Investigating the Antecedents of Customer Loyalty to Broadband Network Services in Taiwan

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Abstract

With the increase in bandwidth of access networks in recent years, Asymmetric Digital Subscriber Line (ADSL) provides most residential consumers with rapid access media connection to the Internet for Web-based activities, such as surfing website, online shopping, Voice over Internet Protocol (VoIP). In an attempt to evaluate existing consumer’s loyalty after adopting broadband services in the mature market, this study investigates the influence of overall service quality, service value, satisfaction and behavioral intentions on loyalty to an incumbent operator. To test the hypothesized model, data are collected from 627 residential subscribers using ADSL services in Taiwan and a two-step approach of LISREL analyses is employed to evaluate the fitness of the research model. The results indicate that overall service quality, service value and satisfaction have a direct positive effect on consumers’ behavioral intentions and, in turn, influence consumer’s loyalty. In addition, satisfaction plays a role as an important mediator that can directly contribute to both the consumers’ behavioral intentions and their loyalty; however, service value perceived by consumers has no significant impact on loyalty.

Keywords: Overall service quality, service value, satisfaction, behavioral intentions, loyalty

1. Introduction

Since the liberalization of the telecommunications industry in Taiwan as of 1996, incumbent fixed-network operators have continued to increase their infrastructure investment, thus nurturing a rapidly growing Internet market. The penetration rate of broadband subscribers has reached 16.5 percent, and to date a total of 176 operators provide broadband Internet access services to 4.3 million consumers, according to the August 2006 statistics (NCC major statistics, 2008). Revenues from data service provide the operators a new revenue source when the growth in voice services has slowed down and the average revenue per user (ARPU) has started to decrease. Services include ADSL, cable modem and leased line, but almost 90% subscribers with broadband accounts access the Internet networks via ADSL from their home or offices. As a result, a relatively important concern for users who surf the Internet is the speed of the connection for Internet access, with the implication being that a high bit-rate transmission connection to the Internet may be a key factor in meeting consumer needs (Papacharissi and Zaks, 2006; Cave and Mason, 2001). Papacharissi and Zaks (2006) have defined broadband access as “all flavors of high-speed digital voice, data and video services, as well as the underlying infrastructure, clients and technologies that
enable these services”. More specifically, speeds of at least 384Kbps and packet-switched technology are used at the level of interactivity when adopting broadband access, and these can be allowed for the control and selection of content.

Prior studies in service marketing recognized that service quality, service value, and satisfaction were important factors in determining whether or not a consumer would accept a service or product (Teas and Agarwal, 2000; Szymanski and Henard, 2001; Sweeney et al., 1999). The relationship among and between these constructs are confirmed by both conceptualization and operationalization, which enable a better understanding of the distinctions between these constructs and of the linkages in these relationships. Cronin et al. (2000) modeled relationships between service quality, service value, and satisfaction and concluded that each is viewed as antecedent of behavioral intentions. To further confirm linkages between any of the constructs and behavioral intentions, they constructed four competing models, based on literature review, which expanded across six service industries and utilized different samples. By testing best model-fitting to the data, they found that the direct effects of service quality, service value, and satisfaction on behavioral intentions acting as a research model outperformed the other three competing models. In subsequent research, Brady et al. (2001) and Brady and Cronin (2001) empirically examined the preceding model in diverse cultural environments and three specific service industries and found that Cronin et al.’s (2000) research model basically reflects its robustness, as a slight measurement change in antecedent constructs of behavioral intentions suitably predicted a consumer’s intended behavior towards adopting a specific service or product. However, increasing a consumer’s perceived value or satisfaction and reducing their perceived risk, including monetary, time, and effort factors, are viewed as a means of enhancing a consumer’s intention, and in turn, consumer’s loyalty (Fornell et al., 1996; Zeithmal et al., 1996; Johnson et al., 2006) and actual retention (Bolton and Lemon, 1999; Mittal and Kamakura, 2001; Mittal et al., 2005).

Prior studies have demonstrated that these relationships are complex and dynamic, such that intentions change and evolve over time. Thus, the aim of this study is to examine this unexplored relationship between consumer’s behavioral intentions and loyalty.

Understanding service quality and delivering higher levels of service quality is an effective strategy that allows service providers to position themselves more effectively in the marketplace. The measurement of service quality (SERVQUAL) was originally conceptualized and operationalized by the gap theory of Parasuraman et al. (1985), which suggests that the difference between consumers’ expectations of performance of service providers and their assessment of the actual performance of a specific firm is what drives the perception of service quality. However, there is little empirical evidence to support the expectations-performance gap as a basis for measuring service quality, because the theory is not completely generic (Carman, 1990). Cronin and Taylor (1992), differing somewhat from prior measures, suggest adoption of a 22-item performance-based alternative to the SERVQUAL measure. Integration of performance-based and overall evaluation for service providers as a SERVQUAL scale appears to support more effectively the validity, and builds relevance between service value, satisfaction, and behavioral intention (Zeithaml et al., 1996; Cronin et al., 1997; Cronin et al., 2000; Brady et al., 2001).

However, managers face a well known dilemma in that a consumer does not always buy the highest quality service or purchase the lowest cost service. Analogous to the concept of service quality, an important predictor influencing satisfaction and intention behavior directly is service value, which is introduced as a crucial construct in consumer decision-making models (Bolton and Drew, 1991; Dodds et al., 1991; Zeithaml, 1988). A common quote of value concept is depicted by Zeithaml (1988, p.14), who suggests viewing value as a tradeoff between a consumer’s overall evaluation of the benefits of using a service and its cost,
defining it as the “consumer’s overall assessment of the utility of a product based on perceptions of what is received for what is given”. Similarly, Cronin et al. (1997) argue that service value should include consumer decision-making processes based on service quality and sacrifice, to enhance the explanatory power of the consumer’s purchase intentions; that is, that value is a function of service quality and sacrifice. Subsequent research confirmed this explanation of higher variance (Sweeney et al., 1999; Teas and Agarwal, 2000; Cronin et al., 2000; Brady et al., 2001); however, consumers’ assessment of service value is considered to be the antecedent of satisfaction and intention behavior (Bolton and Drew, 1991; Fornell et al., 1996; Cronin et al., 1997; Sweeney et al., 1999; Lam et al., 2004; Johnson et al., 2006).

An additional determinant of loyalty is satisfaction, traditionally defined, as derived from Tse and Wilton (1988), as “The consumer’s response to the evaluation of the perceived discrepancy between prior expectations (or some other norm of performance) and the actual performance of the products as perceived after its consumption.” Somewhat differently, Oliver (1996) defined it as “Satisfaction is the consumer’s fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under- or overfulfillment.” In a different vein, Anderson and Sullivan (1993) suggest that satisfaction can be “broadly characterized as a postpurchase evaluation of product quality given prepurchase expectation” and they suggest that consumer satisfaction should focus on the consumer’s past and current evaluations of a product or service. As was previously indicated, satisfaction is followed by service quality and service value, which is based on specific service or product attributes. The relationship between quality performance and satisfaction (quality-satisfaction consistency) is significant (Oliver, 1977; Szymanski and Henard, 2001; Olsen, 2002), to the point that satisfaction is treated as a key antecedent of consumer purchase intentions or loyalty, especially when it is viewed as a more general evaluative construct in service industries (Ostrom and Iacobucci, 1995; Fornell et al., 1996; Zeithaml et al., 1996; Cronin et al., 2000; Brady et al., 2001; Gerpott et al., 2001; Burnham et al., 2003; Kim et al., 2004).

2. Conceptual framework and hypotheses

The primary objective of this study is to examine the factors influencing a consumer’s loyalty when adopting a broadband Internet access. The theoretical model is shown in Figure 1.
2.1 Overall service quality (OSQ)

The measure of service quality (*SERVQUAL*) developed by Parasuraman et al. (1988), which is a 22-item instrument of *SERVQUAL* scale, can be conceptualized as a five-construct of service quality including tangible products, reliability, responsiveness, assurance and empathy. Despite its popularity, Carman (1990) suggests that the *SERVQUAL* scale should be deliberately considered with regard to specific services, in spite of the fact that it was originally designed to provide a generic measure that could be applied to any services. That is, it should be amenable to adding items or changing the wordings to items to fit to specific industries. On the other hand, Brown et al. (1993) found that a *SERVQUAL* scale with a different score will lead to a number of potential problems, including failure to discriminate validity from its components. Therefore, all these constructs used to measure each variable became a major concern for the comprehensive nature of this study, in light of the number of measured items. To conveniently apply this construct, mixed with other constructs, Sweeney et al. (1999) argued that consumer perceptions of service quality should be closely related to a special event. Service quality in their study consisted of functional service, technical service and product quality, and its empirical test revealed that both product quality and functional quality have a slight but significant influence on perceived value, and also that technical service quality has an indirect effect on perceived value. Similarly, Bell et al. (2005) argue that both technical and functional service quality are clearly depicted as an overall service quality perception, which leads to a significant effect on customer loyalty. Therefore, the consumers’ assessment of the service quality should focus on the overall service quality offered by service provider, not its individual components.

In this regard, Cronin and Taylor (1992) follow a performance-based measure of service quality as an alternative to the *SERVQUAL* scale, focusing on service transaction. In their research, Cronin et al. (2000) extracted 10 dimensions of performance-based service quality from the *SERVQUAL* scale, associated with three items of overall service quality as the construct of *SERVQUAL*. A total of 13 items of service quality were confirmed to be more closely related to the implications of satisfaction, indicating that a performance-based scale is as efficient, compared to the *SERVQUAL* scale, primarily because this approach from theoretical and practical viewpoints actually reflects both the judgment of service quality and the satisfaction, in line with the evaluation of a service provider’s performance (Cronin and Taylor, 1992). Different somewhat from a prior specification, Olsen’s (2002) definition has a consumer’s evaluation of attribute performance being associated with other objects. For example, taste, tenderness, texture, and appearance are considered to be performance-based service quality for a seafood product. Results reveal that service quality has a significant effect on customer satisfaction and this, in turn, influences repurchase intentions.

In addition, a similar research model extends this construct to the effect of service value in specific service industries (Brady and Cronin, 2001), slightly different from the studies of Cronin et al. (2000) and Brady et al. (2001), in which overall service quality was viewed as a part of service quality, in evaluating the influence of this construct to service value, satisfaction, and behavioral intentions. Thus, in an attempt to conceptualize this construct, a three-item overall service quality scale, based on Teas’s (1993) report, is used in our study to measure consumer perceptions of overall quality, leading to the following research hypotheses:

*H1*: Overall service quality is positively related to service value.

*H2*: Overall service quality is positively related to consumer’s satisfaction.

*H3*: Overall service quality is positively related to consumer’s behavioral intentions.
2.2 Service value (SV)

In prior research on consumer perceptions of value, Zeithmal’s (1988) study suggests that service value can be considered as a tradeoff between a customer’s evaluation of the benefits of a service and its associated costs in money, time, and effort. Similarly, perceived value is conceptualized as a consumer’s overall evaluation of what is received compared with what is given up or paid out, and perceived it as a major determinant of customer loyalty in such settings as telephone services (Bolton and Drew, 1991). Teas and Agarwal (2000) posit this as the tradeoff between perceived quality and perceived sacrifice, which results in a positive linkage with perceived quality and a negative linkage with perceived sacrifice. The work of Sweeney et al. (1999) argue that perceived sacrifice is derived from performance/financial factors as the subjective expectations of a loss, significantly resulting in a negative effect on perceived value. This relationship is slightly different from Fornell et al.’s (1996) contention that, in addition to perceived quality, customer expectations are also factors influencing customer perceptions of value. They evaluate the level of quality by a consumer’s knowledge and experience with a product or service, such as overall expectations, customization, and reliability, each of which has a significant influence on perceived value under different conditions.

In addition, Cronin et al. (1997) conceptualize service value as a multiplicative or additive function, which explains more representatively consumers’ overall assessment of the value that they attribute to a specific service or product and which, in turn, affects their purchase intentions. This result is consistent with prior studies, both cross-sectional and longitudinal (Bolton and Drew; Fornell et al., 1996; Sweeney et al., 1999; Johnson et al., 2006); moreover, a positive association between service value increases and consumer satisfaction also be confirmed to be closely related (Fornell et al., 1996; Cronin et al., 2000; Brady and Cronin, 2001; Brady et al., 2001). In a further empirical study, Johnson et al. (2006) found that perceived value has a positive direct effect on loyalty intentions, but that this decreases over time. That is, the perceived value varies with time, until its effect on consumer loyalty becomes nonsignificant; this is especially common in relatively mature product or service categories, such as automobiles and credit cards. Because loyalty is organized by the consumer’s superordinate goal of value, and will directly affect loyalty through its influence of creating of value (Bolton and Drew, 1991; Sirohi et al., 1998; Williams, 1999; Sirdeshmukh et al., 2002; Yang and Peterson, 2004; Lam et al., 2004). Drawing on the preceding literature, we study depicts service value as a consumer’s overall evaluation, which is scrutinized by comparing their acquisition associated with the necessary sacrifice. In sum, we hypothesize that:

\[ H4: \text{Service value is positively related to consumer’s behavioral intentions.} \]

\[ H5: \text{Service value is positively related to consumer’s satisfaction.} \]

\[ H6: \text{Service value is positively related to consumer’s loyalty.} \]

2.3 Satisfaction (SAT)

Most businesses has been focused on consumer satisfaction as a way to improve customer loyalty and thus profitability, that is, the more satisfies a consumer is, the more loyal they will be. The assumption is thought of consumer satisfaction as to be the attitude resulting from consumers’ expectation interacting with their performance perceptions (Neal, 1999). But in practice, customer satisfaction represents an important external cue for customer-oriented business. Oliver (1977) delineates satisfaction as a combination of emotion-based and evaluative responses to a service encounter. Rust and Oliver (1994) expand on this by explaining satisfaction as the extent to which a consumer’s positive feelings will be aroused
when possessing and/or using a service. In contrast, Parasuraman et al. (1994) define satisfaction as “to be a function of his or her assessment of service quality, product quality, and price.” Indeed, a framework, in which the service quality of performance will lead to the increase of consumers’ satisfaction, is widely accepted by most marketing researchers, especially when service quality is framed as a specific belief evaluation and simultaneously, satisfaction as a general evaluative construct (Rust and Oliver, 1994; Oliver, 1996; Olsen, 2002). In addition, regarding the relationship between service value and satisfaction, as discussed by Heskett et al. (1997), it is argued that, given a reasonable price, companies can deliver high-value services to their consumers, and satisfy their needs well. Cronin et al. (2000) and Brady et al. (2001) further integrate the relevance, from a prior specification that the highlights the mediating role of satisfaction in the impact of service quality and service value on consumer’s behavioral intentions across different products, and cultures.

Although the majority of satisfaction studies focus on tangible products, some field research examining customer satisfaction in service contexts is not determined on the basis of performance expectations (Gupta and Stewart, 1996; Patterson et al., 1997). One possible reason leading to a nonsignificant relationship would be inconsistency with performance achievement between postpurchase evaluation and prepurchase expectations. In such an uncertain environment, consumers are more likely to form judgments by external cues of a product or service, thus forming prepurchase performance expectations. If they do, then an inconsistent expectation of consumer perception by the actual performance will enhance the level of dissatisfaction. Cronin and Taylor (1992) offered some evidence that customer satisfaction perceptions positively affected behavioral intentions in a way. Moreover, Anderson and Sullivan (1993), in a study of customer satisfaction among Swedish consumers, showed that repurchase intention is strongly related to satisfaction across product categories.

These studies operationalize behavioral intentions in a one dimensional way, rather than describe specified types of behavioral intentions (Zeithmal et al., 1996). Abundant evidence support, as an antecedent of consumer’s behavioral intention and loyalty, that satisfied consumers have a more positive attitude towards intentions and are more likely to stay with their existing provider than are dissatisfied consumers (Fornell et al., 1996; Szymanski and Henard, 2001; Burnham et al., 2003). Brady et al. (2001) and Cronin et al. (2000), with empirically testing, reveal that satisfaction has a stronger impact on behavioral intentions across six service industries and in a diverse cultural environment. Furthermore, several research studies reveal that satisfaction has a stronger impact on consumer loyalty, increasing the commitment, value-added or weighting attributes incorporated into satisfaction judgments, which can contribute to existing consumers staying with a firm or being more likely to purchase again (Lam, et al., 2004; Fornell et al., 1996; Gerpott et al., 2001; Kim et al., 2004). Thereby, to explore satisfaction, based on Oliver’s (1977) contention, consumer satisfaction regarding broadband Internet access services can be decomposed to a series of influenced constructs, because these services consist of salient dimensions, including a core services (equipment), a facilitating service (application procedure), and supporting services (maintenance and customer service). We hypothesize that satisfaction has an impact on both behavioral intentions and loyalty, leading to two research hypotheses, as follows:

\[ H7: \text{Satisfaction is positively related to consumer’s behavioral intentions.} \]
\[ H8: \text{Satisfaction is positively related to consumer’s loyalty.} \]

2.4 Behavioral intentions (BI)

A conceptual model delineates behavioral intentions as a mediated variable between attitude and usage of a specific service or product, from retention to defection. The work of Zeithaml et al. (1996) reveals that service quality and behavioral intentions are closely related
and also, that service quality is a determinant of whether a consumer ultimately remains with or defects from a firm. When consumer perceptions of quality assessment are high, their behavioral intentions are favorable, which enhances their relationship with a firm. On the contrary, when service quality assessments by consumers are not favorable, behavioral intentions are more likely to be weakened. Thus, behavioral intentions can be treated as a key indicator that signal whether consumers will remain loyal to a firm. This inference is supported further by the results of Cronin et al. (2000) and Brady et al. (2001) and Brady and Cronin (2001), which showed that, in addition to service quality, some factors can interpreted as antecedent variables of behavioral intentions, including service value and satisfaction. The results reveal that each variable has a significant effect on behavioral intentions. Furthermore, a subsequent effect of behavioral intentions toward loyalty is worth exploring at the individual consumer level in those who have accepted a product or service for a specific period of time. Johnson et al.’s (2006) findings, from a longitudinal study of cellular phone consumers, reveal that a consumer’s intention towards loyalty evolve over time, and are directly impacted through affective commitment, perceived value, and brand equity. As discussed previously, the relationship between behavioral intentions and loyalty is expected to be structured such that a high level of consumer behavioral intention, formed from overall evaluation of service quality, service value, and satisfaction, will contribute to repeat purchasing. Thus, we hypothesize:

H9: Behavioral intentions are positively related to consumer’s loyalty.

2.5 Loyalty (LAY)

Loyalty represents a type of customer-based measurement system for evaluating and enhancing the performance of the firm that is closely related to the firm’s continued survival and future growth. Its definition, developed by Fornell et al. (1996), is a procedure of repurchase likelihood; that is, even if a firm was to raise its price as a percentage, customers would still definitely choose to buy from that firm again the next time. This causal relationship results from increased overall customer satisfaction and decreased customer complaints (Fornell et al., 1996). Another concept of loyalty is addressed by Ganesh et al. (2000), who conceptualize loyalty as a combination of both commitment to the relationship and other loyalty behaviors, and who argue that customers decide on remaining in a relationship depending on the comparison level for available alternatives. A customer will be motivated to leave a relationship if the expected outcome is believed to be the same or better in an alternative relationship. Intuitively, customers who have switched service providers for reasons other than dissatisfaction are less likely to hold negative attitudes and feelings towards their previous service provider. Also, loyalty is thought of it as the attitudinal measurement of customer’s behavioral intention to continuously or increasingly conduct business with their current company, and their inclination to recommend the company to other customers (Yang and Peterson, 2004). Loyal customers tend to have a higher usage level of a service, buy more from the company than those who are not loyal. They are more likely to possess a stronger repurchase intention and to recommend the product/service to their acquaintances (Zeithmal et al., 1996; Yang and Peterson, 2004).

In the case of mobile telecommunications services, customer loyalty is relatively significant largely because the market has matured. In competition, lower switching costs play an important role as a mediating variable in the relationship between customer’s satisfaction and their loyalty (Gerpott et al., 2001; Kim et al., 2004; Lam et al., 2004; Yang and Peterson, 2004); that is, a firm or service with lower switching costs will provide existing customers with more alternatives, resulting in defection. In addition, Johnson et al.’s (2006) study reflects various impact factors on loyalty, indicating that several drive factors influence
customer loyalty, including perceived value, brands, and relationships, and that these are
dynamic and vary with the growth phase of product lifestyle. Each variable or a combination
of variables will directly or indirectly contribute to the impact of consumer attitude toward
loyalty to the firm. In recent years, Johnson et al. (2006) empirically tested consumer loyalty
via intentions as they evolve over time, and revealed that loyal consumers who purchased and
used technology formed their evaluation of attitude over time. These results can concretely
respond to the studies of Gerpott et al. (2001) and Kim et al. (2004). Once the technology
continues to mature and becomes accepted, products with slight differentiation, such as design
and color, are more likely to increase customer turnover.

Researchers well recognize that customers switching behaviors have deleterious effects on
the profitability and viability of firms in the marketplace. Over time, loyal consumers
effectively contribute to business by buying more, by repurchasing the same or related
products, and by providing new referrals through positive word of mouth. Therefore, firms
rush to implement retention and loyalty programs to keep a competitive advantage,
particularly when a product or service continues to mature in a market (Ganesh et al., 2000;
Gerpott et al., 2001; Johnson et al., 2006). Loyalty has been defined and measured in many
different ways, with some viewing it as the relationship between relative attitude and repeat
patronage (Dick and Bsau, 1994; Olsen, 2002; Lam et al., 2004; Gerpott et al., 2001; Kim et
al., 2004). However, few empirical studies have tested the entire relationship between quality,
satisfaction, and loyalty (Szymanski and Henard, 2001; Olsen, 2002) and these relationships
are assumed to be positive but may vary between products, industries, and situations (Fornell
et al., 1996). The most common assessments of loyalty are either behavioral measures
expressed over time or simply repurchase behaviors (Ganesh et al., 2000; Fornell et al., 1996;
Johnson et al., 2006). In contrast to the previous model, Cronin et al. (2000) and Brady et al.
(2001) examined their hypothesized model and found that the relationship between
satisfaction and loyalty was weaker than the relationship between quality and satisfaction, and
that the correlation between quality performance and loyalty was lower that between
satisfaction and loyalty. These findings resulted in loyalty not being incorporated into their
model, possibly because satisfaction, which is based on of both emotion-based and evaluative
measures, acts in a mediating role of the quality-value-behavior relationship, which
incorporates loyalty. Cronin et al. (2000) and Brady et al. (2001) verified the relationships
between quality, value, satisfaction and behavioral intention (BI) and their results revealed
that the correlations between these constructs hold in the contexts of six different service
industries and cross cultural consumer behavior, respectively. But these two papers did not
study their impact on loyalty. As for the related literature on loyalty, Bell et al. (2005) and
Sirohi et al. (1998) examined the correlation of service quality and loyalty in the context of
banking service and supermarket chain, respectively. Johnson et al. (2006), Williams (1999)
and Sirdeshmukh et al. (2002) examined the correlation of service value and loyalty in the
context of cellular phone, hotel service, clothing purchase retailing and airline travel service,
respectively. Finally, Fornell et al. (1996), Szymanski and Henard (2001), Burnham et al.
(2003), Lam (2004), Gerpott et al. (2001) and Kim et al. (2004) examined the correlation of
satisfaction and loyalty. However, none of the above literatures simultaneously examined the
correlation of service quality, service value, satisfaction and loyalty. Hence, this manuscript
extends Cronin et al.’s (2000) and Brady et al.’s (2001) framework of service quality, service
value, satisfaction and BI to measure the antecedents of customer loyalty to broadband
network services in Taiwan.

To attempt to fill this void, we provide a rigorous combination of the extant literature on
the subject and extend this in three significant ways to their model to include consumer
loyalty. First, we examine the relationships between overall service quality, service value, and
satisfaction on loyalty, focusing on the individual/consumer level rather than the firm/industry level. Second, we explore two mediating effects of service value and consumer satisfaction on their loyalty, through exclusive measurement of emotion-based purchasing, underscoring that overall consumer satisfaction is offered by an incumbent provider. Third, to help simplify the hypothesized model, the overall service quality of measured items is focused on the consumer’s overall evaluation of a specific service, rather than the individual components used in the previous research.

3. Methodology

3.1 Data collection procedures

The goal of this study is to establish the basic factors that determine consumer’s loyalty and how these affect keep/drop decisions in an actual consumer service context. To confirm the cross-validation of a questionnaire, a three-page questionnaire is used as the research instrument, and follows two steps of pilot testing of the process. First, each of the initial measure items in the questionnaire is formed and a review requested, from experts who have been working in this domain over 10 years, for evaluation of the relevance of the questionnaire items. Based on the reviewer feedback, some of the questionnaire items were dropped, and the questionnaire layout out was further modified. The reviewers’ experiences significantly contributed to a higher reliability and validation of the measure items. Next, to avoid vagueness in the questions, 15 respondents for this test are asked to provide comments on the relevance and wording of the questionnaire items. Some wording for each measure item, including professional terminologies, or jargon, was changed to improve clarity.

This study is conducted on data collected from existing consumers of ADSL services, to validate whether consumers would continue to choose ADSL services or, having the opportunity, would keep or drop this monthly service. They also choose levels of usage and specific services that meet their needs, while an incumbent operator monitors these choices. Traditionally, the monthly fee for ADSL services varies with bandwidth usage level. Upon subscription, consumers have to pay an initial fee, including fees for necessary hardware. In Taiwan, Chunghwa Telecomm, a dominator of broadband networks holding over 90% of the market share, launched ADSL services in 2002. A database of ADSL users from National Communications Commission statistics (NCC major statistics, 2008) is used to select the target subjects. Of the 4.21 million ADSL users, users who used Cable Modem or other connections, listed in the database of Chunghwa Telecomm (NCC major statistics, 2008), were excluded. The participants for this study are focused on Chunghwa’s household users who are adopting ADSL services, in order to improve the representativeness of the sample. Participants who are adults residing in the South of Taiwan who are randomly selected from customer service centers of Chunghwa Telecomm. These centers receive a number of request tickets from those who submit a request form of ADSL failure, via free service calls to the customer services center, as sample targets who are asked to fill a questionnaire at home by technical staff after troubleshooting is completed. Respondents are randomly drawn from the incoming services or tickets that require ADSL maintenance service. To facilitate respondents’ willingness to fill out the questionnaire, we offer them a small gift as a participation incentive to encourage responses. Finally, a total of 665 household users were targeted for collecting the data for this study; of these, 38 questionnaires were blank or incomplete. Combining the remaining 612 questionnaires with the 15 from the pilot study yielded a total of 627 complete and usable samples (92%) obtained within the two month survey period from 15 April to 15 June of 2008.
Among the respondents, over sixty percent of respondents (62.84%) are male. Over forty percent (44.17%) have college education and above, and next 25.84 percent have technical degrees, while 29.30 percent have high school. One third of the respondents (33.65%) are between the ages of 31 and 40, and one fourth of the respondents are between the ages of 21 and 30 (27.11%) and between the ages of 41 and 50 (24.88%), respectively. Most of the respondents have used the ADSL to surf the Internet, and 53% of them have been using it for 3 years or more. Of these, 43% of respondents indicate that they use it every day, and the average ADSL usage time among the respondents was between 3-4 hours in the past 12 months. The most frequently cited items (at least by 82% of the respondents) for surfing the Internet include information searches (65%), MSN (Microsoft Network)/email (76%), on-line shopping (48%), on-line games (32%), and on-line music (26%). It appears that the most

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<td>Gender</td>
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<td>Female</td>
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<td>51 and older</td>
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<td>Income (NT$)</td>
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<td>Technical college</td>
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<td>ADSL bandwidth</td>
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</tr>
<tr>
<td>2M/256K</td>
<td>234 (37.32%)</td>
</tr>
<tr>
<td>2M/384K</td>
<td>13 (2.07%)</td>
</tr>
<tr>
<td>2M/512K</td>
<td>10 (1.59%)</td>
</tr>
<tr>
<td>2M/512K</td>
<td>42 (6.70%)</td>
</tr>
<tr>
<td>8M/640K</td>
<td>123 (19.62%)</td>
</tr>
<tr>
<td>12M/1M</td>
<td>42 (6.70%)</td>
</tr>
<tr>
<td>Others</td>
<td>23 (3.67%)</td>
</tr>
<tr>
<td>Total</td>
<td>627</td>
</tr>
</tbody>
</table>
respondents are well-educated, middle-income and middle-aged, and have more ADSL usage as part of their everyday life than do others.

3.2 The measures

Scales from prior research were used, or adapted, as the source of measures for the investigated constructs in the present study. A total of 16 items that are measured using a combination of semantic differential and Likert-type scales are employed for this study, as shown in the Appendix. Where necessary, the survey questions are slightly adapted to reflect the industries and the specific service provider investigated. A three-item overall quality service (OSQ) scale, based on Teas (1993) and Cronin et al. (2000) and Brady and Cronin (2001), is used to measure consumers’ perceptions of overall quality of their ADSL services, ranging from inferior to superior, poor to excellent, and whether the service provider holds to low standards or high standards. A two-item service value (SV) scale is constructed for this study to actually reflect consumer perceptions to value judgments. On the basis of value judgment by Fornell et al. (1996) and consumer’s decision-making model by Cronin et al. (1997), service value is assessed as “the service value of ADSL to meet their needs” and the value of “what I was received compared to what I give up”.

Fornell et al. (1996) suggest that consumer satisfaction indicators should tap into the construct by addressing overall satisfaction and be consistent with consumer expectations with the firm’s offering, indicating that the relationship between operator and consumers reflects overall satisfaction. They argue that expectation plays an important role, primarily because the nature of the ongoing relationship between a firm and its customer base is such that expected future performance contributes to overall consumer satisfaction (Fornell et al., 1996; Lam et al., 2004). We develop a seven-item construct relating the operator’s offering to the consumer’s expectations, whether these be bandwidth offering, transmission quality, or adding functions to meet consumer needs. In addition, overall consumer satisfaction has a direct and positive association with a cumulative evaluation of the firm’s performance over time.

A two-item behavioral intentions scale for this construct is directly adapted from Zeithmal et al.’s (1996) study, which represent a consumer’s willingness to pay a price premium and to stay loyal to a company. Respondents are asked to assess whether they will “recommended ADSL services to other’s” and whether they will “continue to use ADSL services for the next few years”. We adapt the scale of consumer loyalty, summarized from Ganesh et al. (2000) and Gerpott et al. (2001) and Kim et al. (2004), which reflects in individual’s intention to repurchase, intention to stay with the incumbent operator, and intent to continue to use the services even if charged a little higher fee.

4. Results

The research model is tested using the two-step approach recommended by Anderson and Gerbing (1988) for model construction and testing. First, all of the measured variables linking to specific constructs are tested in a comprehensive, confirmatory factor analysis (CFA), but were not allowed to cross-load on other factors. Second, the structural equation model (SEM) is subsequently employed for assessing the relevance between exogenous variables and endogenous variables.

4.1 Reliability and validity

We perform CFA on a four-factor model as a measurement model consisting of overall service quality, service value, satisfaction, and loyalty (Byrne, 1998; Jöreskog and Sörbom, 1993). A total of 16 measured items for measurement model are fitted to the data by using
Table 2. Completely standardized factor loadings and construct reliability estimates.

<table>
<thead>
<tr>
<th>Item</th>
<th>Overall Service Quality</th>
<th>Service Value</th>
<th>Satisfaction</th>
<th>Behavioral Intentions</th>
<th>Loyalty</th>
<th>t-Value</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Service Quality</td>
<td>0.852</td>
<td>0.948</td>
<td>0.903</td>
<td>-</td>
<td>33.06</td>
<td>30.70</td>
<td>0.929</td>
</tr>
<tr>
<td>Service Value</td>
<td>0.820</td>
<td>-</td>
<td>-</td>
<td>0.856</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.909</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral Intentions</td>
<td>0.836</td>
<td>0.851</td>
<td>0.847</td>
<td>0.867</td>
<td>26.82</td>
<td>26.59</td>
<td>0.941</td>
</tr>
<tr>
<td>Loyalty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAY1</td>
<td>0.886</td>
<td>0.768</td>
<td>0.778</td>
<td>0.817</td>
<td>22.82</td>
<td>24.51</td>
<td>0.886</td>
</tr>
</tbody>
</table>

LISREL 8.54, a software package for analyzing structural equation models. By inspecting the LISREL-produced output, a combination of diagnostic measures, including residuals, standardized residuals, and modification indices (MIs) are used to assess the overall model fit of a CFA model. Overall goodness of fit for this measurement model, reported in Table 2, is reasonable. First, loading score estimates for all measured variables corresponding to its construct fall below the .50 cutoff, which will become a prime candidate for deletion. Next, observing these measured variables, with a standardized residual greater than |2.5| correlated with other measured variables, provides further evidence that it might need to be dropped. Finally, to address the issue of unidimensionality, that no measured variable is determined by more than one construct, each item associated with higher MIs ( > 4.0) will be deleted from the original model, meaning that some cross-loadings are hypothesized to be zero, when a unidimensional construct exists (Byrne, 1998; Hair, et al., 2006).

Before testing the relationships in the structural model, the measurement model must have a satisfactory level of reliability and validity. In general, confirmatory factor analysis is used to assess the psychometric properties of the multi-items scales employed to test the hypothesis, and recommends that the reliabilities of measures for the model focus on its construct’s reliability (composite reliability). To carefully scrutinize the internal structure of the hypothesized model, the construct reliability is assessed using confirmatory factor analysis, as presented in Table 2 (Bagozzi and Yi, 1988; Fornell and Larcker, 1981). The qualities of the measurement efforts are unidimensionality, convergent validity, and reliability. Evidence for the unidimensionality of each construct includes appropriate items that load at least .763 on their underlying construct in a CFA model. Thus, the overall goodness-of-fit supports unidimensionality (Steenkamp and van Trijp, 1991). Convergent validity is assessed by all loadings ( > .50) on a factor as well as all loadings being significant (p < .01), meaning that each construct converges on some common point by the purified measurement model (Byrne,
Table 3. Constructs correlations and average variance extracted.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>OSQ</th>
<th>SV</th>
<th>SAT</th>
<th>BI</th>
<th>LAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall service quality (OSQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.902a</td>
</tr>
<tr>
<td>Serve value (SV)</td>
<td></td>
<td></td>
<td>.621b</td>
<td></td>
<td>.865</td>
</tr>
<tr>
<td>Satisfaction (SAT)</td>
<td></td>
<td>.651</td>
<td>.677</td>
<td>.837</td>
<td></td>
</tr>
<tr>
<td>Behavioral intentions</td>
<td></td>
<td>.650</td>
<td>.552</td>
<td>.657</td>
<td>.860</td>
</tr>
<tr>
<td>Loyalty (LAY)</td>
<td>.671</td>
<td>.651</td>
<td>.653</td>
<td>.674</td>
<td>.814</td>
</tr>
</tbody>
</table>

*a* Diagonal: (Average extracted variance from the observed variables by the latent variables)\(^{1/2} = (\frac{\sum \lambda_i^2}{n})^{1/2}.

*b* Off-diagonal: correlation between latent variables.

In addition, the composite reliability for a construct is computed from the squared sum of completely standardized factor loadings and the sum of the completely standardized error variance terms. Results reveal that all values for both reliabilities’ estimates are computed ranging from .850 to .929, exceeding the rule of thumb that .70 or higher suggested good reliability (Bagozzi and Yi, 1988; Fornell and Larcker, 1981).

Further analysis in assessing validation of a measurement model, a stronger test for discriminant validity, provided by Fornell and Larcker (1981), is tested by comparing the average variance extracted (AVE) by the underlying construct and the squared interconstruct correlations. As shown in Table 3, all AVE estimates for each construct, ranging from .663 to .814, are higher than .50 (the root square of AVE for each construct displayed on a diagonal of a correlation matrix), and the AVE value by each construct is found to be higher than the correlations between latent constructs in the corresponding rows and columns (displayed on a off-diagonal). Results indicate that each construct shares more variance with its items than do other constructs. Therefore, this test does not suggest a problem with discriminant validity. Taken together, evidence from the summary of Table 2 and Table 3 supports the convergent and discriminant reliability of the measurement model. Overall, the assessment of validity and reliability reveals that the model works relatively well; thus, all items are retained at this point, and adequate evidence of convergent validity is provided.

4.2 Measurement model result

In reviewing the goodness-of-fit statistics, chi-square value to the overall model test is significantly sensitive to its sample size (greater than 200), and is associated with the null hypothesis \(H_0\) not holding, which suggests that the hypothesized model is not entirely adequate. More common indices to assess measurement models are based on the recommendations of Byrne (1998) and Jöreskog and Sörbom (1993), which propose using chi-square / degrees of freedom ratio \((\chi^2 / df)\) (Marsh and Hovecar, 1985), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR) (MacCallum et al., 1996), Non-normed Fit Index (NNFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), and Adjusted Goodness-of-Fit Index (AGFI) (Jöreskog and Sörbom, 1993), rather than a chi-square test to assess the measurement model. Following up the model-fitting process, the first step should evaluate whether the originally hypothesized model has an acceptable goodness-of-fit. Thus, compared with the suggested values \(2 < \chi^2 / df < 5; \) RMSEA < .08; NFI > .9; NNFI > 0; CFI > .9;
SRMR < .05; GFI > .9; AGFI > .8], all model-fitting indices [$χ^2 (126) = 545.38, p < .001,$ RMSEA = .073; SRMR = .035; NFI = .98; NNFI = .98; CFI = .99; GFI = .91; AGFI = .88] are superior to the original model. This result does not indicate that the observed covariance matrix matches the estimated covariance within the sampling variance. However, given the problems associated with using this test alone, the other index values are supportive (Jöreskog and Sörbom, 1993; Byrne, 1998).

4.3 Assessment of structural equation modeling

Linear Structural Relations Modeling (LISREL) performs structural equation modeling (SEM) allowing for specification and simultaneously tests a series of interrelated dependence relationships in a theoretical model. The advantage of SEM techniques are that they are both more rigorous and more flexible than multiple regression analysis, and also provide overall model analysis, both for measurement and prediction (Hair et al., 2006).

The structural model presented in Figure 2, is estimated using LISREL program. All path coefficients between constructs and all observed variables loading to underlying construct are completely standardized solution. In reviewing of the goodness-of-fit of the structural model, indices are equivalent to the correlated measurement model analyzed in the previous section. The results indicate that the structural mode fits to the data [$χ^2 (126) = 555.10, p < .001;$ RMSEA = .074; NFI = .98; NNFI = .98; CFI = .98; SRMR = .035; GFI = .91; AGFI = .88]. Though the overall model $χ^2$ its $p$-value associated with this result is significant, this result does not indicate that the observed covariance matrix matched the estimated covariance within the sampling variance. However, it is supported by the other index values (Jöreskog and Sörbom, 1993; Byrne, 1998).

An examination of the standardized parameter estimates from the structural mode analysis reveal is shown in Figure 2. As expected, the influence of overall service quality on service value ($γ_{11} = .62, t = 14.42$), satisfaction ($γ_{21} = .18, t = 5.05$) and behavioral intentions ($γ_{31} = .37, t = 8.23$) is statistically significant, supporting Hypotheses 1, 2 and 3. These results show that the higher a subject’s perception for overall service quality, the more a subject’s perception for service value, satisfaction and behavioral intentions. On the other hand, two hypotheses are supported that the effect of service value on satisfaction ($β_{21} = .76, t = 16.73$) is stronger at a significant level than on behavioral intentions ($β_{31} = .19, t = 2.09$), thereby supporting Hypothesis 4 and 5. Contrary to expectations, the influence of service value on loyalty ($β_{41} = -.12, t = 1.68$) is not directly significant, but via either satisfaction ($β_{42} = .14, t = 2.19$) or

Figure 2. The results of structural model.
behavioral intentions ($\beta_{43} = .96, t = 19.81$), thus is not in support of Hypothesis 6. This result is not consistent with prior studies that value was a key driver of customer loyalty (Williams, 1999; Sirohi et al., 1998; Yang and Peterson, 2004), but relatively similar to the work of Lam et al. (2004) that highlighted the mediating role of satisfaction in the impact of value on consumer loyalty. One possible explanation for this finding is that the mediating role of service value in the overall service quality-loyalty neglect the consumer’s perception of sacrifice procedures (e.g., time, money expense and psychological effort). Such as the work of Lam et al. (2004) and Yang and Peterson (2004) in evaluating the schema of value-satisfaction-loyalty, the consideration of switching cost incorporated into their research model to highlight the importance of schema. In response to our finding, consumer may not perceive the importance of service value contributing positively to the consumer loyalty possibly because the market share of Chunghwa telecomm related to other competitors in the area of broadband network services is relatively unequal, without substantial comparison of switching cost to competitors. In this study, most respondents who may adopt Chunghwa telecomm for conveniently managing communication system, from voice to data transmission combining to the same cable, thus respondent’s perception may lack for substantial comparison of evaluating service value, resulting in nonsignificant effect on loyalty.

5. Discussion and managerial implications

Our findings provide insights into the structure interrelationships between overall service quality, service value, satisfaction, behavioral intentions and loyalty. In contrast to previous empirical research, in which service quality, service value, and satisfaction are analyzed as antecedents of behavioral intentions in various service industries (Cronin et al., 2000; Brady et al., 2001), this study reconfirms their combined impact on loyalty in a single model, by conceptualizing, measuring, and managing consumer’s attitude toward using broadband Internet services. Our study’s primary focus is examining the roles of overall service quality, service value, satisfaction and behavioral intentions performed on behavioral intentions and loyalty for a purified model, rather than to model explicitly other customer-related constructs (e.g., brands, switching cost, purchase). Namely, examination of the specific facets of the five-facet model is more appropriate for managers’ decisions, and also the choice of a representative sample for generalizability, which is focused on existing users of Chunghwa Telecom; however, this population and the resulting sample share behavioral and demographic characteristics with the primary target market for broadband services in general.

As expected, the empirical evidence reveals that overall service quality has a direct significant impact both on service value and satisfaction ($H1$ and $H2$ hold), consistent with previous research (Lam et al., 2004; Brady et al., 2001; Cronin et al., 2000; Bolton and Drew, 1991). In other words, a consumer’s evaluations of overall service quality appears to contribute more to the service value and satisfaction than its association with sacrifice, such as perceived price, time and effort. While perceived sacrifice is not involved in the model, this inference form this finding is tenable. We argue that the important role played by the overall service quality in creating service value of consumer perceptions takes place largely through the increase in service components on perceived value, and remainder is obtained by reducing the impact on perceived sacrifice. In addition, this effect not only directly contributes to the satisfaction of consumer perceptions, but also indirectly influences their satisfaction via service value ($H5$ holds). From a comparison of path coefficients between service value and overall quality service influenced on satisfaction, the relationship between service value and satisfaction is much stronger than overall service quality. It appears that a higher service value, through increasing overall service quality, will contribute to a higher evaluation of customer’s satisfaction. Therefore, in assessing satisfaction with broadband access, consumers are likely
to consider both service features (e.g., employee’s abilities, attitude and passion) and product features (e.g., speed access to Internet, transmission quality and stability).

Of particular relevance is the mediating role of satisfaction on the impact of overall service quality and service value on behavioral intentions and loyalty. Prior studies have highlighted the linkage between satisfaction and behavioral intentions, but did not extend to loyalty with both direct and indirect influences (Brady and Cronin, 2001; Brady et al., 2001; Cronin et al., 2000). A structural analysis from empirical testing indicates that a consumer’s behavioral intentions and loyalty behave differently with regard to their linkage with their antecedents. This confirmed that the driving power of a consumer’s behavioral intentions to remain with an incumbent operator was directly influenced by three important constructs: overall service quality, service value and satisfaction (H3, H4 and H7 hold), in agreement with prior research (Cronin et al., 2000; Brady and Cronin, 2001; Brady et al., 2001). These results offer some noteworthy insights, including that the better Chunghwa’s overall service quality scores, the higher are consumer’s behavioral intentions likely to be, both directly and indirectly via service value and satisfaction. From a managerial standpoint, this emphasizes the importance of service quality as an operational tactic and strategic objective, even if Chunghwa Telecomm is the dominator of telecommunications in Taiwan. Satisfied consumers appear to be willing to adopt the ADSL services of Chunghwa Telecomm, and also to recommend this provider to other customers.

Though Neal (1999) argued that the most satisfied customer may not necessarily to be the most loyal, value is a key driver to consumer loyalty by measuring a consumer’s relative value structure for a product or service category. Conversely, our consequence model confirms that satisfaction drives consumer intentions to stay with an incumbent service provider, consistent with prior studies (Szymanski and Henard, 2001; Burnham et al., 2003). Thereby, the influence of loyalty is primarily derived from satisfaction and behavioral intentions, rather than service value. In other words, the direct influence of a consumer’s loyalty is satisfaction that the level of broadband service performance, quality, or other outcomes is perceived by existing users with an evaluative standard. Typically, the assumption of evaluative standard is most likely to affect a consumer’s repurchase expectation. When compared to the level of broadband service performance, consumers are believed to produce a satisfaction judgment, which then leads to loyalty. Contrary to expectations, the influence of service value on loyalty is not directly significant but acts via behavioral intentions, possibly because residential consumers’ overall assessment of the “service value” to broadband services is insufficient to measure as the difference between the benefits and costs, which consumers associate with the acquisition of a service (Cronin et al., 1997). That is, a two-item direct measure of service value places greater emphasis on the consumer’s overall assessment of the facility’s service. The simplistically conceptualized description in the current hypothesized research does not provide an adequate operationalized measurement. Namely, the overall factors of a consumer’s intentions to adopt broadband access are comprehensive and complex. On the other hand, service value, a consumer’s overall assessment of ADSL services based on perceptions of what is received and what is given, is not a fully cognitive tradeoff between perceptions of value and sacrifice (e.g., price, time, effort). Consumers may gain more substantial benefits from an operator by simply adding a wide variety of service settings in such a way that may effectively contribute to consumer’s satisfaction and their behavioral intentions, but may not lead to their loyalty. Though these benefits are more representative of consumers’ overall assessment of “value”, and lessen their sacrifice, consumers consider both benefits and costs of their required service in their decision-making. However, consumers’ perception of adopting ADSL services could indeed improve their performance or make its operation effortless. From the theoretical and
practical communication technology, the provision of broader bandwidth, which could effectively eliminate traffic and drop rates for the Internet’s users, could be inferred to be a salient attribute of satisfaction. Thereby, ADSL services with higher speed transmission were indeed a comprehensive determinant of consumer loyalty, in lieu of cost factors.

The result on the satisfaction links suggests that, to enhance consumer satisfaction, an incumbent operator should spend its effort on improving the overall quality and value perceived by consumers. Our research model allows an operator to identify its strengths and weaknesses on the overall services, relative to its competitors. The overall service components associated with potential sacrifice that appears in the consumers’ overall evaluation tell the incumbent operator where their strengths and weaknesses lie. By enhancing an existing product’s attributes with a high importance rating, the operator can handle those critical weaknesses that significantly impede its effort to increase consumer value perceptions. By diminishing those weaknesses, the incumbent operator can improve consumer value and hence consumer satisfaction. Although service value has a larger effect on satisfaction than does overall service quality, the operator should also pay attention to other factors that may affect consumer satisfaction, for example, switching costs (Burnham et al., 2003) or assessment of prices (Gerpott et al., 2001).

However, an important bandwidth factor elicited from this study as appears as a key characteristic influencing consumer satisfaction; namely, Web-based activities that rely on high-speed Internet access links between a telecom carrier office and the customer’s premises, such as web surfing, e-mail, online banking, online trading, music on demand, and distance learning. As these Web-based activities are further enriched with video, audio, and graphic service on existing consumer’s access to Internet, increasing broadband without extra charge to enhance these functions will facilitate consumers’ perceptions of satisfaction and will, in turn, encourage them to remain with the network. To meet customer demand, Chunghwa Telecomm will begin a new plan for gigabit fiber optic transmission systems that offer a relatively high-speed medium to support broadband Internet services, and also will gradually renew the existing copper lines for high-speed transmission and higher quality in the future.

6. Limitations

Our study has some limitations that offer opportunities for future researches. First, our data are from a telecommunications domain that does not embody many general characteristics of service industries. In addition, our research focuses on the ADSL services of Chunghwa Telecomm that help keep unexplained variables small in our model estimation and hence increases the power of hypothesis testing. But such a narrow focus may limit the generalizability of our results. Future research may replicate our study in other industries and firms.

In addition, the LISREL methodology interprets cross-sectional inter-relationships of constructs but it may not make causal inferences of the data. Regarding aspects of evaluating service value of consumer perceptions, these may vary with the product/service life cycle and therefore consumers’ usage pattern of ADSL services may be different in the telecomm industry. In other words, with high-tech with high-speed Internet access, reduction in traffic jams and increases in stability of the network should enhance consumer’s expectation value, eventually leading to stronger relationships between satisfaction, and loyalty. Finally, the sample measurement in this research does not take into account the subscribers of New Century InformComm (NCIC), Taiwan Fixed Network (TFN), and Asia Pacific Telecomm Group (APTG), because all of these new competitors have relatively lower market shares compared to the dominant operator Chunghwa Telecomm. The investigation of the fixed-network satisfaction reported in NCC major statistics (2008) also precluded new competitors,
primarily because total subscribers of these operators were insufficient for the minimum requirement of sample size (1,068 respondents).

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**References**


Appendix

Measurement Item Description

**DIRECTIONS**: The following set of statements relate to your feelings about using the service of the broadband access to the Internet provided by incumbent operators. For each statement, please circle any of the scales how strong your feelings are.

**Overall Service Quality** (adapted from Fronell et al., 1996; Cronin et al., 1997; Brady and Cronin, 2001)

- **OSQ1** Superior
- **OSQ2** High standards
- **OSQ3** Excellent

**Service Value** (adapted from Cronin et al., 1997; Cronin et al., 2000)

- **SV1** Overall, the service value provided by ADSL's contents to me is high.
- **SV2** Compared to what I had to give up, the overall ability of ADSL to satisfy my wants and needs is

**Satisfaction** (adapted from Fornell et al., 1996; Olsen, 2002; Lam et al., 2004)

- **SAT1** Overall, the speed access to the Internet via ADSL comes up to my needs.
- **SAT2** Overall, ADSL's bandwidth on which I applied is consistent with the actual bandwidth.
- **SAT3** Overall, the transmission quality of ADSL access to the Internet is stable.
- **SAT4** Overall, I have said positive thing about ADSL's services.
- **SAT5** Overall, the use of ADSL is worthy.
- **SAT6** Overall, the functions provided by ADSL come up to my expectations.
- **SAT7** I think that the ADSL's service is professional.

**Behavioral intentions** (adapted from Cronin et al., 2000; Ganesh et al., 2000; Johnson et al., 2006)

- **BI1** I will recommend this operator's ADSL services to others.
- **BI2** I will continue to use operator’s ADSL services in the next few years.

**Loyalty** (adapted from Fronell et al., 1996; Ganesh et al., 2000; Johnson et al., 2006)

- **LAY1** If possible again, I will choose this operator's ADSL services.
- **LAY2** Even charge a little higher, I will continue to use this operator's ADSL services.
- **LAY3** I will quite notice this operator's services or products.
- **LAY4** I consider this operator as the first choice for ADSL's services