

Winning Engagement

Using Data to Drive Fan Loyalty for the Milwaukee Bucks



Meet the team



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Introduction & Problem Statement

The Milwaukee Bucks want to improve...

Fan Engagement

Ticketing
Strategies

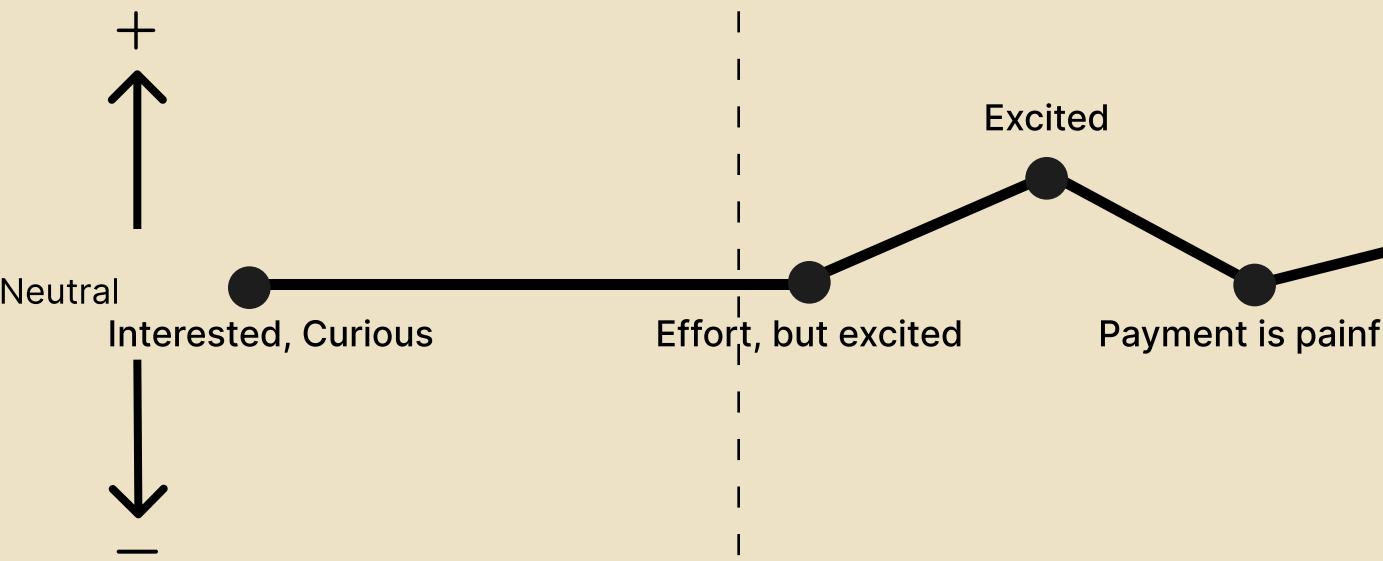
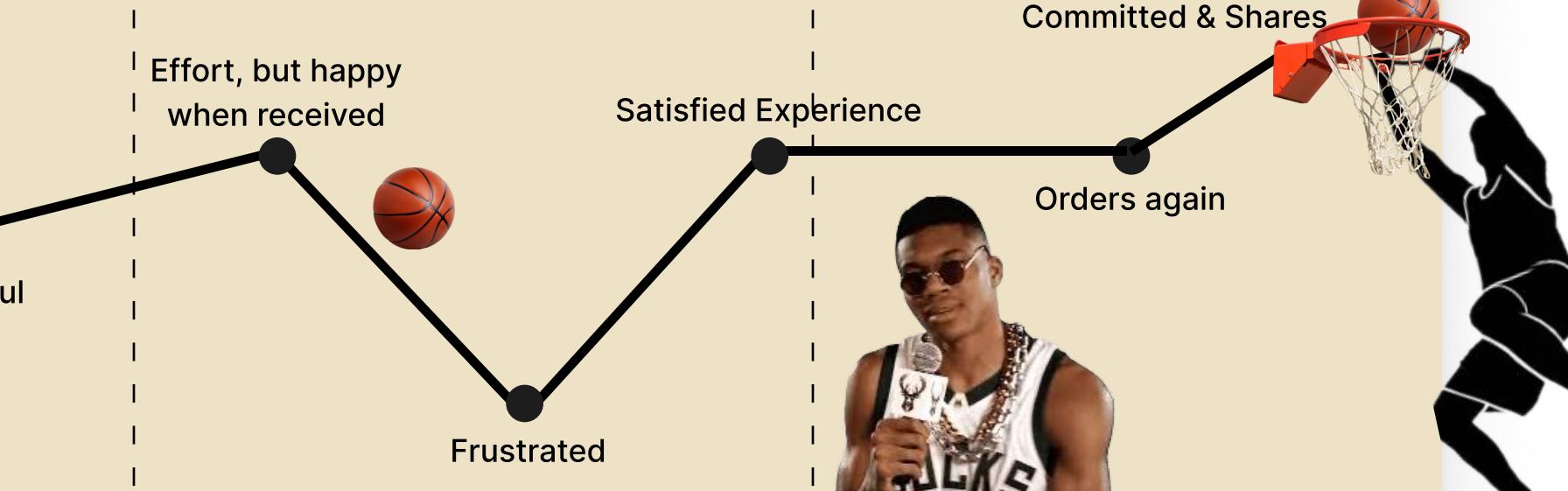
Long-Term
Retention

However, they lack a structured framework to predict how fans progress through different ticketing products over time.

How can we use data to personalize fan engagement and increase lifetime value?



Customer Journey Mapping

Stage	Awareness	Engagement	Experience	Loyalty, Retention
Customer Actions 	<ul style="list-style-type: none">Sees a social media ad, billboard, or email promotion about the upcoming event.Receives a notification from a sports app about upcoming games.Hears about the game from a friend or coworker.	<ul style="list-style-type: none">Visits the team's website to check ticket prices.Compares different seating options (VIP vs. general admission).Purchases a ticket online or at the stadium box office.Shares their excitement on social media.	<ul style="list-style-type: none">Arrives at the stadium and scans their ticket.Buys food, drinks, and team merchandise.Watches the game and shares photos on social media.Interacts with other fans and enjoys the live atmosphere.	<ul style="list-style-type: none">Receives a follow-up email thanking them for attending.Gets a special offer for the next game.Shares their experience online.Either renews their ticket for another game or doesn't return.
Touchpoints 	<ul style="list-style-type: none">Social media (Instagram, Facebook, Twitter ads).Email marketing campaign.Sports team's website.Word-of-mouth or influencer recommendations.	<ul style="list-style-type: none">Official team website.Mobile app for purchasing tickets.Ticket marketplaces (e.g., Ticketmaster).Stadium box office.	<ul style="list-style-type: none">Stadium entrance (ticket scanning).Food & beverage counters.Merchandise stores.Mobile app for in-seat ordering.	<ul style="list-style-type: none">Post-game emails and surveys.Social media engagement.Customer loyalty programs.
Emotions & Pain Points 	<p>↑ +</p> <p>Neutral</p> <p>Interested, Curious</p> <p>Effort, but excited</p> <p>Excited</p> <p>Payment is painful</p> <p>↓ -</p> 	<p>Effort, but happy when received</p> <p>Frustrated</p> <p>Satisfied Experience</p> 		<ul style="list-style-type: none">Personalized offers for returning customers.VIP or membership tiers for frequent attendees.Targeted social media engagement to keep the excitement alive.
Improvement 	<ul style="list-style-type: none">Clearer ticket pricing and benefits of attending.Personalized email promotions with early-bird discounts.Interactive online campaigns (e.g., countdowns, fan contests).	<ul style="list-style-type: none">Offer easy mobile ticketing with QR codes.Provide customer support chat for ticketing issues.Reduce hidden fees or clearly explain them.	<ul style="list-style-type: none">Mobile ordering for food & drinks to reduce wait times.Exclusive in-game experiences for loyal customers.Faster WiFi and better social media engagement.	

Introducing a New Metric: Engagement Score

- **Recency** → Days since last purchase.
- **Frequency** → Number of purchases.
- **Monetary Value** → Total amount spent.

How Engagement Score is calculated:

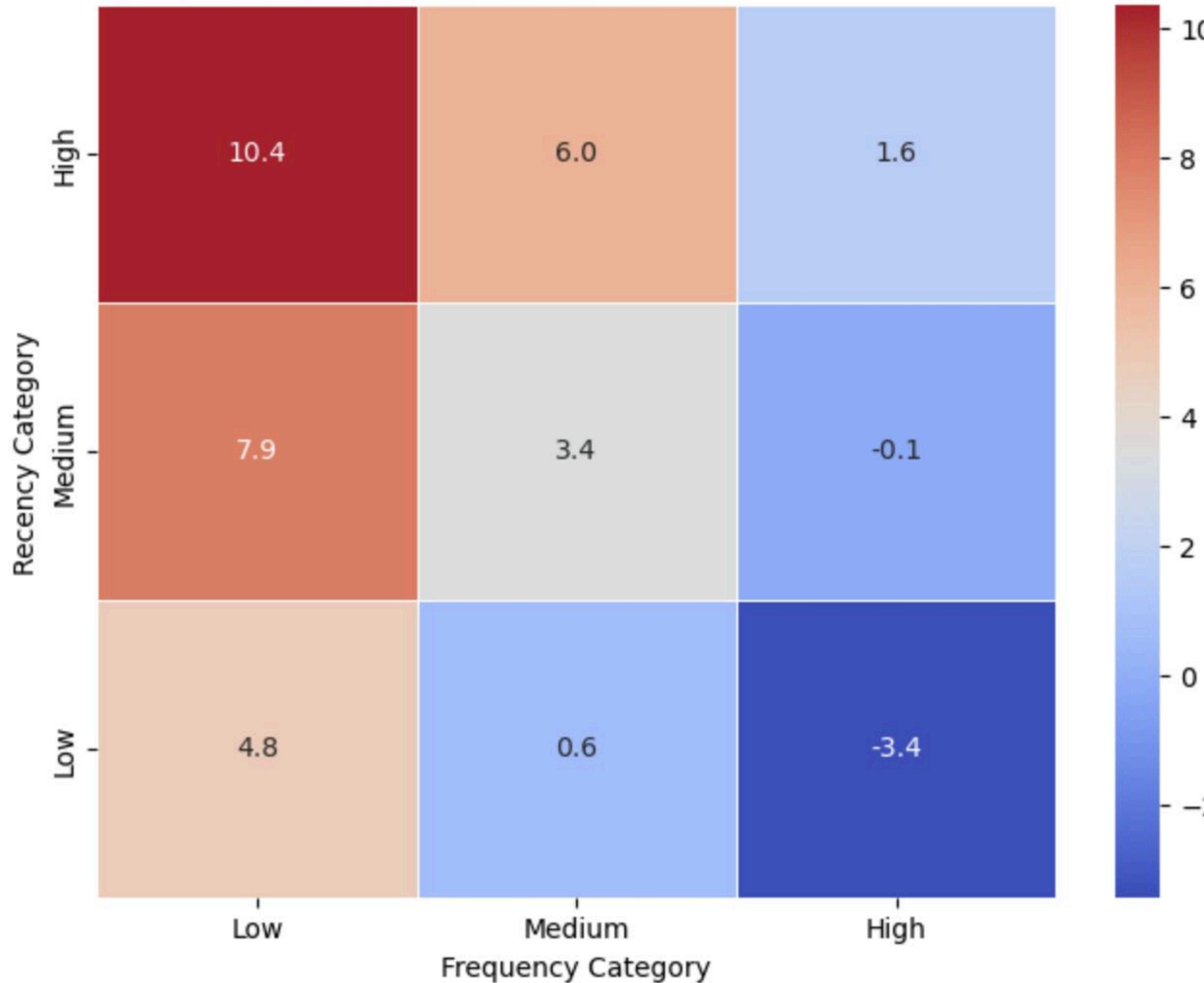
- More purchases = Higher score
- Higher spending = Higher score
- Long time since last purchase = Lower score (risk of churn)

Top Fans by Engagement Score:

	Recency	Frequency	MonetaryValue	EngagementScore
AccountNumber				
47969	12	1	8.78	15.3
74768	36	1	6.83	15.2
90733	27	1	6.93	15.2
41314	14	1	11.71	15.2
36167	27	1	9.74	15.2
101172	12	1	12.20	15.2
2884	36	1	6.83	15.2
103966	43	1	10.80	15.1
75240	35	1	13.46	15.1
118981	27	1	13.33	15.1

Engagement Score = Frequency Rank + Monetary Value Rank - Recency Rank

Fan Engagement Heatmap: Recency vs. Frequency



RFM Analysis & Heatmap

Creating customer segments based on customer data.

- Most engaged fans (frequent & recent buyers)
- At-risk fans (low-frequency, low-recency buyers)
- Newly acquired vs. long-term customers

Note:

- Recency → Days since last purchase.
- Frequency → Number of purchases.

● = Higher Engagement Scores

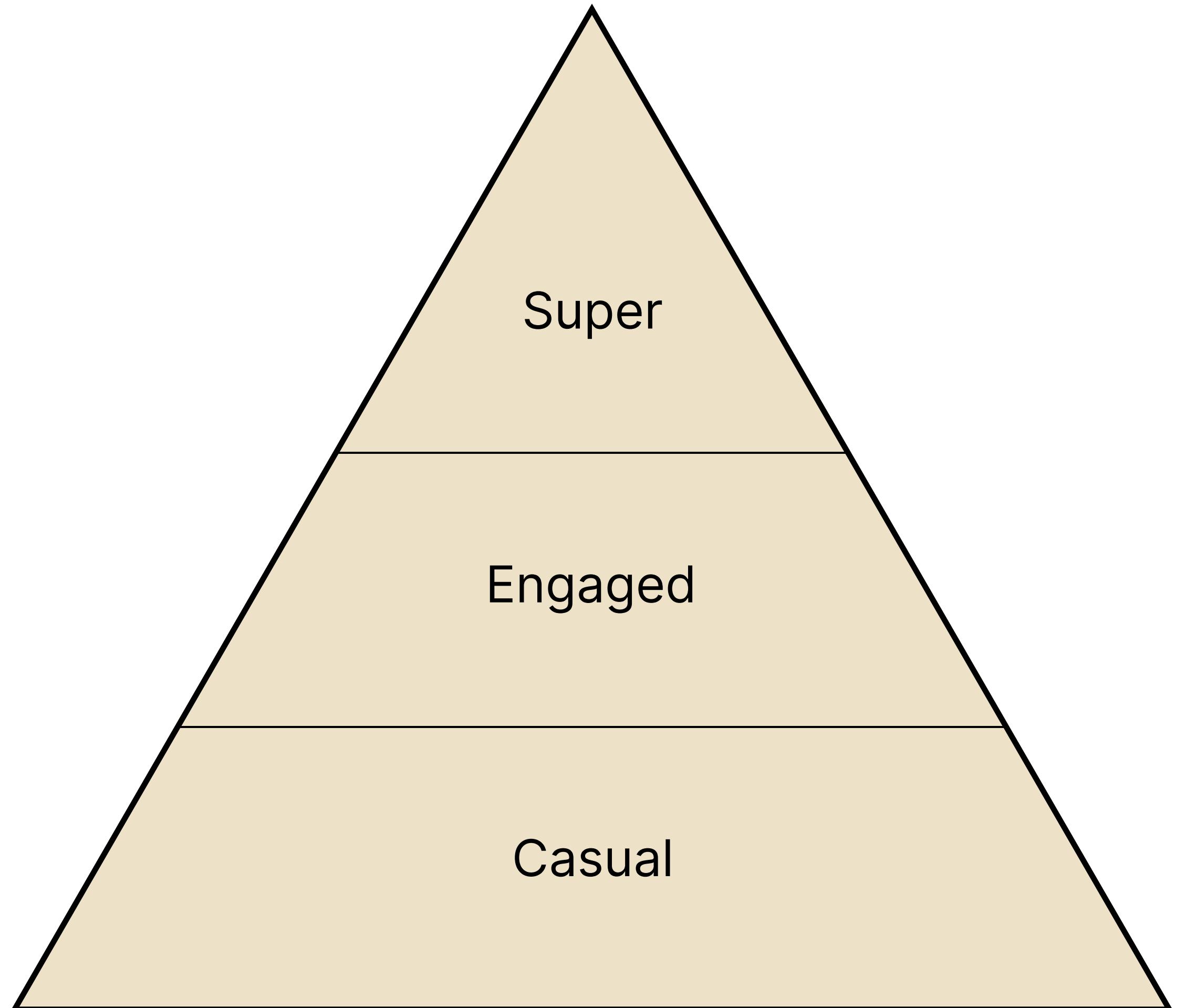
● = Lower Engagement Scores

Markov Chain Model

We defined three tiers of fan engagement:

- Casual Fan
- Engaged Fan
- Super Fan

Main Question: How likely a casual fan will become an engaged fan or drop off?



Why use a Markov Chain Model?

- **Models sequential state transitions**
- **Predict the likelihood of fans moving between engagement tiers**
- **Quantifies fan movement trends, informing ticketing and marketing strategies**

A data-driven approach helps optimize fan engagement strategies and reduce churn risk

Data Analysis

- 1. For each of the data tables, calculated total spending per account per season**
- 2. Computed total spending based off spending data from each table**
 - a. “ReportLineAmount” → Food and Beverages**
 - b. “LineItemTotalPrice” → Retail**
 - c. “InventoryNetAmount” → Tickets**
- 3. Set threshold**
 - a. Casual Fans: Spending $\leq \$250$ (bottom 75% of fans)**
 - b. Engaged Fans: Spending $\$251 - \1600 (75th to 90th percentile)**
 - c. Super Fans: Spending $> \$1600$ (top 10%)**
- 4. Determine how fans transition from one tier to the next throughout the seasons**

Our Model

Casual Fans:

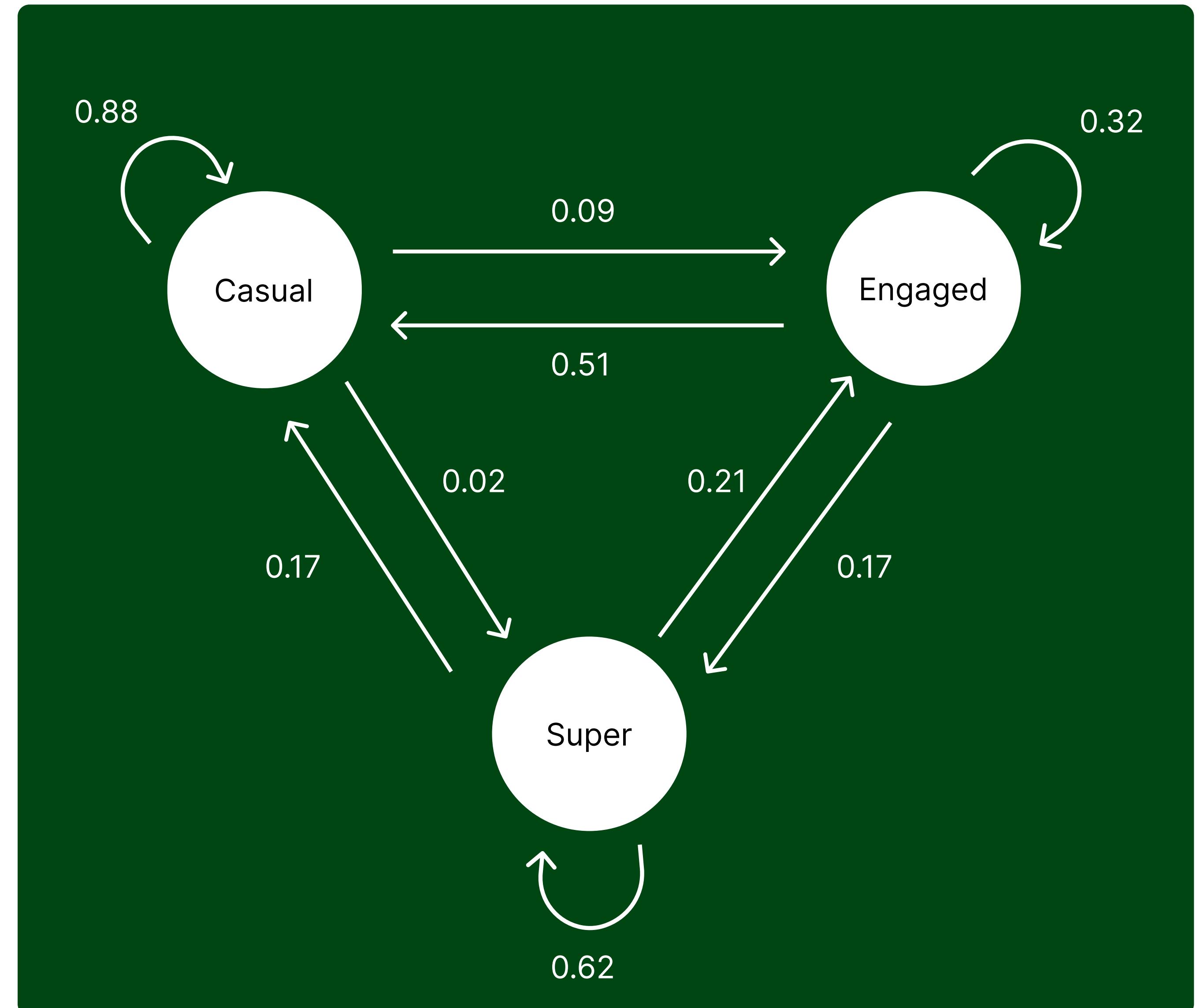
- 88% retention
- 9% upgrade to Engaged
- 2% upgrade to Super

Engaged Fans

- 32% retention
- 51% downgrade to Casual
- 17% upgrade to Super

Super Fans:

- 62% retention
- 17% downgrade to Casual
- 21% downgrade to Engaged



Customer Churn & Retention Analysis

$$\text{Customer Churn Rate} = \left(\frac{\text{\# of Customers Lost during Period}}{\text{\# of Customers at Start of Period}} \right) \times 100$$

$$\text{Customer Retention Rate} = \left(\frac{\text{\# of Customers Lost during Period}}{\text{Total \# of Remaining Customers}} \right) \times 100$$

Data	
2018 Tickets	260501
2019 Tickets	213239
2020 Tickets	26756
2021 Tickets	243990
2022 Tickets	183482
2023 Tickets	120613
2018 Full Season	206853
2019 Full Season	174933
2020 Full Season	13016
2021 Full Season	182388
2022 Full Season	130994
2023 Full Season	88558
2018 Partial Plan	14434
2019 Partial Plan	11473
2020 Partial Plan	0
2021 Partial Plan	19890
2022 Partial Plan	17017
2023 Partial Plan	11825
2018 Single Game	39216
2019 Single Game	26835
2020 Single Game	13741
2021 Single Game	41714
2022 Single Game	35473
2023 Single Game	20232



Analysis cont.

General Tickets		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Customer Churn Rate	18.14273266	87.45257669	-811.9076095	24.79937702	34.26439651	
Customer Retention Rate	22.16386308	696.9763791	-89.0339768	32.97762178	52.12456369	

Full Season Tickets		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Customer Churn Rate	15.43124828	92.55943704	-1301.259988	28.17838893	32.39537689	
Customer Retention Rate	18.24698599	1243.984327	-92.86356559	39.23385804	47.91887802	

Partial Plan Tickets		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Customer Churn Rate	20.51406402	100		14.44444444	30.5106658	
Customer Retention Rate	25.80841977		-100	16.88311688	43.90697674	

Single Game Tickets		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Customer Churn Rate	31.57129743	48.79448481	-203.5732479	14.96140385	42.96507203	
Customer Retention Rate	46.13750699	95.2914635	-67.05902095	17.59366279	75.33115856	

User Interface

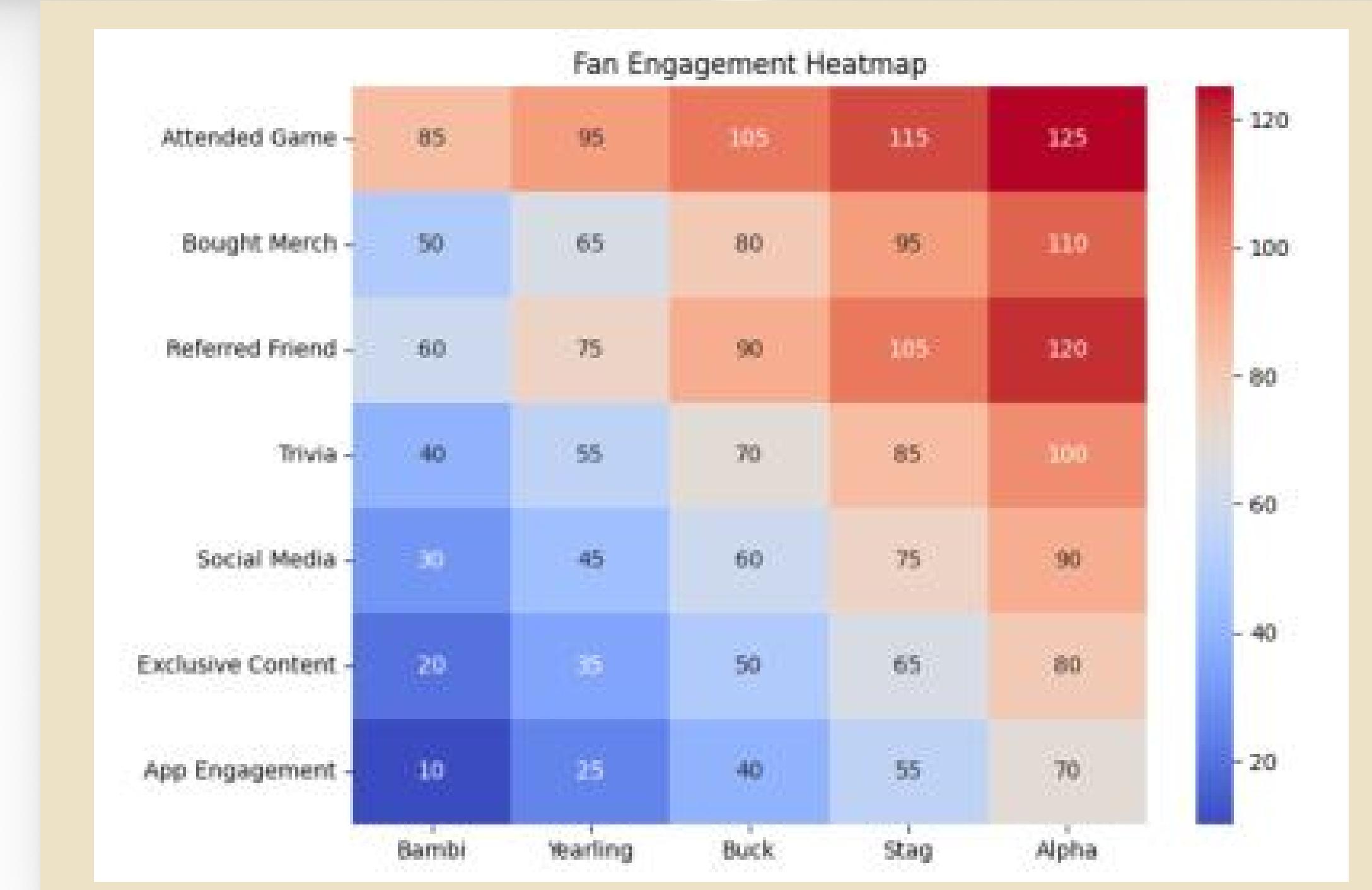
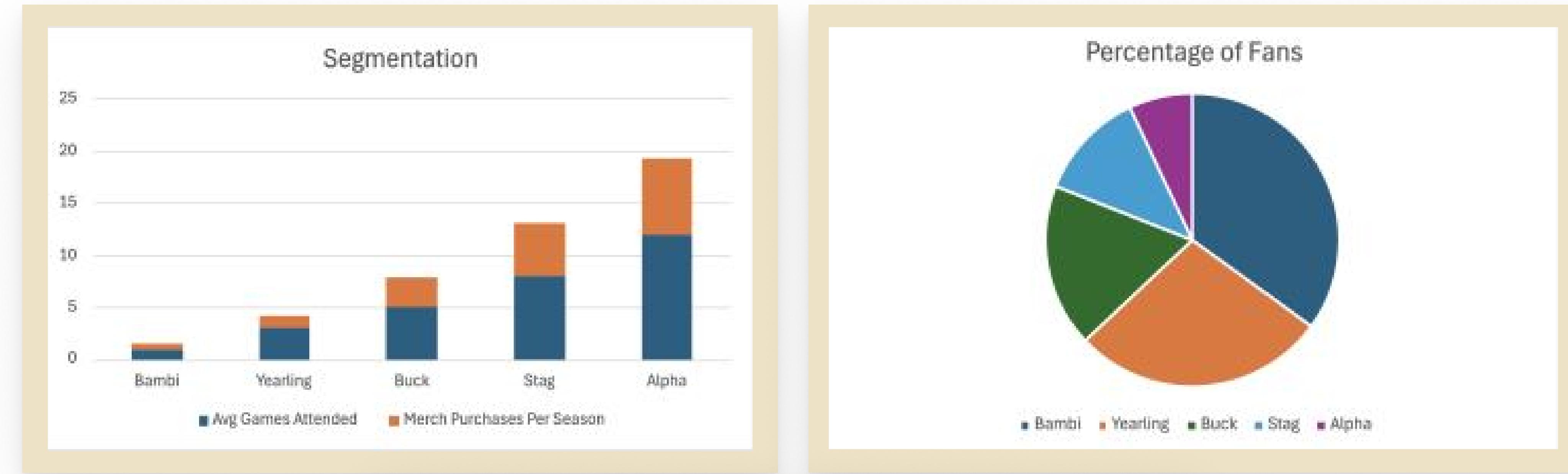
🎮 Gamified Engagement System

📊 Real-Time XP Tracking

🏆 Tier-Based Loyalty Program

🔥 Dynamic Challenges & Weekly Incentives

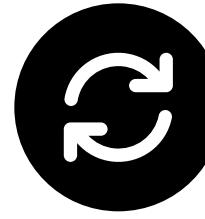




Business Impact & ROI of Gamification

Encourages repeat attendance & purchases

→ More XP = more exclusive benefits.



Creates data-driven marketing opportunities

→ Personalized incentives for different fan types.



Reduces churn risk

→ Keeps fans engaged & predicts drop-off points.



XP Segmentation & Transition Probabilities

→ With this data we can see how fans move between tiers.



Thank You!

