2023 CONSUMER RESEARCH

The Status of U.S. Broadband: The Growing Preference to Fiber Broadband

BASED ON NEW 2023 CONSUMER RESEARCH & PAST CONSUMER STUDIES (2007-2022)

Fiber Broadband ASSOCIATION

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When fiber leads, the future follows.

TABLE OF CONTENTS

I. FORWARD

The global pandemic demonstrated that high-speed broadband is no longer a luxury but a necessity for every home, business, or anchor institution. As a result, the Biden Administration has made the deployment of fiber broadband infrastructure and national imperative. At the end of 2022, there were 63 million unique homes with access to Fiber-To-The-Home so we are nearly halfway to achieving the President's objective of connecting every American by 2030. The Bipartisan Infrastructure Law includes $42.45 billion in broadband infrastructure funding that is being administrated through the NTIA BEAD (Broadband Equity and Deployment) program. This federal broadband infrastructure funding program prioritizes fiber projects. On June 26, 2023, President Biden announced the state-by-state allocation of this funding, and we anticipate that nearly as much fiber will be deployed during the next 5-years as has been deployed throughout history. This Consumer Research Study clearly demonstrates the importance and preference of Fiber by consumers across every measurement and category.

Consumers want Fiber to be able to work from home, healthcare, education, safety, and higher home values, to just mention a few benefits. This study also highlights the Net Promoter Score and market share benefits that network operators enjoy by investing in fiber broadband deployment. One of the most interesting outcomes of this study is that the preference and value of fiber is continuing to increase year-over-year. We expect that trend to continue as fiber becomes more available to consumers.

I hope you find the outcomes and insights from this report to be useful. We are in one of the most exciting periods in telecommunications history as we believe that as we work to get every American connected with Fiber by the end of the decade, it will enable exciting innovations, digital equity, and raised the quality of life for generations to come.

Gary Bolton
President and CEO
The Fiber Broadband Association

II. STUDY METHODOLOGY AND PURPOSE

This report is primarily built on consumer research which has been annually sponsored by the Fiber Broadband Association (FBA) since 2007. Each year, RVA has conducted a study focusing on Internet use among U.S. (and Canadian) online consumers. Sample sizes have ranged from 2,000 - 4,500. The 2023 edition, conducted in May, had a sample size of 4,000.

This FBA/ RVA study is one of the longest running and most comprehensive U.S. consumer Internet research in existence. Besides covering a wide range of questions, it includes important methodology innovations, such as directly sampling in real-time a respondent's speed, latency, and now jitter (variations of latency). There is no other known nationwide random sampling of speeds and latency by broadband type. (Data from speed testing services, although important, is not randomly sampled. Such data can be biased somewhat in that: a) those subscribing to higher speed tiers are more likely to take speed tests; b) speed tests can come from both home and business locations.)

Last year's FBA/ RVA Consumer Broadband Report (2022) focused on measurable performance advantages of fiber broadband or FTTH (fiber-to-the-home) versus other delivery methods in terms of speeds, latency, and jitter. The report also showed statistically significant fiber impact differences in terms of household economics, sustainability, quality of life, and sustainability – many of which are especially important for lower income families.

The 2023 Consumer Broadband Report focuses on the underlying importance of broadband to consumers and consumer preference for broadband delivery methods.

[8] https://www.speedtest.net/global-index/united-states

III. THE BACKGROUND NEED

A. The Current Need: The Importance Of Broadband To Daily Life

It is generally understood that high quality broadband is critical to daily life in 2023.

Broadband importance can be measured in various ways. In response to a question about the importance of home amenities, very high speed and reliable Internet was named the second most important amenity for a single family home – trailing only a laundry room. Good home Wi-Fi connectivity was also important at the fifth position.

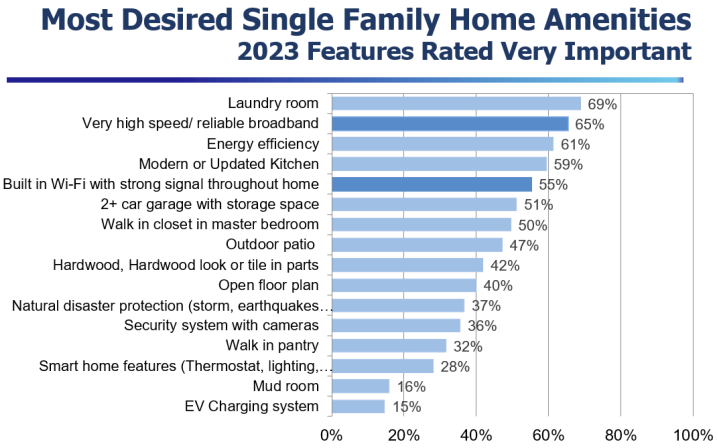

Fig 1

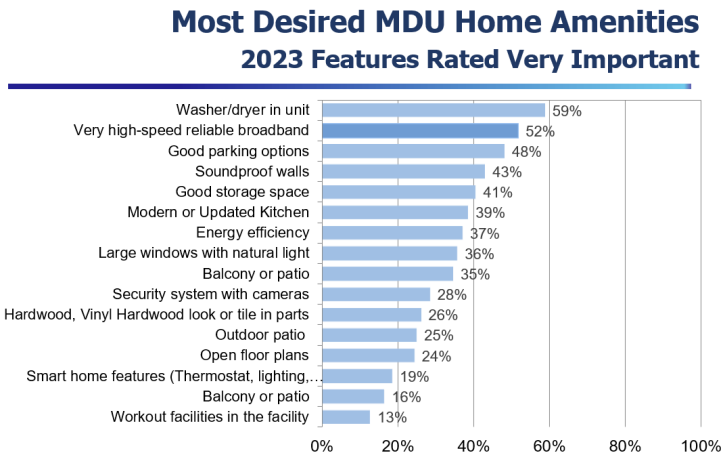

Fig 2

For those in a multi-dwelling unit, such as an apartment or condominium, the top two responses were the same, with high speed and reliable Internet in second position.

B. The Future Need: Desired Future Broadband Applications

As important as broadband is today, it will only increase in importance in the future. Based on past history and logic, the number of applications used and the performance requirements (bi-directional high bandwidth, low latency and high reliability) will continue to increase over time.

In response to a question about the importance of potential future broadband applications, top interest came for applications related to virtual medicine, life independence for seniors, and safety and security. There was also significant interest in applications related to education, shopping, employment, and entertainment.

It is interesting that all of these potential applications require a significant upstream component – probably requiring as much upload as download capacity. Fiber broadband has always had a significant advantage in upstream capacity over other Internet delivery methods.

Reviewing interest in potential applications by gender and age segments (cross-tabulation), two general observations can be made. Most importantly, younger individuals have more interest than older, and males have slightly more interest than females. This norm is broken in cases where the application seems to have particular importance to a segment. For example, older females have the highest interest in applications enabling independence.

Many of these differences are, no doubt, more generational than age related. As an example, the current Gen-Z and Millennial interest will likely be maintained as these groups age.

Percent Interested In Potential Applications
Applications Perceived To Be Somewhat Or Very Important

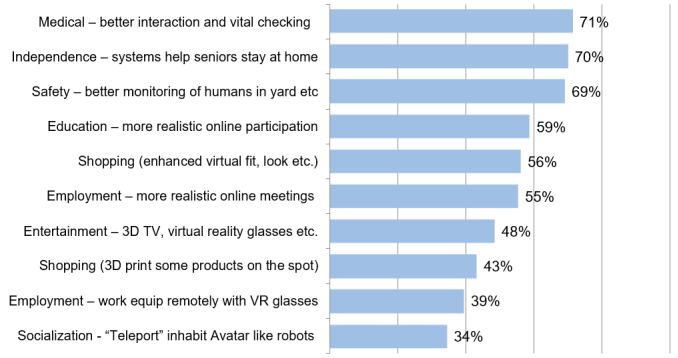

Fig 3

Percent Interested In Potential Applications
By Gender And Age Segments

	Males under 35	Males 35-64	Males 65+	Females under 35	Females 35-64	Females 65+
Medical – better interaction and vital checking	75%	70%	66%	75%	74%	66%
Independence – systems help seniors stay at home	74%	67%	66%	67%	73%	77%
Safety – better monitoring of humans in yard etc	78%	67%	57%	76%	74%	66%
Education – more realistic online participation	75%	61%	39%	75%	62%	44%
Shopping (enhanced virtual fit, look etc.)	70%	59%	40%	67%	59%	42%
Employment – more realistic online meetings	75%	62%	28%	71%	64%	33%
Entertainment – 3D TV, virtual reality glasses etc.	72%	54%	31%	57%	51%	28%
Shopping (3D print some products on the spot)	63%	45%	28%	49%	46%	34%
Employment – work equip remotely with VR glasses	61%	47%	16%	52%	44%	17%
Socialization - "Teleport"/ inhabit Avatar like robots	66%	41%	14%	45%	36%	15%

Fig 4

IV. THE POSITION OF FIBER BROADBAND

A. The Current Position: Technology Market Share

Reviewing recent movement in market share based on FBA/ RVA consumer surveys, it is clear that the fiber broadband or FTTH share continues to accelerate, while the cable modem (DOCSIS) share is declining. "Other" share (primarily fixed wireless and mobile-only households) increased in 2022, likely due to the introduction of 5G technology.

Currently Cable leads in market share at about 47%, while Fiber is second at about 23%, but continued fiber gain seems inevitable.

One note regarding cable share: A common question regarding this data is, "how can cable share only 47% when some other sources seem to show cable share at close to 70%?"

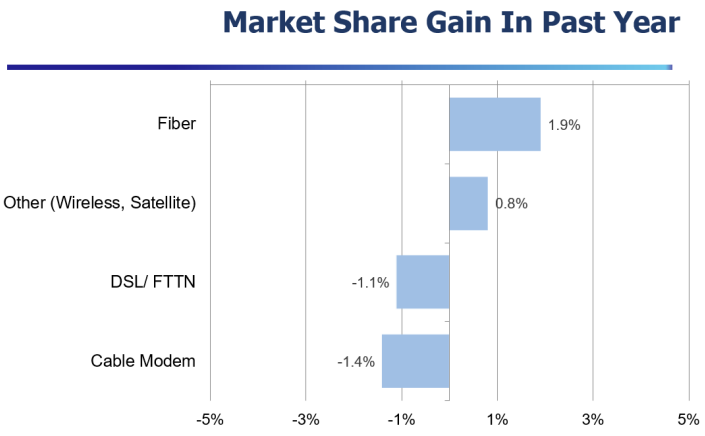

Fig 5

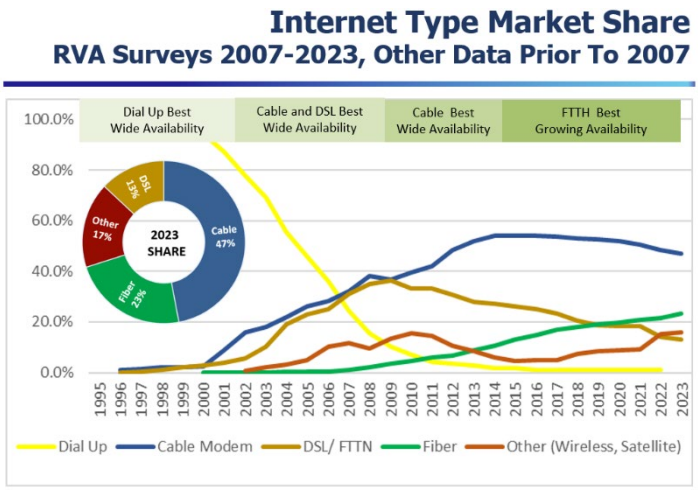

Fig 6

The answer lies in the difference in what is being reported. The high cable share number occurs when comparing the sum of the cable numbers of the top publicly traded cable companies (service delivered by either cable modem or FTTH technology) to a base of only all publicly traded wireline companies. (One additional factor: the data for cable companies often includes 7-13% non residential connections.)

A more complete and accurate cable market share figure would be to measure all residential cable users as a percent of all household Internet users (i.e. all wireline users, fixed wireless users, and mobile-only home Internet users), which would give a result of about 54%.

Further, only considering cable customers who are supplied service by traditional cable modem (i.e. not including those served by FTTH technology) gives a market share of about 47%.

B. The Shifting Position: Recent Broadband Churn To Fiber

New customers for any company or delivery type can come from new household formations (or new-to-the Internet households) or from customers switching from one provider or delivery technology to another.

In the past two years, approximately 17% of respondents with existing Internet reported making a change of providers. In this process of switching, many also changed their delivery method. The primary technology beneficiary of churn in the past two years was fiber broadband, picking up 15% points of the group of 17% of churners. Wireless followed at 11%. The primary loser to churn was cable modem, losing by 14% points.

The loss for cable comes even though cable modem has about twice the current coverage as FTTH, and the fact that many cable companies have been upgrading to DOCSIS 3.1 or beyond and moving fiber deeper into the network.

Wireless share improvement came from 5G bandwidth improvement, especially in areas where low quality DSL, low quality cable modem, wireless, or satellite were the only previous choices to the consumer.

Net Gain Or Loss in Share
Among Those Changing Providers In Past Two Years

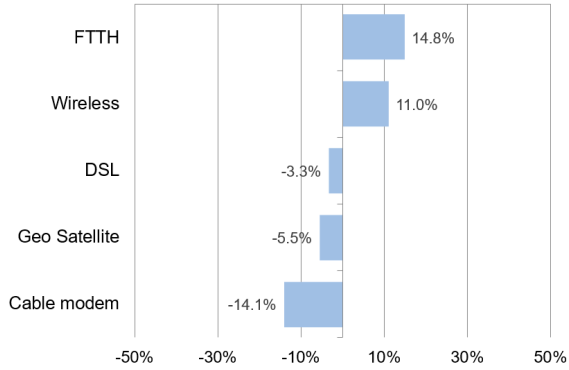

Fig 7

V. THE UNDERLYING PREFERENCE TO FIBER BROADBAND

A. User Satisfaction: Net Promoter Scores

Net Promoter Scores, an important and well accepted measure of customer satisfaction, continue to be highest for FTTH in 2023, though wireless has jumped to second place – probably because 5G speeds represented a significant improvement over other low-end Internet delivery methods the consumer used prior to the change. Cable was third in NPS at 10%.

One side note, NPS scores from a blind third party (such as RVA) are often somewhat lower than NPS scores from surveys sponsored by specific companies. (Customers responding to an invitation from the service provider itself often upwardly bias their answers somewhat.)

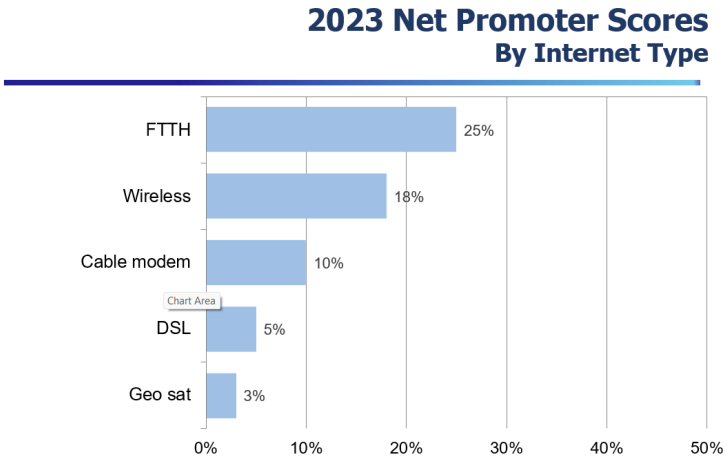

Fig 8

B. Perceived Superiority: Perception Of The Best Delivery Technology

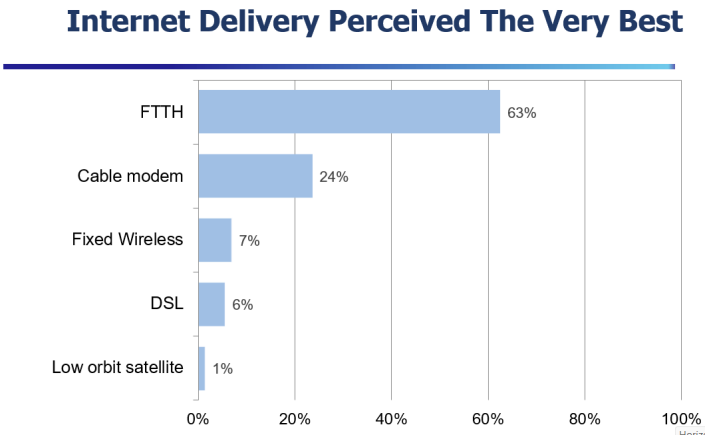

Fig 9

When all respondents were asked what service to the home was the very best in terms of speed and reliability, fiber broadband won by a large majority, and was 2.5 times higher than the second candidate – cable modem.

This level of consumer preference represents a strong indicator that fiber will continue to increase in share over time, especially as fiber availability continues to increase.

Internet Delivery Perceived The Very Best
By Type Of Current Service Provider

	Competitive	Rural Electric	Tier 2/3 ILEC	Large ILEC	Satellite	Small Cable	Municipal	Large MSO	Wirelesss
FTTH	97%	92%	85%	76%	73%	70%	64%	54%	53%
Cable modem	3%	8%	7%	9%	0%	20%	18%	36%	20%
Fixed wireless	0%	0%	3%	5%	9%	7%	18%	5%	17%
DSL	0%	0%	4%	9%	0%	2%	0%	3%	5%
Low orbit satellite	0%	0%	1%	1%	18%	2%	0%	2%	5%

Fig 10

While customers of all types of Internet providers rated FTTH the very best, there were some differences. It appears those customers who have experienced fiber (i.e., their current provider type often delivers service via fiber) were more likely to rate FTTH best. A second correlation may be the performance level of current broadband. For example, satellite customers who have likely not experienced fiber but have poor current performance tend to rate FTTH as best (perhaps based on their own investigative research).

C. *Perceived Value: Fiber Real Estate Premiums*

Fiber Adds To Home Value
Discount Needed To Consider Similar Non-Fiber Home

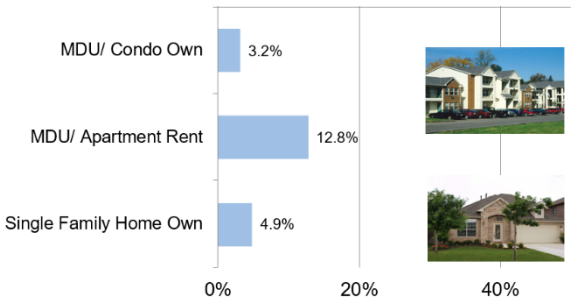

Fig 11

Every three years the FBA/RVA survey asks consumers two questions involving two hypothetical, equally comparable housing properties – except one had fiber broadband and the other did not. (Which would be preferred? How much would the home without fiber need to be discounted in price to be considered?)

The answers in 2023 show that for home ownership, a 3-5% real estate price premium for fiber exists. For rental customers, when considering a shorter time-frame, a 13% fiber premium exists.

It is worth noting that the 2023 premium for fiber broadband is the highest seen in recent years.

D. Switching Intent: Likelihood Of Switching To Fiber If Available

When consumers were specifically asked how likely they would be to switch to a new Gigabit fiber provider entering their market, a total of 33% said they would be very likely to switch overall.

Based on past RVA market research, those who say they are very likely to switch correlates well with actual take-rates in the first few years.

The likelihood of switching services correlates with the performance of the customer's existing Internet delivery technology – those with lower performing technologies are generally more likely to switch.

While lowest, it should be noted that about 26% of fiber (FTTH) customers said they would be very likely to switch to a new fiber provider. This means that some FTTH users with a choice of two fiber providers can and do switch based on their previous experience with the current provider and perceptions of a new provider. The clear message to current FTTH providers is to develop world-class customer service on top of having the best delivery product.

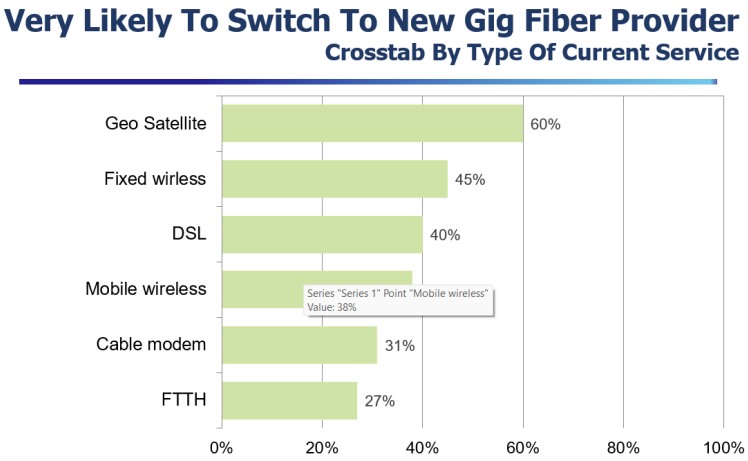

Fig 12

VI. STUDY CONCLUSIONS

Two primary conclusions come from this year's consumer study:

A. Broadband is extremely important.

- High quality broadband is listed second most important for home and apartment amenities
- The need for higher bandwidth and performance will only grow over time. Consumers are interested in many future applications that will require even higher quality broadband.

B. Preference to fiber broadband is extremely strong.

- FTTH is gaining market share on cable modem every year, while cable is declining
- FTTH was selected most often among churning customers recently – despite being often less available
- FTTH has the highest NPS scores
- FTTH is perceived to be the very best delivery method by a wide majority
- About one third indicated they would be very likely to switch to FTTH if a new FTTH provider was available

The level of consumer support for fiber broadband is rather striking. This data, combined with continually increasing FTTH availability, would certainly suggest continued market share growth for fiber broadband, and potential serious trouble ahead for cable share.

While smaller and mid-sized cable operators are migrating quickly to FTTH, the large MSOs are deploying FTTH to new builds (green field) and in areas where they face competition. In non-competitive areas, cable companies are hopeful that DOCSIS 4.0 upgrades, beginning in late 2023, will at least slow the churn to fiber. Of course, the 4.0 activity and results remain to be seen. While such a move will improve cable upload speeds and reliability somewhat, FTTH will still clearly be the highest performing method – and with much more room for continuing performance upgrades in future years.

VII. INDEX OF GRAPHS