![TiVo logo]

Romance Movie
Starring
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Case Study

Retention, Revenue and Recommendations

Impact of TiVo's personalized content discovery solutions
on churn reduction and revenue

Table of Contents

Case Study Overview

This case study of existing customer data indicates potential outcomes of implementing TiVo's Search & Recommendations and Insight products (collectively known as Personalized Content Discovery, or 'PCD') based on data from four customers with approximately 2.5 million combined subscribers in the MVPD and VOD space.

Analysis of the existing customer data includes:

- The top features or behaviors that reduce churn
- Churn reduction rates and long-term retention impact
- Long-term financial impact

The study indicates that an exceptional content discovery experience is critical to reducing churn, and offers significant potential for bottom-line impact to subscriber growth and revenue.

Data was collected through two primary methods:

- Population comparison: Analyzing churn for populations of PCD users versus non-PCD users across all levels of viewership to control for bias with a Shapley attribution model
- Before/after observation: Analyzing the difference in churn over a period of time following the introduction of new personalization features

Definition of *churn* in this study

Churn, also known as attrition or customer churn, is a measure of the number of customers who stop doing business with an entity. In this study we measure churn based on whether or not a previously active viewer is watching content after a given period of time. For example, we consider someone who watched a show 30 days ago, but hasn't watched anything since, as a churned user.

Assumptions

In our retention and revenue models:

- We assume a churned user – 30 days with no viewership – does not return and therefore is no longer contributing revenue.
- We factor in only voluntary churn (the factors included in this study), removing involuntary churn behaviors like an expired credit card.
- We exclude any retention behaviors, like forgetting to cancel a service or staying with a service longer for reasons like an upcoming season of a new show

Executive Summary

The data showcased in this study is based on analysis across four TiVo customers in multiple video service provider segments, covering approximately 2.5 million combined subscribers.

TiVo Discovery customers in the study included

Segment	Geo	Subscribers	Business Model
Pay-TV Operator / MVPD	EU	900k	Paid Subscription
Content Owner SVOD	APAC	52k	Paid Subscription
SVOD/AVOD Service	US	1.5M	Paid Subscription + Ad-Supported
Ad-Supported Aggregator	US	80k	Ad-Supported

TiVo's impact on churn reduction and subscriber growth

The key metrics below, explained in detail in the Case Study Detail section, are personalization's contribution to churn reduction, the total amount of churn rate reduction linked to TiVo, and a projected 1-year increase in subscriber count – each derived from the data collected from customer analytics and then applied to acquisition and revenue models.

44% of all churn reduction factors are linked to TiVo's PCD

44% of all factors that predict churn reduction are explicitly linked to TiVo's personalized features or use cases, and viewership driven by personalization

46% average relative churn reduction across segments

46% is the average reduction in churn rate for users that engage with personalization versus those that don't

110% 1-year Increase in subscribers based on reduced churn rates

110% is the increase in subscribers when modeling growth based on baseline customer churn rates versus TiVo's improved churn rates

TiVo's financial impact

The potential financial implications below are based on averages across the four customers in the study, also detailed in the Case Study Details section:

- Monthly ARPU of $8
- Baseline churn rate of 14.6% without personalization
- PCD-improved churn rate of 7.9% (46% reduction)
- Monthly new user acquisition rate of 11.5%

Recovering at-risk revenue

Using those average figures, each $M box below represents the amount of at-risk revenue that could potentially be recovered:

Formula
(Revenue in a year with TiVo's churn rates) – (Revenue in a year with baseline churn rates)

Potential Revenue Recovery for Different Subscriber Count and ARPU Scenarios

Monthly ARPU	Beginning Subscriber Count					
	50K	250K	500K	1M	2.5M	5M
$5	$1.15M	$5.8M	$11.5M	$23M	$58M	$115M
$7.50	$1.7M	$8.6M	$17.3M	$34.5M	$86M	$173M
$8	$1.8M	$9.2M	$18.4M	$36.8M	$93M	$184M
$10	$2.3M	$11.5M	$23M	$46M	$115M	$230M

The highlighted cell represents the potential $93M in revenue that could be recovered across four TiVo customers' combined 2.5M subs, with sustained churn reduction of 46%.

How to read this

If I start with 250k subscribers at a monthly ARPU of $7.50, after 12 months I would have at-risk revenue of up to $8.6M. Based on the results of this study, implementing TiVo personalization for one year could potentially recover that revenue.

If I start with 2.5M subscribers at a monthly ARPU of $10, after 12 months I would have at-risk revenue of up to $115M. Based on the results of this study, ***not implementing*** personalization for one year could potentially lose that revenue.

Case Study Detail

Recommendations: *Top Churn Reducing Factors*

In this study, we used the Insight platform to measure the top 20 behaviors linked to churn reduction for three of the four customers.

Those behaviors were then categorized into higher level factors that represent TiVo's PCD use cases/features versus non-personalized use cases/features.

The study indicates that the factors below are linked to 98% of all churn reduction for the customers included in the study, meaning if a customer in the study experienced a 30% relative churn reduction, 29.4% of that reduction was the result of these factors.
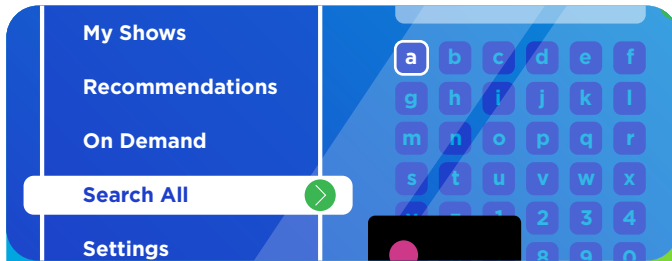
The below table shows the percentage of churn reduction attributable to each factor.

*Personalized factors are highlighted in blue.

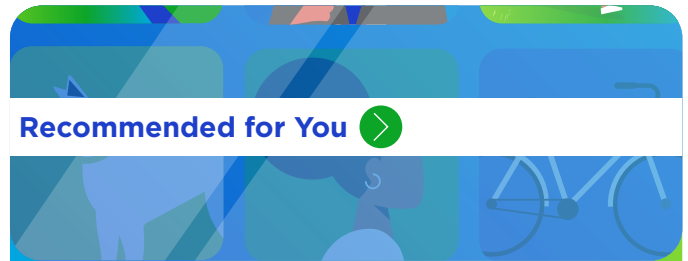| Factors	Personalized?	Influence on churn reduction
Viewership behaviors	Both	75%
How much they watch (Non-personalized)	No	27%
How much they watch (Personalized)	Yes	21%
Where they watch (Device type)	No	12%
What they watch (Genre preferences)	No	8%
When they watch (Time of day or day of week)	No	7%
Interaction with personalization	Yes	23%
Recommendations (How often they're presented and engaged with)	Yes	17%
Engagement signals (Click activity and conversions from personalized features)	Yes	6%

What is non-personalized viewership versus personalized viewership?

Non-personalized viewership
The viewer got to content that was presented or discovered without the aid of personalized use cases

Personalized viewership
The viewer got to content explicitly through personalized features (like recommendations carousels or personalized search and browsing)

Key Insights of the Study

1. How much a user watches (non-personalized plus personalized viewership) dominates the impact on churn reduction, accounting for 48% of churn among subscribers to the customers in the study.

2. All personalized factors (viewership and interaction), taken together, account for 44% of churn reduction among subscribers to the customers in the study.

3. Recommendations – how often a user receives and engages with them – accounts for 17% of churn reduction alone among subscribers to the customers in the study

44% of all churn reduction is linked to personalization

17% of churn reduction is linked to personalized recommendations
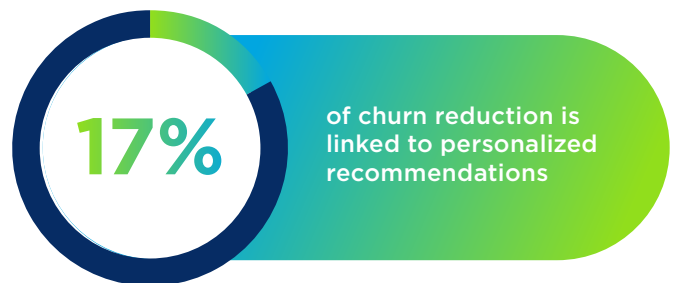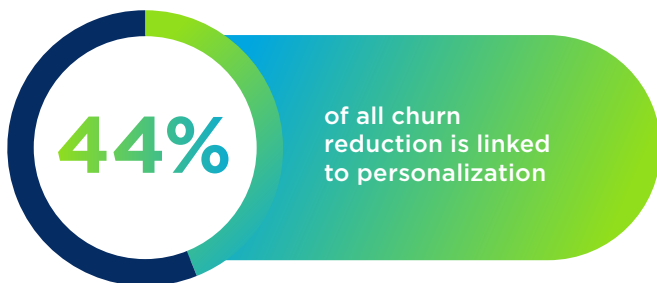
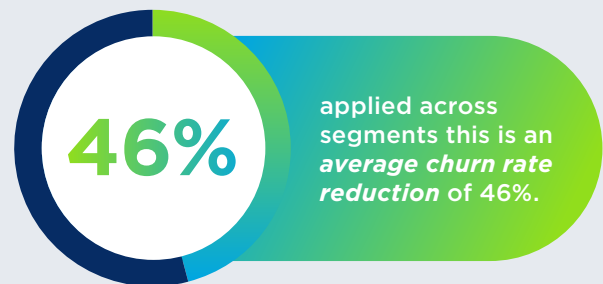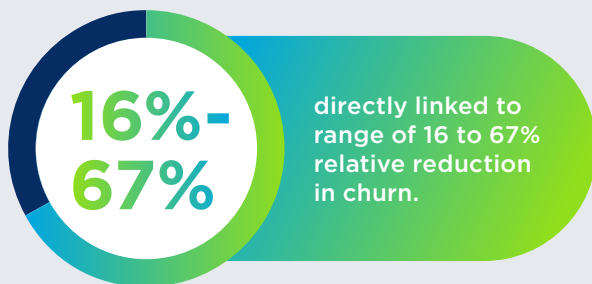# Retention: TiVo's impact on churn reduction

The table below shows each customer in the study's:

- **Baseline churn rate:**
  The likelihood a user will churn without TiVo

- **TiVo improved churn rate:**
  The likelihood a user will churn with TiVo

	Pay-TV/ MVPD	Content Owner SVOD	SVOD/ AVOD	Aggregator	Average
Baseline churn rate without personalization	9%	19%	21%	8.8%	14.6%
TiVo improved churn rate	3%	16%	8%	4.4%	7.9%
Relative churn reduction	67%	16%	62%	50%	46% lower churn rates

PCD Use Cases

"Because You Watched, More Like This or Your Top Channels"

16%-67% directly linked to range of 16 to 67% relative reduction in churn.

46% applied across segments this is an *average churn rate reduction* of 46%.

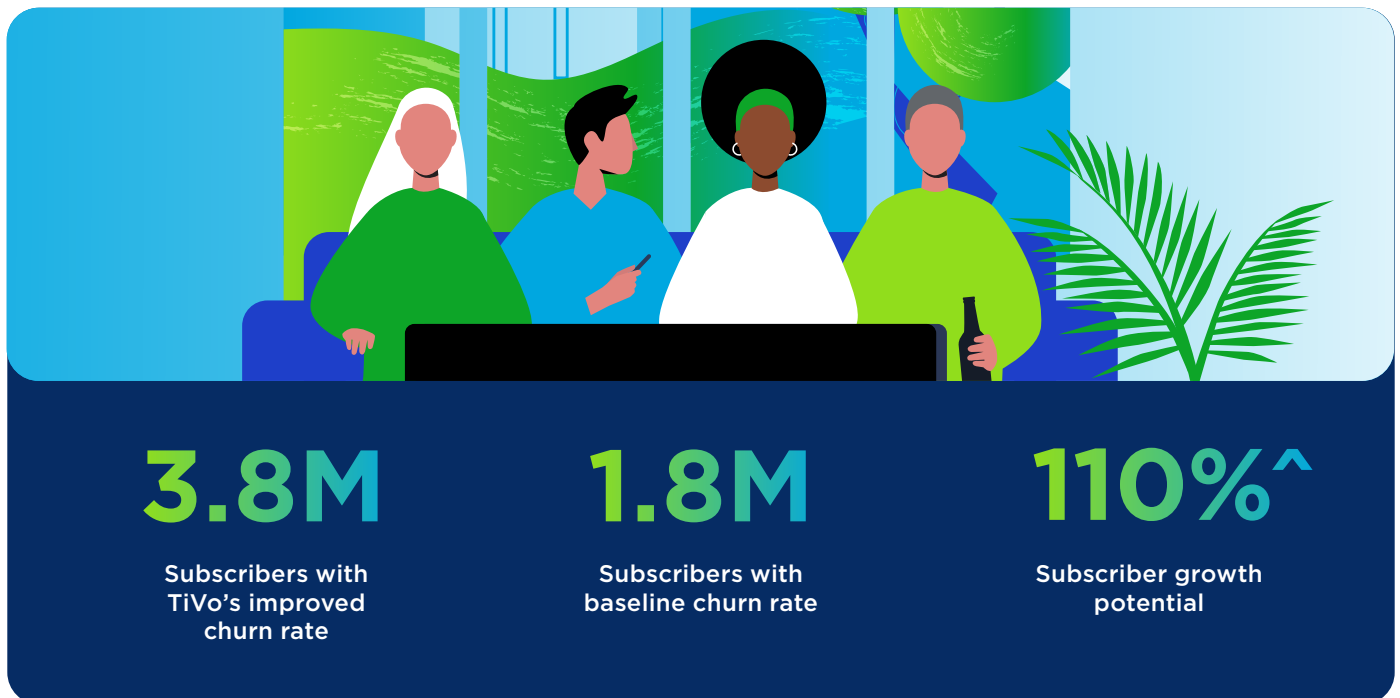# Revenue: Potential 1-year impact from churn reduction

Using the data from the four customers in the study in the table below, we modeled out the potential impact of churn reduction in terms of cumulative revenue attained over 12 months.

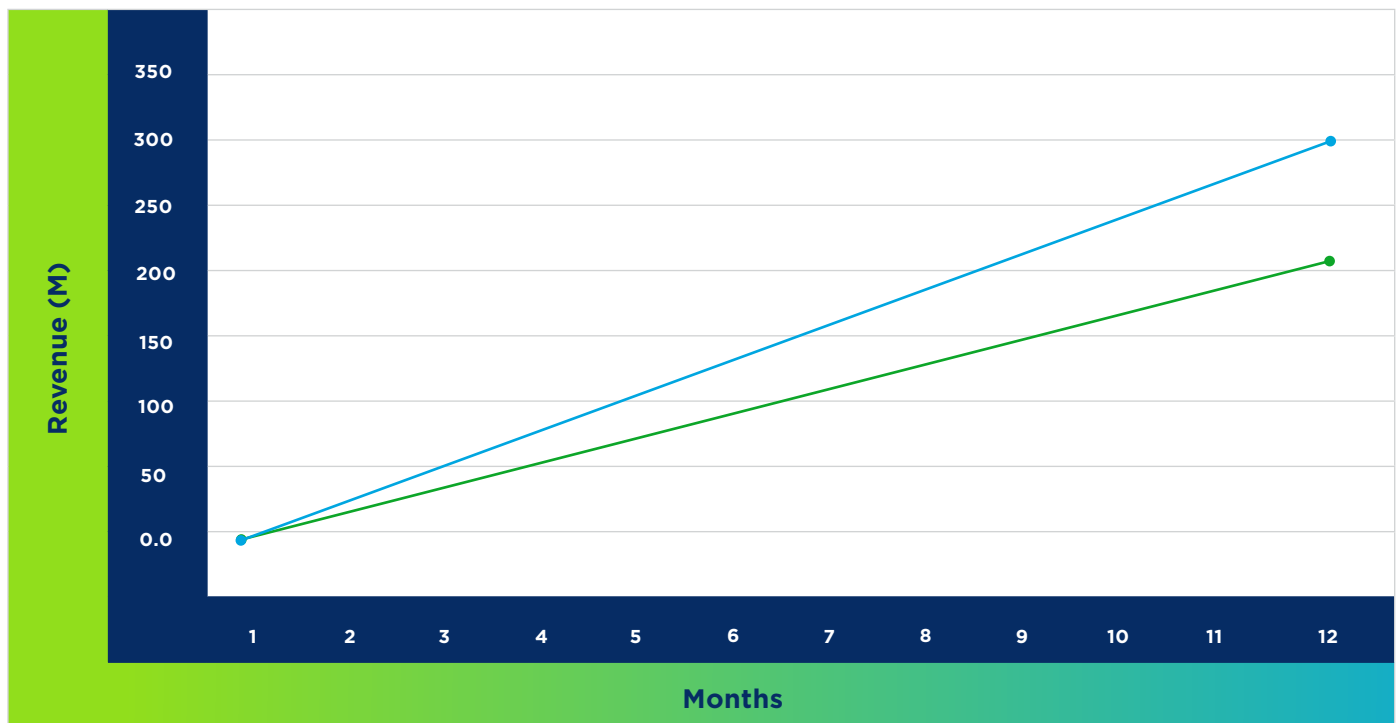| Metrics by Segment	Users in the study	Monthly new user acquisition rate	Monthly ARPU	Churn reduction
Pay-TV/MVPD	~900k	3%	$10	67%
Content Owner/SVOD	~52k	26%	$9	16%
SVOD/ AVOD	~1.5M	10%	$8	62%
Ad-Supported Aggregator	~80k	7%	$5	50%
Cumulative	2.5M Total subscribers	11.5% Average monthly rate of user acquisition	$8 Average monthly ARPU	46% Average improvement in churn reduction

To account for the variation of subscribers, ARPU, user acquisition rates and other factors, we look at the potential implications for the population as a whole, using the cumulative subscribers and averages in the last row.

Subscribers: Potential 1-Year impact from churn reduction

Subs (M) vs Months

■ P = Personalization Users   ■ NP = Non-Personalization Users

3.8M	1.8M	110%^
Subscribers with TiVo's improved churn rate	Subscribers with baseline churn rate	Subscriber growth potential

Revenue: Potential 1-Year impact from churn reduction

Revenue (M) (y-axis: 0.0, 50, 100, 150, 200, 250, 300, 350)

Months (x-axis: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)

■ P = Personalization Users   ■ NP = Non-Personalization Users

After 1 year of operating with the baseline churn rate the resulting subscriber count is actually less – 1.8M total, down from 2.5M – due to a churn rate that is higher than the rate of new user acquisition.

Using the TiVo optimized churn rate, a 46% improvement, subscriber counts reach 3.8M, a 110% increase.

For that same period, with the average ARPU of $8, the cumulative revenue recovery potential after one year is $93M higher, $300M vs $207M, with the improved churn rate from personalization.

$300M
Revenue with TiVo's improved churn rate

$207M
Revenue with baseline churn rate

$93M^
Revenue recovery potential (45%^)

Summary

Focusing on churn reduction as a key initiative can have significant impact on business KPIs.

By looking at the impact over one year, we've shown the different outcomes from operating with a suboptimal baseline churn rate vs. a TiVo improved churn rate for the customers in the study.

For the customers in the study, models with the TiVo improved churn rate, a 46% reduction over the baseline, show an average of:

- 10% increase in subscribers after 1 year
- 45% increase in revenue after 1 year
- 2.1x improvement in customer acquisition cost

For the TiVo customers in this study, these improvements represent the opportunity to:

- Recover up to $93M of at-risk revenue

Recommendations

Recommendation	Basis
Use churn prediction scores to discover positive indicators for retention	Churn prediction scores enable product and merchandising teams to understand and experiment with optimization for subscribers with a high potential for churn
Analyze churn reducing factors at the individual level	Factors that cause a reduction in churn can be personalized or non-personalized. Understanding the nature of both for your specific user population allows your team to identify behaviors that encourage retention
Implement as many personalized features as possible	Individual features like "My Shows," "Your Top Channels," and "Trending" can contribute a meaningful reduction on their own, with each additional personalized feature adding to a higher churn reduction rate