

All Broadband Households Are Not the Same: Why Scope and Intensity of Use Matter

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Canadians have been leaders in broadband internet adoption (Organisation for Economic Co-operation and Development, 2005), with close to two-thirds of Canadian internet households having broadband connections by 2003 (Statistics Canada, 2004b). It is assumed that our high adoption rates reflect a population that is well-prepared to use the internet to access education, health, government, business and entertainment services. By analyzing Statistics Canada's Household Internet Use Survey data, this paper makes the case that not all broadband households are the same, and argues that it is important for policy makers to understand the nuances of broadband adoption in Canada. Broadband *access* does not imply full *usage* of broadband services. This paper identifies differences within broadband households, and explains why it is important to recognize the differences in their usage behaviours.

Introduction and Background for the Study

For more than a decade, the Government of Canada has been developing strategies to enable Canadians to become participants in the information society (Government of Canada, 1999; Government On-Line Advisory Panel, 2003; Industry Canada, 1994). As part of this strategy, it was recommended that broadband¹ internet access be made available to all

¹ The National Broadband Task Force defined broadband as "a high-capacity, two-way link between end user and access network suppliers capable of supporting full-motion interactive video applications. ... A minimum symmetrical speed of 1.5 megabits per second per individual user is currently required to support these applications." (National Broadband Task Force, 2001, p. 10) In practice, broadband access for Canadians is defined by what it is not, that is broadband internet is not dialup. Various service providers offer different "flavours" of broadband access, ranging from what are billed as "ultra light" connections with bandwidth of 128 Kbps, up to "ultra" services, with bandwidth of 5 Mbps. In

Canadian households (National Broadband Task Force, 2001). There are still many unserved and underserved areas in the country (CRACIN, 2005), and the Telecommunications Policy Review Panel has urged the federal government to "reaffirm its commitment to maintaining Canada's global broadband leadership and to ensuring that broadband access is available everywhere in the country" (Telecommunications Policy Review Panel, 2006. p. 8-5).

It is widely believed that having access to a broadband internet connection will provide individuals with social and economic benefits (Anderson & Raban, 2005; Firth & Mellor, 2005; International Telecommunication Union, 2003; Lai & Brewer, 2006). Using US data, analysis conducted by the MIT Communication Futures program concludes that broadband access "does enhance economic growth and performance, and that the assumed economic impacts of broadband are real and measurable" (Gillett, Lehr, Osorio, & Sirbu, 2006, p. 4). The adoption of broadband and other information and communications technologies is seen as "essential to increasing Canada's productivity and competitiveness" (Telecommunications Policy Review Panel, 2006, p. 8-4). This perspective is shared by the European Union, where the Commission of the European Communities (2006) has declared that broadband is "crucial for fostering growth and jobs" (i2010, 2006, n.p.).

Data on broadband adoption are collected in different ways by different organizations. In Canada, the Household Internet Use Survey measures broadband adoption in terms of the number of households who have a high speed internet connection. In order to compare adoption rates on a country by country basis, researchers generally rely upon the data aggregated by the Organisation for Economic Cooperation and Development (see Organisation for Economic Co-operation and Development, 2006b, for recent data) or the International

urban areas, the majority of broadband connections are provided by DSL or cable, and do not provide symmetrical connectivity. Veenhof, Neogi and Tol (2003) offer insights into broadband connectivity in Canada.

Telecommunication Union (see International Telecommunication Union, 2006, for recent data). These organizations report broadband adoption rates in terms of broadband subscribers per 100 inhabitants of a country.

As is seen in Table 1, Canadians are among the leaders in broadband adoption (Lie, 2003). The country's adoption rate was second only to Korea from 2001 through 2003. By 2004, Canada had slipped to third place in broadband adoption, behind Denmark and Korea. As of June 2005 adoption rates in Korea, Netherlands, Denmark, Iceland and Switzerland were higher than those in Canada, dropping it to sixth overall. Canadian adoption rates continue to outpace those in the United States, but there are concerns that the country will lose its competitiveness in the international knowledge economy if it cannot maintain its position as a leader in broadband deployment (Telecommunications Policy Review Panel, 2006).

Table 1: International Broadband Adoption Rates and Rankings, showing Broadband Access Per 100 Inhabitants

	2001	2002	2003	2004	2005
Korea	17.2 (1)	19.1 (1)	23.2 (1)	24.4 (1)	25.5 (1)
Canada	8.9 (2)	10.2 (2)	13.3 (2)	16.7 (3)	19.2 (6)
United States	4.7 (4)	5.6 (6)	8.3 (10)	11.2 (11)	14.5 (12)

Source: OECD (2006a), rounded to one decimal place.
2001 data are for December, 2002 - 2005 data are June figures.

There is a large and growing literature that considers factors that influence the supply and demand of consumer broadband networks. While it is beyond the scope of this paper to provide a comprehensive review of this literature, some key themes are discussed briefly. In recent years, many papers have considered the question of how Korea became the world's broadband leader. Various authors have produced comparative case studies (see for example Brunel - DTI, 2002; Frieden, 2005; Lau, Kim, & Atkin, 2005; Lee & Chan-Olmsted, 2004; Lee, O'Keefe, & Yun, 2003; Lee, Oh, & Shim, 2005) in order to understand the factors that have led to Korea's high adoption rates. The OECD broadband adoption data are used as a common

reference point throughout this literature, with frequent mentions made of broadband penetration rates. In much of the literature, there is no discussion of actual usage of broadband networks, beyond cursory mentions of specific services and applications (e.g. playing games, stock market trading, file sharing) that may drive demand. It is simply assumed that broadband adoption is a yes/no proposition, and once people adopt broadband the many espoused benefits of broadband usage will flow to them.

The treatment of adoption as an end goal is also seen in literature that assesses policy options to stimulate the supply of broadband networks. It is believed that if an appropriate policy regime can be implemented, generally to support a more competitive environment, then broadband networks will be deployed, and adoption will follow. Works that discuss policy aspects of broadband deployment includes Aron and Burnstein (2003), Bauer et al. (2002), García-Murillo and Gabel (2003), Howell (2002), Kim, Bauer & Wildman (2003), Papacharissi and Zaks (2006) and Wu (2004).

Another stream of literature focuses on the determinants of broadband demand, by considering characteristics of individual users. Various authors, including Gardner (2003), Kridel, Rappoport and Taylor (2002), Madden, Savage and Simpson (1996), Madden and Simpson (1997), Rappoport, Kridel and Taylor (2002), and Varian (2002), consider the impacts of income, education level, age, and family structure upon broadband adoption rates. Stern et al. (2004) also noted the importance of geographic location, and of technophilia in determining household demand for broadband. As was observed in the other streams of the literature, broadband adoption is an all or nothing proposition. While technically this is true, in that households cannot acquire a "semi-broadband" connection², little is known of their subsequent

² Households either have a broadband connection or they have a dialup connection. But as noted earlier, there are now a variety of services that provide lower speed "broadband," offering some of the

use of the connection, once it is acquired.

Firth and Mellor (2005) call for research that considers the outcomes of broadband adoption for individuals and households. Working in the European context, Anderson and colleagues (Anderson, Gale, Jones, & McWilliam, 2001; Anderson & Raban, 2005) have considered the impacts of broadband adoption by studying post-adoption behaviours. In their 2005 work, they conclude that the differences in user behaviours between people using broadband and narrowband (low speed) internet connections are attributable more to experience levels than to the technology itself. Broadband in and of itself does not create specific benefits, rather its users must be experienced enough to understand and take advantage of the potential benefits broadband can bring. Further, they note that even among broadband users, the most widely used services are for communication purposes (a finding consistent with Middleton, 2003), and that switching to broadband does not increase the amount of money spent online. They do caution that their study is based on 2002 data, but based on this data express concerns that a focus on technology (i.e. getting people to use broadband networks) is not sufficient to result in usage patterns that reap the potential benefits of broadband.

In an early study of broadband uses in the US, Horrigan and Rainie (2002) concluded that users with broadband connections were more sophisticated in their usage of the internet than those with lower speed connections. Anderson and Raban's (2005) work suggests that it is not the broadband connection per se that drives this finding, rather it is the fact that in general, broadband users are more experienced internet users and thus their usage patterns reflect greater experience and comfort levels with the internet. In their study of the economic benefits

benefits of higher bandwidth connections like freeing up a phone line and always being on, at a lower price point than faster connections.

of broadband, Gillett et al. (2006) make that point that in order to achieve these beneficial outcomes, "broadband had to be used, not just available" (p. 3). The purpose of this paper is to gain a better understanding of how broadband is used, by Canadian households.

Understanding Usage Patterns in Canadian Broadband Households

This paper analyzes data from Statistics Canada's 2001, 2002 and 2003 Household Internet Use Survey (HIUS)³. This survey was not conducted in 2004, and in 2005 was replaced by the Canadian Internet Use Survey, which collects individual level data on Canadians' internet usage. As 2005 survey data are not yet available, the paper reports on the 2001 through 2003 data sets. While it would be beneficial to have more recent data, as the analysis that follows will show, there are interesting findings in the last three years of the Household Internet Use Survey data.

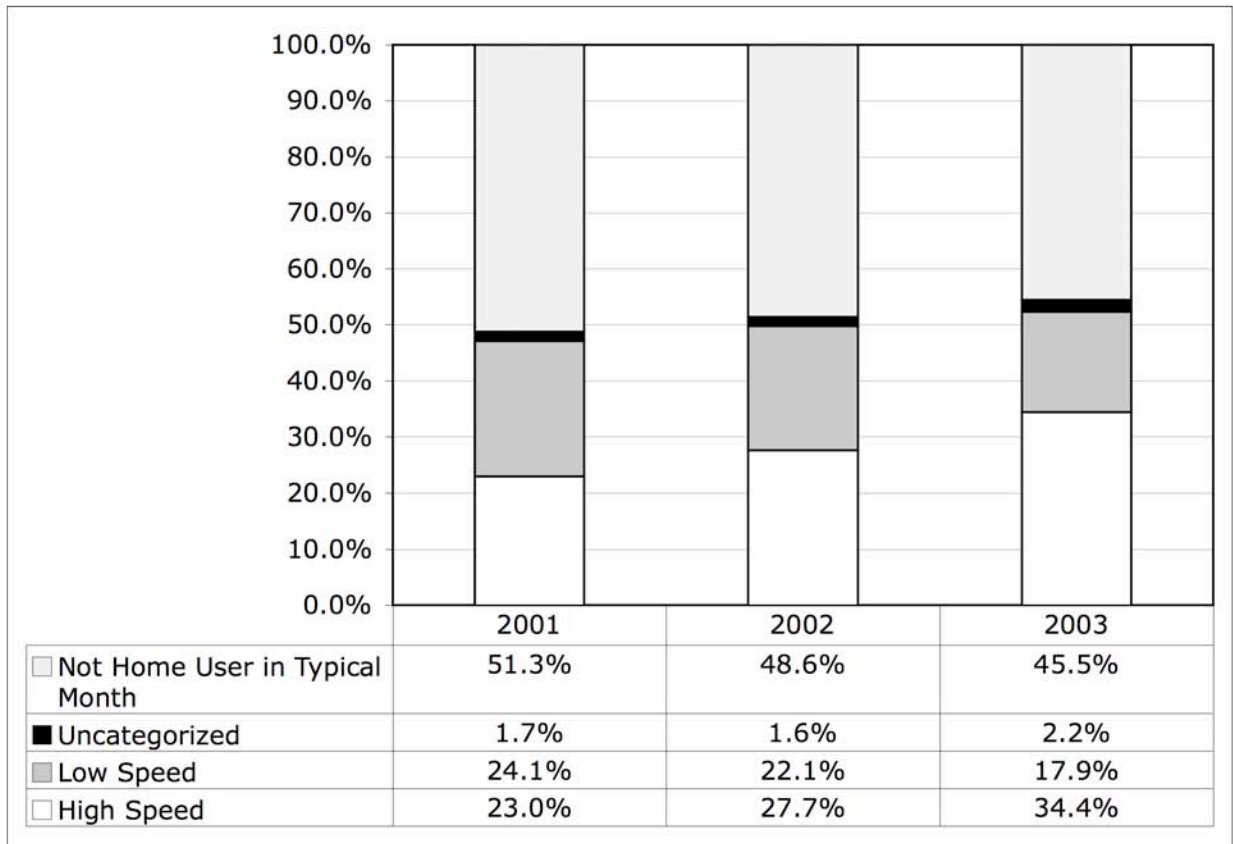
In the context of this paper, there are several variables of interest. The starting point for the analysis is households using the internet *at home* in a typical month. In 2001, 48.7% of households were in this category. In 2002 the number increased to 51.4%, rising to 54.5% in 2003. Within the subset of households using the internet from home in a typical month, the focus in this paper is on households with broadband (high speed) internet connections. Respondents were asked whether their household internet connection was a "high speed" connection. Not all respondents provided an answer to this question, and some answers were unreliable⁴, resulting in a small group of households whose internet connection type could not be

³ All data presented below are from the HIUS. Data sources are indicated by question number, and the full questionnaire is available as Statistics Canada (2004a).

⁴ Some responses appeared inconsistent (e.g. a household indicating that the connection was not high speed also indicated that they connected to the internet by cable, which typically provides a high speed connection). Through examination of responses to questions HU_Q01 (connection speed), HU_Q01U (pricing plan), HU_Q01V (monthly cost), and HU_Q01W (speed), most households could be categorized as high speed or low speed. In cases where there was insufficient information in response to

categorized on the basis of speed. All remaining households were categorized as high speed or low speed households, with the percentages shown in Table 2 below.

Table 2: Canadian Household Internet Usage, Showing Speed of Internet Connection for Households Using the Internet from Home in a Typical Month



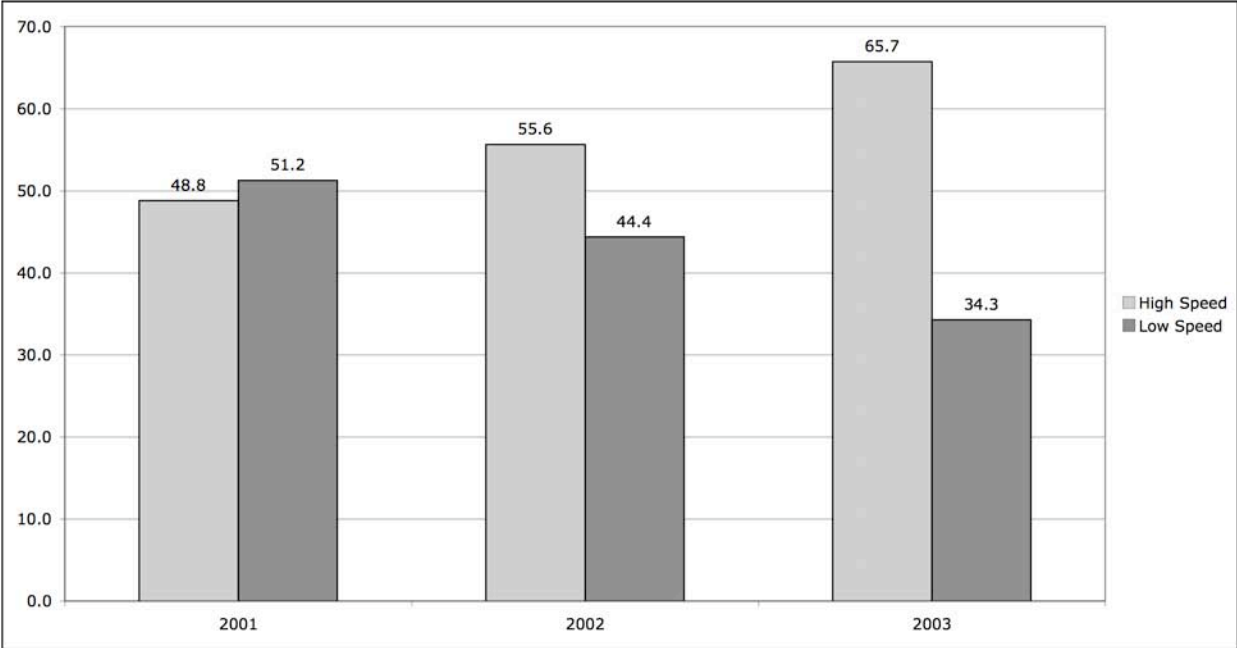
Source: Household Internet Use Survey, 2001-2003.

From this point forward, the analysis includes only households categorized as having high or low speed internet connections, with a focus on the high speed or "broadband" households. Households were also classified based on their intensity of use, and households that could not be classified in this way were excluded from the analysis. Table 3 compares households based on the speed of their internet connection. Not surprisingly, it is noted that

these questions, the household could not be categorized on the basis of speed.

over time more and more households are adopting high speed connections. By 2003, it was estimated that almost two-thirds of the Canadian households that used the internet from home in a typical month had a high speed connection.

Table 3: High Speed and Low Speed Households



Source: Household Internet Use Survey, 2001-2003.

In order to better understand the nature of internet usage among Canadian households, and to explore the differences between high speed and low speed households, two new types of variables were derived from the HIUS datasets. The first measures *intensity* of use, and was based on responses to questions about frequency of internet usage, and time spent online⁵. Households were classified as high intensity or low intensity in their internet usage. The second measures *scope* of use, and was based on responses to questions about the sorts of online activities household members did in a typical month. Several variables were created to measure

⁵ In a typical month, a high intensity household reported using the internet at home "at least 7 times per week" (HU_Q03), and spent more than 39 hours online per month (HU_Q04).

scope⁶. Once these new variables were created, analysis was carried out to explore the nuances of Canadian household internet adoption patterns.

The first area of interest was to understand the relationship between intensity of use and the speed of households' internet connections. The cross-tabulated data are shown below (Table 4). 2003 data are highlighted. It is interesting to note that for all three years, there are more low intensity households than high intensity households (adding together HSLI and LSLI). Of particular interest is the proportion of households categorized as high speed but low intensity (HSLI). These are households that have a high speed connection, but don't use the internet very frequently. While the trend over three years among high speed households shows a shift from low intensity to high intensity, more than half the high speed households in 2003 were low intensity internet users. This observation provides initial evidence that there are different kinds of broadband households.

Table 4: Speed-Intensity Matrix, showing % of Households in Each Quadrant

	Low Intensity	High Intensity
High Speed	HSLI 33.7 2003 28.2 2002 25.9 2001	HSI 32.0 2003 27.5 2002 22.9 2001
Low Speed	LSLI 26.2 2003 33.6 2002 38.7 2001	LSHI 8.1 2003 10.8 2002 12.5 2001

Source: Household Internet Use Survey, 2001-2003.

The first measure of scope provides a count of online activities reported by a household in a typical month. This measures the breadth and diversity in internet usage. The average

⁶ Scope measurements were based on counts of activities, using data in HU_Q11 through HU_Q27. The maximum number of activities was 17, the minimum 0. Activities were also aggregated around common themes, producing measures of usage of the internet for banking, communication, purchasing, education and work, leisure and searching activities. These aggregations are explained as each variable is introduced.

number of different activities reported in a typical month ranged from 8.6 in 2001 to 8.9 in 2003. But examining scope of usage in the context of speed and intensity shows a somewhat different, if not unexpected picture. As shown in Table 5, HSHI households average more than 10 activities per month, compared to the LSLI household average of 7 monthly activities⁷. LSHI households carry out a wider variety of online activities than HSLI households. Consistent with previous analysis of these data sets (e.g. Middleton & Sorensen, 2005), it is also noted that there are differences in usage patterns based on household income, education levels of the head of household, and age of the head of household. Veenhof, Clermont and Sciadas (2005) report similar findings based on the Adult Literacy and Life Skills Survey data. Higher income households have higher mean numbers of online activities, as do those with heads with higher education levels. Households headed by older people have lower mean numbers of online activities. This paper focuses on presenting basic data to show differences in scope and intensity, further analysis will focus on how these differences are influenced by specific household characteristics.

Table 5: Mean Number of Online Activities by Household Speed/Intensity

	2001	2002	2003
HSHI	10.5	10.6	10.6
LSHI	9.4	9.5	9.2
HSLI	8.6	8.8	8.6
LSLI	7.2	7.1	7.0
Total	8.6	8.8	8.9

Source: Household Internet Use Survey, 2001-2003.

While it is interesting to consider total numbers of monthly activities as a method for understanding differences in household internet usage patterns, additional insights can be gained when the online activities are aggregated into types of activities. As was noted earlier,

⁷ For each year, an analysis of variance is significant ($p < 0.0005$), indicating the means for each category are not equal. The 95% confidence levels for each year also show that the means for each group are significantly different.

broadband internet access is touted as a means for individuals to conduct business transactions, participate in educational activities, access health care and government information, communicate with others, and foster a stronger sense of community. HIUS data allow for an assessment of broadband users' financial and purchasing activities, their use of the internet for communication, educational and work-related activities, and the extent of their online searching activities. Extensive analysis was conducted to investigate different usage patterns based on the speed and intensity of household internet connections. A selection of these results is presented below, illustrating interesting differences among households.

In looking at the data on scope of household internet usage, it is noted that in most cases, the trends are predictable. For instance, over time the average number of households that have made an online purchase⁸ in a typical month is increasing (see Table 6).

Table 6⁹: Percentage of Households Who Have Made an Online Purchase in a Typical Month, by Speed and Intensity

	2001	2002	2003
HSHI	37.4%	42.3%	45.8%
LSHI	31.8%	32.9%	37.6%
HSLI	24.9%	30.1%	32.6%
LSLI	19.7%	22.2%	23.7%
Average	26.6%	31.1%	34.9%

Source: Household Internet Use Survey, 2001-2003.

What is interesting in these data is the fact that even by 2003, 65% of Canadian households had not used the internet to make an online purchase, and more than 75% of those in the LSLI category had never purchased anything online. Even amongst those in the HSHI category, less

⁸ Data based on HU_Q13.

⁹ In Table 7, and those that follow below, the "average" line in the table shows the total percentage of households for the scope variable being considered. The four lines for the speed/intensity variable show how the average is distributed among the different categories of users. So for example, in 2001 19.7% of LSLI households had made an online purchase in a typical month, compared to 37.4% of HSHI households.

than half indicated that they had made an online purchase in a typical month.

An examination of internet usage for educational or job search related purposes¹⁰ shows large differences among households who do not use the internet in a typical month for either purpose (e.g. more than 40% of low intensity high speed households do not engage in educational or job seeking internet activities, as compared to just 26% of the high intensity high speed households). It is also noted that the percentages of households not using the internet for educational or work purposes is increasing over time in most categories, rather than decreasing as might be expected¹¹.

Table 7: Percentage of Households Who Have Not Used the Internet for Job Seeking or Education in a Typical Month, by Speed and Intensity

	2001	2002	2003
HSHI	24.4%	25.1%	26.0%
LSHI	29.8%	27.7%	32.3%
HSLI	42.5%	39.5%	42.4%
LSLI	47.3%	48.5%	50.1%
Average	38.6%	37.3%	38.4%

Source: Household Internet Use Survey, 2001-2003.

An analysis of households' online searching behaviours provides a good measure of the breadth of online activities conducted in a typical month. A count of six different types of information searching indicated that most households do use the internet for a variety of search purposes¹². In 2001, an average of 55.8% of households searched for four or more types of information in a typical month. These numbers rose to 59.2% in 2002, and 61% in 2003. High intensity households were more likely to engage in more search behaviours than low intensity households, regardless of the speed of the internet connection.

¹⁰ Data are based on HU_Q15 and HU_Q17.

¹¹ If possible, future analysis should consider the importance of labour force status, and the presence of students in the household in gaining a better understanding of these data.

¹² Data are based on HU_Q14, HU_Q16, HU_Q18, HU_Q25, HU_Q26, and HU_Q27.

Table 8: Percentage of Households Who Have Searched for Four or More Types of Information in a Typical Month, by Speed and Intensity

	2001	2002	2003
HSHI	67.8%	70.4%	74.0%
LSHI	62.3%	64.9%	63.8%
HSLI	54.9%	59.0%	59.8%
LSLI	47.2%	48.3%	47.4%
Average	55.8%	59.2%	61.4%

Source: Household Internet Use Survey, 2001-2003.

Data are available on household usage of email and chat groups, and are aggregated as a communication variable¹³. In the three year period there were very few changes in overall usage patterns. As of 2003, 70% of households use at least one communication tool in a typical month (although these data do not show which tool, it is reasonable to expect that the majority of those households just using one communication tool would be using email), compared to just 3% who do not use the internet for communication purposes (down from 4% in 2001). Stating this another way, 97% of households do use the internet for communication purposes.

Table 9: Percentage of Households Who Have Used the Internet for Communication Purposes in a Typical Month, by Number of Uses.

	2001	2002	2003
Never	3.8%	3.3%	3.0%
One	68.7%	70.0%	70.8%
Two	27.4%	26.7%	26.2%

Source: Household Internet Use Survey, 2001-2003.

As the usage patterns have not changed much over the three year period, the table below provides a breakdown by speed and intensity for the 2003 year only. Similar patterns are found in the 2001 and 2002 data, with high intensity households more likely to use both email and chat than their low intensity counterparts.

¹³ Data are based on HU_Q11 and HU_Q20.

Table 10: Percentage of Households Who Used the Internet for Communication Purposes in a Typical Month, by Speed and Intensity (2003 Data)

	Never	One	Two
HSHI	0.9%	57.1%	42.1%
LSHI	2.0%	65.0%	33.0%
HSLI	3.5%	77.4%	19.1%
LSLI	5.3%	81.0%	13.7%
Average	3.0%	70.8%	26.2%

Source: Household Internet Use Survey, 2001-2003.

Discussion

The data above show clear differences in household internet usage activities when assessed based on the speed and intensity of household internet use. For each aggregate measure of activities, it is demonstrated that high intensity users are also higher scope users. In other words, the high intensity users are observed to have a greater breadth of usage of the internet, and in a typical month, do a wider range of things online than low intensity users. This finding is not surprising, as it makes sense that those households that do more online are also those households that use the internet more frequently. These findings suggest that those who find the internet more useful (as measured by the scope of their online activities) also use it more intensely.

What is interesting in these findings is that the speed of the household internet connection is not so clearly connected to the scope of usage activities¹⁴. Although it has been suggested that high speed users are also more sophisticated users of the internet, this is not observed in this analysis, when scope of internet usage is taken as a measure of sophistication of use. In all types of activities examined above, high intensity users with low speed connections (LSHI) demonstrated broader scope in their internet activities than low intensity users with high speed connections (HSLI). A ranking of scope of usage shows HSHI first,

¹⁴ It is noted that this analysis does not examine causality among variables.

followed by LSHI, HSHI and LSLI, showing the dominance of intensity over speed.

Speed alone is not associated with sophistication of use. Given this finding, it is of particular interest to note the data in Table 4. In 2003, there were more low intensity households (33.7%) among broadband users than there were high intensity households (32.0%). While the numbers are quite close, what is important to recognize is that approximately half of the Canadian households that do have a broadband connection are relatively light users of the internet. These households are shown to be less engaged in internet activities (as measured by scope), and it is suggested that they are less likely to embrace the internet further to realize the potential benefits that more engaged internet usage might provide.

This research also presents valuable findings in terms of understanding the relative popularity of various online activities within Canadian households. Table 11 provides summary data on average scope of use, demonstrating that despite the high rates of broadband adoption by Canadians, their overall scope of use is quite low in some areas. More than two-thirds of online Canadian households have not made an online purchase¹⁵ and less than half of the households use the internet to look for work or for educational purposes. If the internet is to become a means of engaging Canadians in the knowledge economy, through online commerce and lifelong educational activities, and as a means of helping Canadians gain employment, there is a long way to go before this objective can be achieved on a universal basis.

¹⁵ This analysis did not consider the HIUS data on "window shopping".

Table 11: Summary of Scope Average Household Activities in a Typical Month

Type of Behaviour	Measure in Typical Month	2001	2002	2003
Purchasing	Yes	26.6%	31.1%	34.9%
Ed/Work	One	41.7%	42.4%	40.4%
Search	>4	55.8%	59.2%	61.4%
Communication	One or Two	96.2%	96.7%	97.0%

Source: Household Internet Use Survey, 2001-2003.

Canadian households are using the internet quite extensively to search for information (including information on government services, health care and travel), but there is still a large percentage of the online user community that engages in relatively limited searching activity. As searching is an essential means of navigating the internet, extensive searching capability is needed to be a proficient internet user. It is true that not all users will need to search for a wide variety of different information types, but wider searching patterns do indicate more willingness to engage with the internet as a resource to support daily activities.

Canadian households have embraced the internet as a communication device. The vast majority of households report using email and/or chat, thus indicating a basic skill level in internet use.

The data presented here do not allow for analysis of Canadian households' motivations for using the internet, thus it is not possible to assess the extent to which households are not interested in certain activities. Nevertheless, it is argued that the scope of internet usage can be used as a means for assessing overall engagement levels with the internet, no matter the reasons underlying such engagement. Regardless of whether Canadian households are not partaking in certain online activities because they are not interested in them, or because they do not have the necessary skills, computer literacy or equipment to do so, the fact remains that these data show that Canadian households have a somewhat spotty level of engagement with the internet.

Policy Implications

This paper demonstrates that broadband connectivity does not in and of itself enable enhanced engagement with the internet. For people to become full participants in an information society, they must become engaged with the internet. Governments around the world are taking actions that will result in the internet (and other information and communication technologies) becoming a fundamental part of society, and the primary means by which to engage with various societal members. Information and communication technologies are expected to be more widely used to support health care, to provide educational opportunities, to connect and foster communities, to support cultural activities, and to facilitate commerce and trade. Citizens without access to such technologies will be disadvantaged. There has been much work done on the "digital divide" (see for example Clement & Shade, 2000; Haddon, 2000; Hargittai, 2002; Mason & Hacker, 2003; Rideout, 2001; Rideout & Reddick, 2005; Sciadas, 2002; Selwyn, Gorard, & Furlong, 2005; van Dijk, 2005), and this paper contributes to this research. Specifically, this paper addresses the digital divide from the perspectives of internet scope and engagement, and raises concerns about "readiness" for full participation in the information society.

The contribution of this paper is to show that there are differences among Canadian broadband users, challenging the widely held notion that broadband adoption somehow means that that users are ready and willing to become full participants in the information society. There are broadband users who do fit this assumption, but there are also many broadband households that demonstrate much less engagement with the internet, and are expected to have less interest, and possibly less aptitude, to fully embrace and participate in an ICT-enabled society.

From a policy perspective, it is argued that a focus on achieving universal broadband

adoption will not necessarily result in universal broadband engagement, nor will it result in a society that is ready to, or capable of, benefiting from increased online service delivery and enhanced ICT usage. There is a gap between the provision of broadband and the usage of broadband. As Anderson and Raban (2005) note, "broadband access will not change the structural problems already found in narrowband – those who have the knowledge and experience gain the most benefit whilst those who lack the skills, knowledge and perhaps self-confidence are left further behind" (p. 15).

There is a danger that increases in broadband adoption rates will be viewed as measures of increased readiness for "e-society", but this paper argues that this is not the case. In Canada, there is a large group of low intensity broadband households, and it is anticipated that this group will increase more quickly than the high intensity broadband households. Revisiting the matrix presented earlier, it is seen that there is limited room for growth in broadband uptake from high intensity low speed households. Interestingly, the data presented here provide some evidence that not having a high speed connection is not a barrier to engagement with the internet, as the LSHI households showed broader scope of usage than their HSLI counterparts. There is no doubt that broadband access provides a more convenient and efficient means of engaging with the internet, and it is expected that the low speed high intensity users will adopt broadband at a later date (likely barriers to broadband adoption in this category are price and availability).

Table 12: 2003 Canadian Internet Households, by Speed and Intensity

HSLI 33.7	HSHI 32.0
LSLI 26.2	LSHI 8.1

Source: Household Internet Use Survey, 2001-2003.

There is a possibility that over time households will migrate into the HSHI quadrant from all other quadrants. In the short term however, it is most likely that the LSLI households will become HSLI households. If success or "e-readiness" is measured on the basis of broadband adoption rates alone, then this migration from low speed to high speed will be lauded. Based on the analysis presented here however, it is seen that movement within the speed range does not increase engagement as much as movement from low intensity to high intensity. It is anticipated that more recent data on broadband adoption rates in Canada will show a shift in the balance away from low speed to broadband. But given the nature of the market and the products on offer, it is likely that this growth will come in the low intensity segment of the market. In particular, it is noted that the definition of broadband has been stretched by service providers, who now offer a range of "low end" broadband packages that are designed to move people away from dialup services. These packages offer the benefits of free (i.e. non-busy) telephone lines and the convenience of always-on access, but they do not provide the sort of bandwidth envisaged by the National Broadband Task Force and others as the foundation for the information society.

This paper sheds new light on the nature of broadband households in Canada, by showing that not all households are equal. The differences in households' scope of internet usage does matter, as it reflects differences in readiness for participation in the information

society. This paper lays the groundwork for additional analysis of Canadian household and individual level internet adoption data, showing ways in which measures of scope and intensity create valuable new insights, with important implications for equal access and participation in an information society.

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