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Factors Driving Business Consumer Adoption of Broadband in Pakistan: An Exploratory Study

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Abstract
This paper is an exploratory study to gain an initial understanding of the different factors that could possibly affect the broadband Internet adoption by businesses in Pakistan. Particular emphasis was placed to find criterion which have become significantly important in motivating the adoption of broadband Internet. To achieve its objectives, this study identified several factors and examined their possible upon broadband adoption by Pakistani businesses. Survey instrument was used to collect data on these variables. Research findings suggest that customer perception of the broadband is a significant choice criterion. Other important criterions include value of broadband; broadband brand loyalty, and future customer requirements.

Key words**:** Pakistan, broadband, adoption, consumer, survey.

1. Introduction

Since 1990, Information and communication technologies (ICT) have become a significant source of social and economic impact on national level. Around the globe, one of the major policy objectives of the governments is the development and adoption of ICT (Frieden, 2005; Hanna, 1994). Besides economic and social impact, ICT also increases productivity. This is made possible by reduction in transaction and coordination costs, a major obstacle hindering the economic development of many countries (Qiang *et al.*, 2003; Sein & Haridranath, 2004).

The current development of the broadband Internet access market varies greatly across different countries. Broadband Internet penetration rates and share of different broadband access technologies also varies around the globe. Broadband Internet continues to influence every aspect of life including businesses. Businesses as well as national economies are increasingly dependent on broadband Internet for their efficient and effective functioning. The rapid deployment of broadband Infrastructure around the globe is altering the nature of many businesses. It is also changing the nature of a variety of services and content delivered through conventional and non-conventional (such as Internet) channels [(Wolf & Zee, 2000). (Rao, 2001)]. Increasing broadband Internet access has provided many new business opportunities and providing a wide variety of applications from streaming media to tele-medicine (CNETNews, 2002). Due to its ability of global reach, Internet is changing the fundamental nature of global business by providing people opportunity to connect to other people and businesses with no time or geographical limitations [(Sprano&Zakak, 2000), (Albert &Flournoy, 2010)]. In essence, the country-readiness of broadband Internet affects its national competitive advantage.

In Pakistan, deployment and adoption of broadband Internet is still in its early stages. A report published by Pakistan Telecommunication Authority (PTA) highlighted the issue of slow broadband uptake in in Pakistan. Pakistan offers a rich demographic profile, good telecommunication infrastructure, and considerable enthusiasm amongst the general consumers to get high-speed Internet access. But the business sector is reluctant to get high-speed broadband access and the take-up rate has been slow. At the end of 2011 there were almost 1.5 million broadband subscribers in Pakistan with a penetration rate of about 0.88% (PTA, 2011). This situation provides an opportunity to investigate the factors that can encourage further diffusion and management of high speed broadband Internet.

2. Literature Review

There exists both macro [Sim, J. et al., 2012; Giovanis, A. N. 2011, Ooi, K.-B. et al. 2011; Nam, C et al., 2009;Choudrie and Lee, 2004; Garfield & Watson, 1997;Han, 2003;Hargittai, 1999] and micro level [Choudrie and

Dwivedi, 2006ab; OECD, 2001, OECD, 2008] studies on broadband Internet adoption and diffusion. Most studies have been conducted in the context of developed countries. There exist few studies in the context of developing countries [(Dwivedi et al. 2006a; Dwivedi et al. 2007]. One possible explanation for this lack of studies on developing countries could be the relatively lower tele-densities and broadband adoption rates. There exists room for further research to better understand the current state of broadband Internet deployment, uptake, and diffusion in developing world.

In the era of continued development of ICT and emerging network economy, developing countries, such as Pakistan, are faced with various challenges as well as opportunities (Sandeep Kapur, 2001). Inadequate broadband access may result in negative impact on Pakistan's productivity and is likely to result in higher operational costs for a number of businesses. This not only affects the performance of existing Pakistani based firms, but also hinders the attractiveness of Pakistan as a potential investment place. Broadband is immensely important to Pakistan because it can accelerate the economic growth through ICT, which has been identified as a key factor to improve productivity performance. Considering the relatively low levels of broadband adoptions in developing countries, including Pakistan, a research in this area may be helpful in understanding and accelerating the process of broadband Internet adoption by business consumers in Pakistan.

Level of economic development, socio-economic factors, telecommunication infrastructure, and cultural values, strategies targeting socio-cultural values, potential broadband Internet demand of traditionally neglected population groups (e.g. housewives), and high population density in urban area have been recognized as significant factors for successful broadband Internet adoption. But these factors influence the broadband process to varying degrees and alone do not ensure successful development of broadband Internet (Bagchi & Cerveny, 2000; Hargittai, 1999; Maitland & Bauer, 2001; Robison & Crenshaw, 1999). Research on countries leading the ICT development, such as Korea, also identified the role of government as another important factor in broadband roll out (Ferguson, 2002; Frieden, 2005; ITU, 2003; Park, 2000). Table 1 describes various constructs suggested by various studies that can help define consumer's broadband internet adoption (Dwivedi et al. 2007).

Table 1: Constructs Related to Broadband Internet Adoption

Constructs	Definition	Source
Behavioural Intention	It is the consumer's intention to adopt and use broadband Internet.	(Brown and Venkatesh, 2005; Venkatesh & Brown, 2001)
Relative Advantage	Degree to which the consumer perceives broadband Internet beneficial.	(Rogers, 1995)
Utilitarian Outcomes	Degree to which the broadband Internet is beneficial in enhancing the effectiveness of typical daily activities of the consumer.	(Brown & Venkatesh, 2005; Venkatesh & Brown, 2001)
Hedonic Outcomes	The degree of pleasure consumer derives from the use of broadband Internet.	(Brown & Venkatesh, 2005; Venkatesh & Brown, 2001)
Social Outcomes	The enhancement of social status consumer derives from the use of broadband Internet.	(Venkatesh and Brown 2001)
Service Quality	The perceived quality of service of Internet service provider.	(DeLone and McLean, 2003; Parasuraman et al, 1991; Parasuraman et al, 1991).
Primary influences	Influences from consumer's family and friends to use or not to use broadband Internet.	(Brown & Venkatesh, 2005; Venkatesh & Brown, 2001)
Workplace referents' influences	The degree of peer influence on consumer's use of broadband Internet.	(Brown & Venkatesh, 2005)
Secondary Influences	The degree of influence from the secondary sources of information (such as newspapers, advertisement etc.) on consumer's adoption of broadband Internet.	(Brown & Venkatesh, 2005; Rogers, 1995; Venkatesh & Brown, 2001)
Perceived Knowledge	The consumer's perceived knowledge about the broadband Internet.	(Rogers, 1995; Venkatesh & Brown, 2001)
Self-efficacy	The consumer's skill to use broadband Internet without assistance.	(Dwivedi, 2005)
Perceived Ease of Use	The perceived degree of ease in using the computer.	(Venkatesh and Brown 2001)
Facilitating	How resourceful a consumer when feels when he/she	(Venkatesh & Brown, 2001)

Conditions Resources	subscribes to broadband Internet.	
Cost	The cost of current broadband subscription.	(Venkatesh and Brown 2001)
Declining cost	Extent to which the falling cost of broadband Internet access inhibits its adoption.	(Venkatesh and Brown 2001)
Perceived lack of Needs	The degree to which consumers do not feel the need of broadband Internet subscription.	

3. Objectives of the Study

This paper attempts to identify the possible factors that may affect broadband Internet adoption by Pakistani business consumers: Broadband infrastructure, family/friend recommendation, quality of service, knowledge of broadband Internet, government support, broadband Internet availability, return on investment, business needs, skill level of employees, business competition conditions, perceived ISP commitment towards broadband Internet services, broadband hardware brand, broadband Internet price, perceived benefits of broadband Internet, ISP support services, broadband Internet speed, customer pressure to adopt broadband, and level of interest in broadband.

4. Research Design

Research Techniques

Objective of the study was to discover the attributes or dimensions which shaped the business consumer demand of broadband. That was an exploratory research which intended to uncover the latent structure (dimensions or factors) driving the broadband demand from a set of known variables or factors.

Exploratory research can be used to identify various factors of interest related to a particular topic. Factor analysis is a statistical technique that can be used to reduce the number of variables studied to a more limited number of underlying, meaningful but latent, "factors."

Research Methodology

For the purpose of exploratory research, the survey is considered a suitable instrument for primary data collection (Choudrie and Dwivedi, 2005). A self-administered questionnaire was developed and used Literature review provided the foundation for development of questionnaire. The final questionnaire consisted of 21 questions. Each question was a statement followed by a five-point Likert scale ranging from ‘strongly disagree’ through ‘neither agree nor disagree’ to ‘strongly agree’. Questionnaires were distributed both in hard copy format and via emails. Questionnaires were sent to various Pakistani businesses during the periods of November and December of 2012. The process of data analysis began by first checking the responses. Using SPSS software, exploratory factor analysis was used to identify constructs and investigate relationships among key interval scaled questions regarding reasons for adopting broadband Internet from the sample of business consumers in Pakistan. Reliability tests and regression analysis were conducted to establish the sufficiency of the technique, adequacy of sampling, and significance of factors. The details of statistical analysis are described in Statistical Analysis section.

Profile of respondents

Following is the Breakdown of various business sector representations in our sample. IT Sector (40%), Financial Sector (30%), Telecom Sector (10%), Shipping/Logistics Sector (5%), Academia (5%), Other (10%).

The Sample Plan

The study used Convenience Sampling and selected respondents from various business sectors as described in the section about profile of respondents. Reliability of factor analysis is also dependent on sample size. (Field, 2005) concludes that, in general, over 300 cases are probably adequate but communalities after extraction should probably be above 0.5. A total of 150 questionnaires were sent. 100 duly completed questionnaires were received achieving a response rate of 67%. Although the number of cases is 100, statistical analysis of the study data shows

that the validity of the results is not compromised to a significant extent. According to criteria provided by (SPSS Survey Tips, 2013), the statistical accuracy of the results based on a sample size of 100 is 68 % (error = 32%).

5. Statistical Analysis

Research Findings

Correlation matrix showed the determinant value of data (after eliminating few questions and re-running factor analysis) was 3.38E-005 which was greater than the necessary value of 1E-05 (0.00001) (Field, 2005). Therefore multicollinearity was not a problem for this data. All questions correlated fairly well and none of the correlation coefficients were particularly large. Therefore, there was no need to consider eliminating any further questions. KMO and Bartlett's Test Statistics (measure of sampling adequacy and Bartlett's test of sphericity) value was 0.859. Values between 0.8 and 0.9 are good (Hutcheson and Sofroniou, 1999). Bartlett's test was also highly significant ($p < 0.001$). See Figure 1.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.859
Bartlett's Test of Sphericity	Approx. Chi-Square	945.449
	df	171
	Sig.	.000

Figure 1

Factor Extraction

Figure 2 shows the component matrix before rotation. SPSS extracted four factors. Scree plot was used for factor extraction. The scree plot is shown in Figure 3. The curve begins to tail off after three factors. The curve drops further after four factors. After this, a stable plateau is reached. We therefore justified toretain four factors.

Component Matrix(a)				
	Component			
	1	2	3	4
Q01	.757			.135
Q03	.749	-.142	.225	
Q04	.737	-.213	-.288	-.167
Q05	.732	.322	-.255	.248
Q06	.700	.102	-.100	-.299
Q07	.692	.445		.164
Q08	.662	.124	-.340	.103
Q10	.645	.392	-.309	.352
Q11	.633	.277	.220	.213
Q12	.632	-.336		.239
Q13	.607		.289	
Q14	.598	.166	.171	-.491
Q15	.594	-.413	-.158	
Q16	.577	.400		-.534
Q17	-.498	.172		.178
Q18	.554	-.562	-.300	-.146
Q19	-.442	.463		
Q20	.437	.173	.650	
Q21	.505	-.262	.632	.233
Extraction Method: Principal Component Analysis.				
a 4 components extracted.				

Figure 2

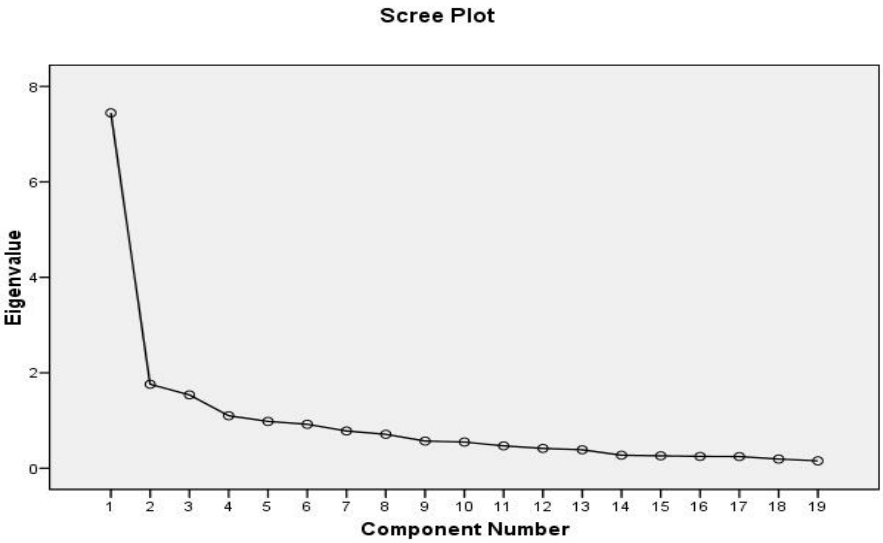

Figure 3

Factor Rotation

Figure 4 shows the rotated component matrix. Factor loadings less than 0.4 have been removed and variables are listed in the order of size of their factor loadings. Rotation of the factor structure has clarified things considerably. There are four factors and variables load very highly onto only one factor. The suppression of loadings less than 0.4 and ordering variables by loading size also makes interpretation considerably easier because we don't have to scan the matrix to identify substantive loadings. The four factors shown in Figure 4 have been discussed in the next section.

Rotated Component Matrix(a)

	Component			
	1	2	3	4
I feel that Pakistan have infrastructure to support quality broadband service.	.840			
Friend's recommendation is the most important factor in deciding broadband service or hardware or both.	.696			
I feel that government is making enough efforts to provide quality broadband service to consumers.	.670			
I don't know what broadband is and I am not interested either.	-.626			
It is impossible for broadband service in Pakistan to continue without interruptions for long time.	.585			
Broadband installation and maintenance is a big hassle	.461	.439	.405	
Broadband availability is crucial in making my choice of business location	-.420			
I feel that broadband doesn't provide the return on investment (ROI) I require.		.870		
I feel that VoIP will become essential to my business in next 5 years.		.813		
My employees possess technical skills to take full benefits of broadband.		.752		
I feel that within next 2-3 years my business will be pressured by my customers to		.627		

conduct business which requires faster Internet such as Broadband				
I feel that ISPs are serious in making efforts to improve their broadband service.		.534	.497	
Broadband price is not important to me.			.833	
To me, broadband hardware must be of a well know brand.			.734	
I don't see any benefits of broadband.	.458		.527	
My ISP technical support is excellent.			.508	
Broadband Speed is the most important to me.				.824
I feel that within next 2-3 years my business will be pressured by my suppliers to conduct business which requires faster Internet such as Broadband				.726
I never used VoIP but I am very interested in using it.				.575
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a Rotation converged in 5 iterations.				

Figure 4

6. Discussion

Factor 1: Customer Perception of Broadband

It is the most vital factor that explains most of the variation. Customer perception factors such as broadband Internet infrastructure (0.840), Friends/family recommendation (0.696),government support (0.670), and perceived difficulty of broadband Internet installation (0.461) had good positive correlation. This factor alone yields great influence on consumers' choice of broadband Internet.

Factor 2: Perceived Broadband Value

It is the second most important factor. The factors broadband ROI (0.870), business need of broadband (0.813), employee skill level (0.752), customer pressure (0.627), and ISP efforts for broadband Internet (0.534) signifies that consumers do have a perceived value of broadband Internet in their minds.

Factor 3: Broadband Brand Loyalty

It is the third most significant factor. There are five loads to this factor. The factors broadband price (0.833), brand of broadband hardware (0.734), and broadband benefits (0.527), and ISP technical support (0.508) shows that customer do value a brand image when it comes to broadband Internet.

Factor 4: Customer Future Requirements

This factor has three loads. The factors broadband speed (0.824), suppliers pressure (0.726), and use of VoIP (0.575) signifies that future considerations do affect significantly the consumers' adoption of broadband Internet.

7. Implications

The research findings have significant implications for Internet Service Providers (ISPs) and policymakers seeking to encourage business consumer adoption of broadband in Pakistan. As discussed above, the quantitative data analysis has suggested that value of broadband; brand loyalty, future customer requirements, and customer perception of broadband are factors that significantly affect business consumers' intentions to adopt broadband.

The research findings extend the current knowledge base of business consumer adoption of broadband. No previous study has examined these factors before to explain the broadband Internet adoption in the context of Pakistan. From a theoretical contribution perspective, this research identifies and integrates the existing literature to provide a deeper understanding of technology adoption by business consumers in developing countries. The research findings generate many issues that may be helpful for ISPs and policy makers to better understand business consumer adoption of broadband in Pakistan. By combining findings of this research with research findings from developed countries, policy makers may emphasize role of value/perception of broadband, branding, and future customer requirements for encouraging growth and diffusion of broadband in Pakistan. As the findings suggest, broadband value and customer perception about broadband are significant factors in explaining business consumers' adoption of broadband. This situation warrants efforts from both the policy makers and ISPs in Pakistan to capitalize on this positive customer attitude by enhancing their knowledge about broadband Internet and its benefits.
The future customer requirements emerged as a significant factor in explaining business consumer adoption of broadband. This suggests that both ISPs and policy makers need to think about consumer-centric emerging broadband technologies and value-added services to promote broadband Internet adoption by potential customers.

8. Conclusion

This study has quantitatively analyzed the factors affecting the adoption of broadband Internet by business consumers in a developing country context with a focus on Pakistan. The following conclusions can be drawn from this research. Value of broadband; brand loyalty, future customer requirements, and customer perception of broadband are factors that significantly affect business consumers' intentions to adopt broadband. With emerging broadband technologies that provide variety of communication and Internet-related services, this study can provide a useful starting point for understanding the adoption of broadband by business consumers in other developing countries. The findings are especially useful for Internet Service Providers (ISPs) and policy makers of Pakistan. The significant factors identified need attentions and detailed analysis to promote the uptake of broadband Internet at national level.

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