

2004 National Technology Readiness Survey

– **Summary Report** –
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Highlights from the 2004 National Technology Readiness Survey

Spam on the Internet

- Thirty-six percent of Internet users receive at least 10 spam e-mails a day (Page 3)
- Fourteen percent of those who receive spam read it to see what it says (Page 3)
- Four percent of spam recipients have purchased from spam in a 12-month period (Page 3)
- The economic impact from time wasted deleting spam is estimated to be \$21.6 billion a year (Page 5)

M-commerce

- Six percent of online users make purchases from a venue other than home or work, usually at a friend or relative's home (Page 8)
- Only 2 percent of those making purchases away from home or work do so over a mobile device (e.g., PDA). Two percent use a mobile phone (Page 8)

E-government

- Twenty-six percent of online users have conducted business with a government entity online over a 12-month period (Page 9)
- The satisfaction level for doing business with government online is 69 percent for local/state sites and 66 percent for federal government sites, which is behind the levels for e-commerce sites in general (Page 10)

E-services

- From 2000 to 2004, the share of online consumers buying items less than \$10 via the Internet grew from 20 percent to 38 percent, almost doubling (Page 11)
- The fastest growth in e-services has been in banking – the incidence of online consumers moving/withdrawing bank funds online grew from 11 percent in 2000 to 27 percent in 2004 (Page 12)
- In 2004, 30 percent of online consumers have purchased directly from other consumers using an auction site or online classified (Page 13)

E-health

- Six percent of online adults have purchased prescription drugs online from a U.S. retailer in a 12-month period (Page 14)

Consumer technology readiness

- The TechQual® Index that measures propensity to adopt new technologies has remained virtually unchanged from 2000 to 2004. Despite the dot.com boom and an Internet revolution, Americans have not fundamentally changed in their acceptance of cutting-edge technology (Page 15)

Introduction

The National Technology Readiness Survey (NTRS) tracks beliefs about technology and key behaviors related to the Internet and e-services. It includes measures of consumer technology readiness and identifies emerging trends in commerce and society.

The study is administered by Rockbridge Associates, Inc., a technology research firm, and sponsored by the Robert H. Smith School of Business' Center for Excellence in Service at the University of Maryland. The study was founded by Charles L. Colby, president of Rockbridge, and Professor A. Parasuraman, University of Miami, both senior fellows at the Center for Excellence in Service.

Methodology

The NTRS is based on a random sample of U.S. adults (18 years or older) and is administered by telephone. The study has been conducted five times since 1999 (see below). A special African American and Hispanic NTRS was conducted in 2003.

Wave	Sample Size	Margin of Error
Jan 1999	1000	+/- 3 percent
Feb 2000	1000	+/- 3 percent
Nov 2001	501	+/- 4 percent
Nov 2002	501	+/- 4 percent
Nov 2004	1000	+/- 3 percent

The following report covers key findings from the 2004 NTRS. Some of the topics discussed here were based on a sub-sample of 500 respondents and have a margin of error of +/- 4 percentage points.

Findings

Key findings from the 2004 NTRS include the following areas:

- Spam
- M-commerce
- E-government
- E-service trends
- E-health
- Technology readiness

Spam on the Internet: How a Few Wasted Minutes Add Up

Widely considered the scourge of the online world, spam is a routine annoyance, if not a carrier of harmful computer viruses. Defined in this study as “unsolicited e-mail from someone you do not know and is typically sent to several e-mail addresses simultaneously,” nearly four out of five (78 percent) online adults receive spam e-mail on a daily basis across all their e-mail accounts. Fully one-third (36 percent) receive 10 or more spam e-mails, while one out of 10 (11 percent) receive at least 40 spam e-mails on a daily basis. Some, however, are spared this bother: nearly a quarter of online adults (22 percent) tend to get no spam at all.

Incidence of Spam E-mail Among Online Adults	
<i>Base: online adults</i>	(418)
No. of spam e-mails received per day on all e-mail accounts	%
0*	22
1 to 4	18
5 to 9	16
10 to 19	13
20 to 39	12
40 or more	11
Not sure how many	8
Median per day	5 spam e-mails
Mean per day	18.5 spam e-mails
<small>*Note: A user who reports “0” spam e-mails per day may still receive spam occasionally. “On average, about how many spam e-mails do you get per day on all your e-mail accounts? Spam is unsolicited e-mail from someone you do not know, and is typically sent to several e-mail addresses simultaneously)”</small>	
Source: 2004 National Technology Readiness Survey	

For a minority of adults, spam is not necessarily dismissed out of hand, but has the potential to pique their interest. Of those online adults who receive spam, 14 percent will open it to see what it says, as opposed to strictly checking to see if it is something they should delete.

In the past 12 months, 4 percent of online adults who received spam purchased something as a result of seeing the product or service advertised in a spam e-mail. This constitutes a marketplace of almost 5 million adults.¹ While these

¹ There are currently 169.4 million online adults (220 million adults per the U.S Census x 77 percent who are online at home, work or another location.) Of these, 70 percent receive spam, resulting in a conservative estimate of 118.6 million adults (118.6 x 70 percent). With 4 percent purchasing from spam each year, this amounts to 4.7 million purchasers.

users account for only a small share of the vast e-commerce market, they appear to be numerous enough to motivate spammers to continue their practices.

Incidence of Spam E-mail Activities Among Online Adults	
<i>Base: online adults who receive spam and recall how many they receive</i>	(295) %
Read spam e-mail to see what it says	14
Have made a purchase as a result of seeing product/ service advertised on spam in past 12 months	4
<i>[IF RECEIVE 1 OR MORE SPAM E-MAILS] "Do you ever read spam e-mail to see what it says, other than to check whether it is something you need to delete?"</i>	
<i>[IF RECEIVE 1 OR MORE SPAM E-MAILS] "In the past 12 months, have you purchased anything as a result of it being advertised in a spam e-mail?"</i>	
Source: 2004 National Technology Readiness Survey	

The degree to which e-mail account holders manage their inboxes and junk-mail folders depends on the volume of e-mail they send and receive, the frequency with which they log on to their accounts, and the space available on their accounts. Overall, two-thirds (68 percent) of online users sweep their accounts clean of spam at least once a week, while more than one-quarter (27 percent) who receive spam feel compelled to delete it on a daily basis. By contrast, a quarter (23 percent) do not need to delete spam more than once a month.

Regardless of how often they delete their spam (e.g., once a day or once a month), on a typical day it takes about three minutes on average to delete it from their accounts.

Time Spent Deleting Spam Among Online Adults	
<i>Base: all online adults</i>	(418)
Frequency of deleting spam	%
Never (receive no spam)	10
Once a month or less	13
2 or 3 times a month	5
Once a week	12
2 to 3 times a week	16
4 to 6 times a week	13
Every single day	27
Not sure	4
Time spent deleting spam in a typical day	%
Do not spend any time	17
> 0 up to ½ a minute	28
> ½ up to 1 minute	18
> 1 up to 5 minutes	26
More than 5 minutes	11
Average time spent in a typical day	2.8 minutes
<i>"In a typical week, how many different days do you go onto e-mail and actually delete spam e-mails?"</i> <i>"In a typical day, when you have to delete spam, do you spend less or more than a minute doing so?"</i> [IF LESS THAN ONE MINUTE] "Approximately how many seconds do you spend deleting spam in a typical day?" [IF MORE THAN ONE MINUTE] "Approximately how many minutes do you spend deleting spam in a typical day?"	
Source: 2004 National Technology Readiness Survey	

When aggregated across the 169 million online adults in the United States, the time wasted from deleting spam is substantial:

- Each week, online users waste over 22.9 million hours (annually, this accounts for 1.19 billion hours)
- The lost time translates into 573,000 jobs (based on a 40-hour work week)
- When this wasted time is valued at the average U.S. wage it amounts to \$21.6 billion per year.²

Implications: The problem of proliferating spam will not easily disappear. Unlike traditional direct mail and telemarketing, the unit cost of sending spam is

² These estimates were computed by combining survey estimates with data from the U.S. Bureau of the Census and the Bureau of Labor Statistics (BLS), as follows: (1) The average minutes per week spent deleting spam was computed for each respondent by multiplying the days per week spent deleting spam by the minutes spent doing so in a "typical day;" the resulting average is 8.12 minutes per week per online user. (2) The minutes per week was multiplied by the number of total online users (169.4 million), to produce the estimate of 1.38 billion minutes (22.9 million hours per week). (3) The total hours per week was divided by 40, to produce the estimate of 573,137 work weeks. (4) The number of work weeks was multiplied by the average weekly wage of \$724 (BLS, 2nd Qtr. 2004), to produce the estimate of \$414,950,947 in wasted time per week. When the weekly estimate is annualized, it is \$21.58 billion dollars per year.

minimal. As the NTRS reveals, at least some consumers are buying from spam, making the activity potentially profitable. Yet, spam has a cost, even if it is not borne by the spammers themselves. The estimate of \$21.6 billion provides one way of assessing the economic impact of unwanted spam by placing a value on the user time wasted by this activity. This figure is conservative because it does not count the wasted resources used to transmit spam, the cost to ISPs to manage and protect customers from spam, and the money spent by consumers on spam blocking software.

Our multi-billion dollar estimate provides an indication of the societal benefit to be derived from successful efforts by the government, business and non-profit sectors to control the problem of excessive spam. For instance, if these sectors spent \$1 billion per year in technology and enforcement activities, and as a result reduced the time wasted from spam by half, the payoff over and above this cost would be almost \$10 billion, a relative bargain.

One solution to the problem may be to charge spam purveyors for sending e-mails, in the same manner that the U.S. Postal Service charges for unsolicited commercial mail. In the future, such solutions may become practical as technology advances in the area of authentication that can flag whether a sender has provided proper identification. Users would be assured that a sender is legitimate, or that the sender can at least be tracked if they engage in illicit activities, so they may actually read more spam. Furthermore, the revenue can be used towards maintenance of Internet infrastructure. If each spammer paid 1 cent per mailing and the volume of spam remained what it is today, the resulting revenue would be approximately \$11 billion a year.³

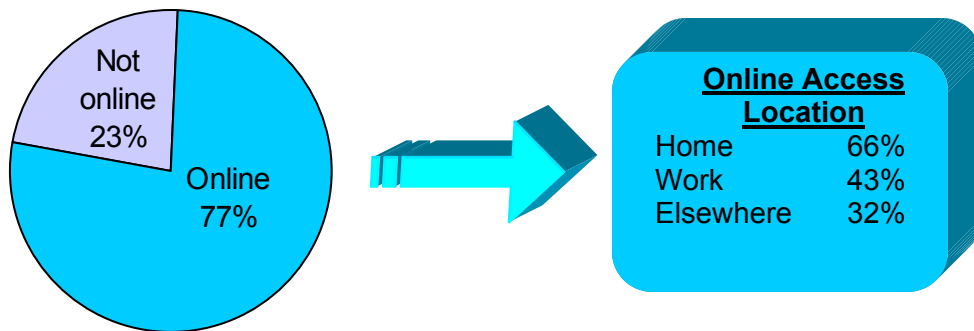
³ Based on 1.14 trillion spam messages a year (assuming a daily receipt of 18.5 per user).

M-Commerce: Is It All Hype?

True m-commerce is still in its infancy, since less than 1 percent of online consumers who have purchased products online used a mobile device, such as a mobile phone or PDA, to make those purchases. However, many consumers are looking beyond their home or office access to conduct e-commerce, showing an inherent need for m-commerce.

Three-fourths of the U.S. population currently has some form of access to the Internet. Two-thirds have Internet access at home and approximately two-fifths access the Internet at work.

Online Access at Home, Work or Elsewhere



About one-third go online at some other location – primarily a friend or relative’s home. Almost half who go online outside their home or workplace visit a public library to access the Internet, and a quarter access the Internet on a college campus. Nearly two out of 10 access the Internet from travel locations.

“Other” Locations From Where Internet Was Accessed	
<i>Base: accessed Internet elsewhere</i>	(181)
Where consumers access the Internet when not at home or work	%
From a friend or relative's home	72
Public library	46
College campus	24
At travel locations, such as airports	17
High school, middle school or elementary	15
Place where you pay for Internet access	11
Local or state government office	9
An automobile	4
Other	7
<i>“In the past 12 months, have you accessed the Internet from any places other than home or work for personal purposes? [IF YES] In the past 12 months, have you accessed the Internet for personal purposes from: READ LIST.</i>	
Source: 2004 National Technology Readiness Survey	

E-commerce is thriving in the United States and moving beyond the home and office – 87 percent of online consumers participate in e-commerce, which amounts to two-thirds (67 percent) of *all* consumers. **While most make these online purchases from home (87 percent) or work (35 percent), 16 percent are going to other locations to conduct e-commerce⁴.**

Of those who conduct e-commerce for personal purposes away from the home or workplace, more than half (57 percent) go to the home of a friend or relative. However, consumers also use a variety of other venues for purchasing online when away from home/work:

- Public library (19 percent)
- Travel locations, such as airports, trains, etc. (9 percent)
- Local or state government office (8 percent)
- College campus (8 percent)
- Car (4 percent)
- K-12 school (2 percent)
- Place where you pay for Internet access, such as cyber café or office store (2 percent).

Of those who make their purchases online away from home or the office, most use a desktop computer (91 percent) or a laptop (28 percent). Very few use mobile devices (2 percent use PDAs and another 2 percent use a mobile phone) which shows that consumers have not made the leap to true m-commerce.

To sum up, true m-commerce has not achieved a critical mass but is likely to grow as consumers show definite signs of a need to conduct commerce online when away from their stationary home or work places.

⁴ These percentages add to more than 100 because consumers may conduct e-commerce from more than one venue.

E-Government: Lagging Behind E-Commerce in Satisfaction

The incidence of online adults visiting government Web sites climbed in 2004, bouncing back to surpass usage in 2001 after dropping in 2002. The incidence of consumers actually conducting business with the government online remained relatively steady since 2001.

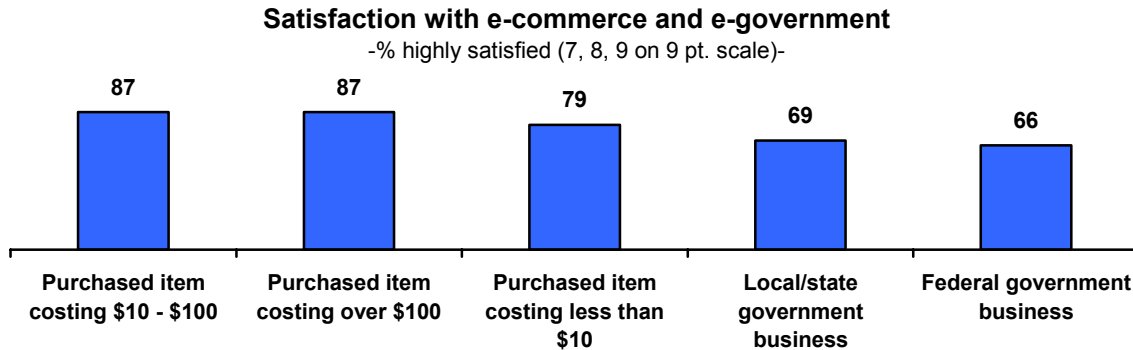
Nearly six out of 10 (57 percent) online adults visited a local, state or federal government Web site over a 12-month period, up from 47 percent in 2002. A quarter (26 percent) of online adults conducted business with a government entity via the Internet. As was the case in 2002, conducting business with the government saw only minimal growth from previous waves. However, e-government has shown continued growth since 2001.

Incidence of E-Government Activities in the Past 12 Months			
	2001	2002	2004
	(418)	(422)	(828)
<i>Base: online adults</i>	%	%	%
All government levels			
Visited government Web site (local, state, fed'l)	55	47	57*
Conducted business with govt. online (local, state, fed'l)	21	24	26
Local/state government			
Visited local/state government Web site	50	39	54*
Conducted business with local/state government online	16	19	19
Federal government			
Visited federal government Web site	33	36	38
Conducted business with federal govt. online	11	18	15
*Significantly higher than 2002.			
<i>"What types of things have you yourself done for personal purposes, either at home, at work or elsewhere on the Internet in the past year? Have You:</i>			
<i>t. Visited a Web site for a local or state government online</i>			
<i>u. Conducted business with a local or state government online</i>			
<i>v. Visited a Web site for a federal government office online</i>			
<i>w. Conducted business with the federal government online"</i>			
Source: 2004 National Technology Readiness Survey			

NTRS breaks results out by state/local and federal government activities. In 2004, 54 percent of online adults visited a local or state government Web site, up substantially from 2002 when it was 39 percent, and surpassing that of 2001 when it was 50 percent. The percent of online consumers who conducted business with a local or state government over the Web was 19 percent, the same as in 2002.

Almost four out of 10 online consumers (38 percent) visited a federal government site in 2004, up slightly from 2002 and 2001. Only 15 percent of online adults conducted business with the federal government, slightly less than two years ago but up from 2001.

Satisfaction with the business of e-government is below that with e-commerce in general. Two-thirds of e-government users are highly satisfied with their experience (69 percent for local/state government and 66 percent for federal government). In comparison, almost eight out of 10 consumers (79 percent) are highly satisfied when purchasing items online costing less than \$10, and almost nine out of 10 (87 percent) are highly satisfied when purchasing items costing more than this amount.



Satisfaction has not changed much since it was last measured in 2002:

- Satisfaction with doing business with state/local governments online rose from 64 percent in 2002 to 69 percent in 2004 (not statistically significant).
- Satisfaction with federal government business online declined from 74 percent in 2002 to 66 percent in 2004 (also not statistically significant).
- Thus, in 2002, federal government was ahead of state/local governments in online satisfaction, but by 2004, the gap has narrowed so the two levels are about the same.

E-government appears to be used by large numbers of citizens, although its incidence of use is not growing rapidly and there is room for improvement in the quality of the experience. Compared with a few years ago when the NTRS first noted that more people do business with the government online than trade stocks online, state and local governments have made strides in expanding and improving online services. The federal government is also pushing ahead with online initiatives, but is lagging behind other levels of government in satisfying its citizen users.

Trends in E-Services

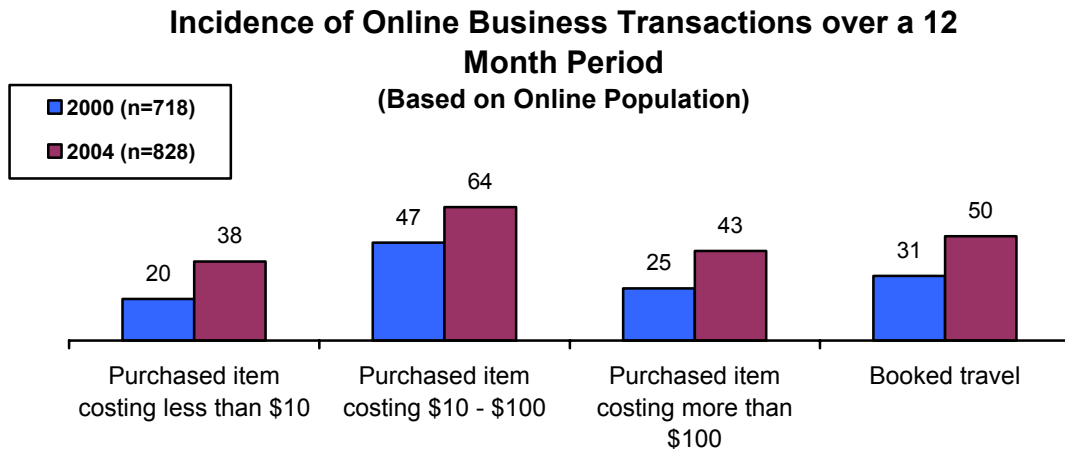
During the time that the NTRS has tracked e-service behaviors, there has been a marked growth in the incidence of online adults who conduct business over the Internet for personal reasons. All kinds of online purchasing has grown significantly, with the most striking growth in banking.

In the past 12 months, 70 percent of online adults have made a purchase over the Internet for personal reasons.⁵ The most common price category consists of items costing \$10 to \$100. Specifically:

- Thirty-eight percent purchased an item costing less than \$10,
- Sixty-four percent purchased an item costing \$10 to \$100, and
- Forty-three percent purchased an item costing over \$100.

The incidence of purchasing in each of these categories has grown by 17-18 percent since 2000. For example, the proportion of online adults who purchased a small-ticket item (less than \$10) over the Internet grew from 20 percent in 2000 to 38 percent in 2004, almost doubling.

Online travel booking has also grown substantially from 31 percent of online adults in 2000 to 50 percent in 2004.

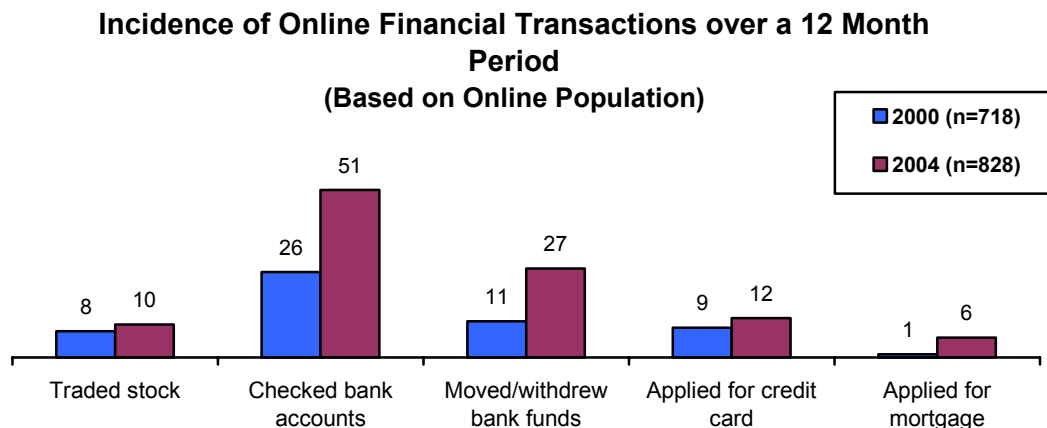


⁵ The question was worded as: “What types of things have you yourself done for personal purposes, either at home, at work, or elsewhere, on the Internet in the past year? Have you: READ LIST.” In 2000, the term “elsewhere” was not used; the authors believe that using the Internet at alternative locations was not common in 2000 and the change in wording does not have a notable impact on results.

The most striking growth has been in online banking. The incidence of online adults who have moved or withdrawn funds over the Internet has more than doubled from only 11 percent in 2000 to 27 percent in 2004. The incidence of those checking banking accounts online has doubled, so that now half of online adults report having engaged in such activities in the past 12 months (26 percent in 2000, versus 51 percent in 2004). Although not tracked four years ago, another prevalent financial activity is paying bills online:

- Thirty percent of online consumers have used bill-paying services on the Internet over the past 12 months
- Thirty-one percent have paid a bill directly to a company's Web site.

Online stock trading, a much touted service in the dot.com era, has not gained much penetration since 2000. Currently, 10 percent of online adults trade securities online, compared to 8 percent four years ago. One activity that was almost non-existent in 2000, applying for a mortgage online (1 percent incidence) is now 6 percent.



Growth in online purchasing and online financial services is connected to consumers' ability to overcome fears of doing business with this new medium. The NTRS tracks beliefs about technology and reveals that there is ample concern about the Internet being a dangerous frontier. For example, in the most recent survey:

- Sixty-eight percent of consumers do not consider it safe giving out a credit card number over a computer, and
- Fifty percent do not consider it safe to conduct any kind of financial business online.

These concerns have lingered since they were first flagged in the NTRS in 1999, and have been a serious drag on online commerce. However, as with any innovation from air transportation to automatic teller machines, consumers do not

necessarily change their views but come to accept their fears and take advantage of the new technologies.

C2C commerce: The Internet is facilitating “C2C” commerce, with consumers selling goods and services directly to each other. Intermediaries may be an auction site or a direct marketing site that enables commerce that is consumer driven. In the 2004 NTRS, the following was observed:

- Thirty percent of online adults made purchases from other consumers through an Internet site such as an auction site or classified online ad
- Twelve percent sold an item over the Internet through an auction site or classified online ad
- Nine percent made purchases through an online direct marketing or multi-level marketing site.

Other online activities: The NTRS also tracks behaviors that do not involve actual commerce. For example, a major area of increased activity is using the Internet to check utility account information. Only 9 percent of online adults did this in 2000, but in 2004, a quarter (27 percent) did so. One reason may be the introduction of new e-service options by phone, gas, electric and cable companies. Other findings include:

- In 2004, 45 percent of online adults visited a Web site for a membership organization they belong to, and this incidence is virtually the same as four years ago (43 percent).
- There has been more growth in online learning – 14 percent of online adults took a course online in 2004, compared with 8 percent in 2000.

In conclusion, there has been significant growth in the prevalence of online activities for commerce, finance and education since 2000. Certain areas have taken off faster than others. Commerce and banking have seen considerable growth because mainstream consumers are beginning to accept fears about the Internet. Another factor contributing to services growth is probably the increase in available services, such as online account management features by financial institutions and utilities. As these sectors grow, other emerging sectors are being created by the Internet, including C2C commerce and the use of the Web by nonprofit organizations.

E-Health: Using the Internet for Wellness

One of the first areas where the Internet made an impact on peoples' lives was in providing health information. Over two-thirds of online adults – 69 percent – researched health information on the Internet over a 12-month period in 2004. Yet, this behavior was also prevalent four years ago (62 percent in 2000).

Consumers use the Internet in other ways to manage their wellness, although these other behaviors are still in their infancy. The following are the percentage of online adults who reported engaging in different behaviors over a 12-month period in 2004:

- Ten percent consulted with a medical professional online
- Six percent purchased prescription drugs over the Internet from a U.S. retailer
- One percent purchased prescription drugs from a non-U.S. provider
- Two percent obtained medical test results online.

With their health, research was and continues to be the major area where the Internet is able to help consumers. Despite the hype about purchasing drugs from Canadian pharmacies and the proliferation of spam touting drugs, the online purchasing of drugs does not appear to be high at this time.

Consumer Technology Readiness: Steady Over Past Five Years

The NTRS tracks the level of Technology Readiness in the general population using a proprietary scale developed by Professor A. Parasuraman, University of Miami, and Rockbridge Associates, Inc.⁶ Called the “Technology Readiness Index” (TRI) by scholars, and TechQual® by researchers in the private sector, this index combines the responses to 36 agreement-scaled survey questions into a single number that correlates with the willingness to adopt and embrace new technology for home and work. Consumers and workers high on this index are usually the first to plunge into a new technology area; for instance, they were the first to get Internet access, and as others got online, the first to purchase goods and bank online.

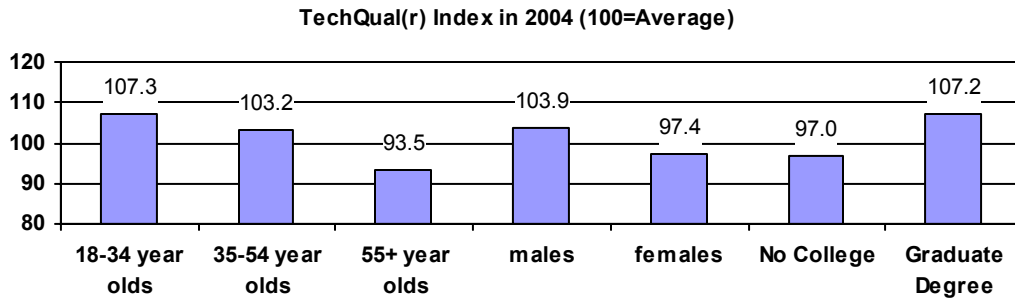
The TRI was set at 100 in the baseline study in 1999. The index score for any one person can range from 44 to 167, depending on their survey responses, but in general, an index value above 110 can be considered very high (upper one-third of the population in 2004) and an index below 96 can be considered very low (lower one-third of the population). The index has been tracked using the same survey questions for four of the past five years. The index includes questions that capture optimism, innovative tendencies, discomfort and insecurity with technology.

Since 1999, the level of technology readiness in the general adult U.S. population has remained virtually unchanged. The TR Index stands at 100.6 compared with 100.0 five years ago. The implication is that there has been no fundamental shift occurring in the technology personalities of the American public. Having experienced the dot.com boom and the Internet revolution, Americans hold similar beliefs in aggregate as they did five years ago, and have not been transformed to be more or less receptive to future technologies. They are doing more with technology, but harbor the same fears and aspirations in 2004 as they did in 1999.

Technology Readiness has and continues to vary by demographic characteristics, with age and education being the most important. Techno-readiness declines with age and increases with the level of education. Males are slightly more techno-ready in their attitudes than females. People whose professions involve technology have an average TRI of 111.3, compared with 102.1 for workers in other professions. *It should be stressed that the index is a measure of beliefs and not of competence or ability.*

⁶ See [Techno-Ready Marketing: How and Why Your Customers Adopt Technology](#), by A. Parasuraman and Charles L. Colby, The Free Press, NY, 2001.

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Technology Readiness also varies by type of community. The most techno-ready consumers live in close-in suburbs, while the least techno-ready live in rural areas.

Perhaps the most important lesson learned from the tracking of this index over time is that we should not be smug about living in an exciting new age that is transforming our fundamental relationship with technology. Research suggests that younger consumers will decline in techno-readiness as they age. We are likely to face the same challenges and enjoyments with the newest technologies (like MP3 players, plasma TVs and wireless networks) as with past technologies such as the first televisions, the first home computers and air travel.