Subscription Product Analytics Project

Retention, Churn, LTV & RFM Analysis using Tableau

📌 Project Overview

The Challenge 🚀

For any SaaS Subscription-based digital product business, high-value retention is the primary growth engine. But when retention fluctuates and acquisition costs climb, the "why" behind user churn often remains a mystery.

The Project 📊

I built this SaaS Analytics Dashboard to simulate a real SaaS product analytics scenario and bridge the gap between raw data and strategic action.

Key Features:

Retention Visibility: Clear, cohort-based views of user longevity.

Revenue Quality: Deep dives into LTV distribution to identify where real value lives.

Growth Levers: Identifying precisely where to optimize the lifecycle for maximum impact.

Instead of just reporting metrics, I approached this from a product decision-making lens — focusing on lifecycle behavior, engagement signals, and revenue impact to identify conversion bottlenecks, optimize retention, and improve customer lifetime value (LTV) and enable product and growth teams to take actionable steps.

🔗 Live Dashboard:

https://public.tableau.com/app/profile/himani.malhotra/viz/ProductAnalyticsSubscriptionRetentionChurnLTVDashboard/ExecutiveOverview

---

📊 What I analyzed:

• Cohort retention trends to understand long-term engagement

• Churn drivers by acquisition channel and subscription plan

• Customer Lifetime Value (LTV) optimization by segment

• Revenue Concentration and retention drop offs

• RFM segmentation (Recency, Frequency, Monetary) to identify:

- Champions

- Loyal users
- At-risk customers
- Lost users

• Subscription funnel from Signup → Subscription → Retention

📌 Key KPIs Tracked

Retention Rate

% of users still active after specific time intervals (30, 60, 90 days).

Churn Rate

% of users who discontinued subscription within a given period.

Customer Lifetime Value (LTV)

Total revenue generated by a user over their subscription period.

Average Revenue Per User (ARPU)

Cohort-based Retention

User retention grouped by subscription start month.

User Lifetime

Time Interval in which users remain active on a platform or service before churning

Avg Subscription Duration

Average time a customer remains subscribed before cancelling

DAU, MAU, Stickiness

Daily Active Users / Monthly Active Users

TTV

Time to Value

Activation Rate

Feature Adoption Rate

MRR

Monthly Recurring Revenue

📂 Dataset Description

The dataset contains 4 tables:

Tables	Attributes
1. Users	User acquisition information
	User_ID, Signup_Date, Acquisition_Channel, Country, Device
2. Subscriptions	Tracks subscription lifecycle
	Subscription_ID, Plan_Type (Basic, Standard, Premium), Start_Date, End_Date, Monthly_Price, Status (Active / Churned)
3. Payments	Tracks recurring subscription payments
	Payment_ID, Payment_Date, Revenue
4. Activity	Tracks product usage
	Activity_Date, Sessions, Feature_Used

🛠 Analytical Approach

1️⃣ Data Preparation

Removed duplicates

Cleaned subscription lifecycle data

Created churn flags (Active vs Churned)

Engineered retention buckets

Derived cohort month

2️⃣ Feature Engineering

LTV per customer

Retention percentage calculations(30/60/90)

Cohort indexing

Revenue segmentation

3️⃣ Dashboard Development (Tableau)

Executive Overview Page

Cohort Retention Heatmap

Churn Trend Analysis

LTV Distribution Histogram

Interactive filters (Plan, Acquisition Channel, User Country, Device Type)

📊 Analysis Framework

1️⃣ Funnel Analysis

Signup → Subscription → Retention

Identified conversion friction and drop-off percentages.

2️⃣ Cohort Retention Analysis

Tracked retention trends by signup month.

Used to evaluate product stickiness and engagement decay.

3️⃣ Activation & Stickiness

Measured:

- Activation Rate (within 7 days)
- DAU / MAU ratio
- Time to Value

4️⃣ Revenue & LTV Analysis

- ARPU calculation
- LTV distribution
- Revenue contribution by segment

5️⃣ RFM Segmentation

Segmented users into:

- Champions
- Loyal Customers
- At-Risk Users
- Low-Value Users

📊 Dashboard Structure

1️⃣ Executive Overview

👉 Designed for leadership-level quick insights.

Total Users

Active Subscribers

Total Revenue

Churn Rate %

Average LTV

Revenue Trend Over Time

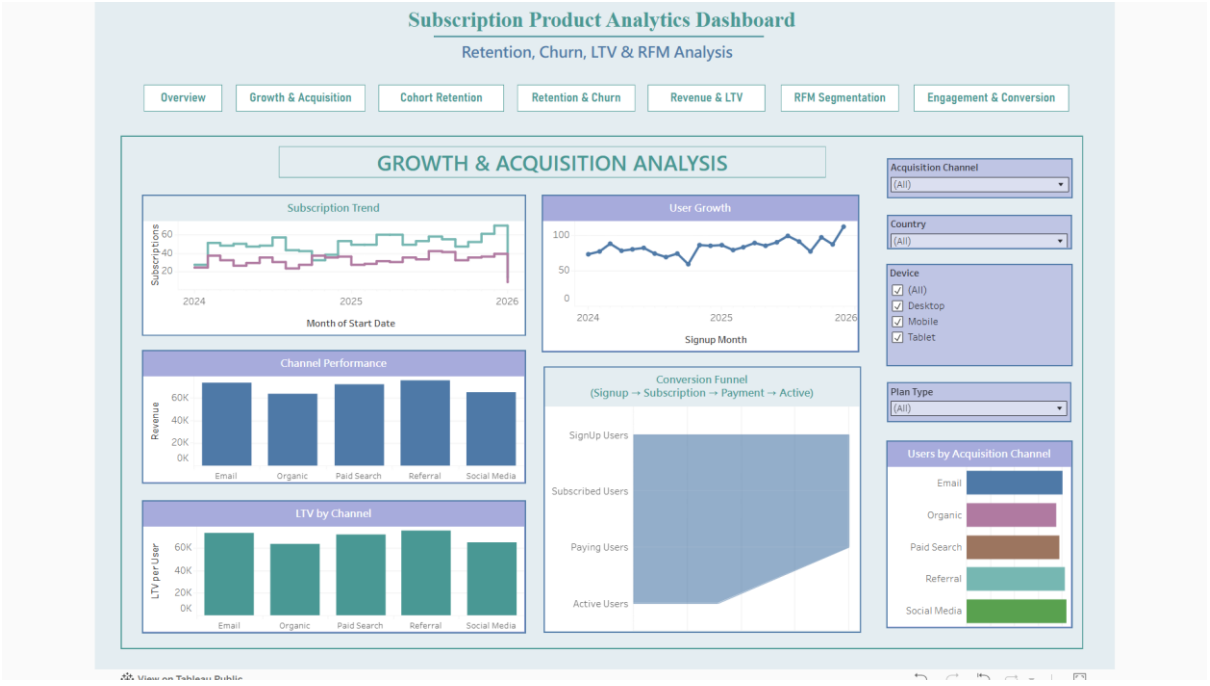
2 Growth & Acquisition Analysis

Active vs Churned User Subscription Trend

Channel Performance

LTV Growth

Subscription Funnel: Signup → Subscriber → Paying User → Repeat Subscriber

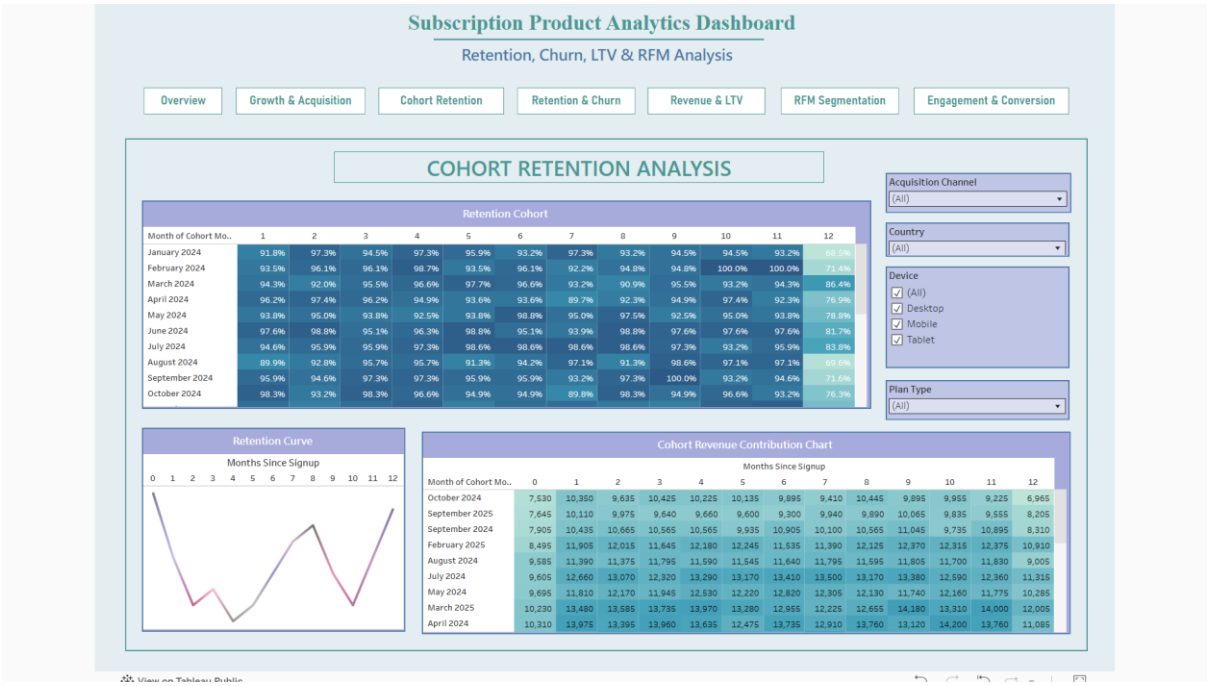


3 Cohort Retention Analysis

Monthly cohort heatmap

Retention Trend by Signup Month

Retention drop-off patterns



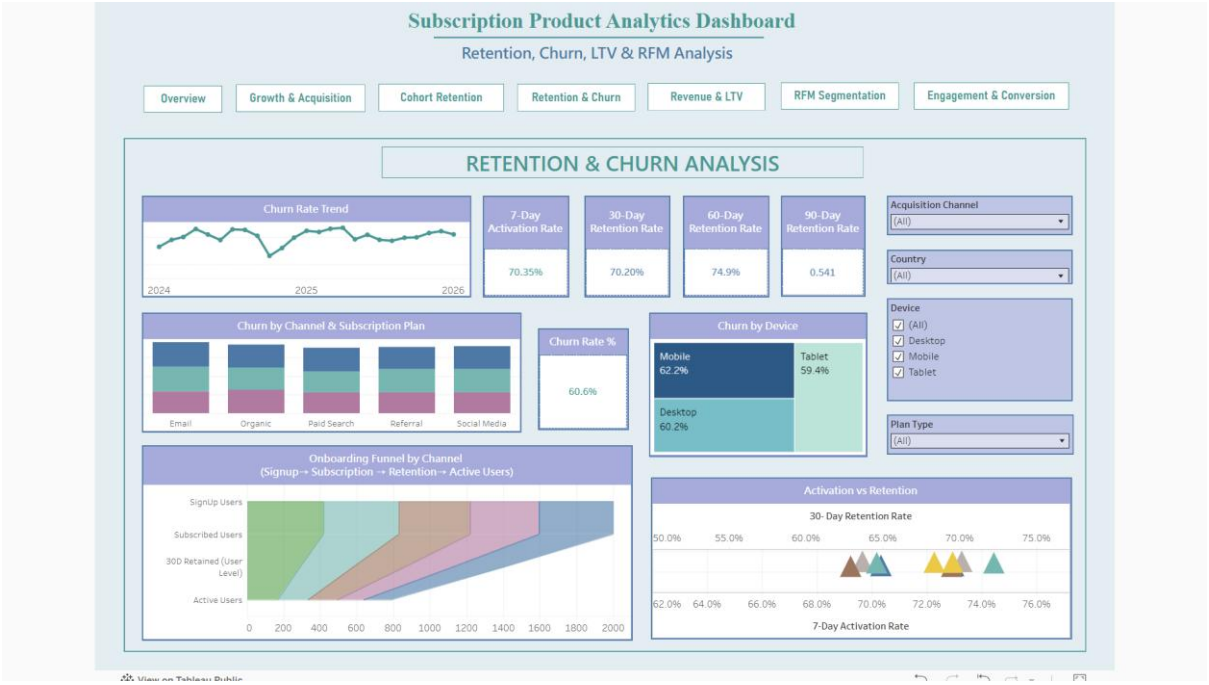
🔽 Churn Analysis

Churn rate by Plan

Churn rate by Acquisition Channel

Monthly Churn Trend

Churn by User Segment



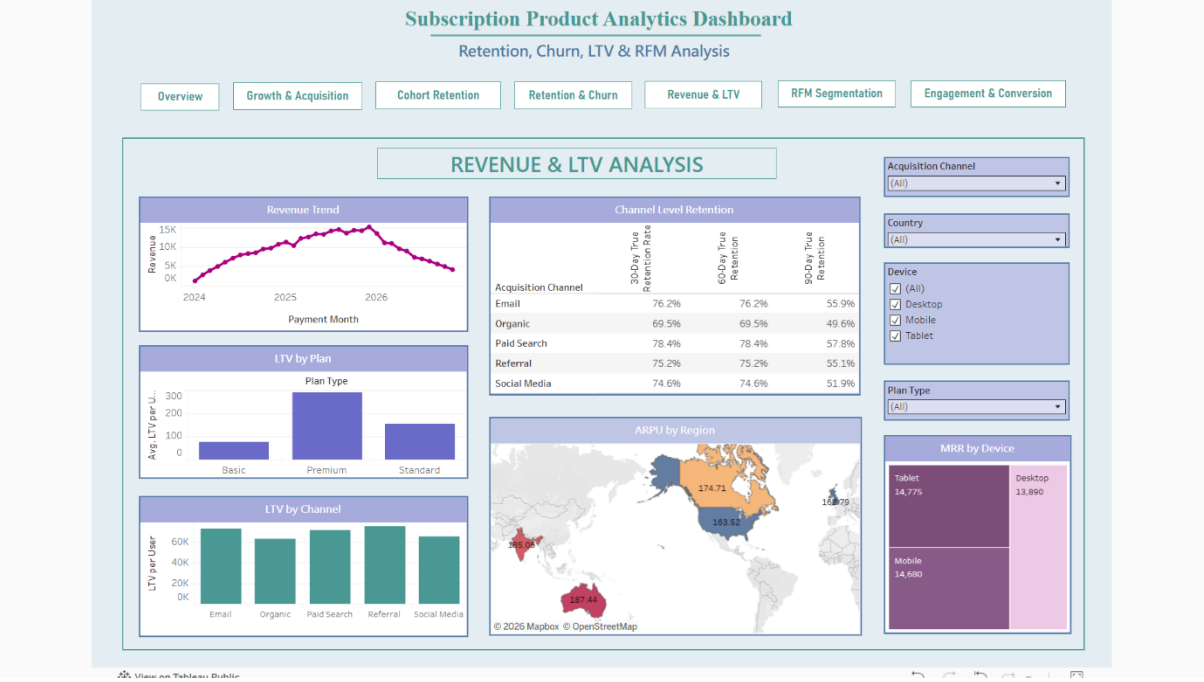
5 LTV Analysis

LTV by Channel

LTV by Plan

Segment-wise LTV Comparison

30 / 60 / 90 Day Retention

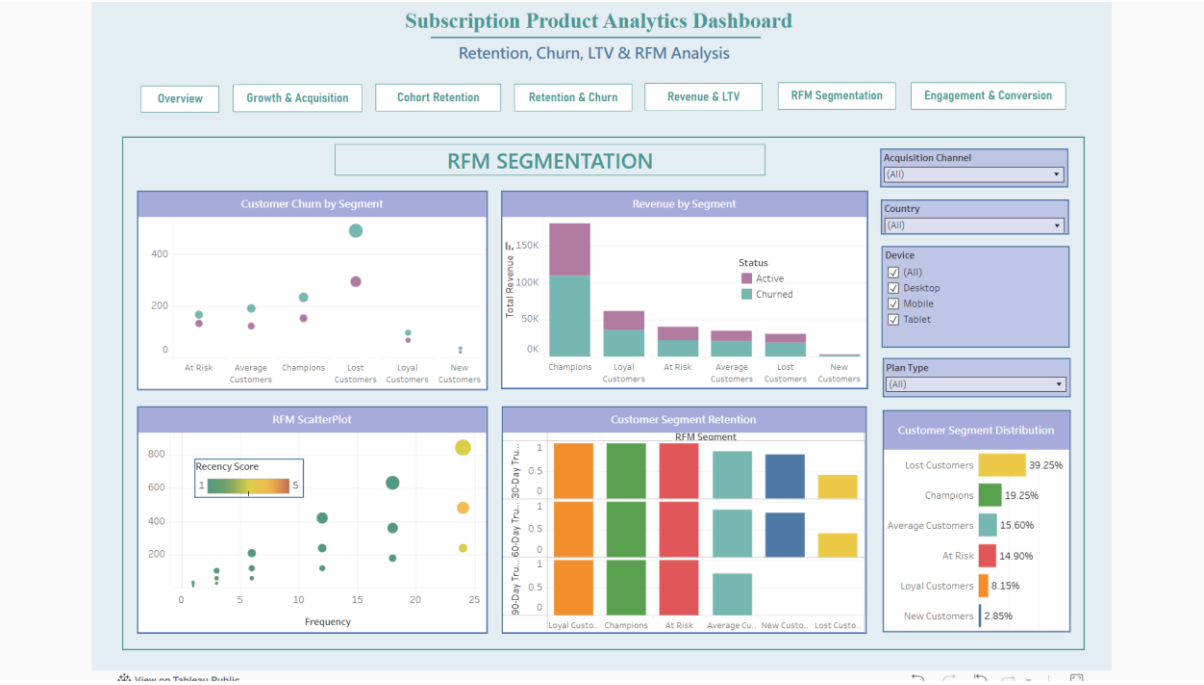


6 RFM Segmentation

Recency, Frequency, Monetary scoring

Customer segments (Champions, Loyal, At Risk, Lost, New Customers, Average Customers)

Revenue contribution by segment



7️⃣ Engagement & Conversion Analysis

Time to Value

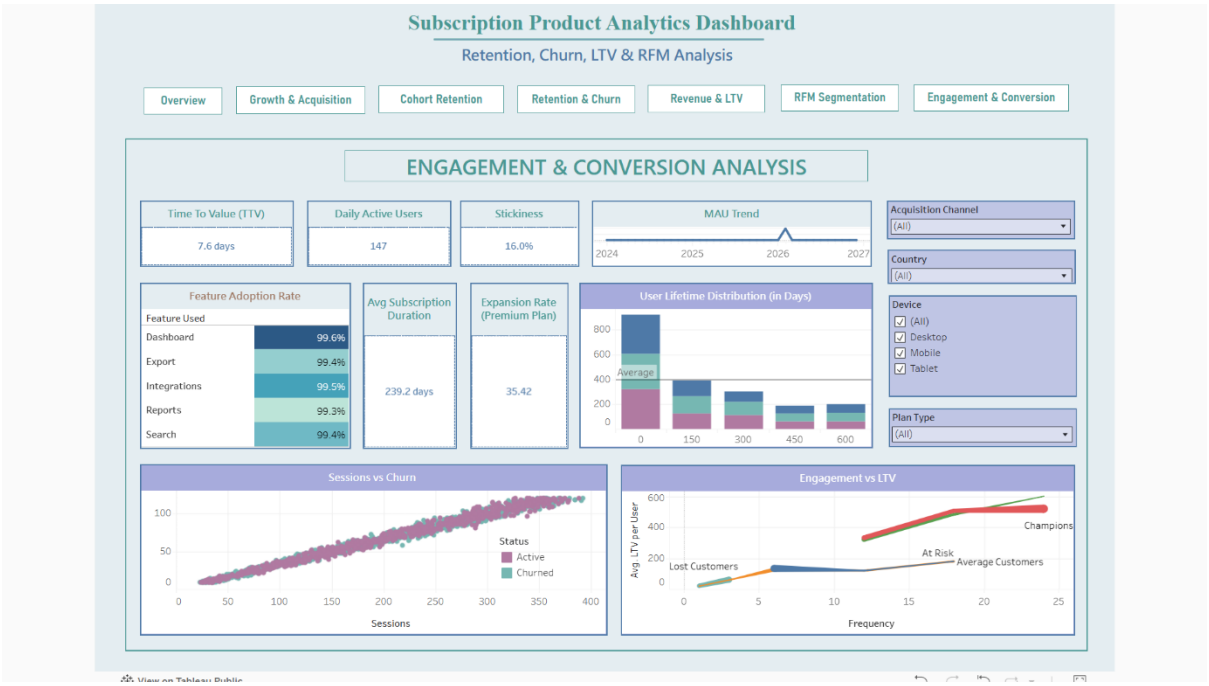
Stickiness

User Lifetime Distribution

Expansion Rate (Premium Plan)

Feature Adoption Rate

Engagement vs Retention



📈 Key Product Insights

📉 Retention Drop After 60 Days

Retention is strong for 30 days but drops significantly between 60–90 days. Users who survive past the third billing cycle tend to stabilize, marking this as the critical activation window

Implication: Onboarding, activation & engagement improvements can drastically impact retention.

⚠️ Cohort Quality Varies

Some acquisition cohorts show weaker long-term retention — suggesting channel quality differences.

Implication: Possible product-market fit or onboarding experience issue.

💰 Revenue is Highly Concentrated

Premium plan users and the "Champion" segment (top 20% of users) drive the vast majority of total revenue

Implication: Growth strategy should balance acquisition + lifecycle optimization.

📈 LTV Distribution is Right-Skewed

Premium plan users generated significantly higher lifetime value

High acquisition ≠ high retention — paid channels drove volume/acquisition but lower LTV/retention.

Implication: Invest in engagement loops, loyalty benefits, renewal incentives.

💡 Strategic Business Recommendations

🎯 1. Strengthen 30–60 Day Engagement

Trigger behavioral nudges

Introduce feature discovery emails

Guided Onboarding to improve First 30-Day Experience

Incentivize milestone usage

🎯 2. Protect High LTV Segment

Implement Early churn prediction model

Premium annual renewal incentives, loyalty benefits and Plan upgrades with bundled features

Dedicated retention campaigns

🎯 3. Improve Acquisition Quality

Reassess channels tied to weak cohorts

Align acquisition with long-term value

🎯 4. Introduce Proactive Churn Alerts

Flag users inactive for X days

Offer upgrade or discount incentives

📈 Expected Business Impact

If implemented, projected outcomes include:

+5–8% increase in 60-day retention

+10–15% increase in average LTV

3–5% reduction in churn

Higher revenue stability

📱 Dashboard

Interactive Tableau dashboard included:

'Product Analytics_ Subscription Retention, Churn & LTV Dashboard.twbx'

Click to Download

📊 What the dashboard covers

• Executive overview with Revenue, Active Users, LTV, and Churn Rate

• Cohort retention analysis to track user engagement over time

• Churn analysis by acquisition channel and subscription plan

• Customer Lifetime Value (LTV) analysis to identify high-value segments

• RFM segmentation to categorize users into Champions, Loyal, At-Risk, and Lost customers

• Subscription funnel analysis from signup to repeat subscription

---

💡 Product Implications:

• Better marketing budget allocation to optimize revenue growth

• Build nudges for declining engagement users - High-value user targeting

• Improve onboarding experience during first 30 days to reduce Churn

• Optimize marketing spend toward high-LTV acquisition channels - Target campaigns toward high-monetary, low-recency users

---

💼 What This Project Demonstrates

✓ Strong product analytics fundamentals

✓ Deep understanding of retention economics

✓ Cohort-based thinking

✓ Revenue-centric analysis

✓ Business storytelling with data

✓ BI Dashboard design for decision-makers

📈 Learning

This project strengthened my ability to connect user behavior to business impact and think beyond dashboards toward product decisions.

Open to feedback and product analytics opportunities!

👩‍💼 Author

Himani Malhotra
Data & Product Analyst
malhotrahimani29@gmail.com
