



CENTER *for* RURAL POLICY *and* DEVELOPMENT

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The 2006 Minnesota Internet Study Broadband enters the mainstream

Introduction

Since 2001 the Center for Rural Policy & Development has annually conducted surveys throughout Minnesota to discern the level of computer ownership, Internet connectivity and broadband adoption. Since the beginning of this project we have observed and reported significant increases in technology adoption, this being especially true in the increasing number of rural Minnesotans who connect to the Internet from home using a broadband connection.

In 2005 we made the decision to conduct two random surveys concurrently in both rural and metro Minnesota to discern residential differences in technology adoption. This decision and methodology was replicated again for the current study. Samples simulating random-digit dialing were drawn for the seven-county Twin Cities area and for the remaining 80 counties by Survey Sampling International of Fairfield, Conn. The surveys were then administered throughout December 2006 and January 2007 via telephone interviews.

The data collection process yielded 748 completed interviews from the rural 80-county sample and 747 completed interviews for the seven-county metro sample. The data were then weighted by age, based upon U.S. Census estimates. Accordingly, the survey results have tolerated margins of error at the 95-percent confidence level of ± 3.52 percent for both the rural and metro samples. Finally, for those results that combine both the rural and metro sample together to yield a statewide estimate, the data was further weighted using U.S. Census estimates to reflect that 54.3 percent of all Minnesota households are located in the seven-county metro, while 45.7 percent are located throughout the remaining 80 counties.

A quick look at the major findings concludes that:

- Our statewide estimate at the end of 2006 is that 1,393,267 households, or 68.7 percent of all Minnesota households, currently possess at least one working computer.

The Center for Rural Policy and Development, based in St. Peter, Minn., is a private, not-for-profit policy research organization dedicated to benefiting Minnesota by providing its policy makers with an unbiased evaluation of issues from a rural perspective.

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That is marginally up from our estimate of 1,379,570 or 68 percent of all households at the end of 2005.

- 1,288,291 or 63.5 percent of all Minnesota households now maintain a home Internet connection, up from our estimate of 1,208,526 or 59.6 percent at the end of 2005.
- 995,641 or 49 percent of all Minnesota households now connect to the Internet from home using a broadband connection. This estimate is up significantly from our previous estimate of 737,397 households at the end of 2005.
- Overall levels of computer ownership and Internet connectivity throughout rural Minnesota have been relatively flat or at best, modestly increasing for some time. Estimates from 2003 to the present are generally within the 3.5-percent margin of error, suggesting that there is little evidence of discernible growth within this time frame. On the other hand, broadband adoption continues to grow unabated throughout rural Minnesota and has clearly accelerated in the past 12 months. For example, in 2003 15 percent of all rural Minnesota households had a broadband Internet connection, but our current findings suggest that at the end of 2006 that number had more than doubled to 39.7 percent.
- As was documented in 2005, there are still significant differences in technology adoption between households in rural and metro Minnesota. While 65.5 percent of rural households report owning a home computer, 71 percent of metro households report likewise. Similarly 59.4 percent of rural households report having Internet connectivity vs. 67 percent of metro households, and 39.7 percent of rural households report connecting to the Internet with a broadband connection compared to 57 percent of metro-area households.
- Socio-demographic factors such as age, income, or whether school-age children are present in the home continue to be excellent predictors of technology adoption in both rural and metro Minnesota.

- Finally, in the earlier years of the study (2001-2003) the reported Internet utilization behavior of consumers who purchased broadband services was quite similar to those of dial-up users, the primary difference being that broadband users were able to engage in such activities faster and more conveniently. That is no longer the case. Today there is discernible product differentiation between broadband and dial-up technologies as it relates to the consumers' online behavior.

Findings from the 2006 Study

The Internet and broadband enter the mainstream

Figure 1 documents the six-year trend line for computer ownership, Internet connectivity and broadband adoption in rural Minnesota, while Figure 2 documents the differences in rural and metro areas for the same parameters. Two observations found in these charts are particularly noteworthy.

First, note in Figure 1 that growth in computer ownership and Internet connectivity has been relatively flat or modest at best for some time among rural households. In fact, as the study has a margin of error of ± 3.5 percent, one can say that there is scant evidence to suggest that there has been any substantive growth for some time. Simply stated, if one did not have a computer in their home in 2005, there is little reason to think one would appear in 2006. Further, it is equally clear that the overwhelming majority of home computers are already connected to the Internet. Thus further growth in Internet connectivity will be quite limited without further penetration of computers into homes throughout rural Minnesota. The only discernible growth in rural Minnesota is among those residents who are switching from a dial-up connection to a broadband connection. Here we find a steady and unmistakable trend.

Further, note that the adoption rate for broadband is not only linear, but it appears to have significantly accelerated in the past 12 months. This acceleration would be quite congruent with theories that suggest that after an innovation has been adopted by 20-25 percent of the population, its adoption curve accelerates as the technology leaves the realm of the "innovators and early adopters" and enters into the mainstream. If this is true, it strongly suggests that broadband technology has entered the mainstream.

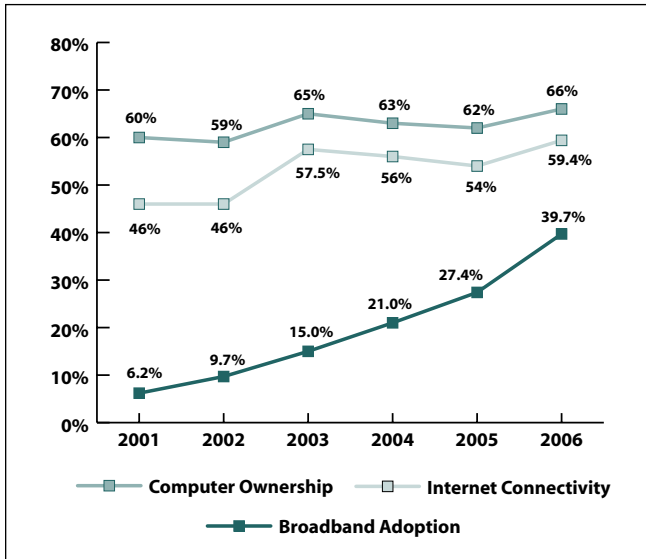


Figure 1: In rural communities, computer ownership and Internet connectivity increased only slightly over last year. Broadband adoption, however, rose sharply.

The second noteworthy observation is that, as many have suspected, there are significant differences in technology adoption between rural and metro households (Figure 2). Here we see again that it all begins with computer ownership. The percentage of home computers is substantially higher among metro households (71%) than rural households (65%), and it is this higher rate of computer ownership in metro-area homes that allows for the greater rates of Internet

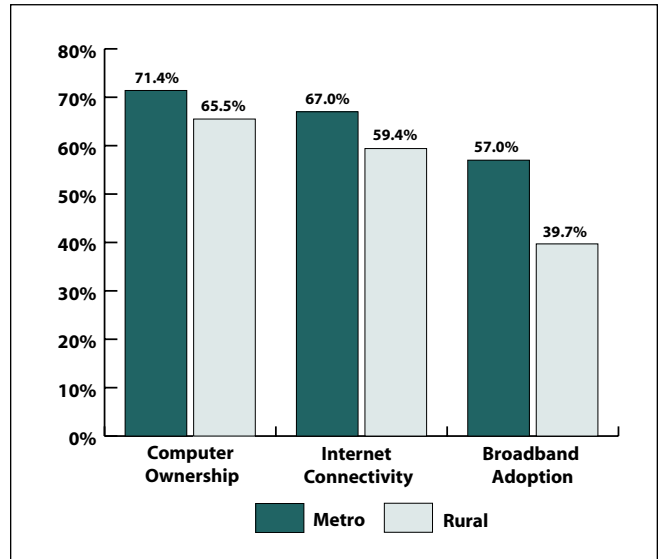


Figure 2: Computer ownership, Internet connectivity and broadband adoption are still higher in the Twin Cities metro area compared to the rest of Minnesota.

connectivity in that region. This relationship breaks down, however, when we examine differences between broadband adoption in metro homes compared to rural locations. In fact, here we find that the rate of broadband adoption in metro-area homes (57%) is much greater than in rural homes (39.4%). This is likely due to a variety of factors, including age and income demographics and broadband availability, which will be discussed later in this report.

Previous studies have reported at times differences in technology adoption rates across various regions of the state. However, as Figure 3 demonstrates, by the end of 2006 such regional variations in computer ownership, Internet connectivity and technology adoption seem to be quite modest.

As Internet applications continue to use larger and larger files and as a result require greater and greater bandwidth, questions about consumer satisfaction with connection speed is important. Accordingly, survey respondents in both rural and metro locations were asked about their satisfaction with the speed of their Internet connection, and as one can see, broadband users in both rural and metro Minnesota report extraordinarily high rates of satisfaction. In fact, as documented in Figure 4, over 90 percent of broadband users in both rural and metro areas report that they are satisfied with the speed of their broadband connection. Unfortunately, the same cannot be said for dial-up users, where well under half reported being satisfied

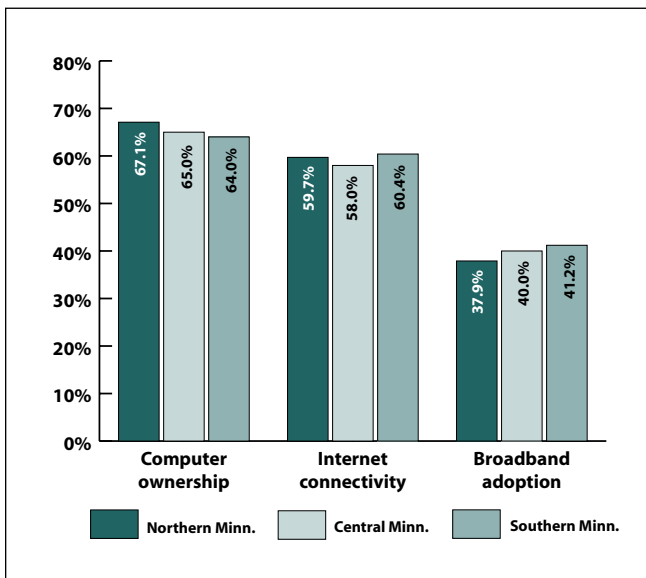


Figure 3: Computer ownership, Internet connectivity and broadband adoption still vary from region to region around the state, but not as much as in past years.

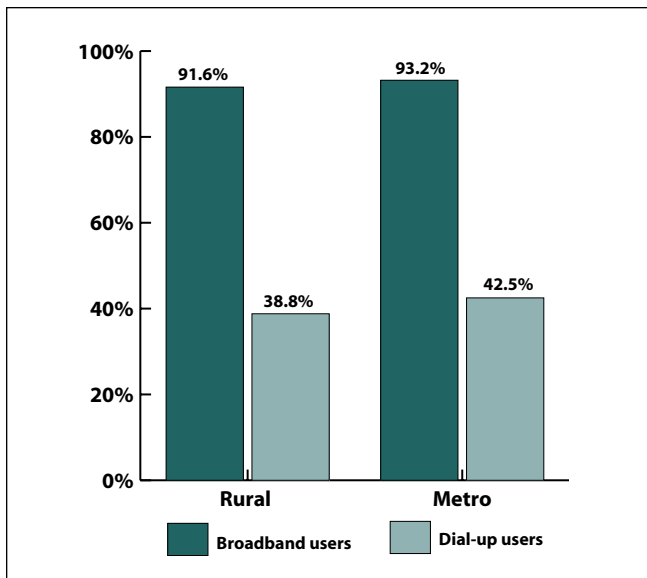


Figure 4: Broadband users in both rural and metro regions reported much higher satisfaction with the speed of their Internet connections.

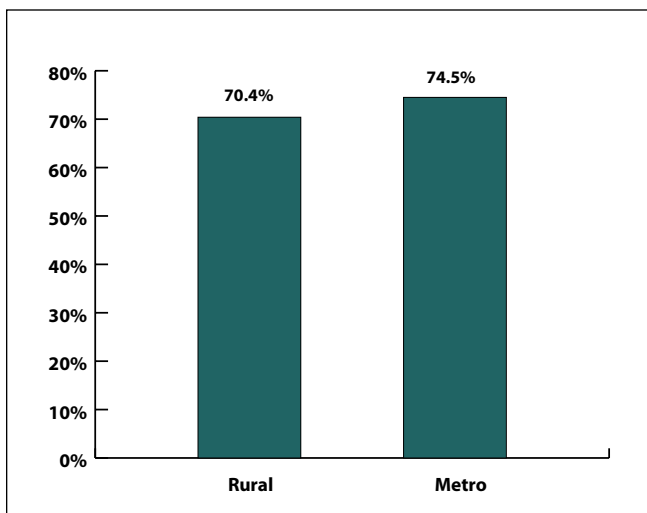


Figure 5: Nearly three-quarters of broadband customers now report purchasing their service as part of a bundle.

with their connection speeds. Such dissatisfaction among dial-up users is likely a function of the increasing amount of time it now takes to download the large files commonly found with modern Internet applications.

One of the most profound marketing innovations since 2000 has been the bundling of broadband services with video services by cable providers or bundling with class and long-distance services by telephone companies. More recently, both cable and telephone providers are rushing to offer “the triple

play,” i.e. a bundle of services consisting of voice (telephony), video (television) and data (Internet) services to consumers for one price. Both the technological as well as the marketing rush toward the triple play have been impressive and appear to be paying off. As Figure 5 shows, more than 70 percent of broadband customers in both rural and metro markets reported receiving their services as part of a bundle of services, compared to slightly more than 50 percent of broadband subscribers in both our 2004 and 2005 surveys.

Finally, Figure 6 examines the most common reasons why current dial-up users in both rural and metro areas report that they have yet to switch to a broadband connection.

As one can see, the most common reason given in both rural and metro areas is that it is too expensive (41% and 42% respectively). The second most common reason cited is that they simply do not use the Internet enough to justify the added cost of broadband. As we have found in previous surveys, a significant number of home dial-up users actually have access to broadband at their place of employment, but they are evidently modest Internet users at home. However, dial-up customers who reported not yet switching to broadband due to its lack of availability are significantly differentiated by geography: 22 percent of dial-up customers in rural Minnesota reported the unavailability of broadband in their area as their primary reason for not switching, compared to only 10 percent of metro-area residents. Clearly, while affordable broadband services are widespread throughout rural Minnesota, it is not yet ubiquitous.

Socio-demographics still count

As we have documented many times in past studies, socio-demographic characteristics continue to be excellent predictors of technology adoption. Primary among these factors are age, income and the presence of school-age children in the home. Figures 7-10 document the differentiation in rates of technology adoption by these three primary predictors in both rural and metro areas.

Figure 7 shows that age has a profound effect on technology adoption rates in both rural and metro environments. In fact, the findings suggest that adoption rates remain rather consistent until the 56-64 age cohort, and the rate plummets among those age 65 and over. Further, this decline in technology adoption

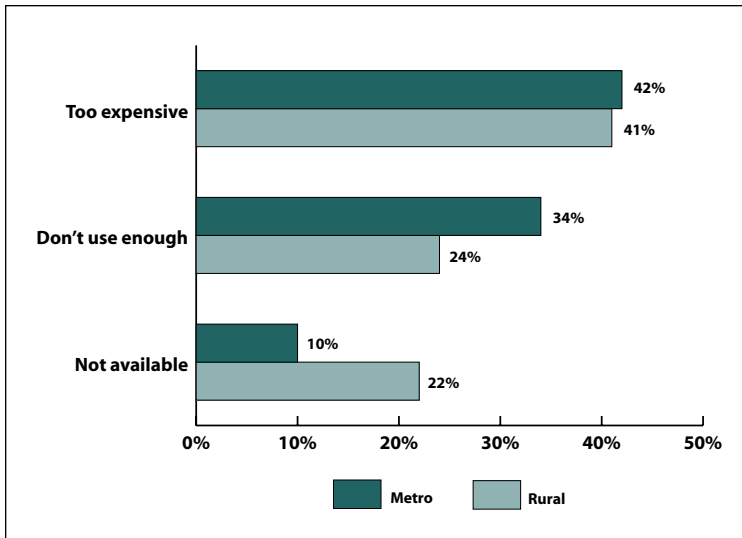


Figure 6: Dial-up users in both metro and rural regions cite expense as the most common reason for not switching to broadband.

across age groups is both linear and dramatic, as the eldest group shows adoption rates that are less than half that of their younger counterparts.

Another way of examining the impact of the “life cycle” on technology adoption is found in Figure 8, where we see the effect on broadband adoption of having children living in the household.

Here again we see that respondents who report

having school-age children (ages 6-18) living in their households are much more likely to report having a home broadband connection. And again, similar to the age data in Figure 7, this pattern is easily discernible and equally true for rural households (52.8% vs. 33.5%) and urban households (70.4% vs. 50%).

Lastly, we look at the impact of income on technology adoption. This analysis can be found in Figure 9. Here we again see an unmistakable linear pattern where the correlation between income and technology adoption is easily discernible. In rural Minnesota, for example, among residents with annual household incomes of less than \$25,000, only 30.5 percent report owning a home computer and only 13.6 percent report purchasing a home broadband connection.

At the other end of the income distribution, among rural residents reporting a household income of \$100,000 or greater, 87 percent report having a home computer and 65 percent report having a home broadband connection.

As one looks at all the income categories between these endpoints, it is clear that a pattern similar to the age distribution chart emerges for both rural and metro Minnesota.

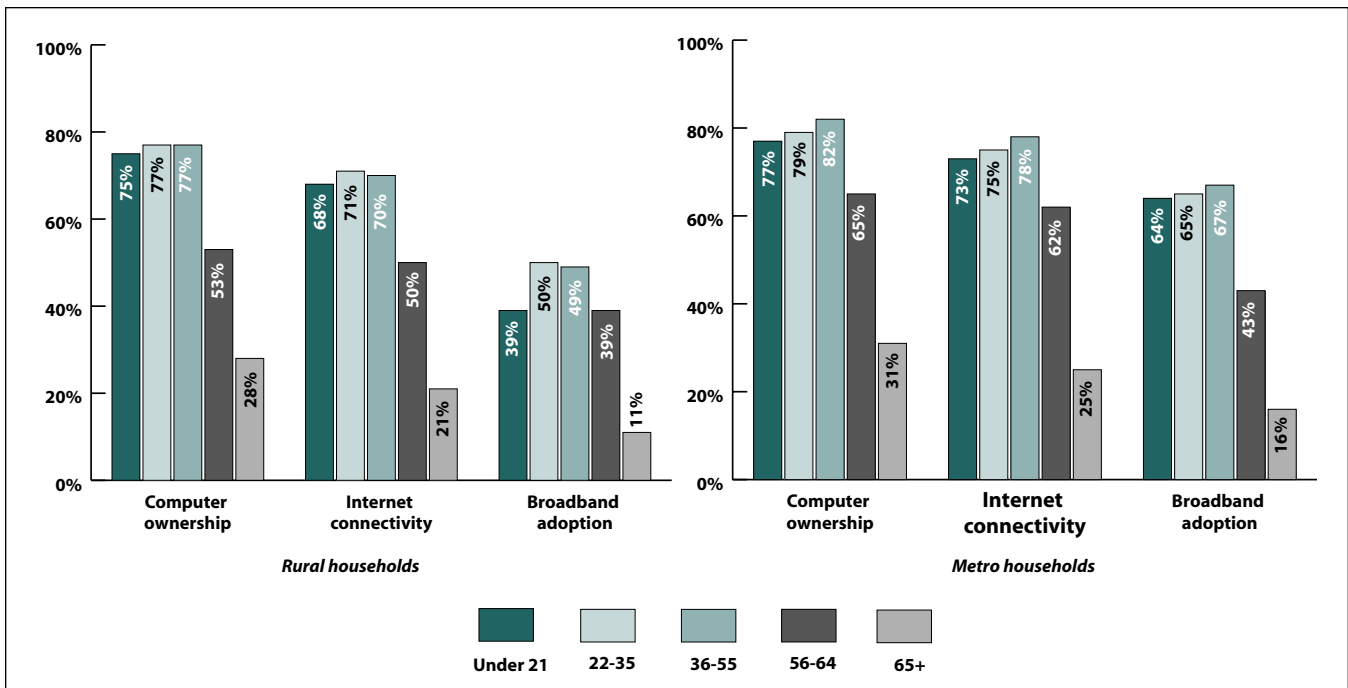


Figure 7: Age has a profound effect on the rate of computer ownership, Internet connectivity and broadband.

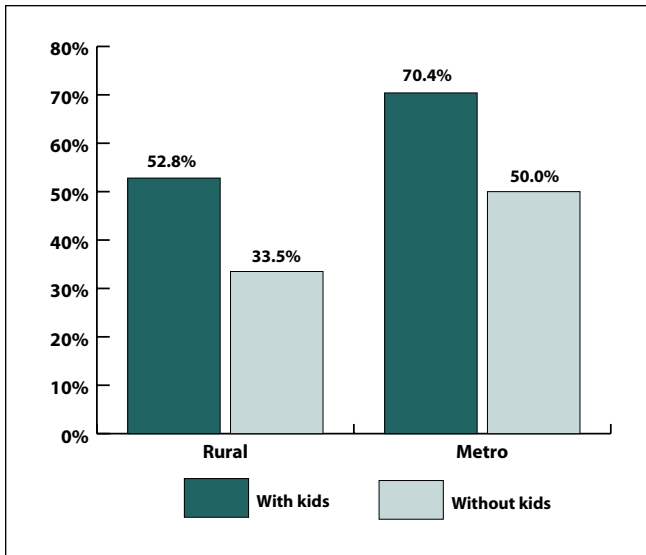


Figure 8: The presence of school-age children in a household has a significant impact on whether broadband is used there also.

Examining online behavior

One of the most interesting findings over the years has been the change in online behavior of broadband users compared to dial-up users. During the early years of our surveys, when asked about their online behavior and activities, broadband users reported activities and

usage that were identical to dial-up users. The primary difference at the time was that broadband users would engage in these activities more quickly and conveniently than their dial-up counterparts. In recent years, however, all that has been rapidly changing.

Today's modern Internet applications are being developed with the assumption that the end-user has a broadband connection. These modern applications in personal entertainment, business and commerce and even online government services require large data and graphic file transfers that often overwhelm a dial-up connection, rendering it useless. Services and networking sites such as YouTube, MySpace and iTunes require the downloading or streaming of large music, graphics and video files that simply exclude those with dial-up connections from their use. Business and commerce applications equally assume that the end user is connecting at speeds capable of large file transfers.

The consequence of this move to more complex, interactive and sophisticated Internet applications is that we now observe significant differences in online behavior depending upon the connection speed of the end user. In simple terms, we view this as product differentiation, which is not only reflected in the types of online activities one engages in, but even in the

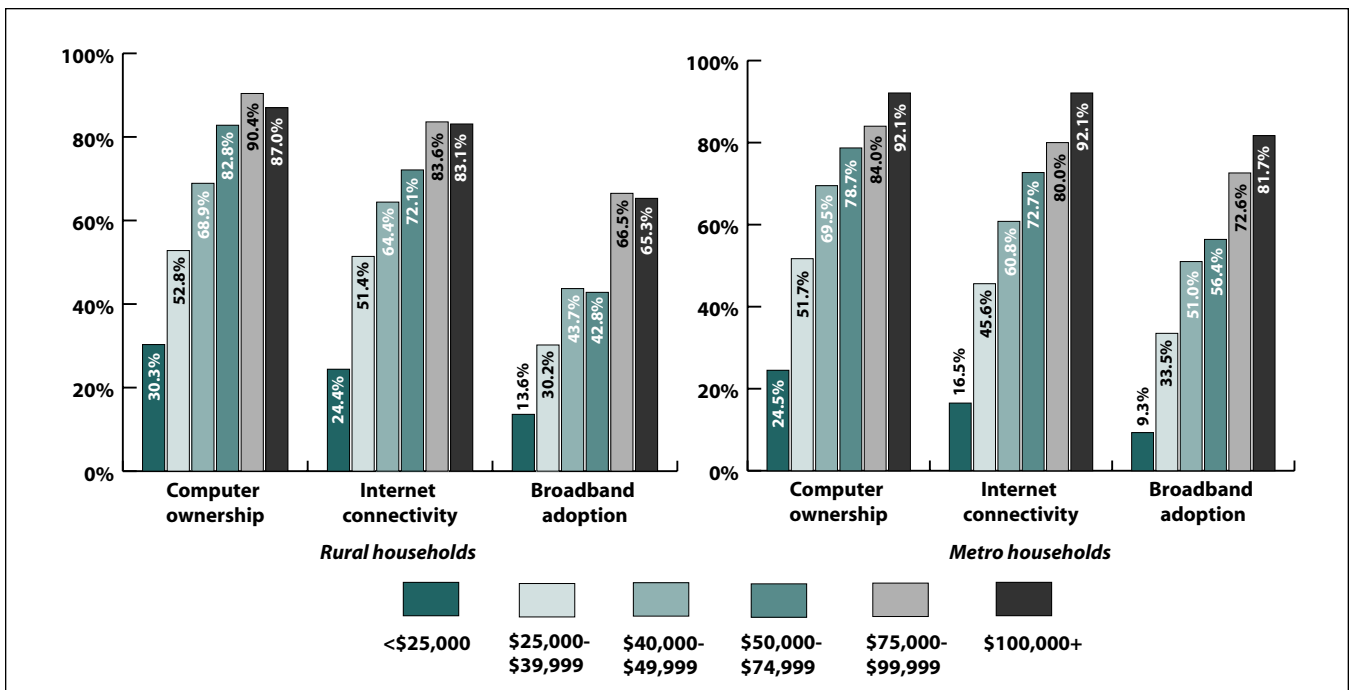


Figure 9: Income is another socio-demographic factor that affects technology adoption significantly in both rural and metro households.

amount of time each week one spends online. Figure 10 documents the average number of hours Internet users spend online each week in both rural and metro Minnesota. As one can see, broadband customers in both rural and metro locations report being online approximately twice as long each week as dial-up customers. And while the reported hours online each week are virtually identical in rural and metro locations for dial-up customers, we notice that metro-area broadband customers report being online a few hours more each week than their rural counterparts.

Finally Table 1 demonstrates how this product differentiation is emerging across a variety of Internet applications. For example, one can see from this table that applications such as sending and receiving e-mail (which are equally effective with a dial-up or broadband connection) show virtually no differentiation, as the rates of use are almost identical across all types of users in all geographies. However, when one looks at virtually all the other selected applications, we see significant and sometimes remarkable differences in reported use depending upon connection type. Further, one can see from Table 1 that regardless of the application, metro-area residents seem to embrace the Internet applications and services at a greater frequency than their rural counterparts.

Summary and Conclusion

As we have done in years past, the 2006 Minnesota Internet Study gives the reader an opportunity to better understand the patterns of adoption, diffusion and utilization of Internet technologies among Minnesota households as reported at the end of calendar year 2006. Further, due to our

Table 1: While virtually all Internet users use e-mail, in other activities broadband users appear to be much more active than dial-up users.

	Metro		Rural	
	Dial-up	Broadband	Dial-up	Broadband
E-mail	94.5%	98.8%	93.8%	97.6%
Online shopping	43.8%	70.0%	63.0%	68.4%
Search for job	34.2%	50.0%	30.8%	37.0%
VOIP phone call	1.4%	8.5%	1.4%	4.7%
Instant messaging	17.8%	49.2%	29.5%	39.1%
Download music/video files	31.5%	64.6%	25.3%	48.1%
Work from home	15.1%	51.2%	19.7%	33.0%

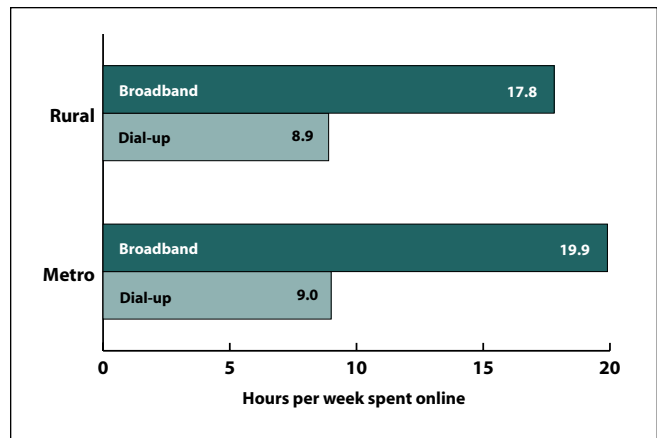


Figure 10: Broadband users in both rural and metro areas spend significantly more time online each week than dial-up users.

long-standing interest in this area of research, it allows the reader to longitudinally chart the rise in technology adoption in rural Minnesota since 2001, as well as compare these adoption rates to residents in the Twin Cities metro.

With that being said, it appears that four broad themes emerge within these findings. First and foremost is that by the end of 2006 we not only witnessed the continuing rise in the number of households in rural Minnesota purchasing a broadband Internet connection, but we witnessed a discernible acceleration as well. Specifically, broadband adoption rates rose from 27.4 percent of all rural Minnesota households at the end of 2005 to 39.7 percent at the end of 2006, a pace twice the rate we have witnessed in previous years. To some extent the rise was expected, but the acceleration was not.

While there are several plausible explanations

for this acceleration, the most likely can be found in Everett Rogers's theory regarding the diffusion of innovations (Rogers 1962). In this seminal work Rogers examines the process and pace by which a new innovation is utilized and diffused throughout a society. Whether it is hybrid seed corn among Midwestern farmers in the 1940s or microwave ovens throughout America's

kitchens in the 1970s, the process and characteristics of their adoption are somewhat uniform. Within that theory of diffusion, it suggests that once an innovation is adopted by approximately 20-25 percent of the population, the adoption curve takes a steep climb upward as the innovation enters the mainstream. No longer in the realm of innovators and early adopters, it certainly appears that broadband Internet technology is now at that point in its adoption curve.

The second theme that emerges from this study is that despite significant acceleration in broadband adoption throughout rural Minnesota, it is clear that the gap between the technology adoption rates of rural and metro Minnesotans has not narrowed. This is especially true in the adoption of broadband technologies. At the end of 2005 we estimated a 16.5-percentage point difference (43.9% vs. 27.4%), while now at the end of 2006 this differential is measured at 17.3 percentage points (57% vs. 39.7%). Given the statistical margin of error of our surveys we can only conclude that while adoption rates have accelerated in all regions of Minnesota, the urban/rural differential in broadband adoption remains unchanged.

The third emergent theme is that socio-demographic characteristics continue to be one of the primary drivers and the most reliable predictors of technology adoption. The evidence around this statement is clear, unequivocal and compelling. Factors such as age, stage in the life and family cycle, and total household income continue to be excellent predictors. That is not to downplay the reality that in some areas of rural Minnesota availability of a land-based broadband service (as opposed to satellite) is still out of reach. In fact, our study found that more than double the percentage of dial-up customers in rural Minnesota (22%) than in the metro area (10%) cited lack of availability as the primary reason for not yet switching to a broadband connection. However, those areas are becoming fewer and fewer as telecommunications providers work to fill in

these geographic gaps. With that noted, it is equally clear that the rural/metro differential cited above is much more a function of the socio-demographic characteristics of these communities than broadband availability.

The final theme that emerges from these findings is that similar to earlier discussions about a digital divide separating those who are online and those who are not, a similar divide is emerging between dial-up and broadband users. The continuing product differentiation and its impact on its respective user groups (dial-up vs. broadband) is quite apparent. Further, there is every reason to predict that this differentiation will only continue to increase with time.

It is clear from our findings that many of the more modern Internet applications that now require very large data, music, video and graphic file transfers are being used to a great extent primarily by a broadband audience. Dial-up users will continue to be frustrated in their efforts to move such large files with relatively slow connection speeds. And in many cases, such as Voice over Internet Protocol (VOIP) telephony, dial-up users will find themselves simply unable to access such services. Further, many of the more traditional web sites, such as those in the real estate industry, will continue to add larger and more complex graphics files or add short streaming video clips, which will keep dial-up customers from fully utilizing the services these web sites provide. Accordingly, whether these web applications are within the category of personal entertainment, business and commerce, or even a variety of public and governmental services, the default now seems to be that they will be used increasingly by broadband customers.

Examining these findings in their entirety, it is hard to come to any other conclusion: broadband technology has clearly exited the realm of the innovators and early adopters and has now entered the mainstream.