Association for Information Systems
AIS Electronic Library (AISeL)

ECIS 2006 Proceedings

European Conference on Information Systems (ECIS)

2006

Investigating the impact of broadband on consumers' online habits and daily life activities in the united kingdom

Yogesh Dwivedi
Swansea University, ykdwivedi@gmail.com

Jyoti Choudrie
Hertfordshire University, jyoti.choudrie@btopenworld.com

Vishanth Weerakkody
Brunel Business School, Brunel University, vishanth.weerakkody@brunel.ac.uk

Follow this and additional works at: http://aisel.aisnet.org/ecis2006

INVESTIGATING THE IMPACT OF BROADBAND ON CONSUMERS' TIME USE ON DAILY LIFE ACTIVITIES IN THE UNITED KINGDOM

Dwivedi, Yogesh Kumar, School of Information Systems, Computing and Mathematics, DISC, Brunel University, Uxbridge, UB8 3PH, UK, ykdwivedi@gmail.com

Choudrie, Jyoti, School of Business and Economics, Swansea University, Singleton Park, Swansea, SA2 8PP, UK, Jyoti.Choudrie@btopenworld.com

Weerakkody, Vishanth, School of Information Systems, Computing and Mathematics, DISC, Brunel University, Uxbridge, UB8 3PH, UK, vishanth.weerakkody@brunel.ac.uk

Abstract

The aim of this study is to conduct a cross-sectional analysis of broadband's impact on a consumers time use on daily life activities. Specifically, this paper aims to achieve the following two objectives: first, to examine and compare the online habits of both broadband and dial-up users; and second, to examine and compare the impacts of both broadband and dial-up on a consumer's use of time upon daily life activities. The study was conducted using a postal survey. A self-administered questionnaire was sent to 1600 households and a total of 358 completed questionnaires were obtained from the respondents. The study provides evidence that significant changes in the total time spent on-line and Internet usage frequency can occur when people use broadband technology. The paper also suggests that consumers of broadband and dial-up are different in terms of time allocation pattern on daily life activities.

Keywords: Broadband, Adoption, Impact, Household, Consumers, UK

1   INTRODUCTION

Time allocation patterns are considered to be an important variable for understanding the role of computing and the impact of ICTs in households (Vitalari et al. 1985). This is due to the total available time being finite and the time spent upon using a technology is likely to influence the distribution of time upon other activities. Therefore, the use of new technology does indirectly rearrange the social action and user behaviour (Vitalari et al. 1985). Vitalari et al. (1985) have demonstrated the impact of personal computers upon the time allocation of various routine activities and have also considered the implications of this action. Although broadband is expected to affect several aspects of daily life in the household (BSG 2004, Carriere et al. 2000), research that understands the impact of broadband on time allocation pattern has not been undertaken. This was a motivating factor for conducting this research.

Early studies on broadband impact related issues have found that users behave differently when online; specifically, in the context of accessibility to the Internet utilizing high-speed connections. The findings suggest that broadband users spend more time online, access the Internet more frequently and access more online services compared to dial-up or narrowband users (Anderson et al. 2002, Carriere et al. 2000, Dwivedi & Choudrie 2003a,b, Horrigan & Rainie 2002). Although these studies examined the online behavior, impacts of broadband upon time allocation patterns, a study of the impact of broadband upon various domestic activities has yet to be undertaken. Therefore, the aim of this study is to conduct a cross-sectional analysis of broadband's impact upon a consumer's usage of time; particularly, when undertaking daily routine activities. Specifically, this paper aims to achieve the following two objectives: first, to examine and compare the online habits of both broadband and dial-up users; second, to examine and compare the impacts of broadband and dial-up upon a consumer's use of time upon the daily routine activities. By achieving the set objectives, the contributions of this research paper are to provide a clear understanding of the impact of broadband diffusion and to also provide an initial indication of the affect of broadband upon future media, B-2-C electronic commerce, telecommunications, teleworking and family life.

Having introduced the topic of interest this paper now proceeds to offer a definition of 'broadband' and a brief discussion of the research undertaken on the usage and impact of broadband in section 2. Section 3 provides a brief discussion of the utilized research methods. The findings are presented and discussed in Section 4. Finally, a conclusion to the research is provided in section 5.

2   BACKGROUND

The term "broadband technology" embraces a variety of high-speed access technologies including ADSL (Asymmetric Digital Subscriber Line), cable modems, satellite, and Wi-Fi (Wireless Fixed) Networks. Broadband has no established definition and evolves across space and time (Sawyer et al. 2003). Given the variations in defining 'broadband', for the purpose of this research the technology neutral definition suggested by the Broadband Stakeholder Group (2001) is utilised. It defines broadband as an 'always on access, at work, at home or on the move provided by a range of fixed line, wireless and satellite technologies to progressively higher bandwidths capable of supporting genuinely new and innovative interactive content, applications and services and the delivery of enhanced public services' (BSG 2001). In this research the term *dial-up/narrowband* refers to the Internet connection that offers a speed below 256 Kilobits per second, whilst the term *un-metered* refers to a fixed subscription fee and *metered* means cost per usage.

As this research places an emphasis upon consumers, a differentiation between consumers and users is provided. According to Rice (1997) 'consumers' are those who pay for services and goods, while, 'users' are 'individuals who are affected by or who affect the product or services'; in other words, users are those

who use the product and services but do not pay for it (Rice 1997). For example, children as users utilise broadband to play online games and to undertake homework; however, they do not subscribe to it. Since the parents pay for the subscriptions as well as use the service, they are referred to as consumers.

The impact of the rapid growth of the Internet and broadband technology on society is an issue that is generating considerable research efforts in both the commercial and academic sectors. Anderson and Tracey (2001) have investigated the impact of the Internet on the everyday life in the UK. Their research indicates that there is little significant change in people's use of time, which can be associated with their acquisition of an Internet connection. The study also suggests that the life style and life stage transitions may trigger adoption of the Internet and changes in domestic use of time (Anderson & Tracey 2001).

The aforementioned study is an academic one. There are also a small number of research studies offered by research consultancy organisations such as, McKinsey and Company (Carriere et al. 2000), and the Pew Internet Project (Horrigan & Rainie 2002) that provided an initial picture of the socio-behavioural impacts of broadband technology in the USA. The McKinsey and Company research suggests that Internet users behave differently when they have broadband access and a large number rated their on-line experience as compelling. The study further emphasized that broadband users are diverse to dial-up ones (Carriere et al. 2000). Broadband subscribers remain online four times longer than the narrowband ones, and utilize more services on a frequent basis. As broadband subscribers are constantly connected to the Internet, instead of logging on every time access to the Internet is sought, there is more use made of the Internet. In terms of the online durations narrowband consumers prefer single, long, daily sessions or two at the most. Contrastingly, broadband users often access sites several times a day for various purposes (Carriere et al. 2000). The McKinsey and Company study also found significant differences between a broadband and narrowband environment in terms of the number of performed activities and the daily online frequency. Broadband subscribers shop on line almost twice as much as narrowband subscribers, which according to the report is hardly surprising as consumers rate slow page loading as an important reason for abandoning online shopping (Carriere et al. 2000).

The findings of the Pew Internet & American (Horrigan & Rainie 2002) Life Project suggest that the average Internet users with high-speed home access undertake seven online activities on a typical day. The undertaken activities are obtaining news, health care information, undertaking an online course, listening to music, or downloading files. Within narrowband (dial-up) users it was found that three online activities are undertaken on a typical day (Horrigan & Rainie 2002). Further, the study suggests that a high-speed connection permits broadband users to perform multiple Internet tasks more easily in a given online session or at different times of the day. Multitasking is another exclusive characteristic of broadband users as they perform many simultaneous activities at one time (Horrigan & Rainie 2002). According to the statistics of this report, communication remains the dominant application. Two-thirds of broadband users inspect mail on a typical day; 21% perform instant messaging; and 71% undertake both on a typical day. Information search was reported as the second dominant application since 46% of broadband users get news online on any given day. 36 % of the respondents completed online job related research on an average day, and 32% of the users undertook online product research on a typical day. Averagely, 49% of the users downloaded some kind of multimedia content, such as, audio and video streaming, on-line games, and video clips during a typical day. The study also explains that 21% of broadband users purchase online products, 22% accomplished online banking or bill paying and 14% purchased a travel service on a travel basis (Horrigan & Rainie 2002).

The aforementioned studies were focused on broadband's impact on online habits and online activities that require Internet access. None of them except for Horrigan and Rainie (2002) examined the impact of broadband use on the time spent on daily routine activities. The Pew Internet & American Life Project survey was the initial study that also included variables examining the impact of broadband on individual use of time (Horrigan & Rainie 2002). This survey found that broadband users watch less television,

accomplish more office work at home, work less in the work place, read fewer newspapers and spend less time on shopping (Horrigan & Rainie 2002).

Within the United Kingdom (UK) such studies are fewer and have been in the form of user surveys that have examined the broadband users' behaviour. Similar to findings from the USA, results from these surveys suggest that Internet users behave differently when they have broadband access. Broadband users employ online facilities for longer durations, and often utilize more services or applications. The majority of broadband users rate their on-line experience as compelling (Anderson et al. 2002, Dwivedi and Choudrie 2003a). Surveys conducted on broadband users also suggest that these users make more online purchases and procure more varied categories of products in comparison to the narrowband users (Dwivedi and Choudrie 2003b). Although the aforementioned studies examined the usage of broadband, understanding the impact of broadband usage on the consumers' daily life is still untouched by previous studies in the UK. Although the Pew Internet Project survey has touched upon this issue, it only reveals the responses obtained from broadband users and has not compared broadband users to dial-up users. Therefore, it is not clear whether the trends obtained from this study are specific to broadband users or to the general trend of Internet users. Utilizing this as a motivating factor this study progresses a step further and performs a cross-sectional analysis to investigate the impact of broadband on online habits and online time spent in daily routine activities.

3 RESEARCH METHODOLOGY

Empirical research via a survey research method is considered to be an appropriate approach to examine the impact of broadband upon consumers' online habits and time spent on daily routine activities in household (Choudrie and Dwivedi 2005). Data on the adoption, usage and impact of broadband 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, Rice 1997).

In order to collect random data for the target population, a self-administered questionnaire was considered to be the most appropriate primary survey instrument in this investigation. The following is the reasoning used for selecting self-administered questionnaires in comparison to other data collection tools: it addressed the issue of reliability of information by reducing and eliminating differences in the way by which the questions are asked (Cornford & Smithson 1996); relatively low costs of administration; can be accomplished with minimal facilities; it provides access to widely dispersed samples; respondents have time to give thoughtful answers; help asking questions with long or complex response categories; asking similar repeated questions; and also the respondents does not have to share answers with interviewers (Fowler 2002).

Overall, the questionnaire used in this research contained 14 questions. These questions were multiple-choice addressing the demographics, type of Internet connection respondents possess at home, frequency of Internet access, time spent online and twenty daily life activities to measure time allocation pattern (Anderson & Tracy 2001, Vitalari et al. 1985). Closed multiple-choice questions were included in the questionnaire in order to obtain a high response rate. This is due to instances where respondents preferred to answer closed questions within the non-interactive, self-administered questionnaires (Fowler 2002).

3.1   Pilot survey

Prior to dissemination of the final questionnaire, a pilot study was conducted to: determine the response rate and learn of any discrepancies within the questions, which included determining whether the format of the questionnaire and questions were suitable. Additionally, the duration that completion of the questionnaire would require was also established.

The pilot questionnaire was delivered via the post to a total of randomly selected 200 participants from UK-Info Disk V11 in December 2004. A total of 40 replies were obtained from the respondents within the specified duration. The majority of the respondents reported that the questionnaire was easily understandable and required 10 to 15 minutes for completion. The majority of the respondents validated the content of the questionnaires, although minor changes to the final design of the questionnaire were undertaken based upon the received feedback and a final questionnaire was developed. Since there were no major changes required to incorporate in questionnaire, responses received from pilot study also included in the final analysis (Fowler 2002).

3.2   Sample size and questionnaire administration

Fowler (2002) has suggested that a prerequisite for determining a sample size should be analysis plan. This paper is a part of a larger study on broadband diffusion in the UK household. Analysis of the entire study required performing principal component analysis (PCA), regression analysis, t-test and chi-square test. It has been suggested that in order to perform the aforementioned statistical analysis with rigour, the sample size should be above 300 (Stevens 1996). Therefore, keeping statistical analysis plan in mind 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 basis of final survey.

Total sample size= [Total responses required*100] / Pilot response rate= 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 undelivered and partially completed responses, the sample size was increased further 1500 to 1600. Therefore, a total sample size of 1600 was considered suitable for this research. The final questionnaires were sent using the postal service. A covering letter and a self-addressed prepaid return envelope were administered to a total of 1600 household consumers in the UK in the periods between January and March 2005.

3.3   Response rate and nonresponse 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 percent was obtained. To test whether the characteristics of the respondents from the original responses were similar to the non-respondents, a chi-square test (x^2) was conducted for two key demographics (i.e. age and gender) (Fowler 2002) and Internet access at home. The findings are illustrated in Table 1. The chi-square value is not significant for all three variables (Table 1). This suggests that the non-respondents who returned the completed questionnaire after reminders were similar to the respondents from the original responses. Hence this suggests that with the provided sample there is no response bias in this research.

Variable	X^2 Value	df	Sig.
Age*Response Type	6.904	5	.228
Gender*Response Type	.312	1	.577
Internet Access * Response Type	.360	1	.549

Table 1. ^{2} test of significance for non-response bias

3.4   Data analysis

The collated data was analysed using SPSS version 11.5. This allowed the calculation of the response frequencies, percentages and chi-square values to analyse the variables determined by this research. Since variables included within this paper were nominal in nature, the, ^{2} test was considered to be most appropriate (Brace et al. 2003) when testing for the statistical significance of the differences between the adopters and non-adopters of broadband.

4   FINDINGS

4.1   Respondents profile

Of the 358 responses, 26 percent of the respondents belonged to the 25-34 years age group, which formed the largest response category. This is followed by the 35-44 years age group with 21.5 percent. The least responsive category was the 75 years and above with 1.1 percent. This was followed by the 65-74 years group with a response rate of 2.8 percent.

In terms of gender only 2 percent more responses were obtained from the male (50.6 percent) in comparison to the female (48.6 percent) population. The majority of the respondents possessed educational qualifications-a degree (33 percent) and postgraduate level education (27.9 percent). The least responsive educational category was the GNVQ/Diploma with 8.4 percent response. 11.5 percent of the respondents possessed GCSE level education followed by 'A' level with 14.8 percent responses. 4.7 percent respondents did not disclose their education.

The occupational category with the highest amount of respondents was 'E' that consisted of casual students, casual workers, and pensioners (35.8 percent); followed by category 'B' which consisted of managers, teachers, and computer programmers (27.4 percent). C1 represented the third largest occupational category with 19.0 percent responses followed by category 'A' with 10.6 percent responses. The least responsive occupational categories were 'D' and 'C2' with a response rate of 1.7 percent and 2.0 percent respectively. Responses for the household income categories varied between 17.3 percent responses for the £20-29 K and 7.0 percent for the £50-59K category. The least annual household income group (<=£10K) obtained a 9.2 percent response, whilst the largest income group (=>£70K) achieved a 10.1 percent response rate.

4.2   Adoption of Internet (narrowband and broadband) by household consumers

Table 2 illustrates the total numbers of the adopters (both dialup and broadband) and non-adopters at home. A total of 308 (86.0%) of the respondents of this sample accessed the Internet at home utilizing either a dial-up or broadband connection. Only 50 (14.0%) respondents did not have the Internet at home. Of the overall numbers of home Internet adopters, the broadband consumers (57.5%) superseded the numbers of dial-up consumers (28.5%). Within the dial-up category, dial-up un-metered (16.8%) consumers exceeded the dial-up metered (11.7%). Amongst the broadband category, the highest percentage was obtained within the broadband DSL category (33.2%). This was followed by broadband cable connections (20.1%). The wireless connections obtained the least percentage with a 4.2% response.

Connection Type	Narrowband
Metered	11.7%
Un-metered	16.8%
Total	28.5%
	Broadband
DSL	33.2%
Cable Model	20.1%
Wireless	4.2%
Total	57.5%
Grand Total	86.0%
	No Access at home
	14%

Table 2: Adoption of Internet by household consumers (N=358)

4.3   How long have you been accessing the Internet for?

Table 3 explains the duration that consumers accessed the Internet from home after first subscribing to broadband. The statistics indicate that the majority of broadband consumers (75%) accessed the Internet for more then 36 months and only 59% were dial up users. However all the categories except above 36 months had larger percentages for narrowband use then the broadband consumers (Table 3).

The chi-square test confirmed the significant difference (x^2 = 10.26, df=3, Sig. 0.16) between non-adopters and adopters of broadband in terms of the duration taken to access broadband (Table 3). The majority of broadband's non-adopters (narrowband consumers) belonged to the less experienced categories. Contrastingly, the majority of broadband adopters had Internet access more then 36 months.

This suggests that the dial-up consumers are more likely to switch to broadband compared to consumers with no Internet access. A reason for this can be attributed to the experience that dial-up users obtain. Once the dial-up users utilize broadband, an evaluation of the direct benefit of high speed Internet can be made; thereby, making them more likely to switch to the better option, in this case, broadband. However, if consumers perceived the relative advantage of the new technology to the old of being less significant than the one currently being utilized, then they are less likely to adopt the new one (Rogers 1995).

This may be the case with the dialup un-metered consumers. Since these individuals obtain 24-hour access to the internet at a fixed price, it is cheaper than the broadband one; hence they are less likely to subscribe to broadband. This may also be a reason for a larger proportion of the dial-up consumers (59%) to access the Internet for more then 36 months and not to switch to broadband. This suggests that old technology may employ the role of both promoter and inhibitor for the successful diffusion of new technology. In this case it is believed that dial-up *metered* connections act as promoters. At the same time dial-up *un-metered* connections assist in slowing down broadband diffusion within the residential consumers.

Duration of Internet Subscription	Narrowband	Broadband		
<12 month	11%	8%		
12-24 month	12%	10%		
25-36 month	18%	7%		
>36 month	59%	75%		
Total	100%	100%		
Chi-Square (x^2) Tests				
		Value	df	Sig.
Pearson x^2		10.26	3	.016

Table 3: Total Duration of Internet Access

4.4 Consumers' on-line habits

Interestingly, it was also found that there is a change in terms of the frequency in access and time spent on-line. Table 4 illustrates that in a broadband environment, 74.3% of the respondents used the Internet several times within a day. Contrastingly, only 52.9% of the dial-up users use the Internet several times in a day. However, an increasing number of the dial-up users (20.6%) used the Internet only once a day compared to the broadband users (15%). Respondents from all the other categories and who utilized the Internet less than once in a day mainly possessed a dial-up connection (Table 4). The chi-square test also confirmed the significant difference (x^2 = 19.3, df = 5, Sig.= .000) between the non-adopters and adopters of broadband in terms of their frequency of Internet access (Table 4). It was found that that the broadband consumers are significantly different to the dial-up ones in terms of consumers on line habits, particularly when referring to the frequency in access.

Internet access Frequency	Narrowband	Broadband
Several times a day	52.9	74.3
About once a day	20.6	15.0
3-5 days a week	10.8	5.8
1-2 days a week	9.8	3.9
Once every few weeks	3.9	1.0
Less often	2.0	0.0
Total	100%	100%
Chi-Square (x^2) Tests		
	Value	df	Exact Sig.
Pearson x^2	19.3	5	.000

Table 4: Frequency of Internet Access

Table 5 depicts that 24% of the dial-up consumers were online less than half an hour per day. Contrastingly, only 9% of the broadband consumers were online less than half an hour on a typical day. From Table 5 a general trend that emerged is that the majority of broadband consumers spent more time online compared to the dial-up consumers. The chi-square test also confirmed the significant difference (x^2 = 15.8, df=5, Sig.= .001) between the non-adopters and adopters of broadband in terms of time spent online on a typical day (Table 5). This again suggests that the online habits of broadband consumers differ significantly to the narrowband ones.

Time Spent online on daily basis	Narrowband	Broadband
<1/2 hour	24%	9%
½-1 hour	12%	7%
>1-2 hour	29%	33%
>2-3 hour	6%	11%
>3-4 hour	17%	23%
>4 hour	13%	17%
Total	100%	100%
Chi-Square (x^2) Tests		
	Value	df	Sig.
Pearson x^2	15.8	5	.001

Table 5: Total Time Spent on Internet

4.5   Impact of Internet (narrowband and broadband) on consumer's use of their time

Cross sectional analysis was applied to both the narrowband and broadband consumers usage of time upon various activities (Table 6). The results found a clear distinction between the narrowband and broadband consumers in terms of time spent on a total of twenty daily life activities examined within this research. Comparisons of the Pew Internet Project (Horrigan & Rainie 2002) with the findings of this research suggest that the respondents of the Pew Survey (Horrigan & Rainie 2002)) are more similar to the results for the dial-up consumers of the UK than those of broadband consumers. The broadband consumers' behaviour in terms of time spent on various activities is dissimilar to both dial-up consumers and the respondents of the Pew Internet project (Horrigan & Rainie 2002). For example, the television-watching behaviour of 41% of the broadband consumers decreased in comparison to 36% of the dial-up ones and 37% of the consumers from the Pew Internet Survey (Horrigan & Rainie 2002). Similarly, reading newspapers/books/magazines was more affected by broadband use. 28% of the broadband consumers read fewer newspapers/books/magazines in comparison to 18% of the dial-up users and 18% consumers from the Pew Survey (Horrigan & Rainie 2002). This again suggests that the online behaviour of the broadband consumers in the USA in 2002 were more similar to the present UK dial-up consumers; particularly when referring to the time taken to undertaken various activities in the daily life.

Daily Life Activities	Narrowband			Broadband			x^2 Tests		
	Nc. (%)	Dec. (%)	Inc. (%)	Nc. (%)	Dec. (%)	Inc. (%)	x^2	df	Sig.
Watching television/cable/satellite	62	36	2	56	41	3	.92	2	.629
Shopping in stores	77	16	7	63	31	6	6.7	2	.034
Working at home	68	5	28	42	5	53	18.1	2	.000
Reading newspapers/books/magazines	76	18	5	60	28	12	7.6	2	.022
Working in the office	86	4	10	65	25	10	18.4	2	.000
Commuting in traffic	95	4	1	80	18	2	10.8	2	.005
Spending time with family	77	17	5	81	12	6	1.33	2	.513
Spending time with friends	80	13	7	82	12	6	.137	2	.934
Attending social events	85	8	8	84	10	6	.567	2	.753
Time spent on sport	82	12	7	83	12	4	.636	2	.728
Time spent on hobbies	77	14	9	73	16	11	.731	2	.694
Time spent on sleeping	72	24	4	77	20	3	1.08	2	.581
Time spent alone (doing nothing)	61	25	14	66	25	9	1.69	2	.430
Studying	60	14	26	63	10	26	.954	2	.621
Household work	82	14	4	82	17	1	3.31	2	.191
Receiving/ making phone calls	63	34	3	60	32	9	2.75	2	.258
Doing charity and social works	86	8	7	89	7	4	.692	2	.707
Outdoor recreation (DIY, pet care)	85	8	8	89	8	3	2.66	2	.263
Outdoor entertainment (concerts, cinema)	85	11	4	76	12	12	4.28	2	.117
Visiting or meeting friends or relatives	85	11	4	85	11	4	.063	2	.969
Legend: NI= Not Included, Inc.=Increased, Dec.= Decreased, Nc.=No Change									

Table 6: The impact of broadband Internet on various daily life activities

Other activities where consumers spent less time then before include, in store shopping, working in the office and commuting in traffic (Table 6). Working in the office had decreased for 25% of the broadband consumers in comparison to 4% of the dial-up consumers. 18% of the broadband consumers spent less time when commuting in traffic than 4% narrowband consumers. There is minor distinction between the narrowband and broadband consumers in terms of time allocation pattern for activities such as spending time with family and friends, time spent alone, receiving/ making phone calls and outdoor entertainment

(Table 6). The only activity where the time spent had increased was 'working at home'. The working at home behaviour of 53% of the broadband consumers increased in comparison to 28% of the narrowband ones (Table 6).

As illustrated above, differences exist between the broadband and narrowband consumers in terms of their time allocation pattern for all the 20 activities examined in this research. However, the chi-square test confirms that the narrowband consumer's time allocation pattern differed significantly to the broadband ones only for 5 activities (Table 6). These include shopping in store (^{2}= 6.7, df=2, Sig.= .034), working at home (^{2}= 18.1, df=2, Sig.= .000), reading newspapers/books/magazines (^{2}= 7.6, df=2, Sig.= .022), working in the office (^{2}= 18.4, df=2, Sig.= .000) and commuting in traffic (^{2}= 10.8, df=2, Sig.= .005).

It was also found that the time allocation pattern for the remaining 15 activities did not differ significantly between the narrowband and broadband ones. However, the internet on its own has begun to influence the daily routine of consumers. This is evident from the findings in Table 6 whereby it was learnt that both the broadband and narrowband consumers influence the time allocation patterns for undertaking daily life activities. This is inline with Vitalari et al.'s (1985) findings that explored the impact of computer use on time allocation patterns and concluded that significant behavioural changes can occur when people adopt personal computers in the homes.

5 CONCLUSION

The aim of this research was to *conduct a cross-sectional analysis of broadband's impact upon a consumers' usage of time, specifically within the context of daily life activities*. To fulfil this aim, a nationwide postal survey was conducted that offered evidence of significant changes in the total time spent on-line and frequency of Internet access. Further it was learnt that frequency of Internet access increase when people use broadband technology. The paper also concludes that the consumers of broadband and dial-up are different in terms of their usage of time within their daily life activities. Comparing the findings of this research with the Pew Internet Project (Horrigan & Rainie 2002) it is suggested that the broadband users from the UK and the USA are dissimilar when referring to domestic time use. The reasons can be attributed to either the two surveys being undertaken at two different points in time or due to the cultural differences; thereby making Internet behaviour patterns dissimilar. An added reason can be due to the differences in sample size.

The findings have important implications for the mass media, e-commerce and telecommunication industries. The study suggests that a positive change in online shopping in a broadband environment may occur. Hence, it is suggested that there is a growth in and the diffusion of B-2-C e-commerce being correlated to the diffusion of a high-speed Internet. Similarly, the mass-media industry likely to benefit from the diffusion of broadband as more respondents is reading more online than utilizing traditional reading resources. This encourages the online media industry to attract revenues from advertising and subscription fees. According to the findings, receiving and making phone calls have decreased for both narrowband and broadband consumers. Therefore, the telecommunication industry has to transform in terms of business model. The business model should also find ways of charging consumers when making phone calls utilizing VoIP or other emerging applications as a consequence of a broadband environment

5.1 Limitations and future research directions

In this survey the sample was randomly drawn from the entire UK population; hence some generalizations can be made. However, for an in-depth understanding a qualitative enquiry that involves employing an interview or diary study will be helpful. However, due to the time constraints imposed by this research, this could not be achieved within this paper. Also the survey undertaken by this research examined only

the principal householders, their behaviour of internet usage and their impact upon the online time spent upon various daily life activities. However, the household head's time spent online may differ from the other members of the family in terms of total time spent on-line and due to that, a reduction and increase in time-spent on various daily life activities could occur. Therefore, it is important to conduct surveys, interviews or diary studies that examine the behaviour of the time spent online within the entire family members. This again will help in obtaining an in-depth understanding of the impact of broadband within the context of the household.

References

Anderson, B., Gale, C., Jones, M. and McWilliam, A. (2002). Domesticating broadband-what consumers really do with flat-rate, always-on and fast internet access. BT Technology Journal, 20 (1), 103-114.

Anderson, B. and Tracey, K. (2001). Digital living: The impact (or otherwise) of the Internet on everyday life. American Behavioral Scientist, 45 (3), 456-475.

Brace, N., Kemp, R. and Snelgar, R. (2003). SPSS for Psychologists: A Guide to Data Analysis Using SPSS for Windows. Palgrave Macmillan, New York.

BSG (2004). The impact of broadband-enabled ICT, content, applications and services on the UK economy and society to 2010. London, United Kingdom
http://www.broadbanduk.org/news/news_pdfs/Sept%202004/BSG_Phase_2_BB_Impact_BackgroundPaper_Sept04(1).pdf

BSG (2001). Report and strategic recommendations, London, Available at
http://www.broadbanduk.org/reports/BSG_Report1.pdf.

Carriere, R., Rose, J., Sirois, L., Turcotte, N. and Christian, Z. (2000). Broadband changes everything. **McKinsey & Company**, Available From:
http://www.mckinsey.de/_downloads/knowmatters/telecommunications/broadband_changes.pdf.

Choudrie, J. and Dwivedi, Y.K. (2005). Investigating the research approaches for examining technology adoption issues. Journal of Research Practice, 1 (1), Article D1, available on
http://jrp.icaap.org/content/v1.1/choudrie.pdf, accessed 20 September 2005.

Cornford, T. and Smithson, S. (1996). Project Research in Information Systems: A Student's Guide. Macmillan Press Ltd, London.

Dwivedi, Y.K. and Choudrie, J. (2003a). The impact of broadband on the consumer online habit and usage of Internet activities. In Proceedings of the 8th Annual UKAIS Conference on Co-ordination and Co-opetition: the IS role (Levy, M. et al. Ed.), Warwick, UK.

Dwivedi, Y.K. and Choudrie, J. (2003b). Considering the impact of broadband upon the growth and development of B-2-C electronic commerce. In Proceedings of the ITS Asia- Australasian Regional Conference on M-Business, E-Commerce and the Impact of Broadband on Regional Development and Business Prospects (Cooper, R. et al. Ed.), Perth, Australia.

Fowler, F.J. Jr. (2002). Survey Research Methods. SAGE Publications Inc., London.

Horrigan, J.B. and Rainie, L. (2002). The broadband difference: how online Americans' behaviour changes with high-speed Internet connections at home. Pew Internet and American Life Project, online at http://www.pewinternet.org/pdfs/PIP_Broadband_Report.pdf

Rice, C. (1997). Understanding Customers. Butterworth-Heinemann, Oxford.

Rogers, E.M. (1995). Diffusion of Innovations. Free Press, New York.

Sawyer, S., Allen, J.P. and Lee, H. (2003). Broadband and mobile opportunities: a socio-technical perspective. Journal of Information Technology, 18 (2), 121-136.

Stevens, J. (1996). Applied Multivariate Statistics for the Social Sciences. Lawrence Erlbaum Associates, Inc., New Jersey.

UK-Info Disk V11 at http://www.192.com/products.cfm?icdaction=details&item_id=41.

Vitalari, N.P., Venkatesh, A. and Gronhaug, K. (1985). Computing in the home: Shifts in the time allocation patterns of household. Communications of the ACM, 28 (5), 512-522.