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ABSTRACT

Existing studies on broadband adoption have investigated how behavioural and demographic factors affect consumers' decision to adopt broadband. However, although the broadband market has been considerably matured, follow up studies on the continued adoption of broadband are yet to be conducted. For example issues of service quality and consumers satisfaction of broadband services have not been studied enough. In line with that, the aim of this empirical research was to investigate the influence of service quality and secondary influence on behavioral intention to change service provider by existing broadband household consumers in the UK. The paper examines users experience on broadband use and thus answers the following research question: *Do service quality and secondary influence affect the behavioural intentions when changing current service provider?* The study was conducted using a postal survey in the United Kingdom. A self-administered questionnaire was sent to 1600 households and a total of 358 completed replies were obtained. The study provides evidence that both service quality and secondary influence constructs were significantly correlated to the behavioural intentions when changing current service provider. The paper also discusses limitations and implications of this research.

Keywords

Broadband Internet, Service quality, secondary influence, behavioural intention to change service provider, residential consumers, continued subscription.

INTRODUCTION

Despite the provision of broadband access at affordable prices, the demand for broadband has not increased in many countries around the globe as expected. Researchers are suggesting that the provision of broadband is more 'demand constrained' than 'supply constrained' (Haring et al., 2002). This means that in order to enhance the homogenous adoption and use of broadband and to reduce the digital divide, it is appropriate to focus on understanding the factors influencing the decisions of household consumers (Crabtree, 2003; Oh et al., 2003). A critical review of literature suggested that although a number of studies have been conducted to examine macro factors such as competition amongst ISPs (Choudrie and Lee, 2004) and the behavior of first time adopters (Choudrie and Dwivedi, 2005a; 2006ab, Oh et al., 2003), no efforts made yet to understand continued subscription behavior of existing broadband consumers. There is intense competition amongst Internet Service Providers (ISPs) to capture broadband market and retain their consumer base (Choudrie and Lee, 2004). Therefore, understanding the consumer perception of service quality and behavioral intention to change service provider is a critical issue that will provide valuable information for ISPs to understand and retain their existing consumer base. The discussion presented above has provided the motivations for conducting research on the continued adoption of broadband in the UK

households. Therefore, the aim of this empirical research was to investigate the influence of service quality and secondary influence on behavioral intention to change Internet Service Provider (ISPs) by the UK household consumers. The findings of this research will help to answer the research question: *Do service quality and secondary influence affect the behavioral intentions when changing current service provider?*

Having introduced the topic of interest this paper now proceeds to provide a brief discussion on the theoretical basis for examining the impact of broadband in section 2. Section 3 provides a brief discussion of the utilized research methods. The findings are presented in Section 4. A discussion including the contributions to the research is provided in section 5. Finally, a conclusion of this research including the limitations is provided in section 6.

THEORETICAL BASIS AND RESEARCH HYPOTHESIS

Service Quality

Marketing research developed the construct service quality 'SERVQUAL' in order to measure a consumer's perception of service quality (Parasuraman et al., 1991). However, only a limited number of studies have recently included to measure the successful adoption of technology. DeLone and McLean (2003) extended a decade old IS success model (DeLone and McLean, 1992) by integrating a new construct called service quality. Service quality was included to evaluate the fact that an IS department also plays a role in facilitating end-user computing via the services it offers to business personnel wishing to develop their own systems (Rosemann and Vessey, 2005). McCalla and Ezingeard (2005) have progressed to develop a data collection protocol that measures the relationship between technology use, emotional expression and service quality perception. Yang et al. (2005) developed and validated an instrument that measured a user's perceived service quality of information presented on web portals. Parasuraman et al. (2005) have recently developed a multiple-item scale for assessing electronic service quality. In the case of IP telephony which is a technology heavily based on fast broadband networks the issue of service quality has been a recurring theme of investigation (Cawley, 1997; Foo & Cheung Hiu, 1998; Mason, 1998; McKnight & Leida, 1998). The main research question of these studies was to investigate end-users potential reactions to the low network service quality and low price trade-off. Therefore, it can be deduced from the aforementioned studies that there is a growing need and importance of the service quality construct within IS research.

Broadband consumers sign an annual contract for subscribing broadband and during this period if the provided service is not satisfactory, then they can/will discontinue the broadband subscription. Alternatively, if consumers have a choice of providers then they might transfer to the competitors. Therefore, it was considered appropriate to understand whether consumers are satisfied with their current broadband providers and provided services employing service quality construct. Hence, the underlying hypothesis is:

H1**:** *Service quality will have a negative influence on the behavioural intention when changing from a current service provider.*

Secondary Influences

Previous studies suggest that messages disseminated using mass media, such as the television (TV) and newspaper advertisements (secondary sources of information) are likely to influence an adopter's intentions (Rogers, 1995; Venkatesh and Brown, 2001). For the purposes of this research, it is expected that secondary sources of information will affect those consumers who have already adopted broadband but are not satisfied with service quality; hence, if advertisements viewed on TV or read in a newspaper promoting broadband packages that are economically better or acceptable and offer a better quality service, then they are more likely to cause adopters to contract with the new provider. Therefore, the hypothesis is:

H2**:** *Secondary influences will have positive influence on behavioral intention to change current service providers.*

RESEARCH METHODOLOGY

Since the research object in this study is the household consumer, it can be argued that the survey approach is the most suitable research approach for this study (Choudrie and Dwivedi, 2005b). This is due to issues such as convenience, cost, time and accessibility (Gilbert, 2001). The extent to which a researcher can be a part of the context being studied is an important factor in determining the research approach. Within the household context, it is difficult for a researcher to be a part of the context; therefore the survey approach was more feasible than others such as case study, ethnography and observations. The type of data required examining influence of independent variables such as service quality and secondary influence upon behavioural intention of broadband consumers to change service providers also influenced selection of the approach. This research requires collecting quantitative data and statistical analysis in order to test research hypotheses.

Although there are a number of research approaches available within the category of quantitative positivist research (Straub et al., 2005), a survey is the most appropriate research approach that can be employed to conduct such research (i.e. that requires hypotheses testing) in a social setting, in this instance the household. Nationwide data was randomly collected from the citizens of the UK. The UK-Info Disk V11 that contained 31 Million Electoral Register records, i.e. addresses of UK citizens was considered to be sample frame of this research. This is because it possesses the characteristics of a good sample frame such as comprehensiveness, accuracy, adequacy, and up-to-date and non-duplicated information (Fowler, 2002).

Survey Instrument

In order to collect random data for the target population, a self-administered questionnaire was considered to be the most appropriate primary instrument in this investigation for the following reasons. Self-administered questionnaires addresses the issue of reliability of information by reducing and eliminating differences in a way that the questions were asked; relatively low costs of administration; can be accomplished with minimal facilities; questionnaires provide access to widely dispersed samples; respondents have time to give thoughtful answers; helps in asking questions with long or complex response categories; asking similar repeated questions; and also the respondents do not have to share answers with interviewers (Fowler, 2002).

Survey measures for the service quality, secondary influence and behavioural intention to change service provider constructs was developed in number of stages comprising exploratory survey, content validity, pre-test, pilot test and confirmatory survey. The development of measures of aforementioned constructs was a part of larger study on broadband adoption, usage and impact and the full methodological details and findings are reported in Dwivedi et al. (2006). In an exploratory survey, a number of respondents with narrowband connection commented that they were not satisfied with the quality of service, which included speed, security, and customer or technical support whenever required. If these issues were not dealt with, consumers stated that they would switch to a broadband connection. However, many of the respondents with narrowband connections also commented that they were satisfied with the quality of service that they are receiving from their current service providers, hence, they would not switch to a broadband connection (Choudrie and Dwivedi, 2006b). Some of the respondents with broadband connection provided similar comments and declared that they were also not receiving the quality of speed and support that was affirmed before subscribing to the service, therefore, they had considered transferring to other Internet Service Provider (ISPs). Considering aforementioned comments from the survey respondents, it was felt appropriate to include a new construct for the purpose for measuring the perception towards the service of quality being received from the current ISPs (Choudrie and Dwivedi, 2006b). Survey measures of other constructs were adopted, modified from previous studies and then validated employing number of stages comprising exploratory survey, content validity, pre-test, pilot test and confirmatory survey (Dwivedi et al., 2006). Table 1 lists the measures of constructs (i.e. service quality (SQ), secondary influence (SI) and behavioral intention to change service provider (BISP) included in this study. The items of constructs (Table 1) were measured on 1-7 point scale where: 1=Extremely disagree; 2= Quite disagree; 3= Slightly disagree; 4= Neutral; 5= Slightly agree; 6= Quite agree; 7= Extremely agree. The experts who validated the content of questionnaire suggested that for the final questionnaire the 7-point scale would be more suitable in comparison to the 5-point scale. This is because the 7-point scale values are widely spread in comparison to 5-point scale and respondents would have more choices to select. This prevents a respondents' bias by just selecting a neutral value. Therefore, 7-point is considered to be the more suitable Likert scale for this study.

1. SERVICE QUALITY
SQ1: I am satisfied with the speed of Internet access obtained from my current service providers
SQ2: I am satisfied with the security measures provided with Internet access obtained from my current service providers
SQ3: I obtained satisfactory customer/technical support from my current service providers
SQ4: The overall service quality of my current Internet connection is satisfactory
2. SECONDARY INFLUENCE
SI1: TV and radio advertising encourages me to try broadband
SI2: Newspaper advertising encourages me to try broadband
3. BEHAVIORAL INTENTION TO CHANGE SURVICE PROVIDER (BISP)
BISP: I intend to continue my current subscription but will change the current service provider

Table 1. List of Constructs and Items to Examine Continued Subscription of Broadband

Sample Size and Questionnaire Administration

It has been suggested that in order to perform statistical analysis such as a rigorous factor analysis, the sample size should be above 300 (Stevens, 1996). Therefore, keeping the statistical analysis plan in mind (Fowler, 2002) it was decided that the total sample size should be large enough to obtain a minimum of 300 responses. Therefore the total sample size was determined by using a pilot response rate as a basis of the final survey. **Total sample size**= [Total responses required*100] / Pilot response rate, which is = 300*100/20= **1500.** As illustrated above an overall sample size of 1500 was required in order to obtain 300 responses. To compensate for any shortfalls in the 300 responses that may occur due to the undelivered and partially completed responses, the sample size was increased further from 1500 to 1600. Employing the postal service a covering letter and a self-addressed prepaid return envelope were administered in the period between January and March 2005 to a total of 1600 household consumers in the UK. The collated data was analysed using SPSS version 11.5. This allowed the calculation of the response frequencies, percentages, chi-square, *t*-test and regression values to analyse the variables determined by this research.

Response Rate and Non-response Bias Test

Of the overall 1600 sent questionnaires, 358 usable replies were received within the specified periods. This implies that a response rate of 22.37% was obtained. Of the 358 respondents, 207 (57.8%) represented the adopters of broadband and 151 (42.2%) the non-adopters. Of the 151 non-adopters category, 101 (28.2%) possessed a narrowband connection and 50 (14%) stated that they do not to have any means of Internet access at home. Hereafter, term non-adopter means narrowband consumers and respondents with no means of Internet access at home excluded from data analysis.

To test the nonresponse bias, 200 questionnaires were sent to randomly selected non-respondents from the original sample in mid-March 2005. Of this, 40 questionnaire replies were received that included 38 usable and two partially completed questionnaires. To determine if the characteristics of the respondents from the original responses were similar to the non-respondents, a chi-square test (χ^2) was conducted, which suggested that the non-respondents who returned the completed questionnaire after reminders were similar to the respondents from the original responses. Hence this proved that it is least likely that the sample is affected by a non-response bias (Table 2).

Variable	$\chi 2$ Value	df	*p*
Age X Response Type	6.904	5	.228
Gender X Response Type	0.312	1	.577
Narrowband & Broadband Consumers X Response Type	2.583	1	.076

Table 2. Test of Significance (χ^2 Tests) for Non-response Bias

FINDINGS

Reliability and Construct Validity of Service Quality and Secondary Influence Constructs

Table 3 illustrates the Cronbach's coefficient alpha values that were estimated to examine the internal consistency of the measure. The findings suggest that secondary influence construct possess excellent reliability (α= .90) and the service quality construct illustrate high reliability (α= .79). The high Cronbach's α values for both constructs imply that they are internally consistent. That means all items of each constructs are measuring the same content universe (i.e. construct).

In order to verify the construct validity (convergent and discriminant validity), a factor analysis was conducted utilizing Principal Component Analysis (PCA) with Varimax rotation method (Table 3). The factor analysis results that illustrated in Table 3 satisfied the criteria of construct validity including both the discriminant validity (loading of at least 0.40, no cross-loading of items above 0.40) and convergent validity (eigenvalues of 1, loading of at least 0.40, items that load on posited constructs) (Straub et al 2004). This confirms the existence of the construct validity (both discriminant validity and convergent validity) in the instrument measures of this research that were utilised for data collection (Table 3). This means that the collected data and findings that were obtained from this instrument are reliable.

	Component	
	1 (SQ)	2 (SI)
SQ4	0.881	
SQ3	0.826	
SQ1	0.774	
SQ2	0.669	
SI1		0.951
SI2		0.947
Eigenvalues	2.58	1.76
Cronbach's Alpha (α)	0.79	0.90

Table 3. Rotated Component Matrix and Reliability test

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Perception of Service Quality and Secondary Influence by Broadband and Narrowband Consumers

Table 4 presents the descriptive statistics and the results of the *t*-test, which tested the differences between the narrowband (non-adopters) and broadband (adopters) consumers on both service quality and secondary influence constructs and their items. The findings indicate that for the service quality scale and for all its 4 items, the narrowband and broadband consumers differ significantly on the mean score. Even though overall both groups (i.e. narrowband and broadband consumers) view the service quality of Internet access negatively, the mean scores indicate that broadband consumers have significantly more positive perceptions on all the 4 items and scale of service quality than narrowband consumers. Although, narrowband consumers rated the secondary influence construct and for its both items slightly above than broadband ones (*M*ean Difference= -0.17) on a 7-point likert scale (Table 4), the *t*-test results indicate that the mean score difference between the two were not significant.

	Narrowband (No) and Broadband (Yes) Consumers	Mean	Mean Difference	Std. Deviation	t	df	Sig.
***Service Quality Scale (SQ)**	No	4.03	0.95	1.34	-6.18	306	.000
	Yes	4.98		1.22			
ITEM-SQ1	No	3.55	1.76	1.75	-8.72	306	.000
	Yes	5.32		1.62			
ITEM-SQ2	No	4.10	0.43	1.76	-1.95	306	.052
	Yes	4.53		1.83			
ITEM-SQ3	No	4.10	0.56	1.67	-2.92	306	.004
	Yes	4.66		1.52			
ITEM-SQ4	No	4.37	1.04	1.66	-5.92	306	.000
	Yes	5.41		1.34			
****Secondary Influence Scale (SI)**	No	3.75	-0.17	1.73	0.92	306	.359
	Yes	3.57		1.73			
ITEM-SI1	No	3.92	-0.21	1.81	1.07	306	.287
	Yes	3.71		1.86			
ITEM-SI2	No	3.57	-0.13	1.80	0.68	306	.497
	Yes	3.44		1.76			

**Legend: ***Scale formed by taking average of SQ1, SQ2, SQ3 and SQ4; ** Scale formed by taking average of SI1 and SI2

Table 4. Descriptive Statistics Obtained for Adopters (Yes) and Non-adopters (No) of Broadband

Measuring Influence of Service Quality and Secondary Influence on Behavioral Intention to Change Service Provider

A regression analysis was conducted with behavioural intention to change service provider (BISP) as the dependent variable and secondary influence and service quality as predictor variables. A total of 308 cases were analysed. From the analysis, a significant model emerged (F (2, 308) = 13.239, p < .001) (Table 6). The adjusted R square was 0.074 (Table 5). Both the variables were found to be significant (Table 7). These include secondary influence (SI) (β= .153, p = .006) and service quality (SQ) (β = -.255, p < .001). Service quality is negatively correlated with the behavioural intention to change service provider, which means that the lower the quality of the service provided, the higher the chance that consumers will change service providers. However, it is important to indicate that since the adjusted R square is very low (Table 5), service quality and secondary influence is almost unable to explain the variation of BISP.

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.283[(a)]	.080	.074	1.811
[a.] Predictors: (Constant), SI, SQ				

Table 5. Regression Analysis IV: Model Summary

Model		Sum of Squares	df	Mean Square	*F*	*p*
1	Regression	86.841	2	43.420	13.239	.000(a)
	Residual	1000.289	305	3.280		
[a.] Predictors: (Constant), SI, SQ [b.] Dependent Variable: BISP						

Table 6. Regression Analysis IV: ANOVA (b)

Model	Predictors	Un standardized Coefficients		Standardized Coefficients	*t*	*p*
		B	Std. Error	β		
1	(Constant)	4.495	.415		10.843	.000
	SQ	-.359	.078	-.255	-4.619	.000
	SI	.166	.060	.153	2.774	.006
[a.] Dependent Variable: BISP						

Table 7. Regression Analysis IV: Coefficients (a)

DISCUSSION

It was discussed in the background and theoretical basis sections that only a limited number of studies have included the service quality construct to measure the successful adoption of technology. DeLone and McLean (2003) extended the IS success model (DeLone and McLean, 1992) by integrating a service quality construct. Broadband consumers sign an annual contract and during this period, if the provided service is not satisfactory, they can discontinue the broadband subscription. Alternatively, if consumers have a choice of providers then they might transfer to the competitors. Therefore, it was considered important to understand whether consumers are satisfied with their current providers and provided services by employing service quality construct. The findings of this study suggest that service quality has a significant negative influence on the behavioural intention to change the current service provider (Tables 5-7).

As discussed in the theoretical basis section, messages that are disseminated using mass media, such as TV and newspaper advertisements (secondary sources of information) are considered to be secondary influences, which are likely to influence consumer's intentions to adopt or reject the technology in question (Rogers, 1995; Venkatesh and Brown, 2001). In terms of this research, a secondary influence affects those who have already adopted broadband but are not satisfied with the service quality; hence, if the advertisements on TV or in newspapers, which advertise broadband packages that are economical and offer a better quality service, they are more likely to cause the adopters to contract with a new provider. The aforementioned

theoretical argument was supported by the findings obtained in this research. The results illustrate that secondary influences have a positive influence on the perceived behavioural intention to change current service providers (Tables 5-7).

Research Contributions and Managerial Implications

The research contribution is that this research introduced and validated constructs such as 'service quality', 'secondary influence' and 'perceived behavioral intention to change service provider' for investigating the continued adoption of broadband in the household. Since these constructs were not included in any of the previous studies on broadband, there is an offering that contributes towards theory development in the form of a theory extension in area of broadband deployment. These constructs can be utilized to measure the perception of household consumers towards the continued adoption of subscription-based emerging technology and new Internet based services.

This research offers following implications for ISPs. Findings presented in Table 4 suggest that the broadband consumers' perception of service quality in terms of speed and overall service quality is much higher than narrowband consumers. However, in terms of providing security measures and technical and service support the differences between the two groups are very narrow. This means that ISPs engaged in business of providing broadband need to improve their customer and technical support to their existing consumers. Otherwise, if consumers are not satisfied in terms of customer and technical support may switch to new broadband provider or even to narrowband connection. If a broadband provider aim to capture a larger part of market and want to retain their existing customer base then they have to focus on all three components of service quality measures examined in this study including: speed of Internet access; security measures; and customer and or technical support to consumers whenever needed. In terms of secondary influence, newspaper advertising found to be less influential than TV and Radio (Table 4). Therefore, it may be advised to ISPs to spend more on TV and Radio adverts than newspaper.

CONCLUSIONS

The aim of this empirical research was to investigate the influence of service quality and secondary influence on behavioral intentions to change service provider by the UK household consumers. The study concludes that although both service quality and secondary influence constructs had significant influence on behavioral intention when changing current service provider, overall variance explained was low. Paper also conclude that current security measures and customer/technical support provided by broadband providers to their existing consumers are less satisfactory and it need to be improved. The paper also discussed research contributions, implications and limitations of this research.

Limitations and Future Research Directions

The finding of this study is limited due to low variance explained by model. The reason could be problems with items that measured the construct. In this study employed items for measuring influence of service quality and secondary influence constructs are generic in nature. Future research should create and validate more specific items related with aforementioned two constructs, which may lead to improve the performance of the model. Similarly, adding one more item for measuring dependent construct 'behavioural intention to change service provide' may help to improve the explained variance. This study provides a snapshot of influence of service quality and secondary influence upon behavioral intention to change service provider by the UK household consumers. The findings may change as technology becomes established and consumers become more experienced in its use. However, as this research has a limited completion timeframe, it is not possible to conduct further data collection in order to observe the effect of time on the continued adoption behavior of broadband. The findings would also have been reinforced if the research had been a longitudinal one. Further justification for undertaking a longitudinal study is the reasoning that the elimination of any variables could achieve anomalies in the obtained results.

This study was focused upon utilizing a quantitative approach that may have limited the ability of this research when attempting to obtain an in-depth view of household technology adoption and usage. The questionnaire findings would have been strengthened if it had been possible to also supplement them using interviews. However, this supporting tool had to be abandoned due to the limitations of time and resources. There is also need to explore issues such as the effect of service quality of Internet access on the growth and development of the emerging electronic services and applications (e.g. VoIP, consumer-to-consumer electronic commerce and e-government services areas).

This research did not investigate service quality provided by a particular service provider. It will be more insightful to examine service quality provided by specific ISPs and than ask consumers why they are not satisfied and what they expect from their providers. This research was a part of a larger project focused upon broadband adoption therefore a limited attention was provided to this particular aspect. Therefore, future research should concentrate on this particular aspect of

continued adoption by including more items to measure service quality and BISP constructs and examining the relation between two.

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