectively verified performance data. As a result, a subjective personal and firm performance evaluation are recommended [116]. In the current research, the firm performance is evaluated by three items such as 'increase in number of customers', 'increase in sales' and 'reduction in cost' after adopting the ASP service.

3.1.3 User Satisfaction

Since it is difficult to evaluate the effects of information system quantitatively, the notion of user satisfaction has been used as an appropriate surrogate measure for effectiveness of information system [32, 38, 72, 97, 101]. In the current research, the overall user satisfaction along with several individual measures are employed, and they include 'overall satisfaction with the provided service', 'meeting the prior expectation on the service', 'reasonableness of service price', 'satisfaction with the provided user training and

education program', and 'active utilization of provided service information.'

3.1.4 Customer Loyalty

Customer loyalty can be defined as intended behavior for repurchase of specific products and services. Similar to the existing researches, we measure the customer loyalty through their willingness to use continuously and to recommend the products to others [13, 28]. In specific, 'Do you want to use the service after the contract is expired?' and 'Do you want to recommend the service to the other people?' are included in the questionnaire.

3.2 Research Hypothesis

The researches on the relationship of quality with user satisfaction and customer loyalty have been attracting attentions from the academicians and practitioners in marketing and service operations management fields [28, 77, 78]. The relationship between quality and user satisfaction has been discussed in many studies such as Bitner [17], Cronin and Taylor [27], Teas [112], Gotlieb et al. [52], and Dabholkar et al. [31] who proved that rather than the service quality directly affecting firm performance, it improves the user satisfaction as an intermediary variable and the user satisfaction enhances the customer loyalty.

Sivadas and Baker-Prewitt [104], Zeithaml [121], Cronin et al. [28], and Szymanski and Henard [110] verified the relationship of quality with user satisfaction and customer loyalty collectively. They showed affirmative and positive relationships among the above factors. In other words, the service quality is one of the most important criteria for user satisfaction, and user satisfaction leads to the customer loyalty. However, it is argued that the strength of the relationship differs across different products, industries and environments [46, 61] and that the relationship is not direct nor straightforward one [27, 53].

Meanwhile, user satisfaction has been proven to help to expand the market share and enhance financial performance such as profitability [1, 14, 96] and several studies showed a strong link between user satisfaction and loyalty [4, 12, 18, 76]. In addition, the relationship among user satisfaction, value, customer loyalty and financial performance has also been in the main interest of many studies [5, 40]. However, some recent studies have demonstrated that satisfied users do not necessarily imply that they are loyal customer [e.g., 27, 45].

On the other hand, not only the quality of information system but also the offline service quality has close connection with the user satisfaction [32, 33, 66, 89, 101, 111]. The improvement of service quality leads to higher user satisfaction, which resulted in repurchase, higher customer retention, and positive word of mouth effect that enhance the sales performances [4, 46, 99, 111]. If customers are satisfied with the service, their loyalty rises and firm performance improves again [6, 14, 45]. The personal performance also has a positive influence on the firm performance [32].

However, most of the researches on user satisfaction have been interested only on effect that results from the service quality. As a result, if a product can be represented both by tangible and intangible factors, the tangible factors are likely to be disregarded. However, Parasuraman et al. [84] indicated that besides the purchased

services, the physical facilities, equipments used in service rendering process, personnel, communication methods should be considered in evaluating the service quality [13]. On the other hand, Lehtinen and Lehtinen [70] have pointed out that the notion of service quality should include that of physical products as well as that of service including the physical environment and supporting equipments.

Until now, there has been relatively fewer researches on the relationship between product quality and user satisfaction and customer loyalty. However, several scholars [35, 120] verified that the perceived quality of the products has a direct effect on the customers' buying behavior. It also influences the business performance [87]. These researches shed lights on the importance of product quality. In particular, Parasuraman et al. [84], Cronin et al. [28], and Brucks et al. [20] have pointed out that the concepts of the quality of product and service are equally important and should be included in a model to understand factors that influence user satisfaction.

In general, it was shown in existing studies that the user satisfaction affects the customer loyalty and the customer loyalty affects the firm performance. However, there are some important differences between the current study and the existing studies in terms of survey subjects and the notion of firm performance. In the existing studies that identified the relationship between the customer loyalty and the firm performance, the subjects of survey were service providers. Therefore, the firm performance refers to that of the service providers. However, the current study is designed to study the ASP service users as the subjects and the firm performance means that of the companies that use the ASP service. Therefore, it is assumed that the improvement of personal performance, user satisfaction and performance of the ASP service recipient firm strengthens the customer loyalty to the ASP service. In other words, the ASP service users that have experienced the enhancement of firm performance will raise their loyalty to ASP service by continuously using it and recommending it to other users.

The hypotheses of our study based on the literature cited above and the characteristics of variables used in our model are stated more formally as follows.

Hypothesis 1 : ASP service quality has a positive influence on personal performance.

Hypothesis 1a : Performance has a positive influence on personal performance.

Hypothesis 1b : Features has a positive influence on personal performance.

Hypothesis 1c : Reliability has a positive influence on personal performance.

Hypothesis 1d : Conformance has a positive influence on personal performance.

Hypothesis 1e : Serviceability has a positive influence on personal performance.

Hypothesis 1f : Aesthetics has a positive influence on personal performance.

Hypothesis 1g : Perceived quality has a positive influence on personal performance.

Hypothesis 2 : ASP service quality has a positive influence on user satisfaction.

Hypothesis 2a : Performance has a positive in-

fluence on user satisfaction.

Hypothesis 2b : Features have a positive influence on user satisfaction.

Hypothesis 2c : Reliability has a positive influence on user satisfaction.

Hypothesis 2d : Conformance has a positive influence on user satisfaction.

Hypothesis 2e : Serviceability has a positive influence on user satisfaction.

Hypothesis 2f : Aesthetics has a positive influence on user satisfaction.

Hypothesis 2g : Perceived quality has a positive influence on user satisfaction.

Hypothesis 3 : Personal performance has a positive influence on perceived firm performance.

Hypothesis 4 : User satisfaction has a positive influence on perceived firm performance.

Hypothesis 5 : Personal performance has a positive influence on customer loyalty.

Hypothesis 6 : User satisfaction has a positive influence on customer loyalty.

Hypothesis 7 : Perceived firm performance has a positive influence on customer loyalty.

4. Questionnaire, Sample and Data Collection

A questionnaire is developed for the small firms with less than 50 employees that have experienced the ASP service. The Korean government has initiated "ASP-based e-business project for small businesses" since 2001 in order to enhance the ability of small firms to utilize advances in information technology. The aim of this project is to enable the small businesses that accounts for 99% of the companies in Korea to participate in the balanced nationwide e-Transformation movement. To this end, they pushed ahead with the development of ASP service suitable for the small firms, raising awareness of IT mind, usage training, development and dissemination of e-business models for small firms. The ASP service applications developed for the small firms through this project are basic solutions for common and routine work procedures, industry-specific solutions, and value-added solutions with additional features that are specific to business type.[1)]

In the questionnaire, all items are evaluated using a five-point Likert scale ranging from one (Disagree At All) through five (Absolutely Agree). From a pool of small firms who are currently using ASP services provided through the project, 300 firms were contacted through a random sampling procedure and 240 effective samples were secured through door-to-door survey conducted during November 10 through to December 10, 2002. The details of the distribution of the samples are provided in <Table 3>.

1) Basic solutions : customer management, tax management, book keeping, advertising and marketing management etc ; Industry-specific solutions : customized solutions for eyeglass shop, hair and beauty shop, car repair shop, franchised bakery shop, real-time reservation system for travel agency, daycare facility, motel and E-TEL, web-based real estate service etc ; Value-added solutions : tax and accounting related integrated solution for small firms, industry-specific supply chain management solutions for small firms, coupon system utilizing mobile platform, real-time integration application for franchised retail branches, PKI based bilateral digital receipt issuing solutions etc.

〈Table 3〉 Demographic Characteristics of Samples

Item	Classification	Frequency	%		Classification	Frequency	%
Industry	Livestock and forestry	1	0.4	Number of Employee	1~4	107	44.6
	Manufacturing	21	8.8		5~9	69	28.8
	Electricity, gas and water supply	2	0.8		10~19	37	15.4
	Construction	9	3.8		20~49	15	6.3
	Wholesale and retail	24	10.0		More than 50	11	4.6
	Lodging and food/beverage	66	27.5		No response	1	0.4
	Transportation and ware-housing, telecommunication	9	3.8	Primary reason for ASP service	Customer management	74	30.8
	Banking and insurance	1	0.4		Inventory management	9	3.8
	Real estate and lease service	20	8.3		Purchasing management	6	2.5
	Educational service	11	4.6		Sales management	16	6.7
	Healthcare	19	7.9		Financial accounting	26	10.8
	Other public	4	1.7		Wage management	3	1.3
	Social and personal service	44	18.3		PR and marketing management	8	3.3
	Household service	9	3.7		Others	97	40.4
Main User	CEO (President)	79	32.9		No response	1	0.4
	General manager, deputy general manager, manager	32	13.3		Total	240	100.0
	Assistant manager, staff	129	53.8				

95% of the responses are from small firms with less than 50 employees across various industries. While samples are from diverse industries, the lodging, food and beverage, and service industries account for relatively large portion of the sample. The types of ASP service applications that are used for most frequently by responding companies are customer management, finance and accounting, and sales management. The main users of the service are staffs and CEOs.

5. Analysis and Results

5.1 Testing for Reliability and Validity

A two-stage process was used to assess the content validity of the instruments. First, a list of items and factors that the instrument for ASP service quality and firm performance should be included were collected through an extensive literature review of the academic journals, professional journals, and books. Then this list was refined and validated through interviews with 7 experts including as professors and IT consultants and working-level practitioners of the ASP service providers and the users.

Reliability and validity of the instrument for ASP service quality model were assessed using SPSS 12.0 and AMOS 4.0, the results are presented in <Table 4> and <Table 5>. Reliability refers to consistency of measurement. In this study, the reliability of each of the dimensions was examined using Cronbach alpha. The recomm-

〈Table 4〉 Reliability and Validity of instruments

Factor	Measurement variable	factor loading	item reliability	error variance	construct reliability	Cronbach alpha	Average Variance Extracted
Performance	User friendliness	0.76(9.76)	0.57	0.43	0.87	0.82	0.50
	Request for proper data entry	0.77(11.18)	0.59	0.41			
	Easy to learn how to use	0.67(9.56)	0.45	0.55			
	Easy to use	0.72[a]	0.52	0.48			
	Existence of sufficient functionalities	0.68(5.96)	0.46	0.54			
	Suitable to handle my work	0.66(9.02)	0.44	0.56			
	Ability to correct operator's mistakes	0.69(9.29)	0.47	0.53			
Reliability	Frequency of disorders	0.69[a]	0.47	0.53	0.82	0.89	0.60
	Processing speed	0.81(8.16)	0.66	0.34			
	Stability of system	0.81(7.94)	0.66	0.34			
Conformance	Consistency	0.68[a]	0.46	0.54	0.80	0.81	0.51
	Accuracy	0.75(5.64)	0.56	0.44			
	Satisfying my needs	0.76(5.66)	0.57	0.43			
	Suitable for our work process	0.67(4.19)	0.45	0.55			
Serviceability	Proper problem solving ability	0.79(13.09)	0.62	0.38	0.89	0.87	0.61
	Respond within reasonable time	0.78[a]	0.61	0.39			
	Providing right service personnel	0.77(13.78)	0.59	0.41			
	Rapid repair	0.80(10.31)	0.64	0.36			
	Safe recovering from the errors during use	0.78(12.02)	0.61	0.39			
Aesthetics	Easy configuration	0.72[a]	0.51	0.49	0.85	0.85	0.59
	Proper form to use	0.79(9.99)	0.63	0.37			
	Clear color and font	0.82(9.2)	0.67	0.33			
	Well-structured form	0.73(8.78)	0.54	0.46			
Perceived quality	ASP service enhances the efficiency of work	0.84[a]	0.70	0.30	0.84	0.80	0.57
	ASP service has the risk to leak information	0.86(14.73)	0.74	0.26			
	The needs for ASP service adoption is well known	0.55(6.74)	0.30	0.70			
	ASP service is well known	0.73(9.22)	0.54	0.46			
Personal performance	Reduction of repetitive work	0.85(8.74)	0.73	0.27	0.83	0.86	0.62
	Systematic arrangement of work data	0.81(12.43)	0.65	0.35			
	Efficient support of work process	0.69[a]	0.48	0.52			
User satisfaction	Satisfaction with user training and education program	0.68[a]	0.46	0.54	0.86	0.82	0.55
	Degree to which the service meets the expectation	0.73(10.01)	0.53	0.47			
	Overall satisfaction with the service	0.77(10.63)	0.59	0.41			
	Actively utilization of the provided service information	0.76(10.18)	0.57	0.43			
	Reasonable service price	0.79(10.43)	0.62	0.38			
Perceived firm performance	Increased sales	0.77[a]	0.60	0.40	0.81	0.80	0.59
	Reduced cost	0.68(10.61)	0.46	0.54			
	Increased number of customers	0.84(9.86)	0.71	0.29			
Customer loyalty	Continuous use	0.73[a]	0.53	0.47	0.77	0.76	0.63
	Intension to recommend to others	0.86(8.17)	0.73	0.27			

주) 1. Performance and features were combined as a single factor, performance, as a results of the exploratory factor analysis(Varimax Rotation).
2. [a] Indicates a parameter fixed at 1.0 in original solution and t-values for item factor loadings are indicated in parentheses.

ended minimum acceptability value for the reliability is 0.70 [22, 75]. The values of Cronbach alpha in <Table 4> range from 0.76 to 0.89, and they are high enough to warrant further validity investigation. Note in <Table 4>, the factors of performance and features are combined into a single factor. It should be taken into consideration that, due to a short service history of ASP, the firms utilizing ASP in the market are not differentiating additional features from basic features yet.

Construct validity refers to the degree to which a measure assesses the constructs is purported to assess [85]. Convergent and discriminant validity can be used to examine construct validity [9]. Convergent validity is based on the correlation between responses obtained by maximally different methods of measuring the same construct [85], and it can be evaluated by the degree of agreement among items measuring the construct. In the present study, convergent validity was assessed by item (indicator) reliability, construct (composite) reliability and average variance extracted [7, 44]. Item reliability indicates the amount of variance in an item due to the underlying construct rather than to error and can be obtained by squaring the factor loading [24]. Eleven of the 40 item reliabilities are less than 0.50, although the t-values are all significant ranging from 4.19 to 14.73 ($p < 0.01$). The construct validity range from 0.77 to 0.89 and the average variance extracted (AVE) range from 0.50 to 0.63. These estimates exceed the lower limits of 0.70 and 0.50, respectively, recommended by Nunnally

〈Table 5〉 Correlation and Squared Correlation among the Constructs

Constructs	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Performance(C1)	1.00									
Reliability(C2)	0.47	1.00								
	(.22)									
Conformance(C3)	0.61	0.41	1.00							
	(.37)	(.17)								
Serviceability(C4)	0.27	0.45	0.22	1.00						
	(.07)	(.2)	(.05)							
Aesthetics(C5)	0.59	0.40	0.50	0.18	1.00					
	(.34)	(.16)	(.25)	(.03)						
Perceived quality(C6)	0.52	0.34	0.42	0.17	0.47	1.00				
	(.27)	(.11)	(.17)	(.03)	(.22)					
Personal performance(C7)	0.55	0.57	0.51	0.35	0.49	0.46	1.00			
	(.31)	(.32)	(.27)	(.12)	(.24)	(.21)				
User s satisfaction(C8)	0.58	0.47	0.44	0.38	0.40	0.40	0.45	1.00		
	(.34)	(.22)	(.19)	(.14)	(.16)	(.16)	(.2)			
Perceived firm performance(C9)	0.46	0.38	0.43	0.24	0.39	0.42	0.37	0.58	1.00	
	(.21)	(.15)	(.18)	(.06)	(.16)	(.18)	(.14)	(.33)		
Customer loyalty(C10)	0.57	0.36	0.46	0.30	0.43	0.45	0.45	0.62	0.53	1.00
	(.32)	(.13)	(.21)	(.09)	(.18)	(.21)	(.21)	(.38)	(.29)	

and Vernstein [75] and Fornell and Laker [44]. Thus the measures support convergent validity.

Discriminant validity is the extent to which a measure of a construct differs from measures of neighboring constructs [9]. Two methods may be used towards providing evidence of discriminant validity. First, discriminant validity can be assessed for two estimated constructs by constraining the estimated correlation parameter between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models [7]. Second, an alternative assessment of discriminant validity is to compare the squared correlation between two constructs with their respective average variance extracted [7, 44]. That is, if the average extracted variances of both constructs are greater than the squared correlation, discriminant validity is supported. This study used the second method to examine discriminant validity. As presented in <Table 4> and <Table 5>, the largest squared correlation between constructs is 0.38 (user satisfaction and customer loyalty), and the least AVE is 0.50 with performance. Therefore, these results support the discriminant validity of the multi-item scales.

5.2 Evaluating Overall Measurement Model Fit

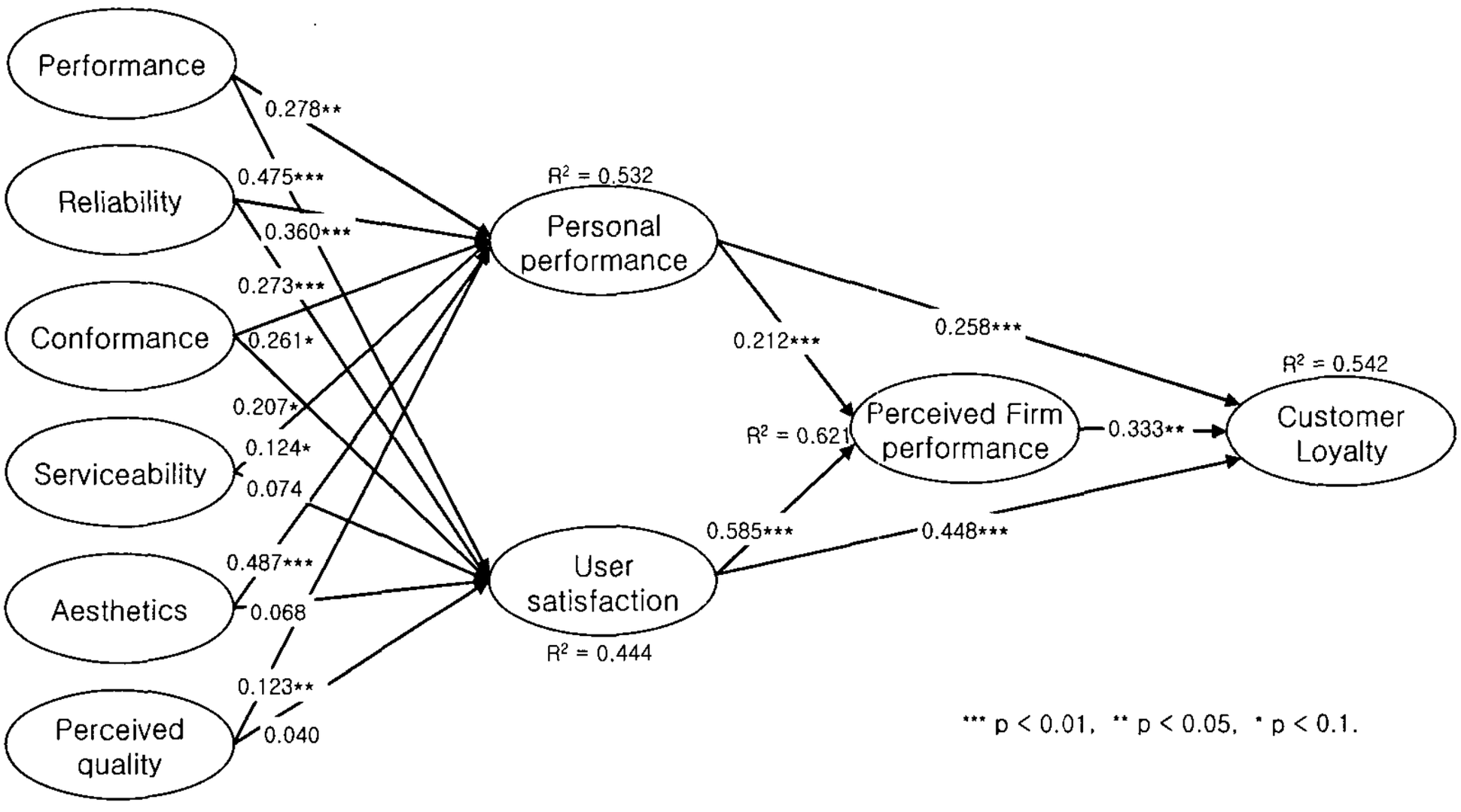
The research model was evaluated using AMOS 4.0 and provides a reasonably good fit for the data. As presented in <Table 6>, the model satisfies most of the fit indices for the structural equation modeling; the values of, CFI, AGFI, PGFI, RMSEA, TLI, and RMR satisfy the fit indices while the values of GFI and NFI do not. Nevertheless, the values of GFI and NFI are 0.860 and 0.867 respectively, which are very close to an acceptable value for good fit of 0.9 and the value of adjusted value of GFI (AGFI) meets the fit index and the degree of freedom is 661, which is very large. Thus, we can conclude that the current model is acceptable to use in testing hypotheses.

〈Table 6〉 The Result of Fit Test for Linear Structure Model

Fit Index	Criteria*	Model	Result
χ^2		834.239	
d.f.		661	
χ^2/d.f.	Below 5	1.263	Satisfied
CFI	Over 0.9	0.969	Satisfied
GFI	Over 0.9	0.860	Dissatisfied
AGFI	Over 0.8	0.826	Satisfied
PGFI	Over 0.5	0.693	Satisfied
RMSEA	Below 0.1	0.033	Satisfied
NFI	Over 0.9	0.867	Dissatisfied
TLI	Over 0.9	0.963	Satisfied
RMR	Below 0.1	0.064	Satisfied

주) 1. * Hair et al. [54], Jiang et al. [60], Pflughoeft et al. [86].
2. CFI : Comparative fit index ; GFI : Goodness of fit index ; AGFI : Adjusted GFI; PGFI : Parsimony-adjusted GFI ; RMSEA : Root mean square error of approximation ; NFI : Normed fit index ; TLI : Tucker-Lewis index ; RMR : Root mean square residual.

The results of the path analysis are presented in [Figure 2] and <Table 7>. The statistical estimation of the relationship between the ASP service quality factors and the ASP service performance presented in this study was found to be significant in most of cases. Therefore, all the hypotheses except for Hypothesis 2e, Hypothesis 2f, and Hypothesis 2g are validated. Note that as the current study is exploratory in nature to see if the quality framework proposed by Gavin will



[Figure 2] Test Results of Model

〈Table 7〉 Verification of Research Hypotheses

Hypothesis		*p*-value	Hypothesis test Result
Hypothesis 1a	Performance has a positive influence on personal performance.	0.027	Accept
Hypothesis 1b	Feature has a positive influence on personal performance.		
Hypothesis 1c	Reliability has a positive influence on personal performance.	0.002	Accept
Hypothesis 1d	Conformance has a positive influence on personal performance.	0.059	Accept
Hypothesis 1e	Serviceability has a positive influence on personal performance.	0.091	Accept
Hypothesis 1f	Aesthetics has a positive influence on personal performance.	0.002	Accept
Hypothesis 1g	Perceived quality has a positive influence on personal performance.	0.050	Accept
Hypothesis 2a	Performance has a positive influence on user satisfaction.	0.000	Accept
Hypothesis 2b	Features have a positive influence on user satisfaction.		
Hypothesis 2c	Reliability has a positive influence on user satisfaction.	0.004	Accept
Hypothesis 2d	Conformance has a positive influence on user satisfaction.	0.071	Accept
Hypothesis 2e	Serviceability has a positive influence on user satisfaction.	0.219	Reject
Hypothesis 2f	Aesthetics has a positive influence on user satisfaction.	0.598	Reject
Hypothesis 2g	Perceived quality has a positive influence on user satisfaction.	0.440	Reject
Hypothesis 3	Personal performance has a positive influence on perceived firm performance.	0.000	Accept
Hypothesis 4	User satisfaction has a positive influence on perceived firm performance.	0.000	Accept
Hypothesis 5	Personal performance has a positive influence on customer loyalty.	0.002	Accept
Hypothesis 6	User satisfaction has a positive influence on customer loyalty.	0.001	Accept
Hypothesis 7	Perceived firm performance has a positive influence on customer loyalty.	0.023	Accept

be suitable for measuring ASP service quality, we apply p-value criterion of 0.1 instead of 0.05.

The values of for the dependent variables such as personal performance, user satisfaction, perceived firm performance and customer loyalty are ranging from 0.44 to 0.62, which are good. Direct effects of the ASP service quality factors on personal performance are significant in the order of aesthetics, reliability, performance, conformance, serviceability, and perceived quality. On the other hand, direct effects of the factors on user satisfaction are significant for performance, reliability and conformance while aesthetics, serviceability and perceived quality do not affect the user satisfaction.

5.3 Discussions on the Result

Our results show that the model on the relationship among the ASP service quality and various performance indicators is reasonable, and they can be summarized as follows. Performance, reliability, conformance, serviceability, aesthetics, and perceived quality have positive influences on the personal performance of the ASP service users. In particular, aesthetics is the factor that influences the personal performance most and the next influential factors are reliability, performance, conformance, serviceability, and perceived quality. Therefore, it is more important to develop and maintain the application that is user friendly for small firms.

Second, the performance, reliability and conformance have positive influences on the user satisfaction while serviceability, aesthetics, and perceived quality do not have statistically meaningful influences on the user satisfaction. In other words, the ASP service users of the Korean small firms value much of the primary features of ASP service such as performance, reliability and conformance rather than the secondary features of service or the awareness of ASP service. Therefore, it is crucial to develop and deliver the ASP service that is suitable to work, easy to learn and convenient to use. On the other hand, serviceability, aesthetic characteristics such as screen configuration or report form and the branding of the ASP service have less importance in enhancing the user satisfaction. This is because the small firms using the service have insufficient experiences in utilizing the ASP service due to the short history of ASP service in Korea so that most small firms are in their initial stage to adopt and utilize the ASP service, which makes factors such as the easiness to use and short-term outcomes more important. Therefore, they tend to focus on whether the ASP service supports their work, the system is stable, easy to learn and convenient to use rather than on the serviceability of the service providers or the aesthetic aspects of the service.

Third, the personal performance and the user satisfaction have a positive influence on perceived firm performance. In particular, user satisfaction is more important factor to the perceived firm performance than personal performance.

Fourth, the personal performance, user satisfaction, perceived firm performance have a positive influence on customer loyalty. The strongest factor is user satisfaction and then perceived firm performance and personal performance come to the next. Therefore, we can conclude that the improvement of performance, reliability and conformance that affect user satisfaction lead to better perceived firm performance and customer loyalty.

In summary, the ASP service quality positively affects the personal performance and user satisfaction, which affects again the perceived firm performance and customer loyalty. Therefore, the model presented in the current study proves reasonable and the results are similar to those of the existing researches on service quality.

6. Conclusion

6.1 Implications of the Study

In this paper, we present a model for evaluating ASP service quality that reflects the characteristics of ASP service and small firms, and examine the relationship among the ASP service quality and the personal performance and the perceived firm performance using the data through the questionnaire to the Korean small firms. In particular, we derived ASP service factors that encompassing goods and service aspects of ASP and performance factors through interview with experts and literature study, and developed a model that explains the relationship among various factors. Out test results show that the ASP service quality has a close connection with the personal performance, user satisfaction, perceived firm performance and customer loyalty. Furthermore, they suggest that the ASP service should be developed and delivered with more focused product quality rather than service quality in order to enhance the user satisfaction and perceived firm performance. Further explanation of study implications are as follows.

First, this study presents a new model to evaluate service quality considering the characteristics of the ASP model and the small firms that are main targets for the service. The ASP model possesses both the products feature as an application and the service feature to solve the problems occurring during the service usage. In addition, network quality and security compose crucial characteristics as it is serviced from the outside through network. Therefore, on top of Garvin's framework of eight quality dimensions, characteristics such as network quality and security are added to the model in order to evaluate the ASP service quality comprehensively. As most of the small companies cannot afford to have IT experts, the questionnaire had to be simplified as much as possible and terms should be straightforward enough for them to comfortably respond to the questions. To that end, SERVPERF model is employed in our survey to evaluate only the perceived performance quality, and survey questionnaire was refined and enhanced through interviews the ASP model experts and working-level officials.

Second, the small firms in Korea have improved their performance by adopting and utilizing the ASP service. Moreover, the current study verifies the earlier insights from existing studies [16, 90, 95] that the ASP service can be effective for the small firms due to smaller administrative costs such as smaller upfront investment cost and less burden of upgrade, data backup, maintenance and repairs.

Third, it is shown that only a part of ASP service quality factors meaningfully affects the user satisfaction of small firms. In specific, performance, reliability, conformance have the positive influence on user satisfaction whereas serviceability, aesthetics, and perceived quality have little influence. This implies that while the product-based approaches centering on performance and feature and manufacture-based approaches

centering on conformance and reliability are important in evaluating the ASP service quality, the user-based approach focusing serviceability, aesthetics and perceived quality are less important in the evaluation process. Thus, it may not be desirable to evaluate the ASP service quality by applying SERVQUAL model as in the previous research [60, 65, 88, 89]. In fact, it would be more appropriate to focus on the product features as an application and then to consider the service quality additionally in order to evaluate the ASP service quality. In conclusion, it is appropriate to evaluate the ASP service quality through Gavin's multi-dimensional perspective to reflect the actual characteristics of ASP service. However, one should be careful in generalizing the results from the current study since the study is designed for the small firm which lacks IT expertise and the survey is carried out in the initial stage of ASP service in its life cycle.

Last, this study demonstrates that the ASP service leads to improved performance of the small firms and that the user satisfaction has a significantly positive effect on the perceived firm performance. Therefore, not only providing opportunities for the small firms to adopt the ASP service but also supporting them to continuously utilize the service is important to enhance the national competitiveness through a balanced spread of e-transformation across different firm sizes and industries. It is also essential to develop and distribute a service that is highly applicable under various business environments, is easy to learn and use, and is generating less troubles for the small firms that has few IT resources and experts.

6.2 Limitation and Future Study

The current research has generated some insights on the ASP service by focusing on developing an evaluation model and on the relationship between the ASP service quality and the personal and the perceived firm performance. Nevertheless, it also has some limitations that need to be addressed in the future study.

First, in our quality evaluation model, we only considered the perceived performance quality as in SERVPERF instead of considering both the expectation and perception as in SERVQUAL model. Therefore, it was not possible to come up with a list of factors that would enhance or impede the expectations on service quality. In other words, while our model is useful to understand the current level of perceived performance quality, it cannot used to articulate the strengths and weaknesses of the ASP service based on the expectation of customers.

Second, the subjects of our study were the small firms with less than 50 employees. Since they are small and cannot afford to hire IT experts, it is difficult for them to pursue the benefits of information technology systematically and to build expertise in an organized manner. Therefore, there might be some unintended response errors in their responses to our questionnaire.

Third, the measurement of firm performance was relied on responses to questionnaires that are based on perceived performance as secondary measures. Although it is not easy to obtain objectively verified performance data in small firms, it is recommended to consider actual performance indices in the future research in order to reduce measurement error.

Last, it has been only two years since the in-

ception of the ASP service for small firms in Korea. Therefore, it is necessary to reevaluate the effects of ASP service after more experience of the service by the small firms to see if there is any change in term of the ASP quality and its effect on firm performance.

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