



VIDEO TRENDS REPORT

Q1 2017 Video Trends Report:

Consumer Behavior Across Pay-TV, PVOD, OTT, TVE,
Streaming Devices and Content Discovery



Introduction



TiVo enables pay-TV providers, digital publishers, and consumer electronics (CE) manufacturers to power personalized search, recommendations, carousels, and social and sports discovery, while gaining invaluable insights into these features through analytics. TiVo's customers include Charter, DISH Network, DIRECTV, Sharp Electronics and other leading global pay-TV providers, broadcast networks and CE manufacturers.

Each quarter, TiVo seeks real consumer opinions to uncover key trends relevant to pay-TV providers, digital publishers and CE manufacturers. Consumers' genuine, unbiased perspectives and feedback drive continuous improvements to TiVo's Seamless Discovery™, the industry's leading personalized content discovery platform, and Seamless Insight®, a reporting tool that delivers the analytics necessary to optimize content discovery. TiVo shares these findings for the same reason it uses them—in the hopes that video service providers leverage the information to improve and develop applications and features that will enhance the overall TV viewing experience offered today.

This survey has been conducted every quarter since 2012, enabling the company to track key trends in viewing habits, identify consumer opinion of pay-TV providers and monitor emerging technologies, streaming devices, TV Everywhere (TVE) apps and content discovery features, such as personalized recommendations.

In addition to key quarter-over-quarter (q/q) and year-over-year (y/y) trends, TiVo's Q1 2017 *Video Trends Report* covers many new topics, including:

- A breakdown of top channels desired by respondents in an à la carte pay-TV package, with results separated into U.S. and Canadian respondents—plus, concerning historical trends regarding ideal pricing for the top 20 channels.
- New viewership data on the hot trend of social media networks streaming high-profile sporting events.
- New coverage of respondents' sentiments about cross-catalog guides and content discovery.
- New data illustrating the effect of content recommendations on respondents' ability to find something to watch.
- A new survey of "Home Assistant Devices" such as Amazon's Echo, as well as an analysis of device integration with respondents' TV viewing.

SURVEY DEMOGRAPHICS

- Q1 2017 Survey Size: 3,081
- Geographic Regions: United States, Canada
- Age of Respondents: 18+

This survey was conducted in Q1 2017 by a leading third-party survey service; TiVo analyzed the results. TiVo conducts this survey on a quarterly basis and publishes a report evaluating and analyzing key trends across the pay-TV industry. The purpose of this survey is to track consumer trends over time in order to offer pay-TV providers unbiased feedback regarding consumer behaviors, industry perceptions, and opinions of new technology hitting the market.

The State of Pay-TV

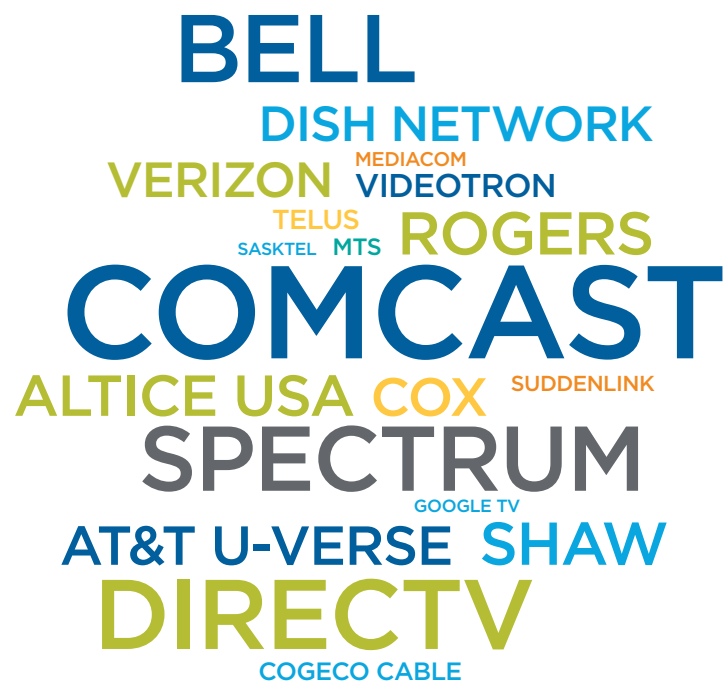


While the majority of this report examines how those with a pay-TV provider interact with their TV offerings, TiVo first sought to understand the audience without a pay-TV provider. In Q1 2017, 84.8% of respondents have pay-TV service. Of the 15.2% of respondents who do not have pay-TV service, 21.8% cut cable/satellite service in the last 12 months, an increase of 4.4% y/y. Of those without pay-TV service, 45.6% use an antenna to get basic broadcast networks, and this percentage increased slightly q/q.

Pay-TV providers are presented by popularity in the illustration below. The services used most by respondents are indicated by the names in large type; those used by fewer respondents are indicated by the names in small type.

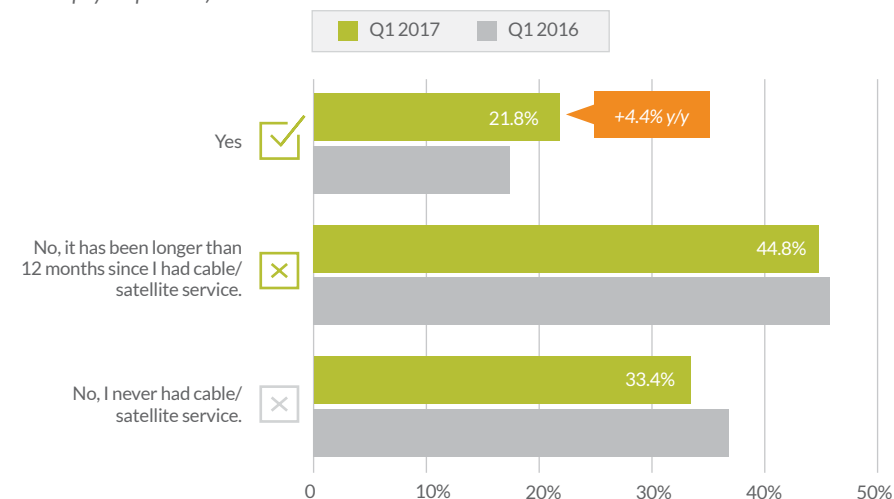
PAY-TV PROVIDERS

Who is your current cable/satellite service provider?



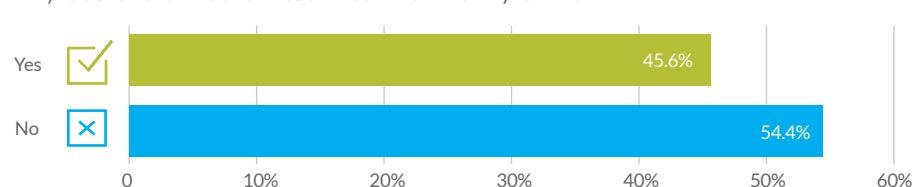
CUTTING PAY-TV SERVICE

Did you cancel cable/satellite service in the last 12 months? (Only answered by respondents who do not have a pay-TV provider)



ANTENNA USE

Do you use an antenna to access the basic channels on your TV?



The State of Pay-TV



For the third quarter in a row, the three main reasons for cutting pay-TV service are:

- “Price – Too expensive” – 79.7%
- “I use an internet streaming service, such as Netflix, Hulu, Amazon Video, etc.” – 57.6%
- “I use an antenna to get the basic channels on my TV.” – 32.5%

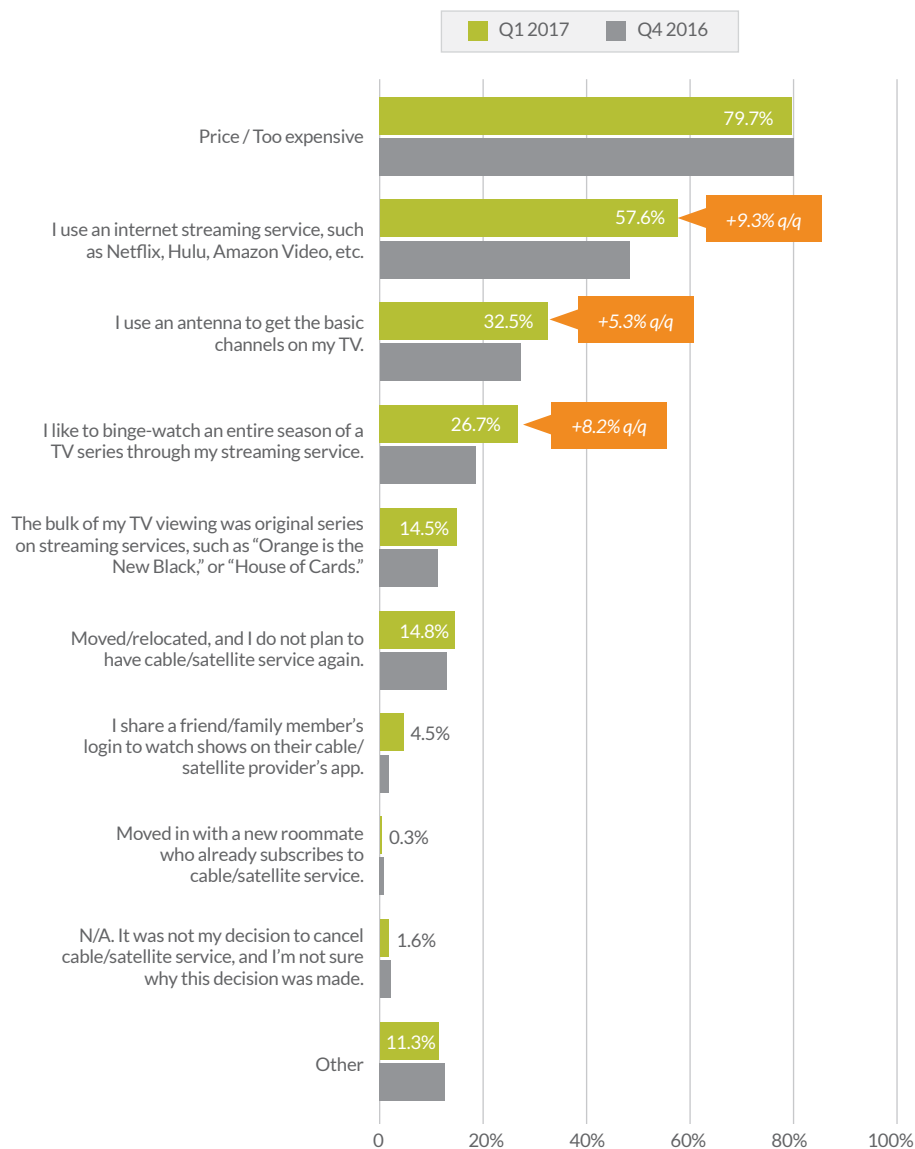
Many answer choices experienced notable growth, including:

- “I use an internet streaming service, such as Netflix, Hulu, Amazon Video, etc.” – increased 9.3% q/q
- “I like to binge-watch an entire season of a TV series through my streaming service.” – increased 8.2% q/q
- “I use an antenna to get the basic channels on my TV.” – increased 5.3% q/q

These results further illustrate how disruptive over-the-top (OTT) streaming services are for the pay-TV industry. Not only did OTT/SVOD subscribers increase by nearly 10%, binge-watching on streaming services spiked as well, illustrating the content is enticing.

TOP FACTORS FOR CUTTING PAY-TV SERVICE

What factors influenced your decision to cancel your cable/satellite service? (Choose all that apply)



The State of Pay-TV

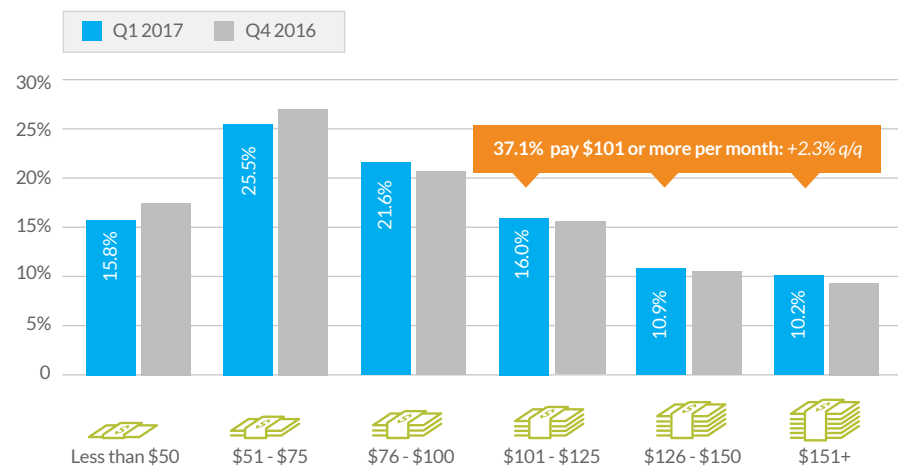


In Q1 2017, 37.1% of respondents spent at least \$101 per month — with some spending more than \$150 per month — on pay-TV services alone, a percentage that increased of 2.3% q/q. Though tracking subscriber fees is important, pay-TV providers should also keep a pulse on subscriber satisfaction. Satisfaction cements retention, even when subscribers are increasingly paying more each month.

Seventy-eight percent of respondents answered they are “satisfied” or “very satisfied” with their pay-TV service. “Very satisfied” increased 3.6% y/y, 3.8% over two years, and 4.0% over three years. An increase in satisfaction is positive news for pay-TV providers, however it is also important for pay-TV providers to keep a pulse on why subscribers are unsatisfied in effort to improve the experience for this group.

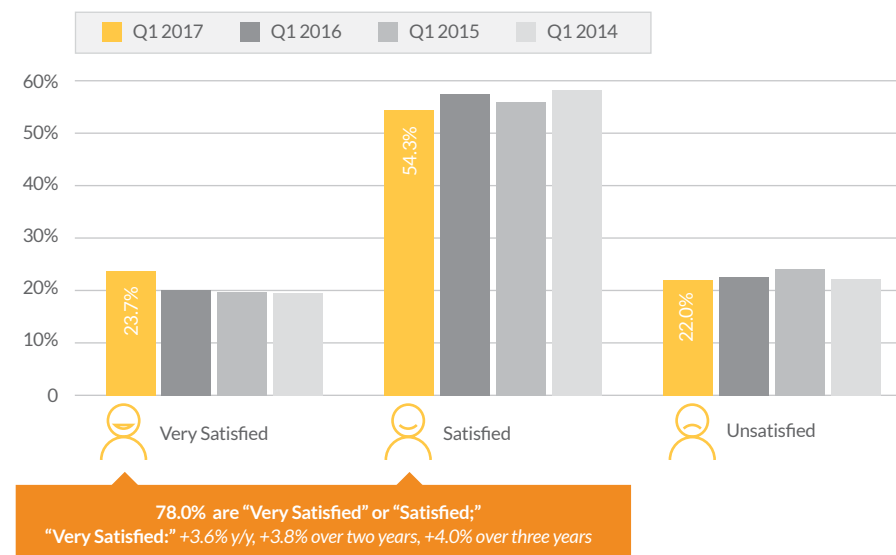
BILL AMOUNT

How much is your monthly cable/satellite bill for TV services only? (Not including video-on-demand/ movie purchases, phone or internet)



VALUE

How would you rate the level of value you are receiving from your cable/satellite service provider?



The State of Pay-TV

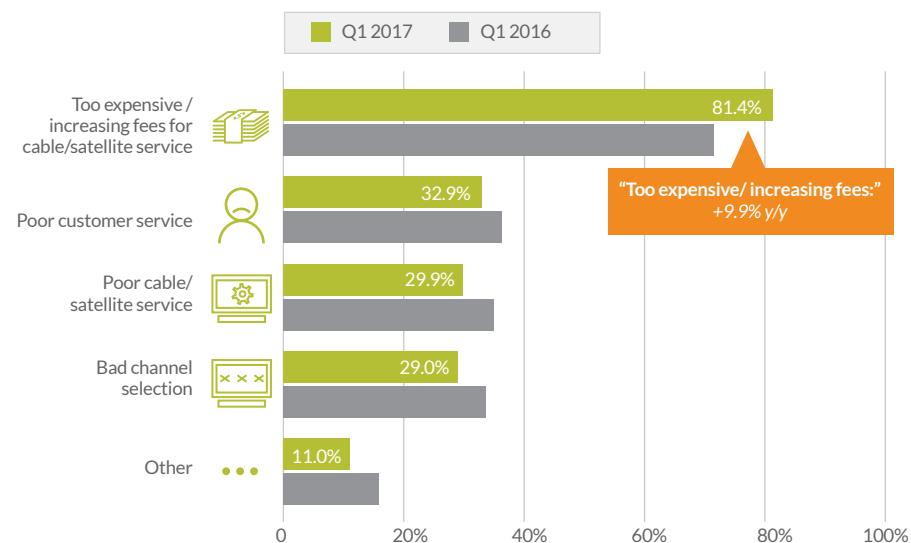


The top three reasons for pay-TV service dissatisfaction are:

- “Too expensive/increasing fees for cable/satellite service” – 81.4%, an increase of 9.9% y/y
- “Poor customer service” – 32.9%
- “Poor cable/satellite service” – 29.9%

IF UNSATISFIED...

Why do you feel you're not getting enough value from your provider? (Choose all that apply)



When the increase in monthly bills is coupled with the fact that 81.4% of unsatisfied respondents selected “Too expensive/increase fees for cable/satellite service,” it becomes evident that something must be done about this group. With more options than ever for TV in 2017, consumers continue to get smarter about their TV options, and many have discovered ways to access TV for far less than \$100 a month. Skinny bundle offerings have increased, too, and options include Dish Networks’ SlingTV, DIRECTV NOW and Sony’s PlayStation Vue. YouTube TV recently announced its TV product with a blog post taking direct aim at those unsatisfied with their traditional pay-TV service, stating,

“There’s no question that people love TV, from live sports to breaking news to sitcoms and dramas. But the truth is there are a lot of limitations in how to watch TV today.”¹

— YouTube Official Blog, February 2017

While the pay-TV industry has not experienced consumers leaving en masse for these trimmed-down offerings, the options are growing in number, and new services continue to enter the market. Though new competition in the video market may make the rest of the industry feel slimmer, it seems many of these recent offerings are here to stay, and pay-TV providers will have to innovate to stay ahead.

¹ <https://youtube.googleblog.com/2017/02/finally-live-tv-made-for-you.html>

The State of Pay-TV



POTENTIAL CHURN

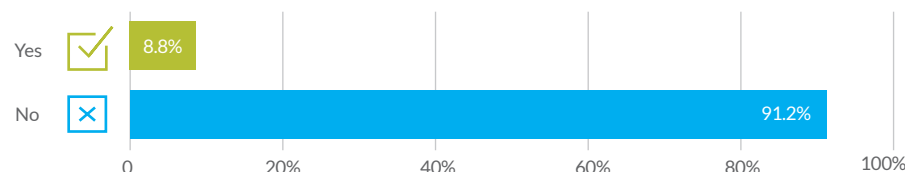
Of respondents with pay-TV service, 8.8% switched providers in the last three months. When asked if they plan to change pay-TV providers in the next six months, results broke down as follows:

- 7.2% plan to *cut* their pay-TV service.
- 6.6% plan to *change* to another pay-TV provider.
- 3.5% plan to *switch* to an online service or app.
- 31.6% are on the fence, answering “*maybe*,” an answer that increased 2.0% q/q.
- These figures, which increased slightly q/q, total 48.9% of respondents — meaning nearly half of respondents could potentially leave their current pay-TV providers in the next six months.

In Q1 2017, the category “maybe” increased 2.0% q/q, and as a result the overall figure of potential churn (48.9%) increased slightly q/q. In addition, the number of those who plan to “cut” pay-TV providers increased slightly y/y, 2.4% over two years, and 3.4% over three years. Pay-TV subscriber loss in Q1 has been covered in the press a great deal in the previous weeks. Therefore, some of the trends may not come as much of a shock, but it does add further proof that disruption is taking place in the pay-TV industry.

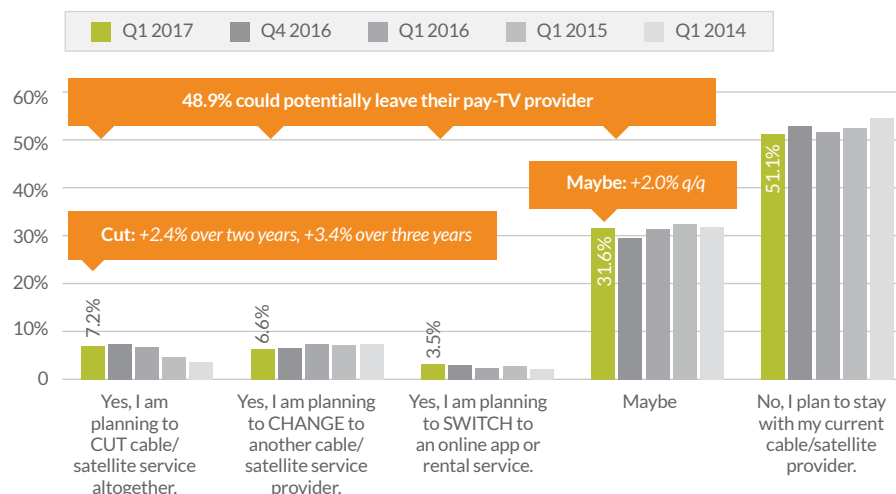
SWITCHED PAY-TV PROVIDERS

Have you switched cable/satellite providers in the last three months?



PLANNING TO LEAVE PAY-TV PROVIDER

Do you plan to change cable/satellite providers in the next six months?



The State of Pay-TV



POTENTIAL CHURN (CONTINUED)

The 48.9% of respondents planning to cut, change or switch pay-TV providers — or at least considering it — were asked if they would stay should they be given new functionality to improve the TV viewing experience. Of this potential churn group, answers were as follows:

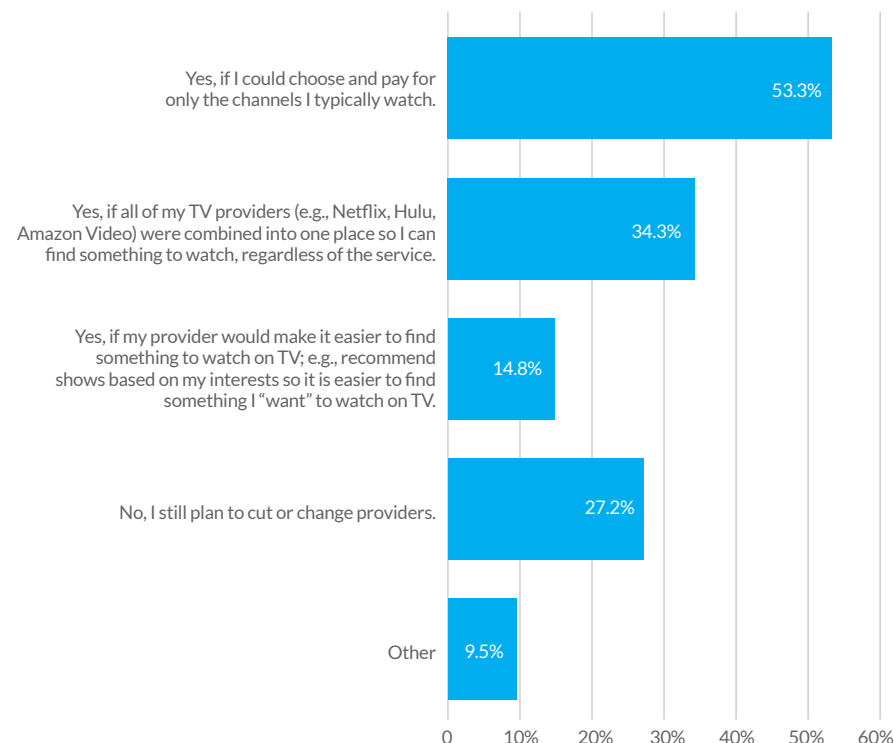
- **Flexible Package Structure:** 53.3% would consider staying if an option existed to pay for only the channels they watch.
- **More Integrated Video Solution:** 34.3% would consider staying if all TV providers (such as Netflix, Hulu, Amazon Video) were combined into one place where consumers can find something to watch, regardless of the service.
- **No Turning Back:** 27.2% remain firm on their decision to change and no functionality or service is likely to persuade them otherwise.

The pay-TV industry may be facing a gloomy future if some in the 'potential churn group' noted above cannot be persuaded to stay with their pay-TV providers. This is a significant group, and pay-TV providers must focus on the two key drivers that might convince these subscribers to stay: à la carte channels and cross-catalog discovery features. As respondents gravitate to outside sources such as Netflix, pay-TV providers need to weigh the pros and cons of providing these features. If offering an integrated guide that incorporates not only pay-TV content, but also OTT content, will help retain subscribers, then it's time to get on board. This is a hot topic among the industry today, and one this report touches on further in the [TV Viewing section](#).



PLANNING TO SWITCH PAY-TV PROVIDERS ? IF YES...

Would you consider keeping your existing cable/satellite service provider if they allowed you to do the following? (Choose all that apply)



Revenue-Generating Pay-TV Services

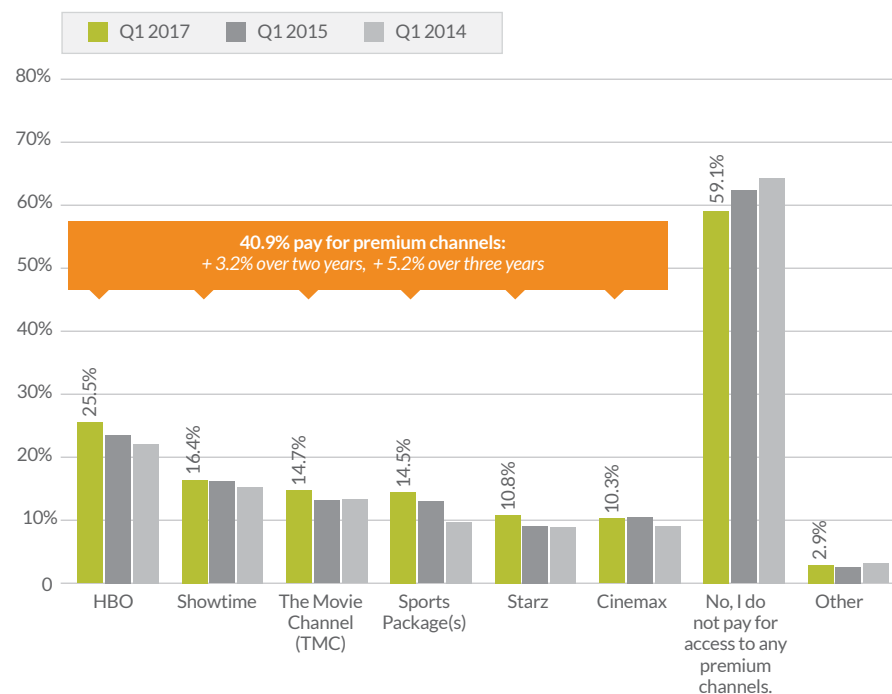


PREMIUM CHANNELS

With all the competition available today, it's important to track yet another revenue stream for pay-TV providers — premium channels. In Q1 2017, 40.9% of respondents pay for premium channels. The top three most popular channels are HBO, Showtime and The Movie Channel/Network. However, sports packages almost tied for the third spot. (Note: the NFL, NBA and NHL all were in season when the survey was taken). Though premium channels experienced a minimal decline q/q, and this might not be what these networks would like to see, long term growth trends were present, which is still encouraging given the abundance of OTT competition.

PREMIUM CHANNELS

Do you pay for any of the following premium channels through your cable/satellite provider?
(Choose all that apply)



Revenue-Generating Pay-TV Services



PAID VIDEO-ON-DEMAND (PVOD) OFFERINGS

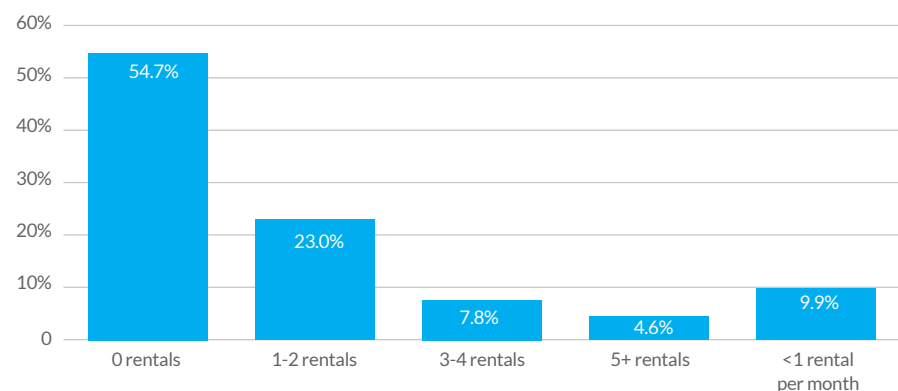
In Q1 2017, 45.3% of respondents with pay-TV service purchase PVOD content from their pay-TV providers' services, and of this audience, 35.4% do so on a consistent, monthly basis. The majority of monthly PVOD users who make purchases (23%) make one or two purchases per month.

While purchase growth is important, respondents' sentiments toward their providers' PVOD catalogs is equally valuable information. In Q1 2017, 66.2% percent of respondents who purchase PVOD content answered they are satisfied with their ability to find something to watch within their providers' offerings, and this satisfaction increased 18.3% over two years, 19.3% over three years, and 29.2% over four years.

TiVo has noticed more pay-TV providers are delivering PVOD catalogs in more modern formats, as opposed to the traditional linear grid. The key difference between linear and PVOD content is PVOD has more options for grouping similar categories (i.e., new releases, genre, etc). However, with 66.2% of respondents satisfied with PVOD content discovery, which is 6.8% higher than satisfaction with pay-TV service discovery, could this higher satisfaction be the direct result of an improved user experience?

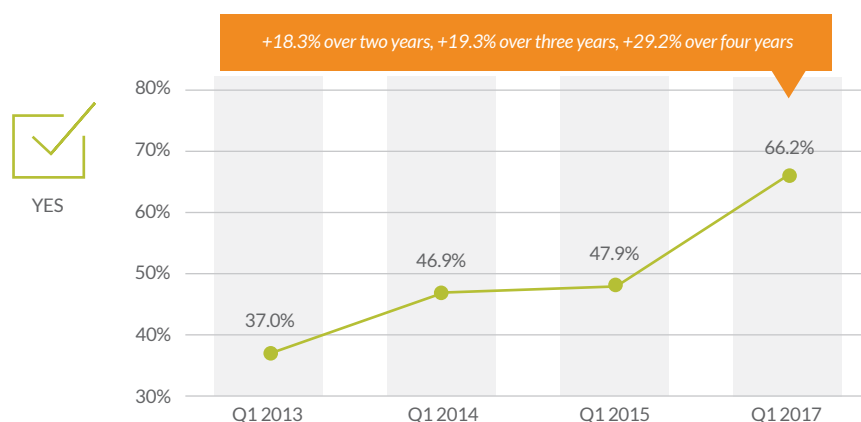
PVOD PURCHASES PER MONTH

On average, how many video-on-demand (movies offered through your provider) purchases does your household make each month? (Movies purchased from on-demand stations provided by your cable/satellite provider. Does NOT include Netflix, Redbox, iTunes, etc.)



PVOD CATALOG DISCOVERY

Do you feel it's easy to find a movie you will enjoy in the video-on-demand catalog provided by your cable/satellite provider? (Accessed from your guide)



Respondents' Sentiments on À La Carte Pay-TV Packages



In Q1 2017, 77.3% of respondents would like to pay for only the channels they watch — and this response is up slightly q/q and y/y. On average, respondents chose 19 channels to compose their ideal line-up. Additionally, the average price respondents want to pay for a package of self-selected channels is \$25.73 total per month — or \$1.62 per channel, per month.

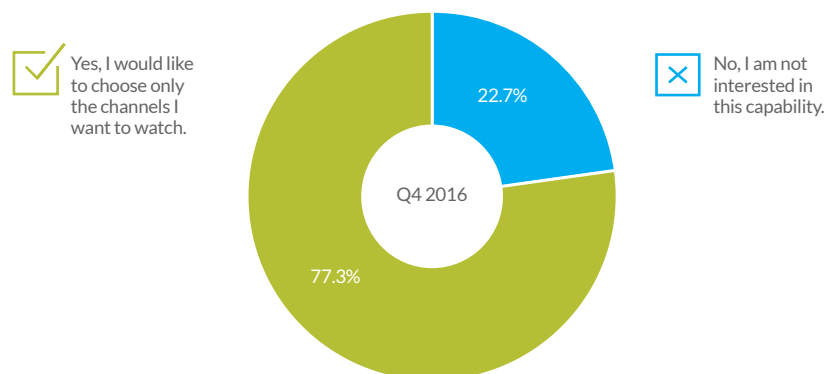
The top five channels across *all* respondents were:

- | | |
|------------------------------|--------------------|
| 1. ABC – 58.4% | 4. History – 52.5% |
| 2. Discovery Channel – 56.6% | 5. NBC – 52% |
| 3. CBS – 54.1% | |

These channels have consistently ranked in the top five most popular channels in Q2, Q3 and Q4 2016 survey results², and in Q1 2017, all of these networks saw slight positive q/q growth in popularity among all respondents.

INTEREST IN AN À LA CARTE PAY-TV PACKAGE

When purchasing cable/satellite service, you often choose from pre-set channel packages. Would you like the ability to make your own package by selecting **ONLY** the channels you **WANT** to watch?



Because the report surveys respondents in both the U.S. and Canada, much of the video content is the same in both countries, but some Canadian content is unavailable in the U.S. Therefore, the charts on pages 11-12 are displayed by country.

Because this report has covered respondents' ideal price per channel since Q3 2016, a clear trend has emerged — prices are declining. Here is a breakdown of the Q1 2017 à la carte results by region (see charts on pages 11-12):

- **U.S.:** The average price respondents will pay for the top 20 channels is \$28.31, a slight decrease q/q, and 14% decrease over two quarters.
- **Canada:** The average price respondents will pay for the top 20 channels is \$25.56, a decrease of 9.2% q/q, and 20.1% decrease over two quarters.

For the third quarter in a row, the question remains: What could be causing this decline in value for pay-TV channels? Broadcast networks should take a close look at these numbers since a large portion of their revenue comes from what pay-TV providers pay them per channel, per subscriber. Will this trickle down to ultimately affect network partnerships with pay-TV providers? That potential effect will likely take time, but as the industry shifts due to disruptive trends like online streaming and skinny bundles, TiVo will continue to monitor the falling value of individual channels among consumers.

² The order in which these channels made the top five has varied each quarter.



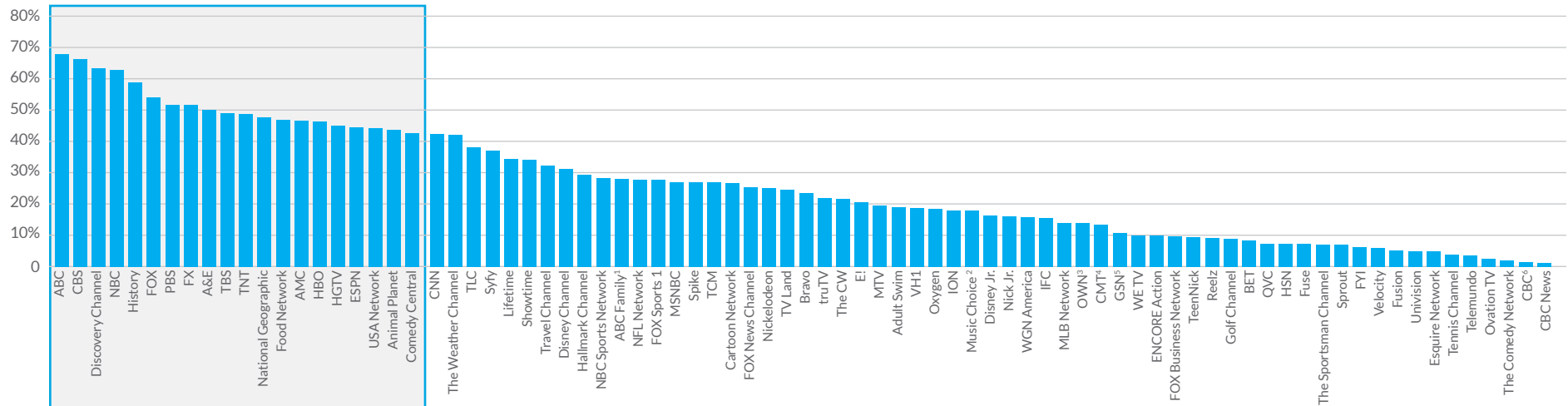
Analytical Commentary

ANALYSIS OF DESIRED CHANNELS IN AN À LA CARTE PAY-TV PACKAGE BY COUNTRY



IDEAL CHANNELS IN AN À LA CARTE PAY-TV PACKAGE - U.S.

If YES, which channels would you be interested in including in your TV package? (Choose all that apply)



Q1 2017			Q4 2016			Q3 2016		
Top 20 Channels Among U.S. Respondents	Popularity Among U.S. Respondents	Price Per Channel	Top 20 Channels Among U.S. Respondents	Popularity Among U.S. Respondents	Price Per Channel	Top 20 Channels Among U.S. Respondents	Popularity Among U.S. Respondents	Price Per Channel
ABC	67.9%	\$1.21	ABC	65.8%	\$1.25	ABC	70.7%	\$1.52
CBS	66.1%	\$1.26	CBS	63.5%	\$1.25	CBS	70.1%	\$1.55
Discovery Channel	63.3%	\$1.37	Discovery Channel	61.8%	\$1.42	NBC	65.5%	\$1.54
NBC	62.7%	\$1.27	NBC	61.0%	\$1.30	Discovery Channel	62.1%	\$1.53
History	58.8%	\$1.40	History	56.0%	\$1.49	History	59.7%	\$1.54
FOX	54.1%	\$1.36	FOX	52.6%	\$1.30	FOX	56.0%	\$1.47
PBS	51.7%	\$1.51	A&E	51.6%	\$1.24	A&E	50.8%	\$1.49
FX	51.6%	\$1.40	PBS	49.0%	\$1.52	PBS	49.3%	\$1.74
A&E	50.0%	\$1.19	TNT	47.6%	\$1.24	TNT	49.1%	\$1.51
TBS	49.1%	\$1.19	FX	47.5%	\$1.33	TBS	48.2%	\$1.41
TNT	48.7%	\$1.20	HBO	47.2%	\$2.81	USA Network	47.7%	\$1.46
National Geographic	47.7%	\$1.44	AMC	45.5%	\$1.40	FX	47.2%	\$1.59
Food Network	47.0%	\$1.39	TBS	45.1%	\$1.20	National Geographic	46.1%	\$1.57
AMC	46.6%	\$1.39	National Geographic	45.0%	\$1.50	HBO	45.2%	\$3.13
HBO	46.3%	\$2.73	USA Network	44.4%	\$1.20	AMC	44.0%	\$1.64
HGTV	45.0%	\$1.48	Food Network	43.5%	\$1.49	ESPN	44.0%	\$1.95
ESPN	44.5%	\$1.74	Comedy Central	43.4%	\$1.39	Food Network	43.9%	\$1.60
USA Network	44.3%	\$1.24	HGTV	42.2%	\$1.52	Comedy Central	43.8%	\$1.62
Animal Planet	43.8%	\$1.26	ESPN	41.3%	\$1.82	The Weather Channel	42.4%	\$1.36
Comedy Central	42.6%	\$1.28	The Weather Channel	40.6%	\$1.20	HGTV	42.0%	\$1.70
Total \$28.31			Total \$28.87			Total \$32.92		

1 Renamed to Freeform
2 Music Channels
3 Oprah Winfrey Network
4 Country Music Channel
5 Game Show Network
6 Canadian Broadcasting Corporation

-14.0% over two quarters



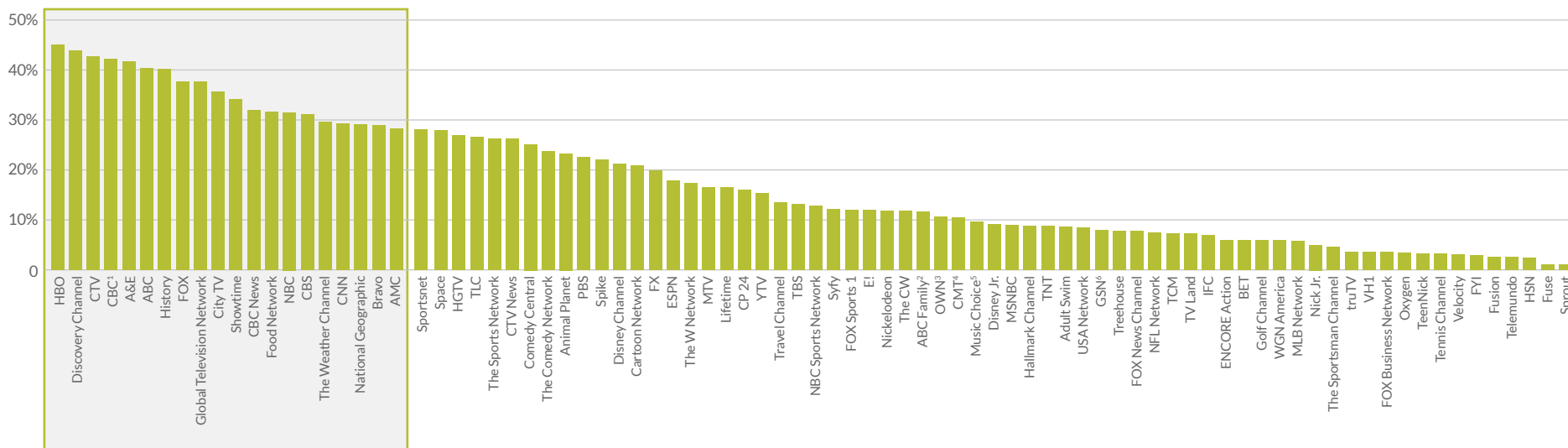
Analytical Commentary

ANALYSIS OF DESIRED CHANNELS IN AN À LA CARTE PAY-TV PACKAGE BY COUNTRY



IDEAL CHANNELS IN AN À LA CARTE PAY-TV PACKAGE - CANADA

If YES, which channels would you be interested in including in your TV package? (Choose all that apply)



Q1 2017

Top 20 Channels Among Canadians	Popularity Among Canadians	Price Per Channel
HBO	45.0%	\$1.92
Discovery Channel	43.8%	\$1.50
CTV	42.7%	\$1.04
CBC ¹	42.2%	\$1.13
A&E	41.7%	\$1.42
ABC	40.3%	\$1.18
History	40.2%	\$1.36
FOX	37.7%	\$1.24
Global Television Network	37.7%	\$1.06
City TV	35.7%	\$0.94
Showtime	34.1%	\$1.49
CBC News	31.9%	\$1.24
Food Network	31.7%	\$1.52
NBC	31.5%	\$1.05
CBS	31.2%	\$1.07
The Weather Channel	29.6%	\$0.83
CNN	29.2%	\$1.30
National Geographic	29.1%	\$1.42
Bravo	29.0%	\$1.32
AMC	28.2%	\$1.53
		Total \$25.56

Q4 2016

Top 20 Channels Among Canadians	Popularity Among Canadians	Price Per Channel
HBO	46.3%	\$2.26
A&E	45.4%	\$1.40
Discovery Channel	43.2%	\$1.56
History	40.6%	\$1.53
CTV	38.9%	\$1.17
CBC	38.8%	\$1.22
ABC	38.2%	\$1.38
City TV	37.1%	\$1.22
Global Television Network	35.8%	\$1.28
FOX	33.9%	\$1.22
CBC News	32.6%	\$1.27
Food Network	32.0%	\$1.51
National Geographic	30.9%	\$1.43
Showtime	30.5%	\$1.58
Space	30.5%	\$1.52
TLC	30.3%	\$1.35
NBC	29.6%	\$1.20
CBS	29.1%	\$1.24
AMC	28.9%	\$1.73
The Weather Channel	28.6%	\$1.09
		Total \$28.16

Q3 2016

Top 20 Channels Among Canadians	Popularity Among Canadians	Price Per Channel
HBO	44.8%	\$2.59
A&E	43.9%	\$1.68
Discovery Channel	42.1%	\$1.79
CTV	40.1%	\$1.42
CBC	39.8%	\$1.42
History	39.3%	\$1.69
ABC	38.4%	\$1.53
Global Television Network	36.4%	\$1.47
FOX	35.8%	\$1.44
City TV	35.0%	\$1.35
Food Network	34.9%	\$1.61
CBC News	33.8%	\$1.45
CBS	32.3%	\$1.41
NBC	32.1%	\$1.37
The Weather Channel	30.1%	\$1.35
Showtime	29.8%	\$1.78
National Geographic	29.8%	\$1.79
TLC	29.4%	\$1.52
AMC	29.3%	\$1.82
HGTV	29.3%	\$1.50
		Total \$32.00

1 Canadian Broadcasting Corporation
2 Renamed to Freeform
3 Oprah Winfrey Network
4 Country Music Channel
5 Music Channels
6 Game Show Network

-9.2% q/q,
-20.1% over two
quarters

TV Viewing Habits



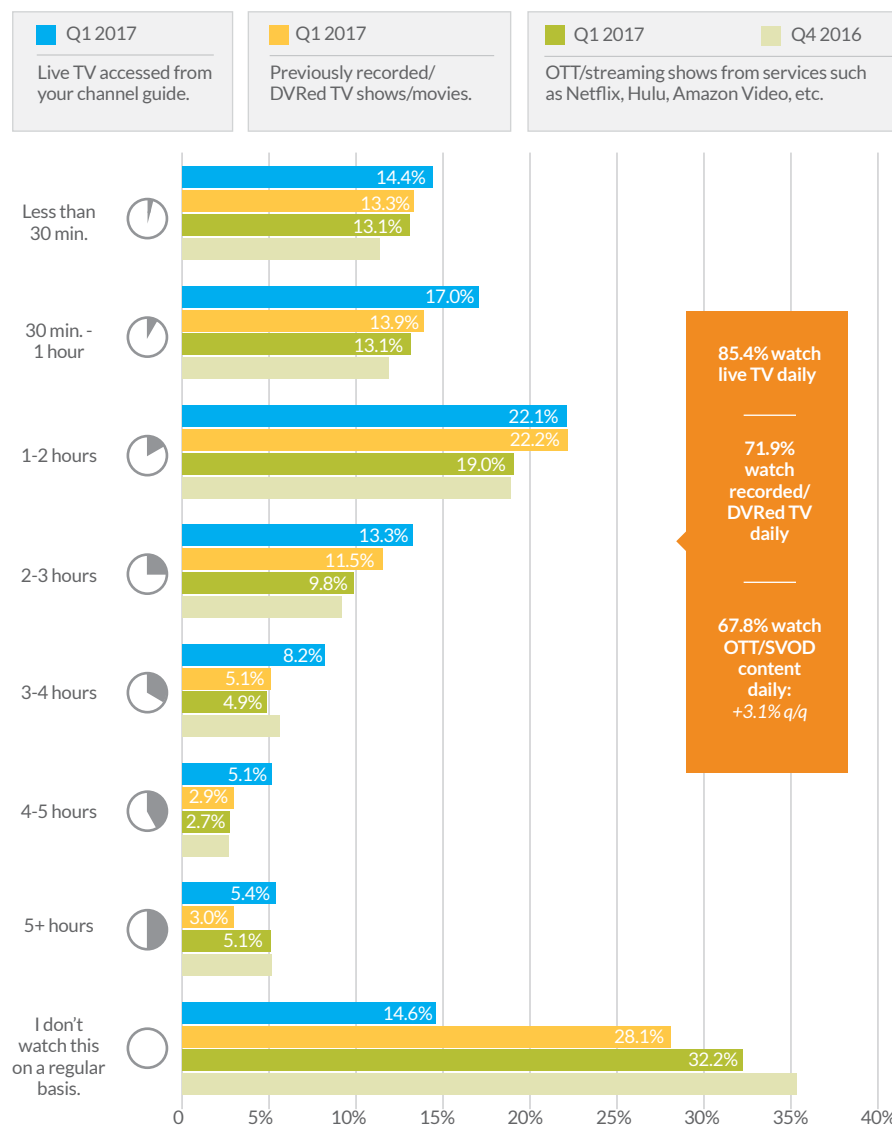
Fortunately for the video industry, many existing reports track TV viewing habits. However, TiVo believes pay-TV providers should have a high-level understanding of daily viewership for both pay-TV content and online services. According to the Q1 2017 survey results, respondents' TV viewing behavior, per day, is as follows:

- 85.4% watch live TV on a daily basis.
 - 39.1% watch 30 minutes to two hours of live TV on a daily basis.
- 71.9% watch previously recorded/DVRed TV shows/movies on a daily basis.
 - 36.1% watch anywhere from 30 minutes to two hours of previously recorded/DVRed TV on a daily basis.
- 67.8% watch content on OTT/streaming services (e.g., Netflix, Hulu and Amazon Video) on a daily basis, which is an increase of 3.1% q/q.
 - 32.1% said they watch anywhere from 30 minutes to two hours of OTT/streaming content on a daily basis.

Though TiVo has only been collecting respondents' viewing habits across these main video categories for three quarters, Q1 2017 is the first quarter in which survey results show positive q/q increases in all three categories. Both live TV and DVRed viewing increased only slightly q/q, whereas OTT/SVOD increased at a larger pace (3.1%). TiVo will continue to monitor viewing habits to determine if pay-TV will experience future positive growth in parallel with its fierce competition, OTT/SVOD services.

TV VIEWING TIME

On average, how much of your daily TV viewing time is spent watching the following types of TV?
(Provide an answer to all 3 categories listed below)



TV Viewing Habits



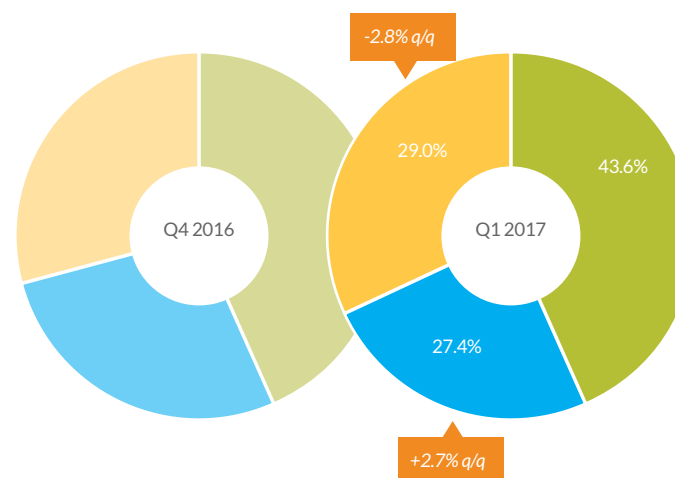
In addition to the type of content viewed, TiVo wanted to understand whether respondents feel they have “too much” to watch, or are pleased with how they fit in all of their favorite shows on a weekly basis. While a large portion of respondents (43.6%) feel they have ample time to watch their shows each week, a large audience (29%) still runs out of time. Two key takeaways can be obtained from these results regarding pay-TV providers and their subscribers viewing available content:

1. Those who run out of time each week decreased 2.8% q/q.
2. Those who DVR content in order to fit in all their shows increased 2.7% q/q.

When respondents feel they have enough time to watch their favorite TV shows, this sentiment should positively affect overall satisfaction. Additionally, these results illustrate DVR plays a key role in respondents' ability to watch their favorite TV shows. The DVR has long been the differentiator for pay-TV versus skinny bundle offerings such as Sling TV and DIRECTV NOW. As skinny bundles have recently launched cloud-based DVR functionality, pay-TV providers need to be aware of this threat and identify other differentiators that provide value to their services. The fact that skinny bundle services offer DVRs further levels the playing field, and this functionality can no longer be viewed as a plus for pay-TV providers.

TIME FOR FAVORITE TV SHOWS

On average each week, do you feel you have enough time to watch all your favorite TV shows?



- ☒ Yes, I find time each week to watch all the shows I want to watch.
- ☒ Yes, but only if I DVR them so I can skip the commercials.
- ☐ No, I typically run out of time on a weekly basis and do not get to watch all my favorite shows.

TV Viewing Habits

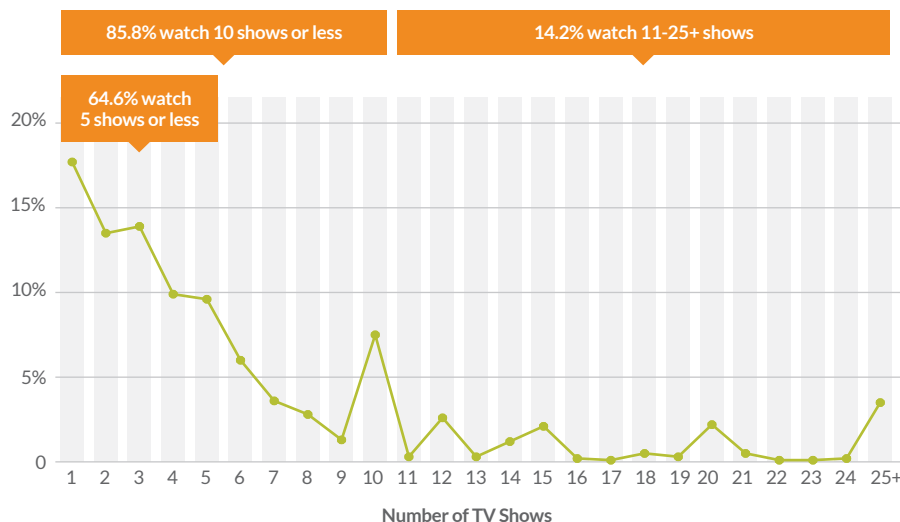


In addition to respondents' perceptions of their viewing habits, TiVo wanted to understand exactly how many TV shows are viewed each week. Therefore, new to TiVo's Q1 2017 *Video Trends Report* is a question asking respondents how many TV shows they watch from cable/satellite services and subscription services (Netflix, Hulu, etc.).

In Q1 2017, 85.8% of respondents watch 10 or fewer shows on a weekly basis; of that majority, over half (64.6%) watch five or fewer shows each week. Only 14.2% of respondents selected 11 shows or more per week as their answer.

NUMBER OF TV SHOWS WATCHED

On average per week, how many TV shows do you watch from your cable/satellite service and subscription services (Netflix, Hulu, etc.)?



TIVO'S TIPS

TiVo believes the breadth of video content consumed is a metric pay-TV providers should have the ability to measure, and one that should be monitored closely. In 2016, TiVo released a white paper³ recommending pay-TV providers adopt a key metric referred to as Effective Catalog Size (ECS). In addition to measuring overall consumption patterns, this metric can also be leveraged to analyze the efficacy of personalized content discovery functionality. In order to understand long-term consumption trends for groups of viewers, ECS monitors how many catalog items (TV shows, movies, sporting events, etc.) are typically watched.

When the viewers being analyzed consume more content, ECS increases. Likewise, if the number drops, this indicates the group has consumed less content. TiVo has witnessed scenarios in which personalized content discovery functionality, particularly recommendations, is implemented well, and then drives an increase in ECS. Therefore, this number can also be used to compare groups of individuals, to see if their ECS values are higher or lower than those of other groups.

³ https://business.tivo.com/content/dam/tivo/resources/whitepapers/tivo_success-story_personalized_content_discovery_2017.pdf

TV Viewing Habits

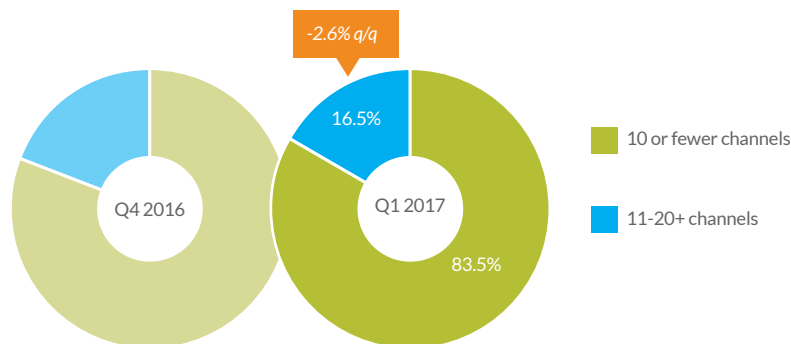


It's important for Pay-TV providers to understand respondents' engagement levels with the channels offered to them, as well as respondents' ability to find something to watch while navigating the pay-TV experience. According to Q1 2017 survey results:

- 34% of respondents are overwhelmed by the number of channels available to them, and this percentage has increased 3.9% over three years, and 4.9% over four years.
- On average, 83.5% of respondents watch 10 channels or fewer from their pay-TV service. Based on the 2.6% q/q decline in those who watch 11 or more channels, this report concludes that respondents are watching fewer channels.
- 59.4% of respondents feel it is easy to find something to watch on TV. This level of audience satisfaction in finding something to watch on TV is the highest it's ever been across all survey results, dating back to Q2 2015. Despite this, rapid growth trends in this area remain elusive, revealing there is still work to be done on the content discovery front.

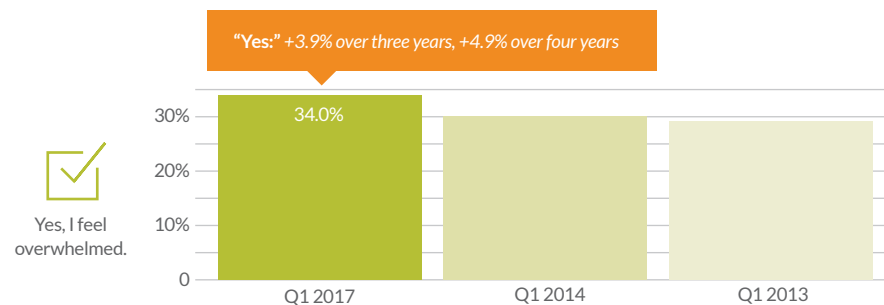
NUMBER OF CHANNELS WATCHED

Of the channels offered to you, how many channels do you typically watch, on average?



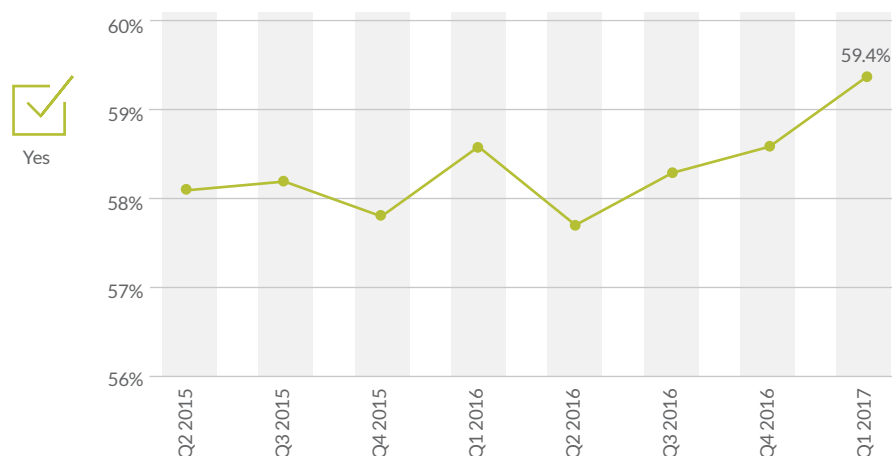
OVERWHELMED BY CHANNELS

Do you feel overwhelmed by the number of channels available to you, and listed in your guide?



EASY-TO-DISCOVER CONTENT

Do you feel it is easy to find something you "want" to watch on TV?



TV Viewing Habits



NEXT-GENERATION USER EXPERIENCES FOR TV

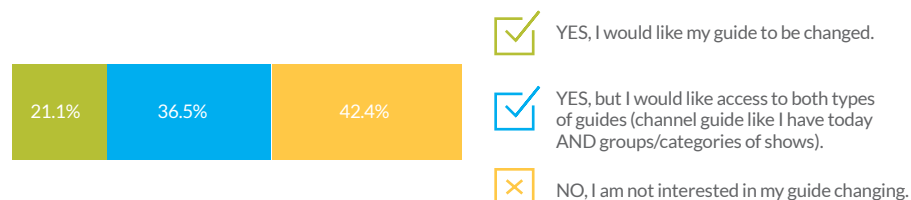
With abundant video content viewing options spanning numerous devices available today, TiVo takes great pride in not only offering its own next-gen user interfaces (UIs) to improve content discovery across many video sources, but also in continuing to track how consumers want to discover content and how they perceive next-gen user interfaces. Here is a breakdown of how respondents feel about next-gen UIs and cross-catalog content discovery:

- **Next-Gen UIs:** 57.6% of respondents with pay-TV service would like their guide to be changed to a carousel format (categorized groupings/ lists of video content). However, overall interest in guides changing to carousel-driven UIs is down slightly q/q and y/y.
 - 36.5% of respondents would like access to a carousel format while also keeping access to their traditional, linear guide.
- **Cross-Catalog Discovery:** 41.1% of respondents with pay-TV service would like an improved guide experience to find additional content available in TV apps such as Netflix, Hulu, etc. The breakdown is as follows:
 - 18.0% would like a guide that shows what is on across all apps.
 - 23.1% would like a guide that shows what is on across all apps AND pay-TV services, a slight q/q increase.

Almost half of respondents are looking for an improved guide to help them find content across all available TV sources. While several third-party services offer cross-catalog solutions, few pay-TV providers offer cross-catalog discovery functionality to their subscribers. TiVo believes great value exists in viewers exclusively using pay-TV providers' devices and offerings (set-top box (STB), mobile or website) to search content, whether

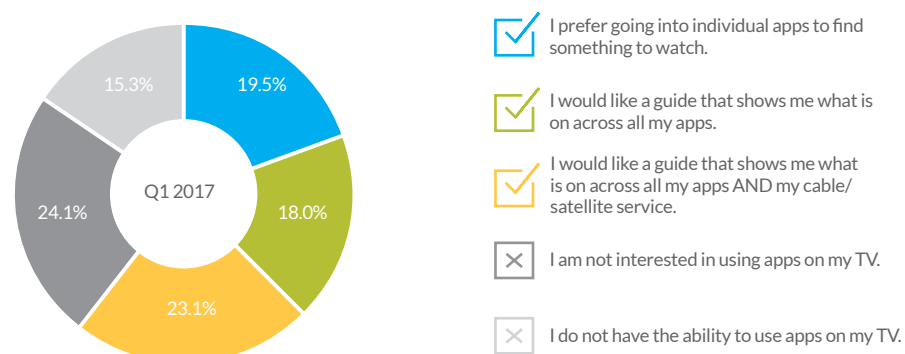
CHANNEL GUIDE OR CAROUSELS

Would you like your channel guide to be changed, so that it's sorted or categorized into groups/lists of TV shows or movies? For example, "What is on Now", "Because You Watched This," "Live Sports On Now."?



CROSS-CATALOG GUIDE OR TRADITIONAL GUIDE

Do you prefer using individual TV apps (Netflix, Hulu, etc) to find something to watch, or would you prefer a unified guide-like format that combines all of your available content into a single guide that shows all app content (Netflix, Hulu, etc.) and cable/satellite content?



that content is provided by their service or an OTT service. By keeping subscribers on the pay-TV provider's devices, subscribers don't have to switch their search efforts to a streaming service, which sometimes causes them to abandon the pay-TV device without toggling back to it, or worse, leads to perceiving lesser value in pay-TV services, thus creating churn.

Pay-TV Providers' TV Everywhere (TVE) Offerings



TVE AWARENESS

Over half of respondents (51.9%) with pay-TV service know their provider offers a TVE app, marking the highest level of TVE awareness recorded since the start of the question in Q4 2012. Overall awareness of TVE increased 2.8% q/q, 4.4% y/y, 9.6% over two years, 14.7% over three years, and 25.6% over four years.

TVE ADOPTION

Thirty-four percent of respondents access their pay-TV providers' TVE app; an increase of 3.2% q/q, 5.6% y/y, 9.2% over two years and 12.7% over three years. This is the highest rate of TVE adoption across all survey results since the start of this question in Q4 2012.

TV EVERYWHERE



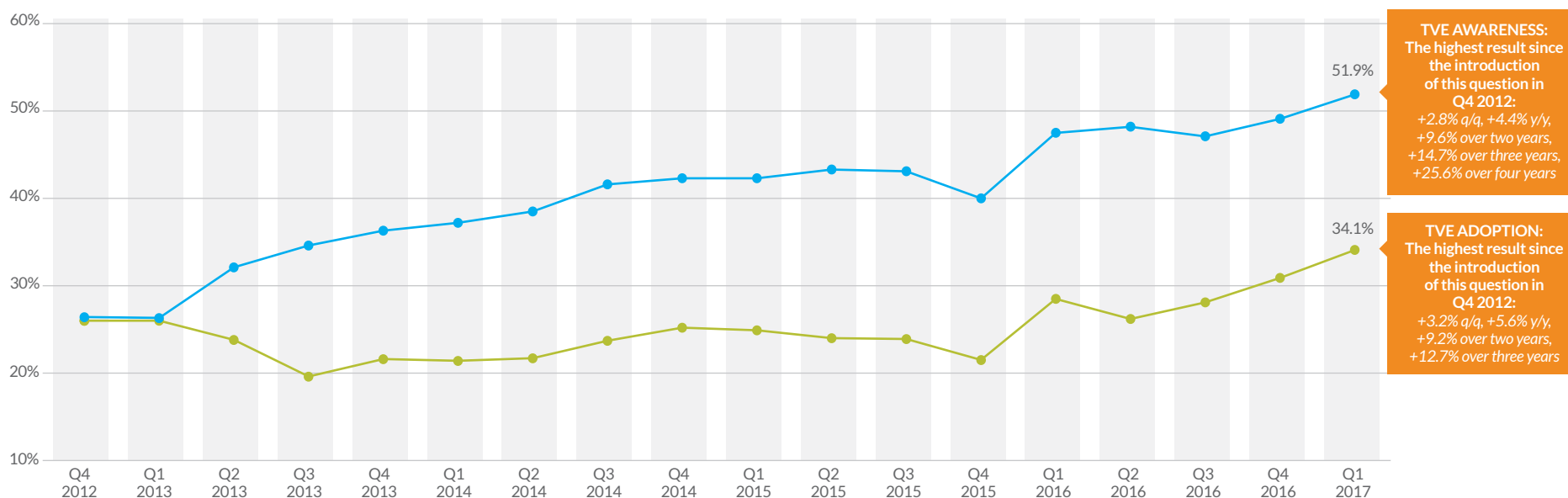
AWARENESS:

Does your cable/satellite provider offer an app(s) that allows you to watch TV/movies on devices such as a smartphone, iPad/tablet or a computer/laptop?



ADOPTION:

Do you access your cable/satellite provider's TV offering on your iPad/tablet, smartphone, smart TV, streaming device and/or computer/laptop?



Pay-TV Providers' TV Everywhere (TVE) Offerings



TVE VIEWING AND ENGAGEMENT

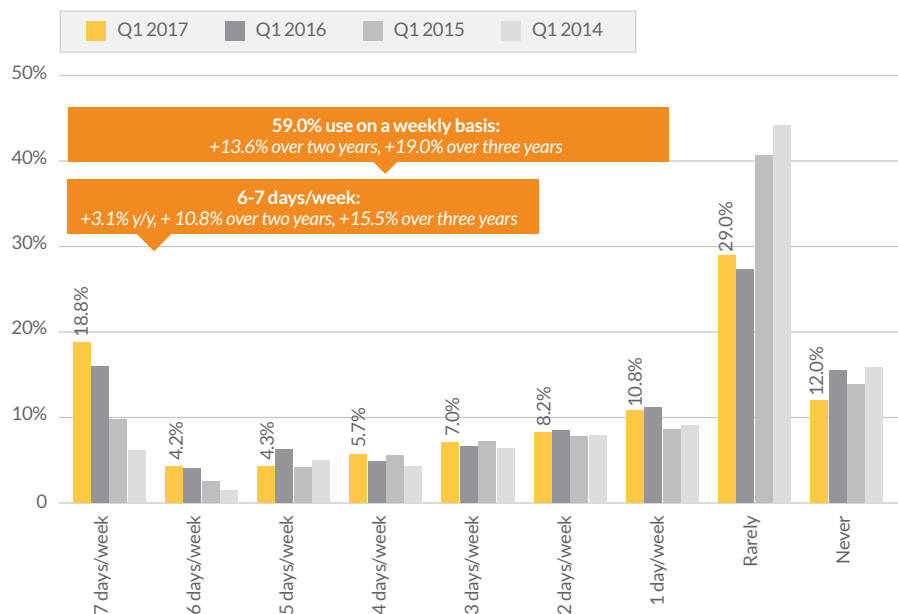
Fifty-nine percent of respondents use their pay-TV provider's TVE app on a weekly basis, a slight increase y/y; 13.6% over two years, and 19% over three years. In addition to weekly usage, respondents use their pay-TV providers' TVE apps more frequently due to increases in the usage category of "6-7 days a week" – 3.1% y/y, 10.8% over two years, and 15.5% over three years.

In addition, over half (53.4%) of TVE users are engaged in the content discovery functionality (search and/or recommendations) offered in their pay-TV providers' TVE apps. Here is a breakdown of engagement with each content discovery feature:

- "Search (you type in a title or topic to search)" – 45% of respondents use this feature.
- "Recommendations ("Similar Titles," "Suggested for You," "Because You Watched")" – 22.9% of respondents use this feature.

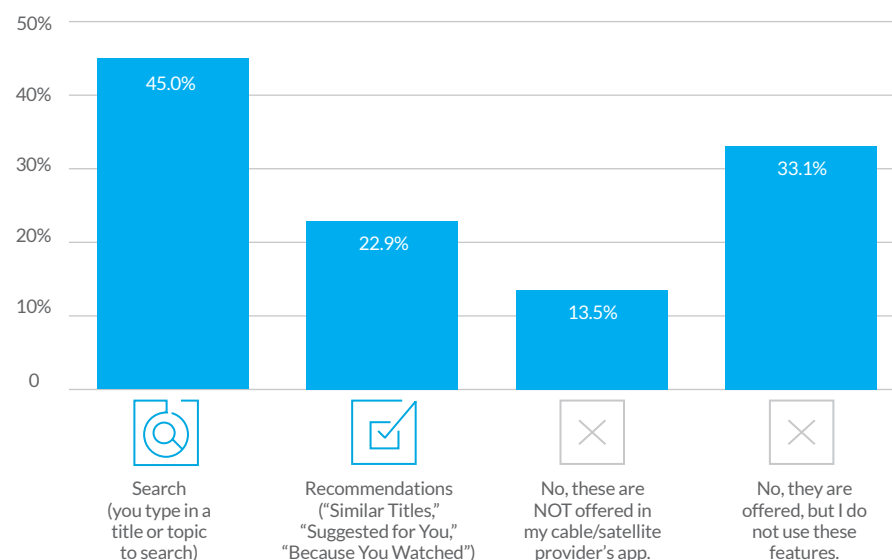
TV EVERYWHERE: WEEKLY USAGE

If yes, how often do you use your cable/satellite provider's app or TV Everywhere offering on a weekly basis?



TV EVERYWHERE: CONTENT DISCOVERY USAGE

Do you leverage any of the following features in your cable/satellite provider's app? (Choose all that apply)



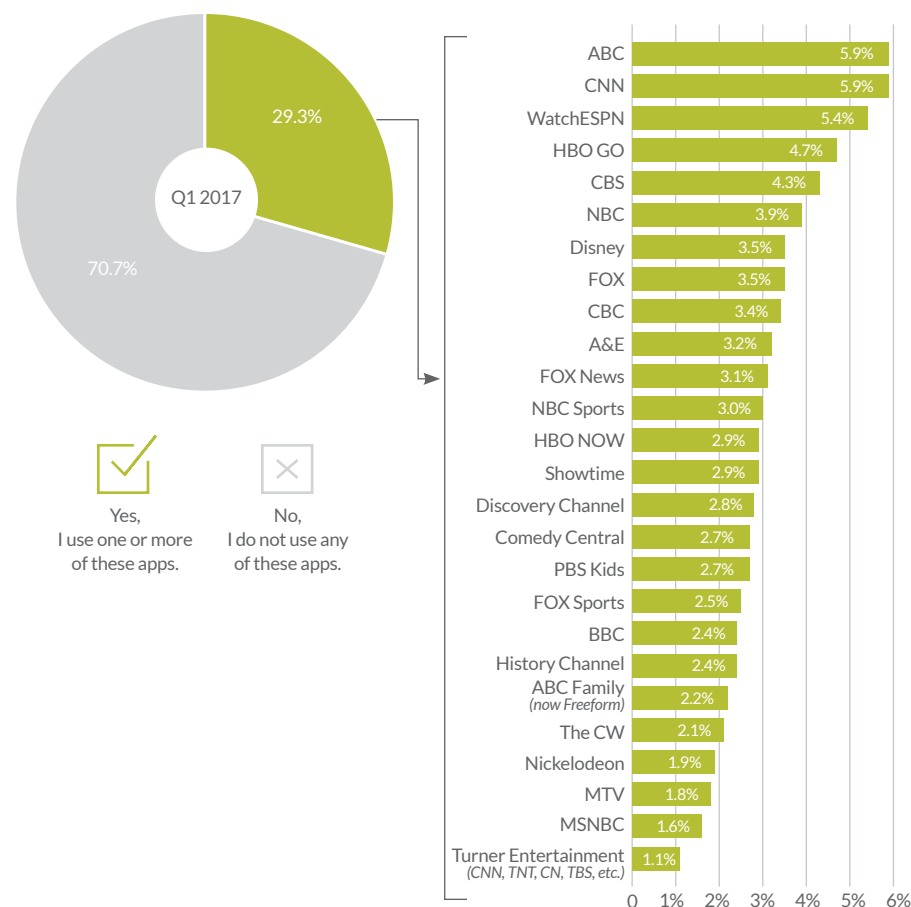
TV Network Apps



In Q1 2017, 29.3% of respondents have downloaded TV networks apps to their iPad/tablet and/or smartphone, which is a slight q/q and y/y increase. For the fourth quarter in a row, the top five most popular TV network apps are: ABC, CNN, WatchESPN, HBO GO and CBS.

TV NETWORK APPS

Do you have any of the following TV/TV network apps downloaded on your iPad/tablet and/or smartphone? (Choose all that apply)

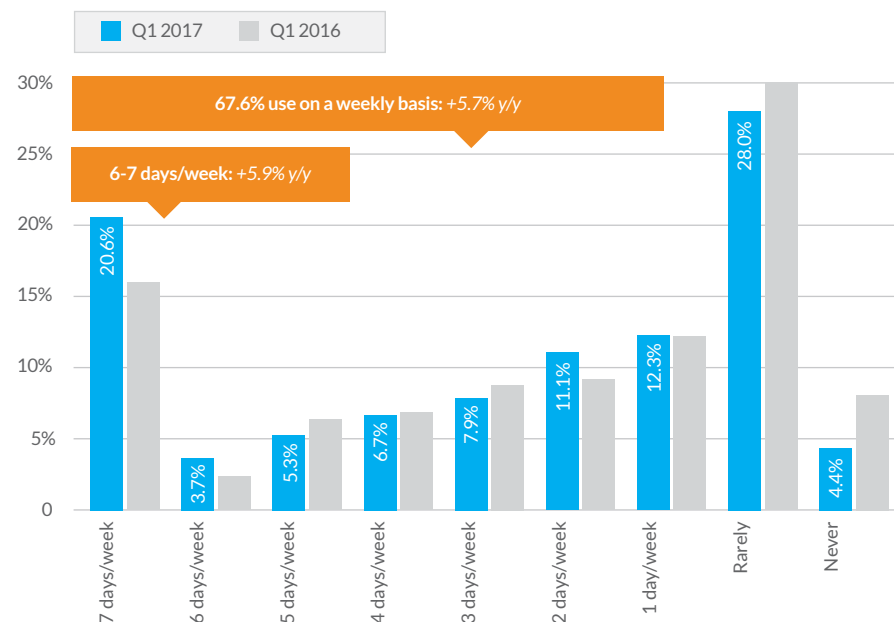


Of respondents using TV network apps, 67.6% do so on a weekly basis, a percentage that has increased 5.7% y/y. Of the two largest groups, the survey found:

- 23.4% of respondents use them 1-2 days a week.
- 24.3% of respondents use them 6-7 days a week.
 - Those who use TV network apps 6-7 days a week increased 5.9% y/y.

TV NETWORK APPS WEEKLY USAGE

How often do you use these TV/TV Network apps?



OTT Trends: Subscription and Transactional Video-On-Demand (SVOD and TVOD)

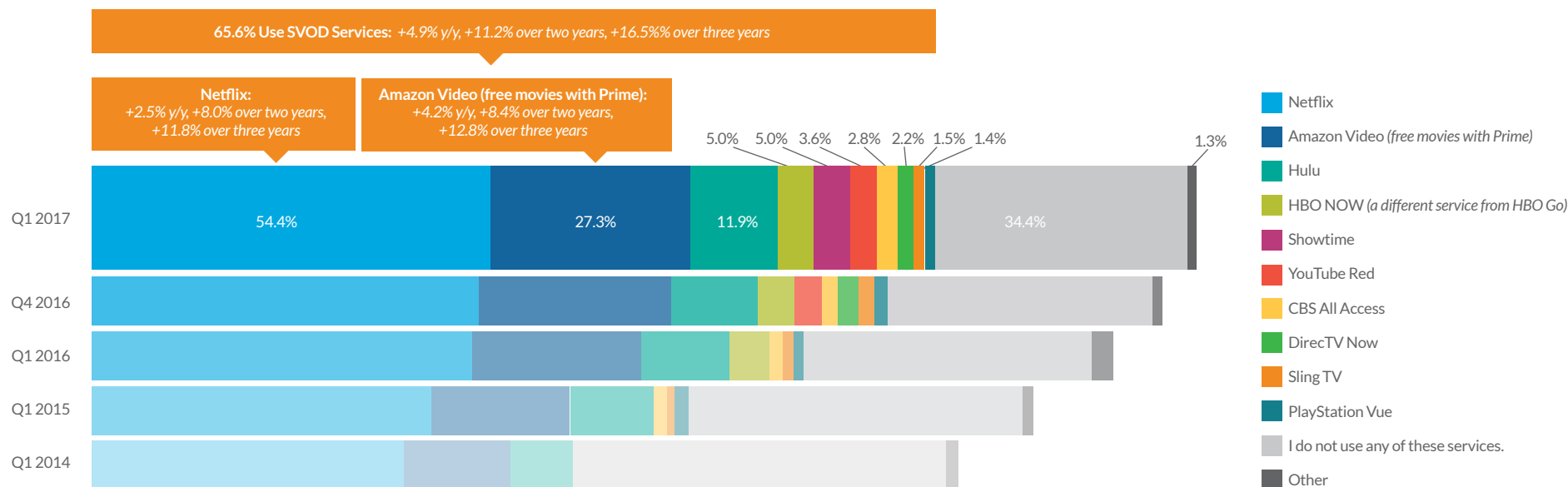


In Q1 2017, 65.6% of all respondents use one or more SVOD service(s). Additionally, of respondents with pay-TV service, 93% also use one or more SVOD service(s). The top three services are Netflix, Amazon Video and Hulu. A few noteworthy trends for several SVOD providers include:

- Overall adoption of SVOD services across all respondents increased slightly q/q, 4.9% y/y, 11.2% over two years and 16.5% over three years.
 - Adoption by the cord-cheater audience (they have pay-TV services and also use at least one SVOD service) increased nearly 2.0% q/q.
- Respondent selection of “Netflix” increased slightly q/q, 2.5% y/y, 8% over two years, and 11.8% over three years.
- Respondent selection of “Amazon Video (free movies with Prime subscription)” increased slightly q/q, 4.2% y/y, 8.4% over two years, and 12.8% over three years.
- While Hulu ranks among the top three SVOD services used by respondents, it experienced little to no growth q/q or y/y.

MONTHLY SUBSCRIPTION OTT/SVOD SERVICES

Do you use any of these monthly subscription services for movies or TV shows? (Choose all that apply)



OTT Trends: SVOD and TVOD



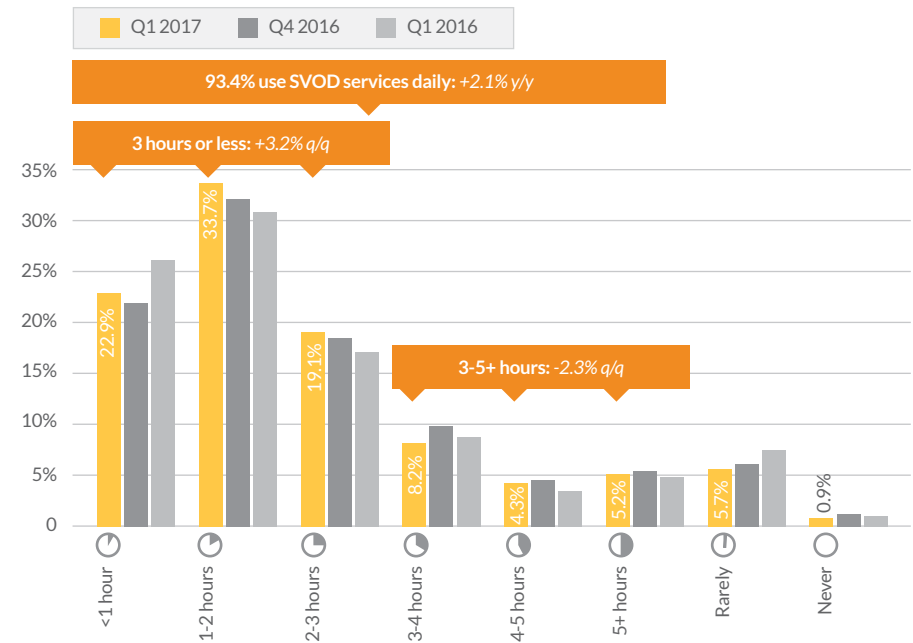
SVOD ENGAGEMENT AND VIEWERSHIP TRENDS

Below is a breakdown of SVOD viewership trends in Q1 2017:

- 93.4% of respondents watch SVOD services on a daily basis, a habit that increased slightly q/q and 2.1% y/y.
- The largest group (75.7%) watches three hours or less per day of SVOD content, an increase of 3.2% q/q.
- Although daily viewing as a whole is up, respondents spent less time watching SVOD services on a daily basis than they did in Q4 2016. This decline is based on the 2.3% q/q decrease in the three combined categories of 3-4 hours, 4-5 hours and 5+ hours per day.

VIEW TIME FOR SVOD

On average per day, how many hours do you watch content on these subscription services?



OTT Trends: SVOD and TVOD



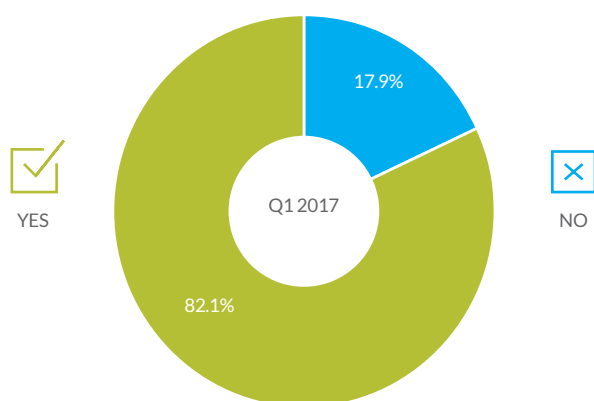
SVOD ENGAGEMENT AND VIEWERSHIP TRENDS (CONTINUED)

In Q1 2017, 43.5% of respondents spent \$6-11 each month on SVOD services. While in Q1 2017 only 13.4% of SVOD users spent from \$21 to \$30+ a month, respondents are spending more based on increases in this category of 2.2% q/q, 3.3% y/y, 5.5% over two years, and 7% over three years.

User experiences and content discovery within SVOD services continue to be superb with 82.1% of respondents answering they are pleased with their ability to find something to watch on SVOD services — the highest level of satisfaction for this question across all survey results dating back to Q3 2015, when it was added.

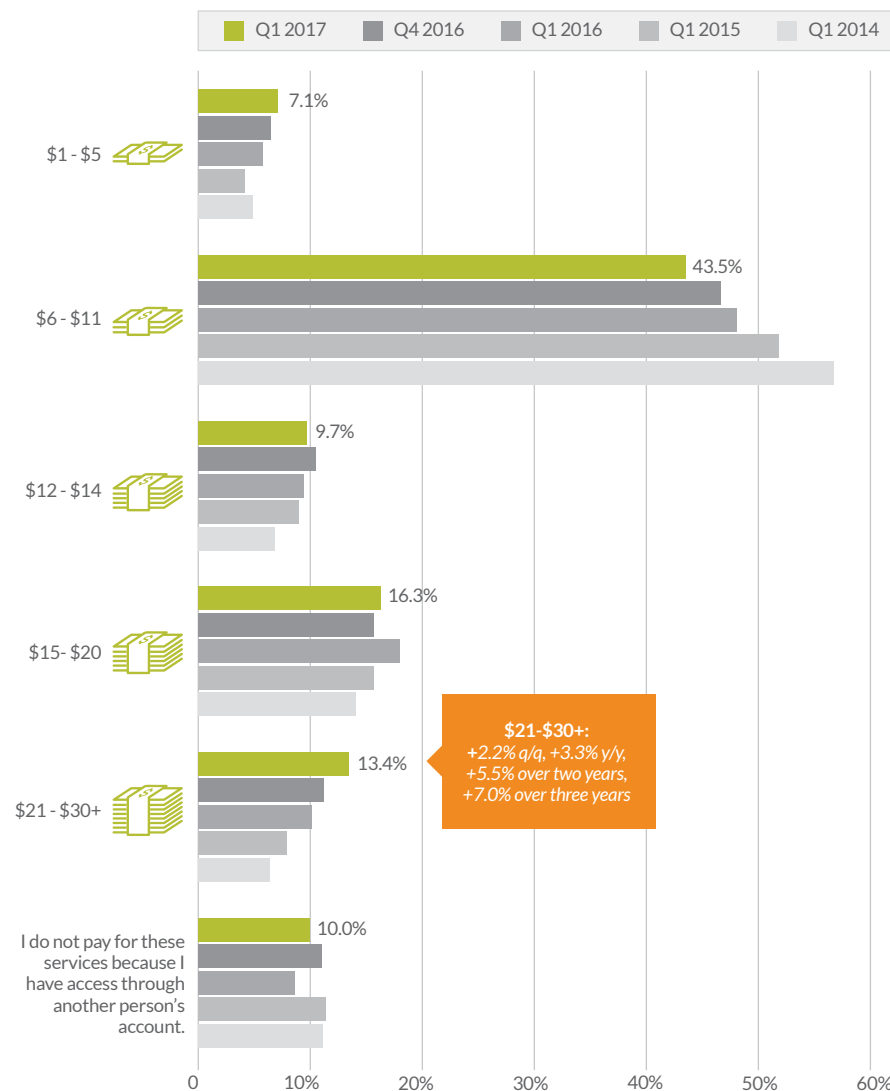
SVOD CONTENT DISCOVERY

Do you feel it is easy to find something you "want" to watch on these subscription services?



SVOD BILL AMOUNT

How much do you spend each month on subscription services (combined spend on Netflix, Hulu, etc)?



OTT Trends: SVOD and TVOD



SVOD ENGAGEMENT AND VIEWERSHIP TRENDS (CONTINUED)

Because Netflix is the clear leader in the SVOD industry, it's important to understand why the service appeals so strongly to respondents. For the fourth quarter in a row, the top three most appealing Netflix features are:

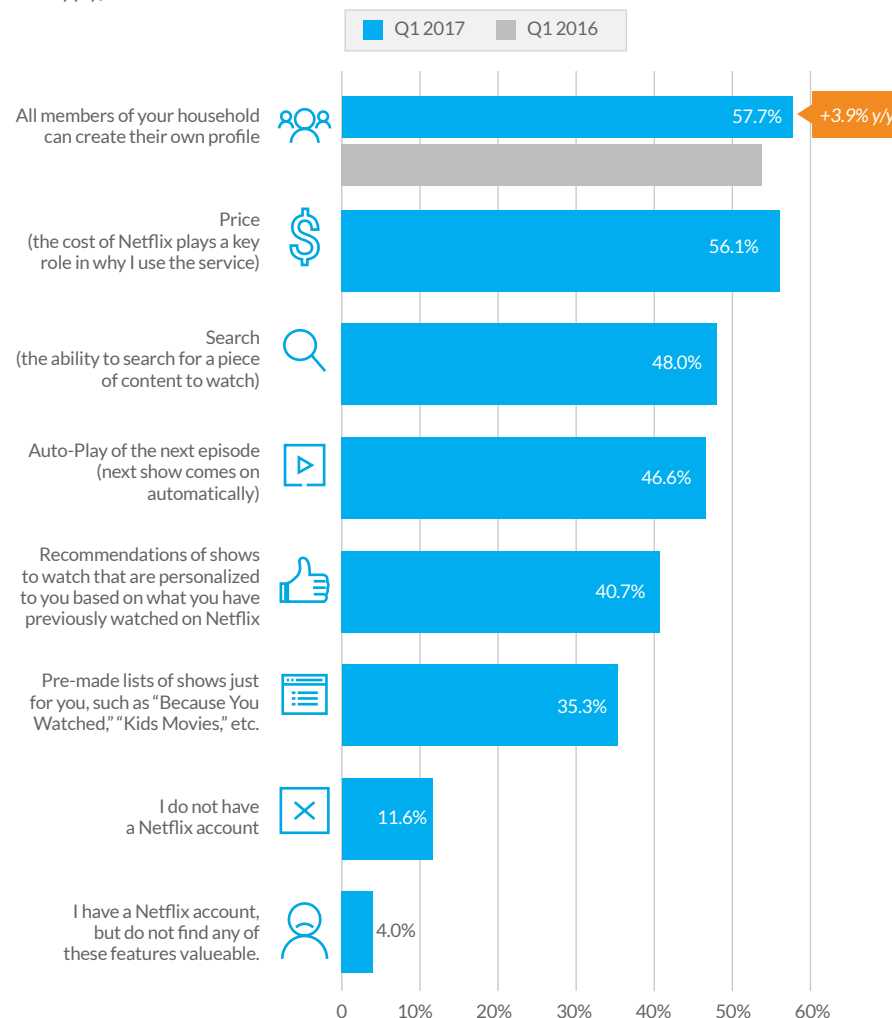
- “All members of your household can create their own profile” – 57.7%, a slight increase q/q, and 3.9% y/y.
- “Price (the cost of Netflix plays a key role in why I use the service)” – 56.1%
- “Search (the ability to search for a piece of content to watch)” – 48%

Of those with Netflix, nearly 60% indicated their favorite feature is profiles for each member of the household. By allowing subscribers to create multiple profiles, Netflix is able to deliver more personalized content recommendations to each viewer. Netflix is now able to silo out each viewer and leverage not only their viewing habits but also explicit feedback such as likes/dislikes indicated after watching a piece of content.

A debate within the industry has been brewing for some time over whether consumers would be willing or comfortable to toggle between profiles within their pay-TV offerings. TiVo believes this supposed hesitation is insignificant, and feels the survey result provides further support for this belief. Personalization is not the future; instead it is here now and is in many devices used every day. Pay-TV providers need to accelerate personalization efforts, especially if they intend to target Millennials, an audience that will demand this feature from their pay-TV or online video providers.

NETFLIX'S APPEALING FEATURES

If you are a Netflix subscriber, which of Netflix's features do you find appealing? (Choose all that apply)



OTT Trends: SVOD and TVOD



SVOD ENGAGEMENT AND VIEWERSHIP TRENDS (CONTINUED)

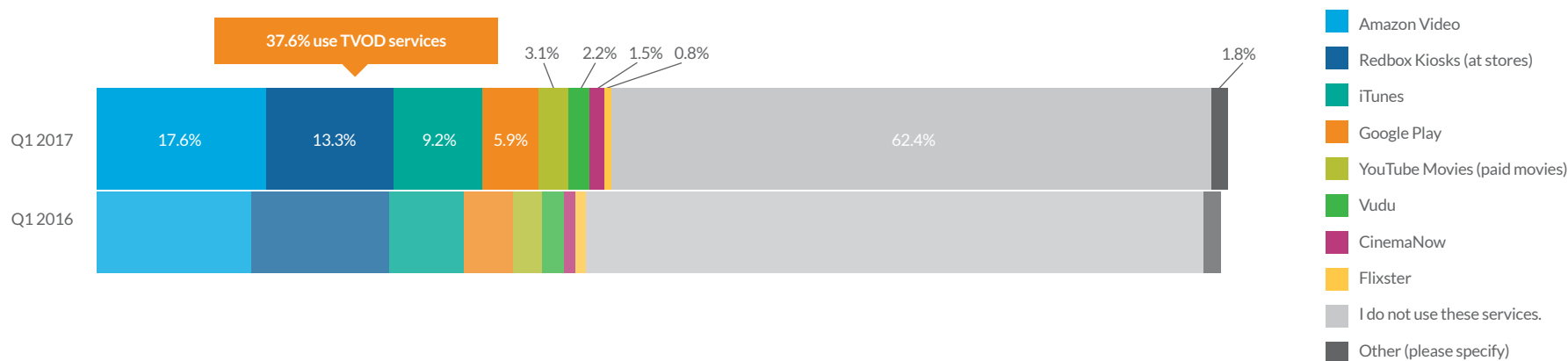
It is also worth noting nearly half of respondents put “search” in their top three most appealing Netflix features. Most SVOD providers offer predictive (or popularity) search, meaning once the viewer types a letter, the results are not sorted alphabetically, but rather by what other viewers were typically seeking when they typed the same letter(s). For example, if the viewer types “B,” the first two shows displayed might be “Big Bang Theory” and “Better Call Saul.” Most pay-TV providers do not offer this feature today, but to do so would add further desirable functionality for customers.

STATE OF ADOPTION AND MARKET SHARE OF TVOD SERVICES

In Q1 2017, 37.6% of all respondents use TVOD services, which is up slightly. More specifically, of respondents who subscribe to pay-TV services, 53.2% also use a TVOD service. Based on survey results, PVOD offerings from pay-TV providers are growing at a faster pace than TVOD. Are pay-TV providers’ efforts to improve the user experience with PVOD catalogs (including content discovery) having an effect on TVOD? While it may be too early to venture an answer, TiVo will continue to monitor and track this area.

TVOD SERVICES

Do you rent or purchase movies from services like Amazon, CinemaNow, iTunes, Redbox kiosks, Vudu, etc.? (Choose all that apply)



OTT Trends: SVOD and TVOD



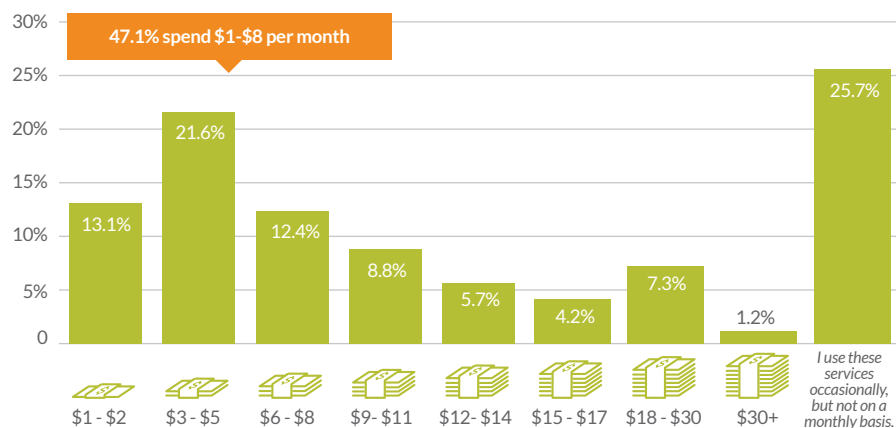
TVOD ENGAGEMENT AND VIEWERSHIP TRENDS

In Q1 2017, 73% of those using TVOD services said they watch them on a weekly basis, an interval that increased 2.7% q/q. Of those using TVOD services, the largest group (34.6%) answered they watch TVOD services 1-5 hours per week. While overall weekly viewership may have experienced positive growth, an examination of the combined categories of 20 hours to 30+ hours from the Q1 2017 survey results show that on the average consumers are not watching longer hours of content each week via these services.

In terms of money spent, the largest group of respondents (47.1%) spends \$1-8 a month on TVOD services. Based on minimal q/q and y/y growth in the combined categories \$18-30+, it appears respondents are not rapidly increasing monthly spending on TVOD rentals.

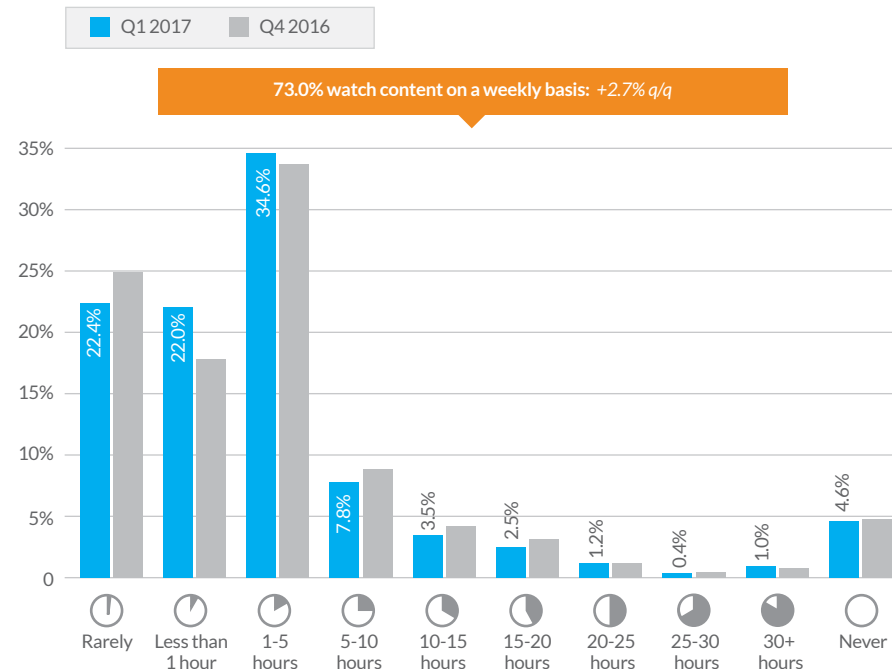
MONTHLY SPEND ON TVOD SERVICES

How much do you spend per month renting movies from these pay-per-rental services?



VIEW TIME FOR TVOD SERVICES

On average per week, how many hours do you watch content on these pay-per-rental services?



OTT Trends: SVOD and TVOD



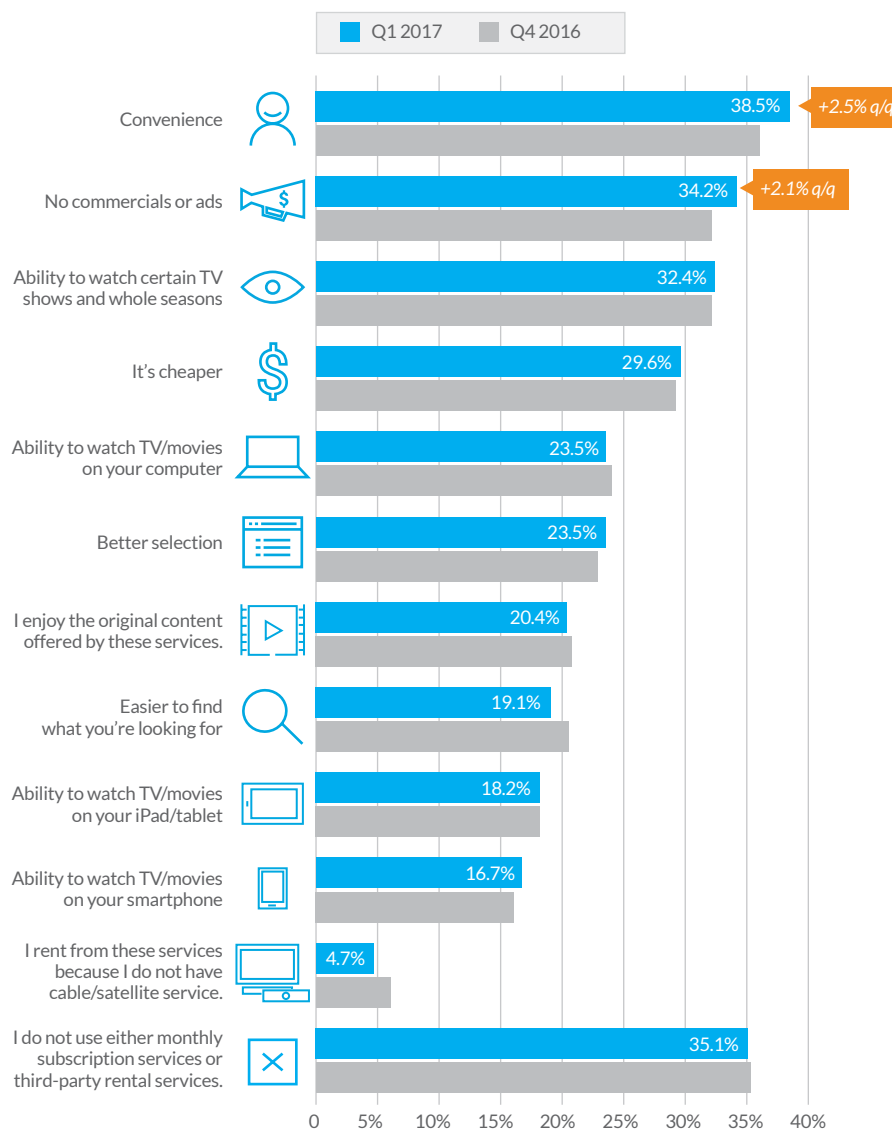
THE ENTICEMENT OF OTT SERVICES

The good news is both TVOD and SVOD services experienced positive growth in overall viewership y/y, and as a result, it remains imperative to keep a pulse on the top reasons people use these services. These reasons include:

- “Convenience” – 38.5%, a 2.5% q/q increase
- “No commercials or ads” – 34.2%, an increase of 2.1% q/q
- “Ability to watch certain TV shows and whole seasons” – 32.4%
- “It’s cheaper” – 29.6%
- “Ability to watch TV/movies on a computer” – 23.5%
- “Better selection” – 23.5%
- “I enjoy the original content offered by these services.” – 20.4%
- “Easier to find what you’re looking for” – 19.1%
- “Ability to watch TV/movies on your iPad/tablet” – 18.2%
- “Ability to watch TV/movies on your smartphone” – 16.7%
- “I rent from these services because I do not have cable/satellite service.” – 4.7%
- “I do not use either monthly subscription services or third-party rental services.” – 35.1%

REASONS TO USE OTT SERVICES

Why do you use these third-party rental and/or monthly subscription services like Amazon, iTunes, Netflix, Vudu, CinemaNow, Blockbuster, Redbox or YouTube? (Choose all that apply)





Analytical Commentary

ANALYSIS OF VIDEO VIEWING SERVICES USED BY NUMBER IN HOUSEHOLD



With all the options available today to view video content, TiVo was interested in conducting a deep dive to better understand exactly what kinds of households use which types of services. In Q1 2017, TiVo's Data Science team analyzed who subscribes to pay-TV, SVOD and TVOD services. Here is a snapshot of subscriptions by households:

Number in Household	1	2	3	4	5	6	7+
Subscribes to Pay-TV	77.2%	86.0%	88.6%	89.4%	85.3%	83.9%	85.0%
Subscribes to SVOD	52.8%	63.8%	64.3%	75.9%	73.0%	69.6%	57.5%
Uses TVOD	29.1%	35.7%	38.1%	43.8%	41.1%	51.8%	47.5%

According to this analysis, it is evident single-person households hold the least number of video subscriptions. The largest jump in subscription levels is from one household member to two. Subscription levels peak at four household members, then starts to decline.

Connected Devices



STREAMING DEVICES

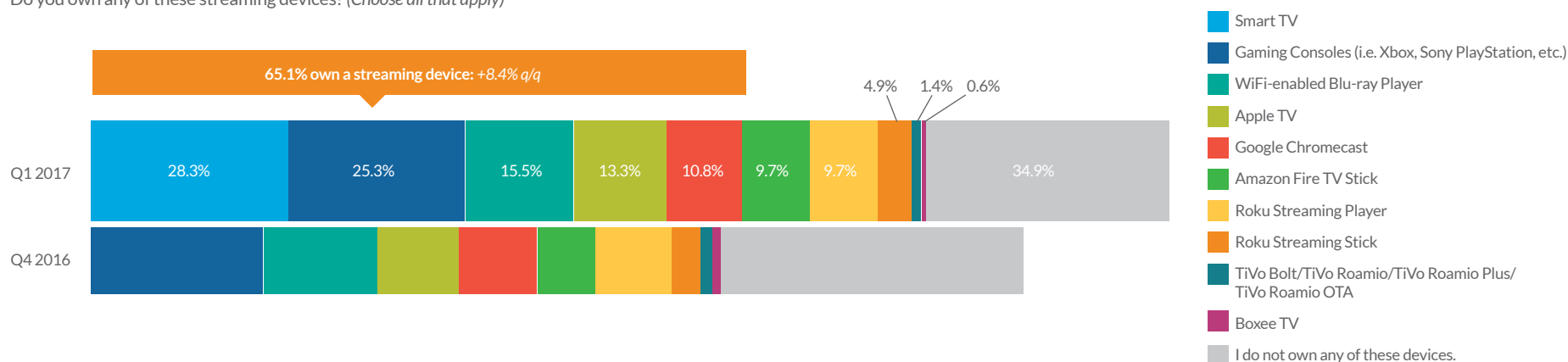
Because consumers now have dozens of services for viewing TV, plus multiple screens on which to stream video content, it's important to examine overall device ownership and engagement as they relate to pay-TV service. In addition to ownership and engagement, TiVo seeks to understand why some respondents do not own a streaming device during an era of so much media and advertising hype for these devices. Below is a breakdown of market share and engagement for streaming devices in Q1 2017:

- 65.1% of respondents own a streaming device.
 - Overall ownership of streaming devices increased 8.4% q/q; however, smart TV was added as an answer choice, which is likely responsible for this increase in Q1 2017.

- The three most popular devices are:
 1. Smart TV - 28.3%
 2. Gaming consoles (e.g., Xbox, Sony PlayStation, etc.) – 25.3%
 3. WiFi-enabled Blu-ray Player – 15.5%
- 12% access their pay-TV service on a streaming device, but growth in this group is flat q/q (see chart on page 30).
- 17.2% have replaced one or more of their pay-TV providers' set-top boxes with a streaming device, a practice that decreased slightly q/q.
- Those who answered “No, I have not replaced any of my cable/satellite provider's set-top box(es) for a streaming device” increased 2.2% q/q (see chart on page 30).

STREAMING DEVICE OWNERSHIP

Do you own any of these streaming devices? (Choose all that apply)



Connected Devices

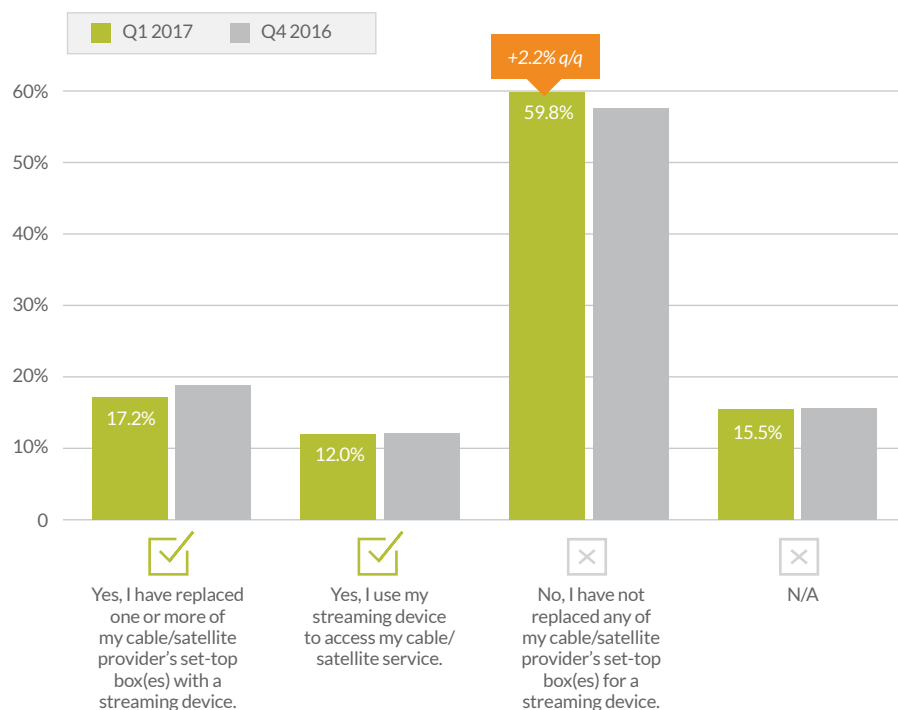


STREAMING DEVICES (CONTINUED)

While the number of respondents who replaced one or more STBs with streaming devices decreased slightly, pay-TV providers should keep a close eye on this trend. Pay-TV providers receive significant revenue each month from renting/leasing this equipment to subscribers. Couple the falling cost of streaming devices with the benefit of using one device to access all content, and it's evident streaming devices present a significant threat to pay-TV providers' STB rent/lease revenue.

REPLACE SET-TOP BOXES WITH STREAMING DEVICES

If YES, have you replaced any set-top boxes in your home with a streaming device, and if so, do you use it to access your cable/satellite service? (Choose all that apply)



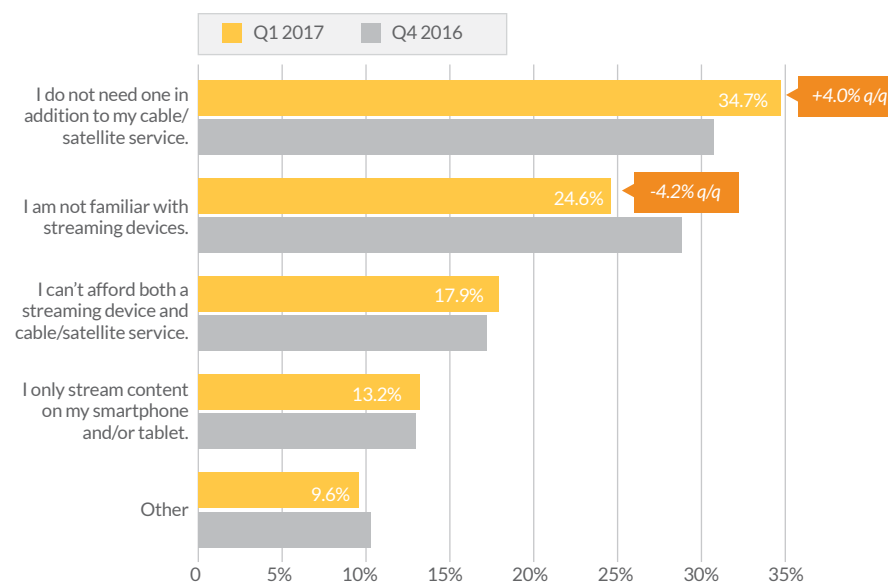
When asked why they do not own a streaming device, respondents' top reasons were because they are not familiar with them (24.6%) and they feel they do not need one in addition to their pay-TV service (34.7%). The Q1 2017 survey results show both positive and negative news for streaming device manufacturers:

Positive: Overall awareness of streaming devices increased, since the answer choice "I am not familiar with streaming devices." (24.6%) decreased 4.2% q/q.

Negative: Those who might not see value in owning a streaming device in addition to pay-TV service (34.7%) increased 4% q/q.

NO STREAMING DEVICE, WHY?

If NO, why have you not purchased a streaming device?



Connected Devices



HOME ASSISTANT DEVICES

In the last two years, much hype and advertising have surrounded what many refer to as “home assistant devices.” In 2016 these were “must-have” holiday gifts for early adopters; in 2017 the device marketing has evolved to focus on how to deeper integrate it into everyday tasks around the house. For example, commercials by Amazon Echo featuring the former NBA star Grant Hill have illustrated various real-life ways to use these devices in an effort to link them to consumers’ daily needs around the house.

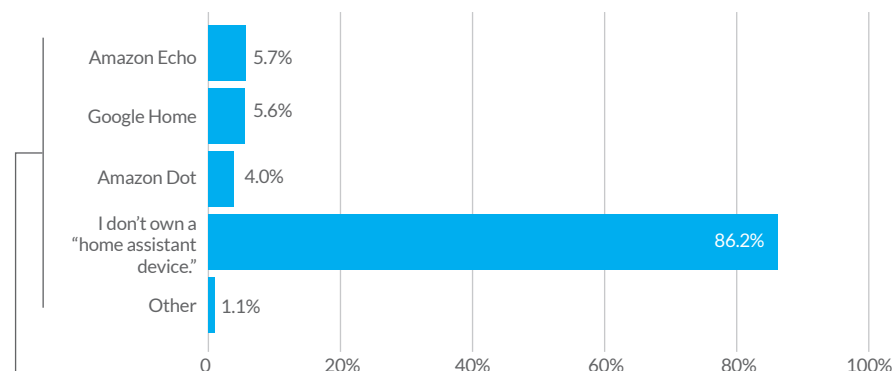
Therefore, based on the evolving integration with video and TV within the home, TiVo added two questions to the Q1 2017 survey to track overall market share and engagement with these devices in relation to video. The results are:

- Only 13.8% of respondents own a home assistant device, and interestingly, Google Home and Amazon Echo are basically equal in market share.
- Of those who own a home assistant device, 30.5% of those use it to find something to watch on TV.

A sizeable group of respondents (22.8%) was unaware these devices could be used to find video content; nonetheless, they are interested in taking advantage of the functionality in the future. Though home assistant devices might have been a “hot” gift, time will tell if they truly help around the house in areas such as video. TiVo will continue to track progress on how respondents use their home assistant devices, and whether they can help consumers find something to watch on TV.

HOME ASSISTANT DEVICES

Which of the following “home assistant devices” do you own? (choose all that apply)



IF YES...

Do you use your home assistant device to find or watch video content on another device, such as your TV?



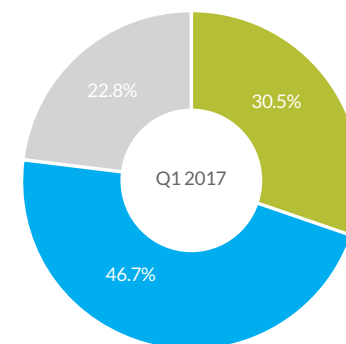
Yes



No



No, I did not know I could use it to find video content, but I am interested in taking advantage of this functionality in the future.



Content Discovery: Recommendations, Search and Sports Discovery



In Q1 2017, 65.2% of respondents answered they are frustrated “always” or “sometimes” when trying to find something to watch on TV. Overall frustration increased 2.2% y/y and 3.4% over two years.

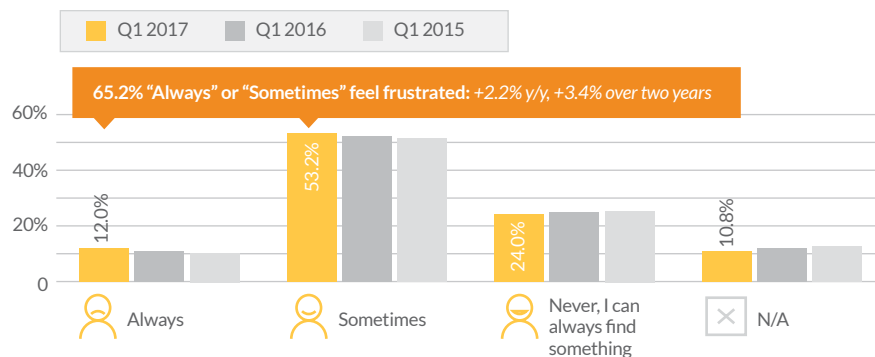
Another source of frustration when navigating the myriad of available content sources and platforms is inconsistency in content availability. As consumers become increasingly connected and mobile, many are discovering some content is only available on certain services, devices, or platforms — or specific episodes and seasons are trapped behind additional pay walls.

In Q1 2017, 28.4% of respondents stopped watching a show they previously enjoyed because it became too difficult to access. The good news is this group who stopped watching a show because of frustration with content discovery declined 3.8% q/q. Below are the primary drivers behind why respondents “show-dumped” and gave up on the content:

- “New seasons and episodes were not available on my streaming service.” – 32.4%
- “The content is not available on the streaming service to which I currently subscribe (e.g., Netflix, Hulu).” – 30%

FINDING SOMETHING TO WATCH

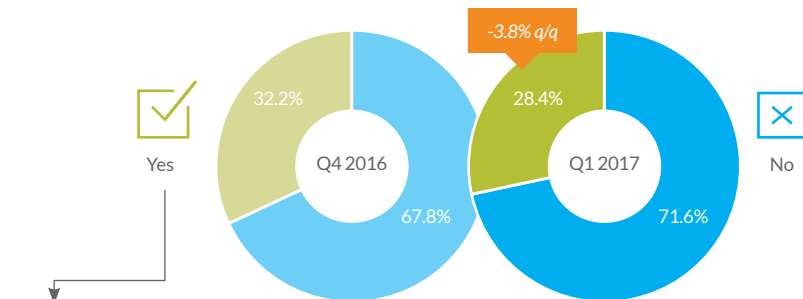
How often do you get frustrated when trying to find something to watch on TV?



With over 60% of respondents “show-dumping” content they enjoyed due to lack of availability on streaming services, this highlights the importance of strategic licensing, while illuminating the complex competitor/supplement relationship between traditional pay-TV and streaming services. If content owners aim to secure long-term engagement in the era of peak TV, they must find ways to keep viewers from “show-dumping.”

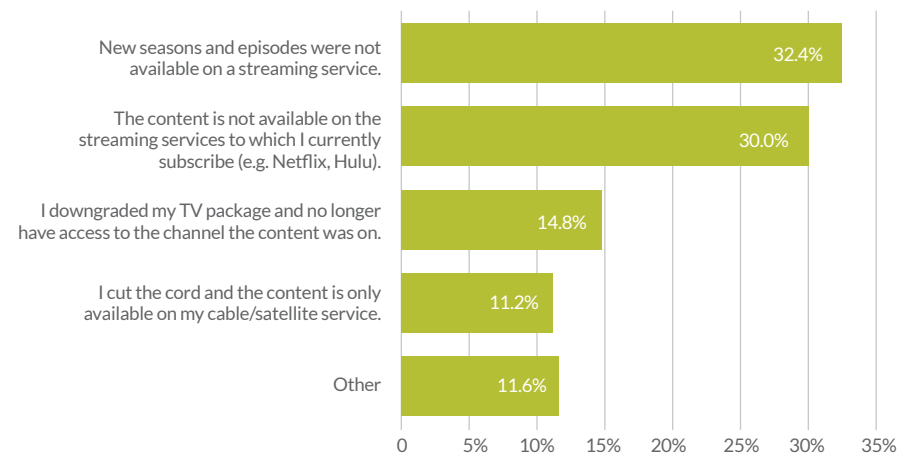
TROUBLE FINDING CONTENT

Have you ever stopped watching a show that you previously enjoyed because the content became too difficult to access?



IF YES...

Please select the main reason the content became too difficult to access:



Content Discovery:

Recommendations, Search and Sports Discovery



RECOMMENDATIONS

In Q1 2017, 17.2% of respondents indicated their pay-TV providers offer personalized recommendations of TV shows and/or movies, which increased slightly q/q. While many pay-TV providers have successfully launched content recommendations on their TVE product, STB launches have been slow and more staggered, which is concerning in TiVo's opinion. Not only are pay-TV providers slow to roll out recommendations on STBs, the majority of content recommendations delivered to date, whether TVE or STB, have not been personalized to the viewer. Rather, the content recommendations shown in pay-TV offerings today seem to be based on popularity of content or "More Like This" (similarities between types of content).

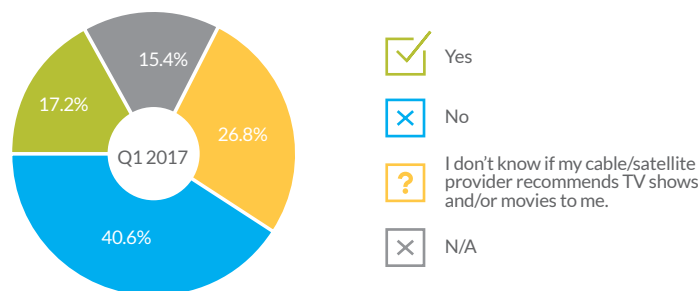
However, as rollouts of recommendations slowly pick up, TiVo wanted to track respondents' awareness of recommendations, or lack thereof, in order to more accurately educate pay-TV providers on how to market to their subscriber base. In Q1 2017, 26.8% are unaware whether their pay-TV provider offers this functionality, and this lack of awareness increased slightly q/q. While the report only covers two quarters of data for this

answer choice, pay-TV providers need to ensure they clearly market and demonstrate this functionality across all mediums of marketing — in other words, mailers alone will be unlikely to demonstrate the usefulness of recommendations.

Of respondents with access to recommendations, 81.7% feel the results are "always accurate" or "sometimes accurate"— sentiments that increased 2.6% q/q. Though the percentage of respondents satisfied with accuracy is high, 11.3% could not rate the quality of the recommendations because they answered, "I don't know because I have never paid attention to or used the recommendations." This answer choice was newly added to the survey in Q4 2016 to identify whether an audience existed that is aware of content recommendations, but chooses to ignore them. Though this audience of aware non-users is small (11.3%), it indicates disengagement with this functionality. While this audience is worth noting, a more positive outcome for pay-TV providers is this group of aware non-users decreased 2.1% q/q. TiVo will continue to track this behavior to identify trends among this audience.

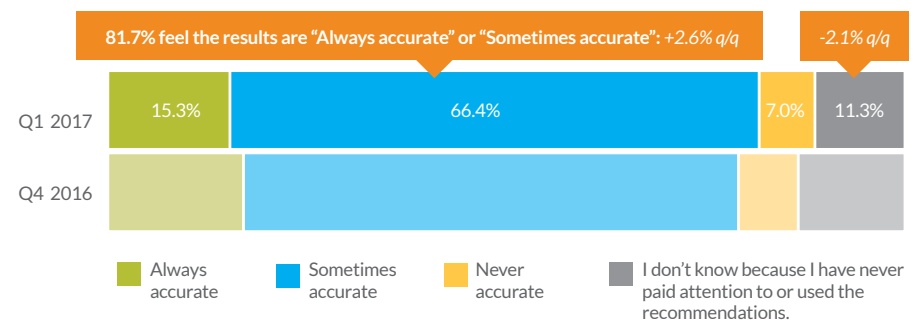
RECOMMENDATIONS

Does your cable/satellite provider make personalized recommendations of TV shows and movies to you based on your interests, past viewing habits, etc.?



RECOMMENDATIONS? IF YES...

Do you feel the recommendations are accurate/relevant?



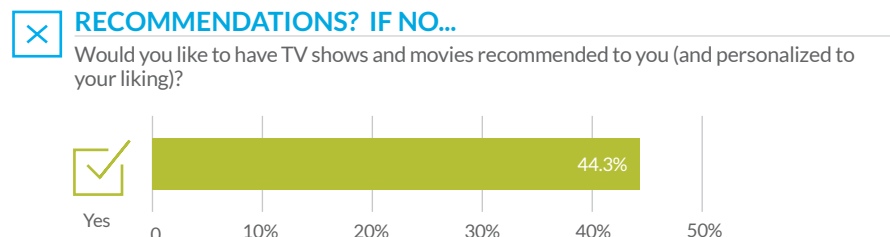
Content Discovery:

Recommendations, Search and Sports Discovery



RECOMMENDATIONS (CONTINUED)

Of those without recommendations, 44.3% would like their pay-TV providers to offer them, and this group increased slightly q/q. As this group approaches a majority, pay-TV providers should be listening to them, especially when considering pay-TV would be one of the last video solutions to offer content recommendations.



Analytical Commentary

DEEP DIVE INTO RECOMMENDATIONS AND THEIR EFFECT

As content recommendations become more frequently available, TiVo continues to monitor their effect, and whether they improve the viewer experience. Therefore, in Q1 2017, TiVo's Data Science team took a deep dive into data surrounding those with and without content recommendations from their pay-TV providers, and whether recommendations affect how viewers feel about finding something to watch on TV (See [TV Viewing Habits](#) section of the report, page 16).

The analysis revealed content recommendations have a positive impact on respondents' perceived value of the discovery experience offered by their pay-TV provider; nearly three out of four respondents with recommendations indicated ease of finding something to watch. TiVo pushes the importance of content recommendations to pay-TV providers and respondents' feedback validates the need for this functionality.

Of Pay-TV Subscribers	Pay-TV Provider Makes Recommendations	Pay-TV Provider Does NOT Make Recommendations
Easy to Find Something to Watch on TV	71.6%	56.4%
Not Easy to Find Something to Watch on TV	28.4%	43.6%

Content Discovery:

Recommendations, Search and Sports Discovery



SEARCH

Search is another form of content discovery that, like the video industry as a whole, has evolved over the lifetime of this report. Therefore, to account for the various search methods offered today, this report breaks search functionality into three categories: lists or category searches, text search and voice search.

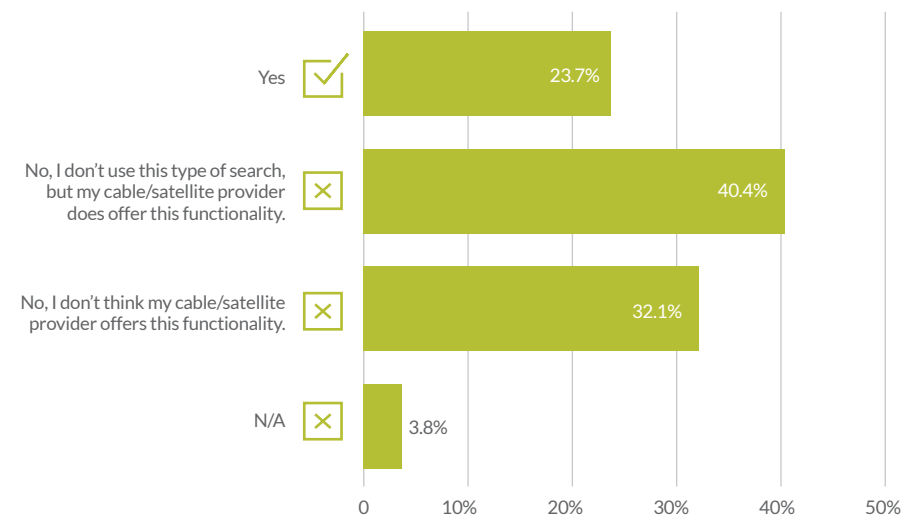
In Q1 2017, TiVo added a fourth search category, cross-catalog search, to account for the various video sources available today.

Lists or Category Search

In Q1 2017, 23.7% of respondents use pre-made lists (e.g., kids' shows, popular TV, news, etc.) to search for something to watch on TV, whereas 40.4% of respondents answered "No, I don't use this type of search, but my cable/satellite provider does offer this functionality." While those aware of but not using lists search is a sizable group, it's also rare to get adoption by all subscribers. Therefore, a more critical audience to focus on is the 32.1% who are unaware of whether or not their providers offer this functionality. At nearly a third of respondents with pay-TV service, this group is ripe for effective marketing, which could turn them into adopters of this functionality, ultimately improving overall satisfaction with the content discovery experience within their pay-TV offerings.

LIST/CATEGORY SEARCH

Do you use the pre-made category lists to search for channels such as "Family/Kids Shows," "Sports," or "Lifestyle Channels?"



Content Discovery:

Recommendations, Search and Sports Discovery

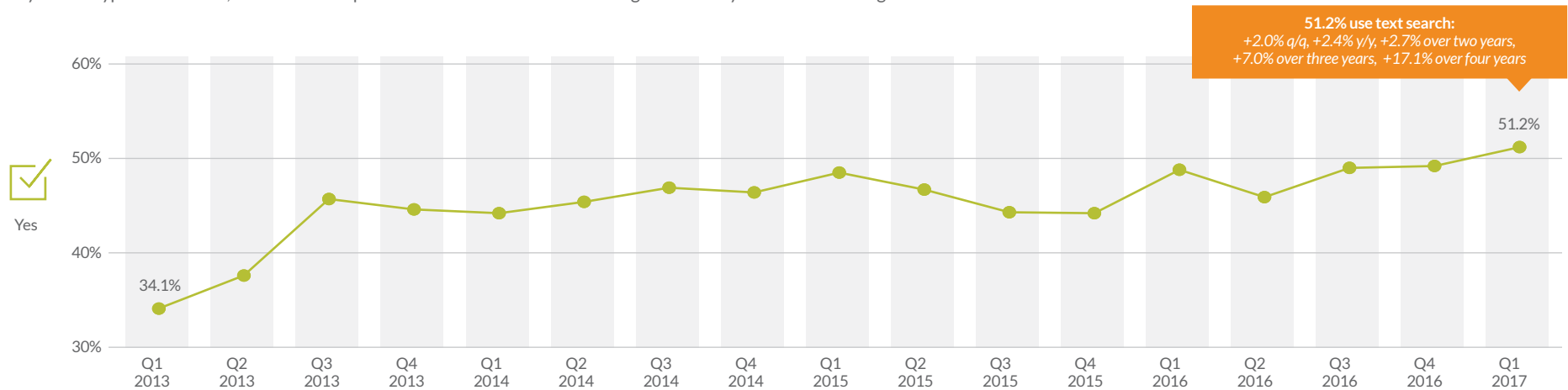


Text Search

Over half (51.2%) of respondents type in a TV show, movie or topic on their STB to find something to watch on TV, marking the highest adoption of this search feature so far across all survey results dating back to Q1 2013. Engagement with text search functionality increased 2% q/q, 2.4% y/y, 2.7% over two years, 7% over three years, and 17.1% over four years.

TEXT SEARCH

Do you ever type in a TV show, movie title or topic into a search box to find something to watch in your cable/satellite guide?"



Content Discovery: Recommendations, Search and Sports Discovery



Text Search (continued)

In addition to engaging in text searches, respondents demonstrated positive perception of accuracy, with 86.4% of respondents rating their text search results as accurate, which is an increase of 2.4% y/y.

Similar to other trends covered in this report, it's always important to keep a pulse on why respondents are not engaged with text search functionality. For the third quarter in a row, the top three reasons respondents do not use text search are:

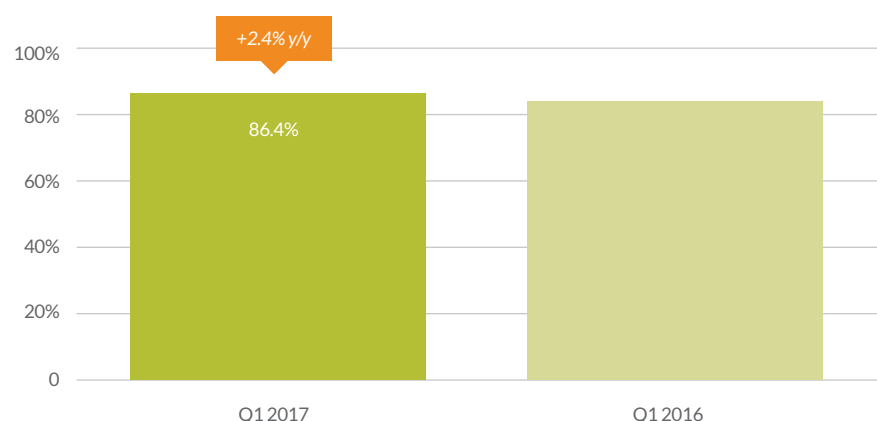
- "I only watch a few channels, so no need to search." – 36.1%
- "I am not interested in searching for TV shows/movies." – 23.5%, an increase of 4.2% q/q
- "It takes too much time." – 21.8%

Two key takeaways regarding those who do not use text search are:

- There was a sizeable increase (4.2%) in those who are simply not interested in using text search functionality. Is this a result of the introduction of voice search? Though it's too soon to tell, TiVo will continue to monitor this trend.
- Higher awareness for text search is positive news for pay-TV providers. This growth was indicated by a steady decrease in selection of the answer choice "Search is not offered by my cable/satellite provider," which dipped slightly q/q, 3.4% y/y, and 7.1% over two years.

✓ TEXT SEARCH? IF YES...

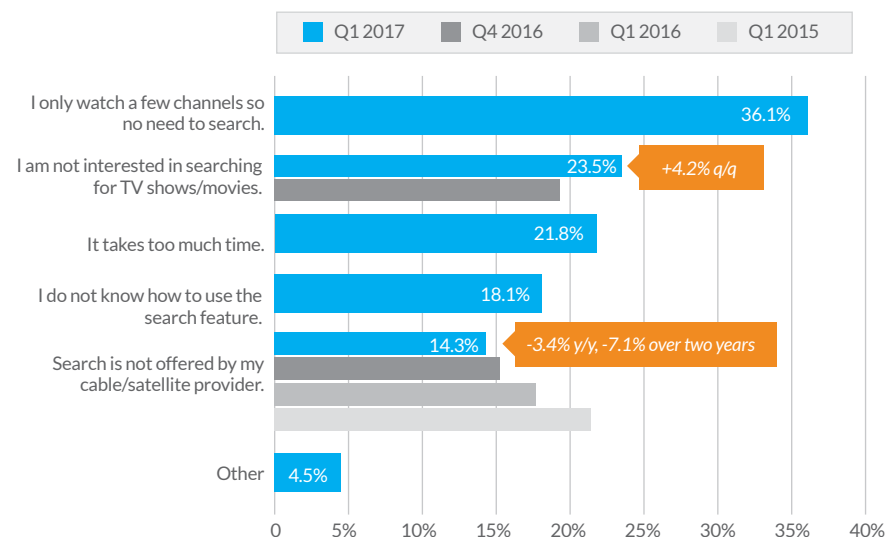
Do you feel the search results are accurate?



✓ Yes, I feel the results are accurate

✗ TEXT SEARCH? IF NO...

Why don't you use the search functionality offered to you? (Choose all that apply)



Content Discovery:

Recommendations, Search and Sports Discovery



Voice Search

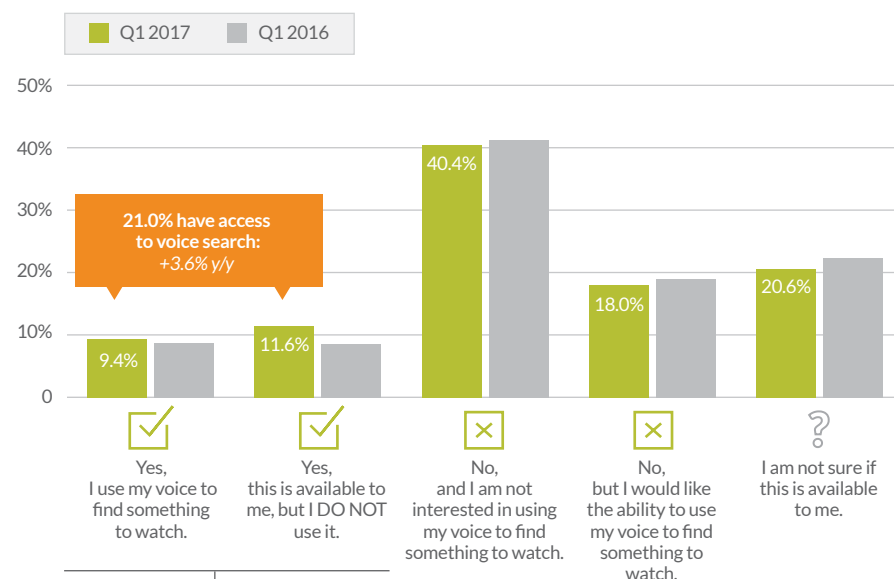
In Q1 2017, only 9.4% of respondents use voice search to find something to watch on TV, though this category of respondents did increase slightly q/q. While many providers have not yet introduced this functionality, those with access to voice search increased by 3.6% y/y, proving voice search is a priority of pay-TV providers. Of respondents who do use voice search, 88.3% do so on a weekly basis, which increased 4.6% q/q and 13.9% y/y. Though still a small group, weekly usage trending upward is a positive sign for pay-TV providers.

Though relatively new and offered by few pay-TV providers today, it is important to know the potential voice search could have if rolled out to all pay-TV subscribers. According to Q1 2017 survey results, the future is very promising. Eighteen percent of respondents do not have voice search today, but would like to use it, and 20.6% answered they do not know if it is available to them. In addition, 11.6% have access to voice search, but are choosing not to use it. However, with continued marketing of the benefits, as well as examples of how to use voice search, it's possible this group could gradually shift to adoption, which would create a sizable audience of voice search users. Voice search is yet another new feature that could improve viewers' ability to find something to watch, and thereby effecting an increase in viewer satisfaction.

Similar to marketing ads produced for Amazon Echo featuring Grant Hill mentioned earlier in this report, TiVo believes that pay-TV providers should market specific use cases to subscribers. This strategy is recommended for two reasons: It builds awareness of the functionality and shows consumers how to get started, and real-life examples give subscribers an idea of the realistic capabilities of search results, keeping expectations in line. Though promotion is encouraged, poor demonstration of a complex search feature can lead to failed search results and dissatisfied subscribers.

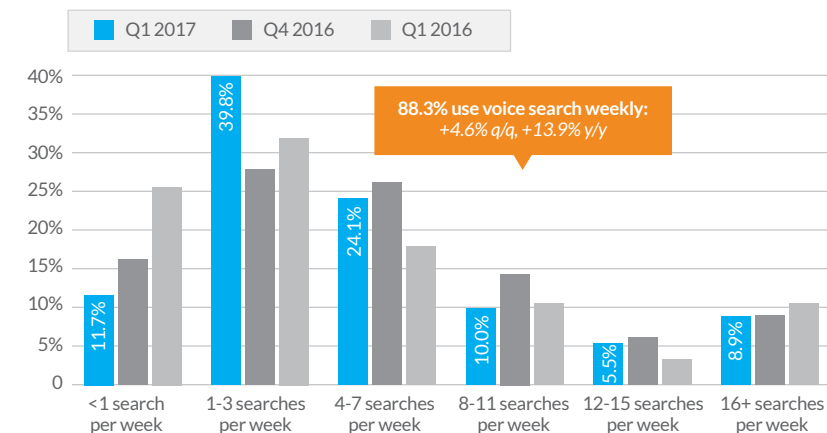
VOICE SEARCH

Do any of the devices on which you view TV and/or movies allow you to talk into the device to search for programming, change channels, etc.? (E.g., search by saying "Is a scary movie on now?")



IF YES...

How often do you use voice search?



Content Discovery:

Recommendations, Search and Sports Discovery



Voice Search (continued)

As an example, Comcast has launched advertising around its voice search on the Xfinity platform, and during a recent country music awards show, a series of commercials aired featuring real searches, giving viewers a clear idea of how to use the functionality. Leveraging marketing efforts to educate consumers is one of the many keys to success when launching new functionality such as voice search.

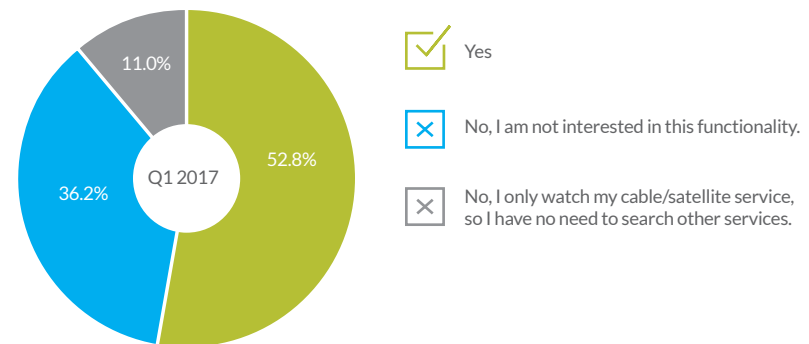
Cross-Catalog Search

Again, consumers today are faced with more options than ever to find something to watch — and now it's not just what they watch, but where they look for something to watch. Do they look in their pay-TV providers' guides or their PVID catalogs? Do they scroll through their SVOD accounts, or search on mobile through a TV network app? Regardless of the final destination, navigating multiple catalog options can be cumbersome, and oftentimes very frustrating — not only for viewers, but for pay-TV providers attempting to provide solutions.

TiVo believes cross-catalog search is an essential component of compelling, next-gen user interfaces for viewers. Therefore, new to the Q1 2017 *Video Trends Report* is a question asking respondents whether they would like the ability to search for TV shows and movies across all TV services (cable/satellite, Netflix, Amazon Prime, Hulu, etc.). Results reveal over half (52.8%) of respondents would like the ability to conduct cross-catalog searches. When looking at this sizeable audience alongside the 41.1% noted in the TV Viewing Habits section who desire a cross-catalog guide, it highlights that consumers want this functionality.

CROSS-CATALOG SEARCH

Would you like to be able to search for TV shows and movies across all of your TV services (cable/satellite, Netflix, Amazon Prime, Hulu, etc.)?



Content Discovery: Recommendations, Search and Sports Discovery



SPORTS DISCOVERY

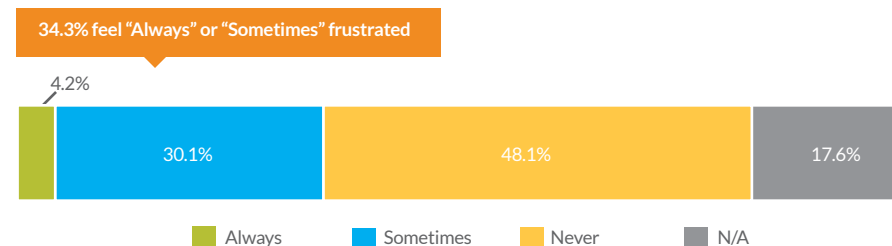
In Q1 2017, 34.3% of respondents are “always” or “sometimes” frustrated when trying to find their favorite team, or sporting events in general. While this is a large portion of respondents, the positive news is there is not much more frustration than one and two years ago.

A new and prevalent threat to pay-TV providers comes from social and OTT services offering sports content to their viewers. Recently in the video industry, streaming services have paid astronomical amounts for the rights to air popular sporting events. For example, at least 22 Major League Soccer (MLS) games in the 2017 season will be streamed live on Facebook.⁴ The sourced article also states Major League Baseball (MLB) has been investigating whether it can gain the necessary clearances from rights-holders to start Facebook live streams of its games as well. Just in time for the start of the season on April 2nd, MLB also recently became available to PlayStation Vue subscribers.⁵ In addition, the National Football League (NFL) is getting more diverse with its rights, reaching a deal with Amazon to stream 10 Thursday night games during the 2017-18 season.⁶

As streaming services become a new avenue for watching sporting events, TiVo added two new questions to gauge traction among consumers. In Q1 2017, 13.5% of respondents answered they have watched a live sporting event on a social media network such as Twitter or Facebook.

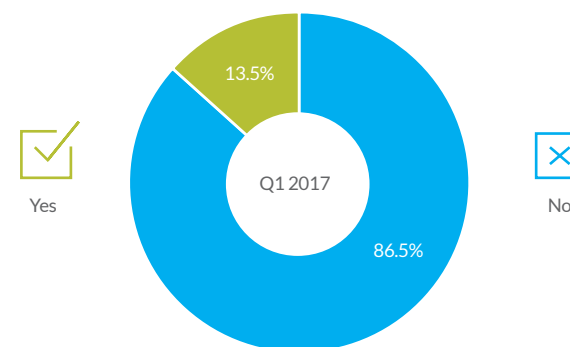
SPORTS DISCOVERY

Do you have trouble finding your favorite sports teams games or do you ever miss sporting events because they're on a channel that is far down in your channel guide?



STREAMING LIVE SPORTING EVENTS

Have you ever watched live sporting events on Twitter and/or Facebook?



⁴ <http://finance.yahoo.com/news/least-22-mls-games-streamed-183136589.html>

⁵ <http://www.multichannel.com/news/sports/playstation-vue-mlb-network-play-ball/411662>

⁶ <http://www.cbssports.com/nfl/news/amazon-wins-huge-bidding-war-to-stream-thursday-night-football-games-in-2017/>

Content Discovery: Recommendations, Search and Sports Discovery



SPORTS DISCOVERY (CONTINUED)

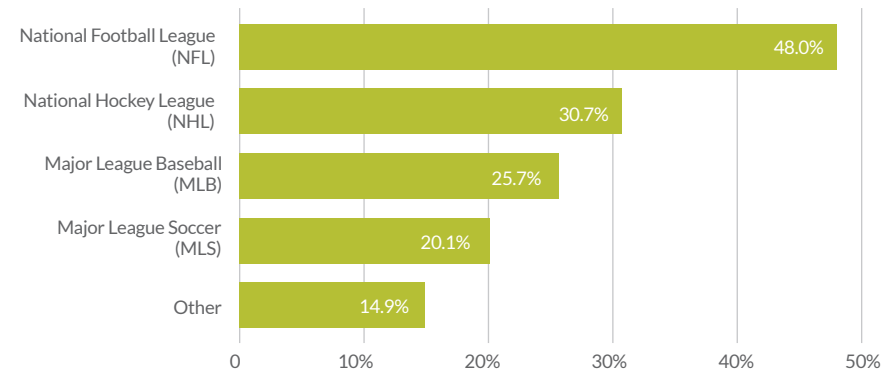
Of this small group of respondents who watched sports via social networks, the top games watched are from the following leagues:

- National Football League (NFL) - 48%
- National Hockey League (NHL) - 30.7%

For many years, sports have been a leading reason to subscribe to pay-TV service. Therefore, social network broadcasting is a trend TiVo will continue to watch and monitor for signs of consumer adoption and industry disruption. In the meantime, with over a third of respondents struggling to find their favorite sports teams or sporting events, pay-TV providers must identify better methods for getting viewers to sports content faster, before they begin seeking the content on a social media network or streaming service instead.

STREAMING LIVE SPORTING EVENTS? IF YES...

Which sports have you watched on Twitter and/or Facebook? (Choose all that apply)



ABOUT TIVO

TiVo Corporation (NASDAQ: TIVO) is a global leader in entertainment technology and audience insights. From the interactive program guide to the DVR, TiVo delivers innovative products and licensable technologies that revolutionize how people find content across a changing media landscape. TiVo enables the world's leading media and entertainment providers to deliver the ultimate entertainment experience. Explore the next generation of entertainment at tivo.com, forward.tivo.com or follow us on Twitter @tivo or @tivoforbusiness.



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