



BIG RED DATA CHALLENGE 2025

BEHIND EVERY DOLLAR

A Pattern, A Person, A Possibility

OUR TEAM

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WHAT IS TIME SERIES ANALYSIS?

01 **What:** Looks at data points collected or recorded over time

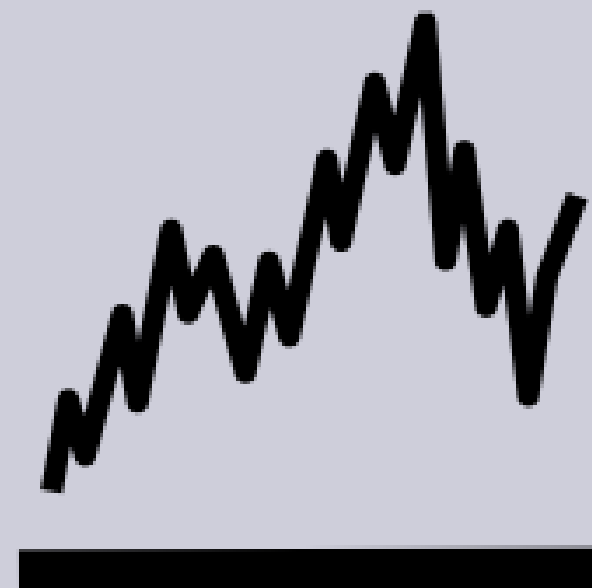
02 **How:** Identify trends, seasonality, and irregularities

03 **Why:** Forecast future values and make decisions based on past behavior

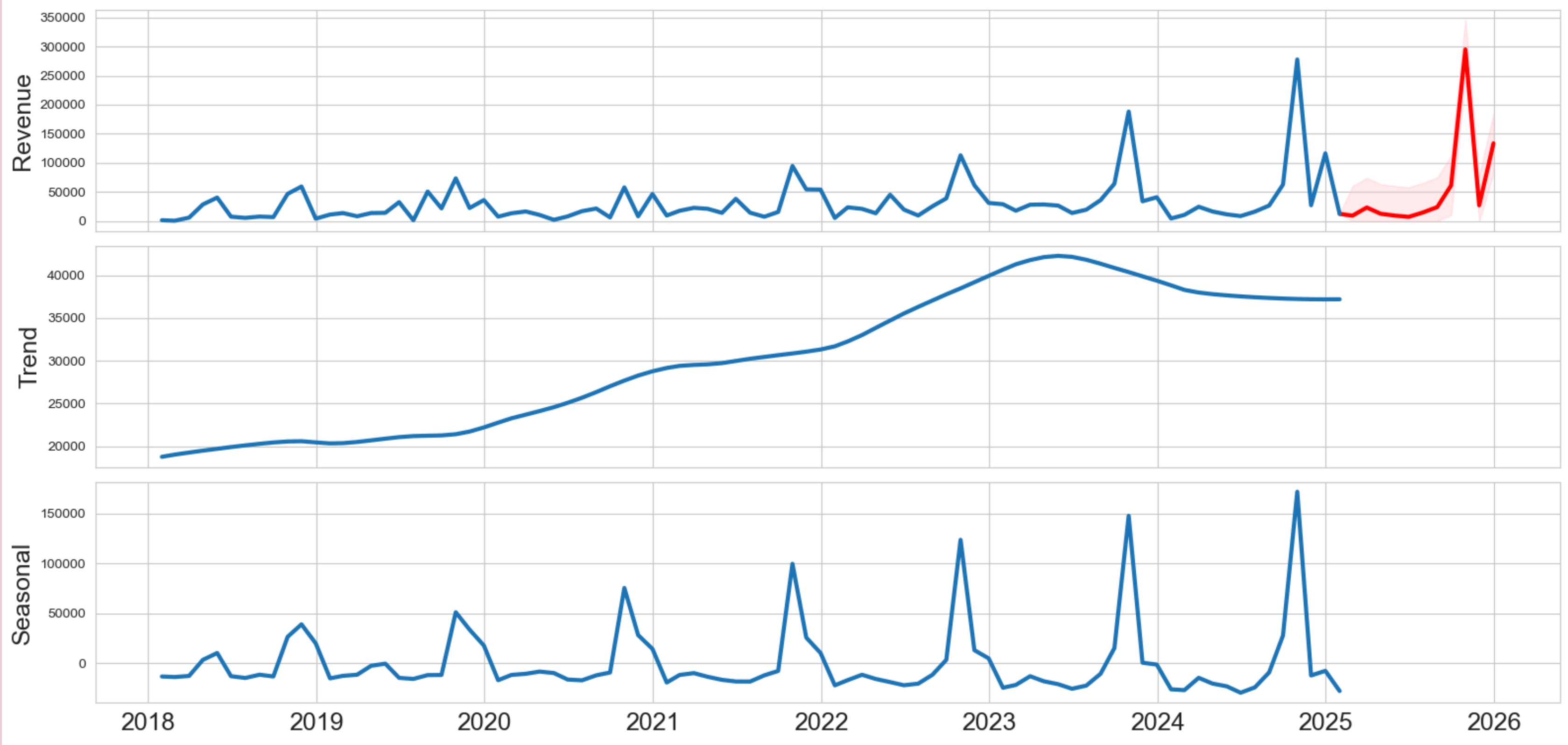
HOW WE USE IT?

STL: Separates changes in time into permanent and seasonal components

SARIMA: Predicts future changes using both regular trends and seasonal patterns.



SEASONAL DONATION GROWS STRONG, BUT REGULAR DONATION STALLS



WHAT IS RFM ANALYSIS?

01 **Recency:** How recently a donor has made a donation

02 **Frequency:** How often a donor donates

03 **Monetary:** How much money they donate

HOW WE USE IT?

K-Means Clustering: An unsupervised machine learning algorithm used to group similar characteristics together

5

DONOR GROUPS!



Total Customers

2,523



Avg. Recency

585



Avg. Frequency

31



Avg. Monetary

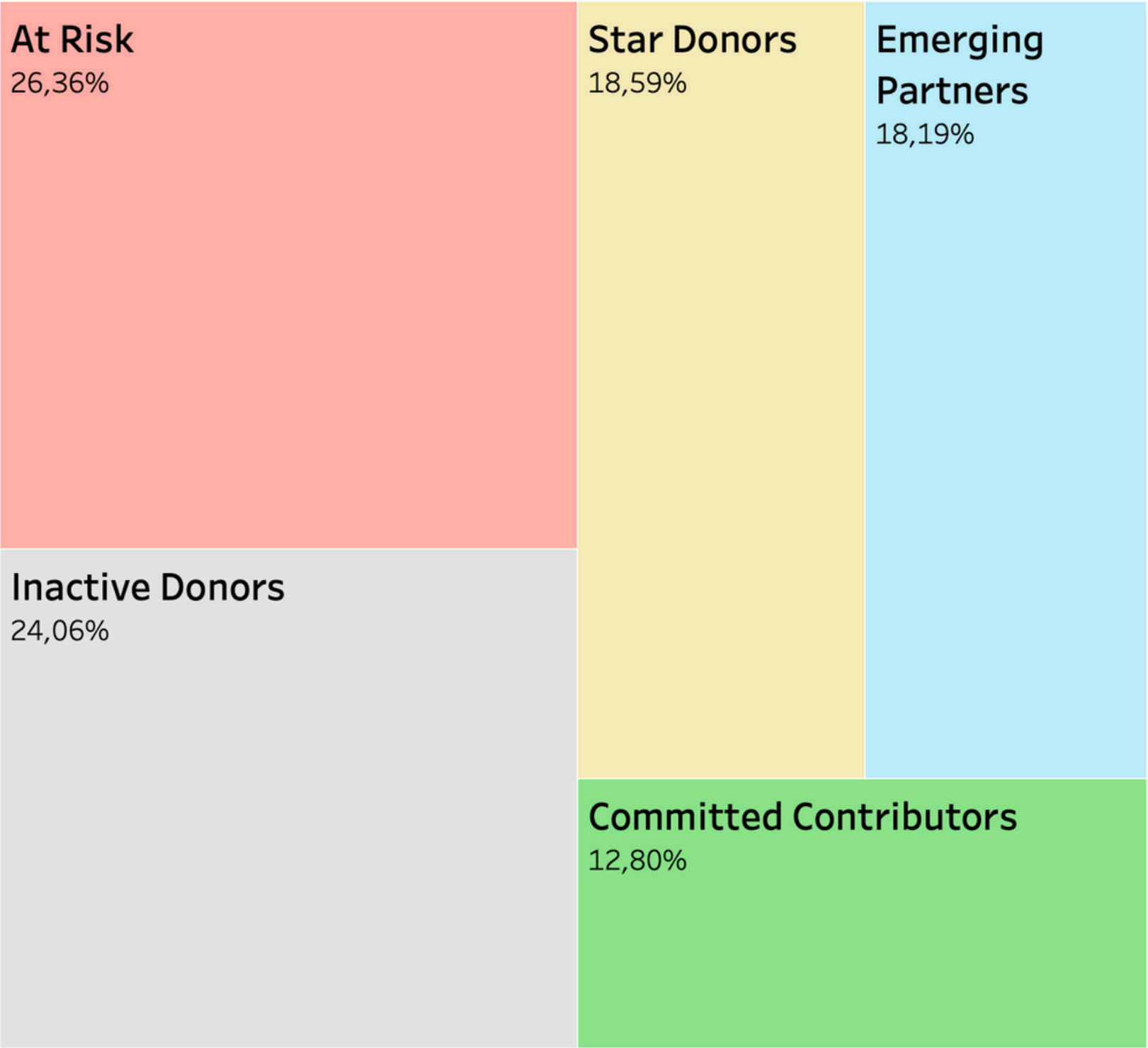
4,187



Total Revenue

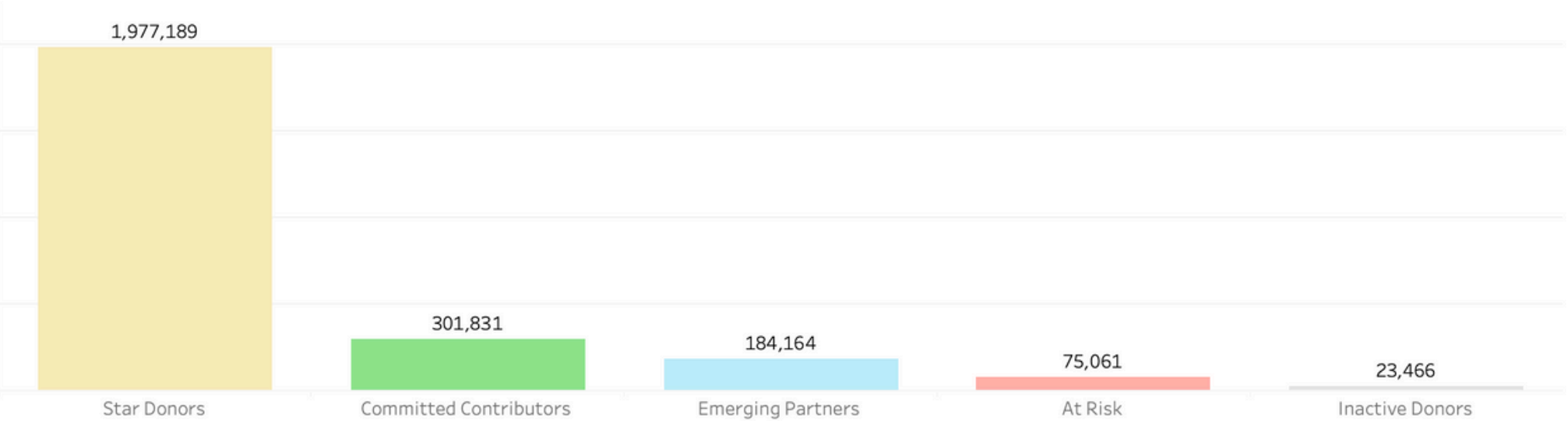
2,561,711

RFM Segment Treemap

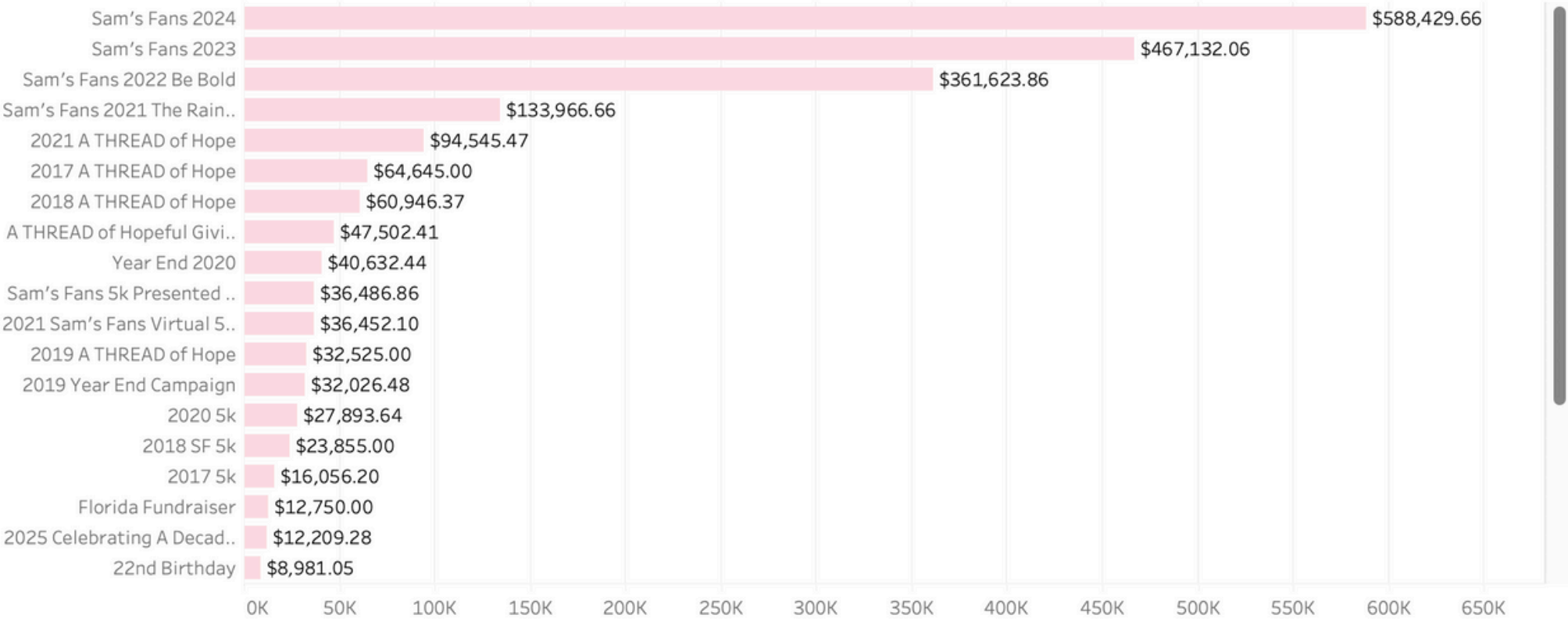


RFM Analysis

Total Revenue by Donor Segments



Total Revenue by Campaign



WHAT IS SURVIVAL ANALYSIS?

01 **What:** Models the time until an event occurs, such as failure or death

02 **How:** Analyze the probability of an event over time.

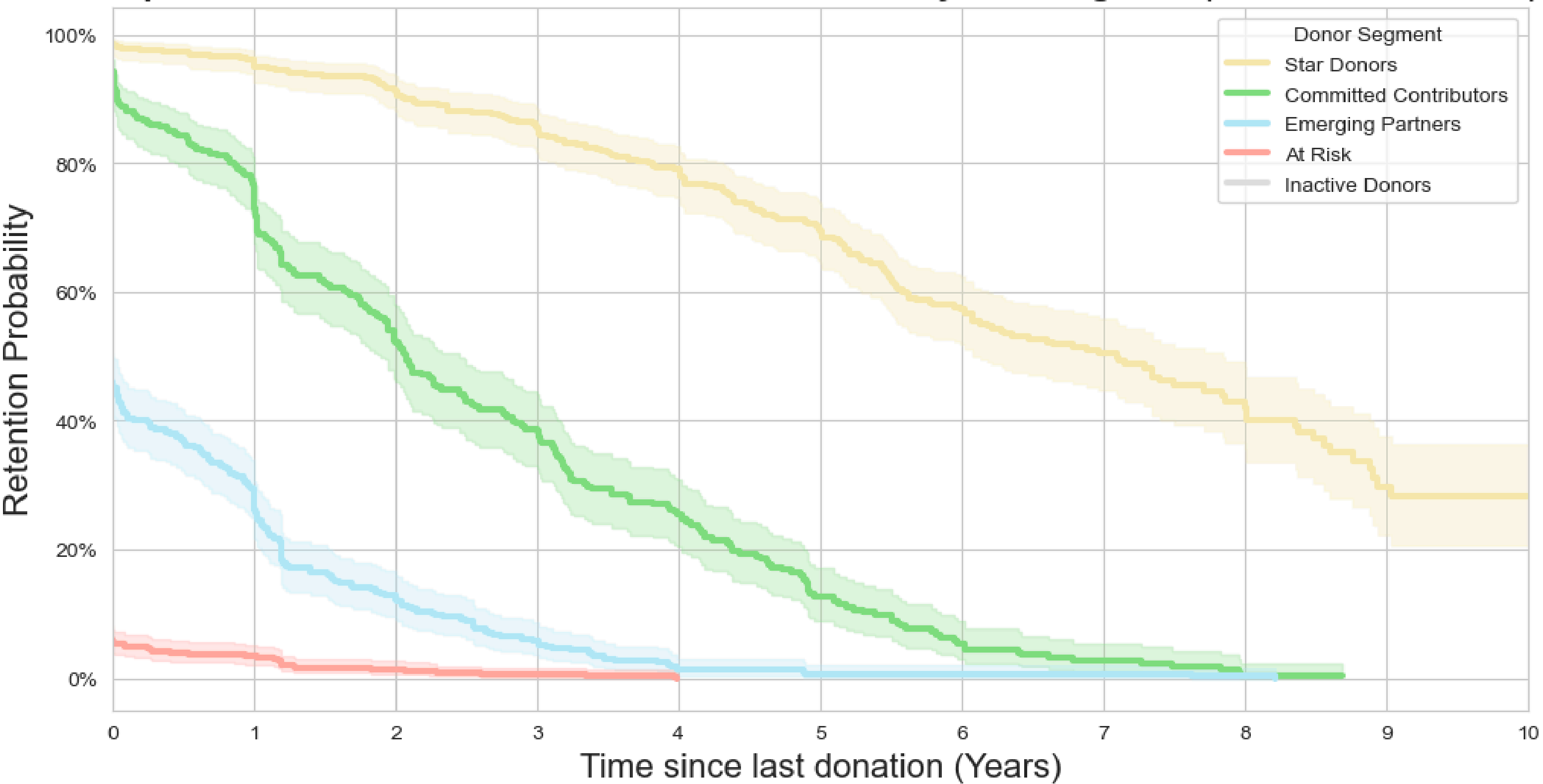
03 **Why:** Useful for risk assessment and decision-making in various fields like healthcare and engineering.



ANNUAL ENGAGEMENT IS KEY TO GRASSROOTS DONOR RETENTION



Kaplan-Meier Donation Retention Duration Curves by RFM Segment (Jan 2015 - Jan 2025)



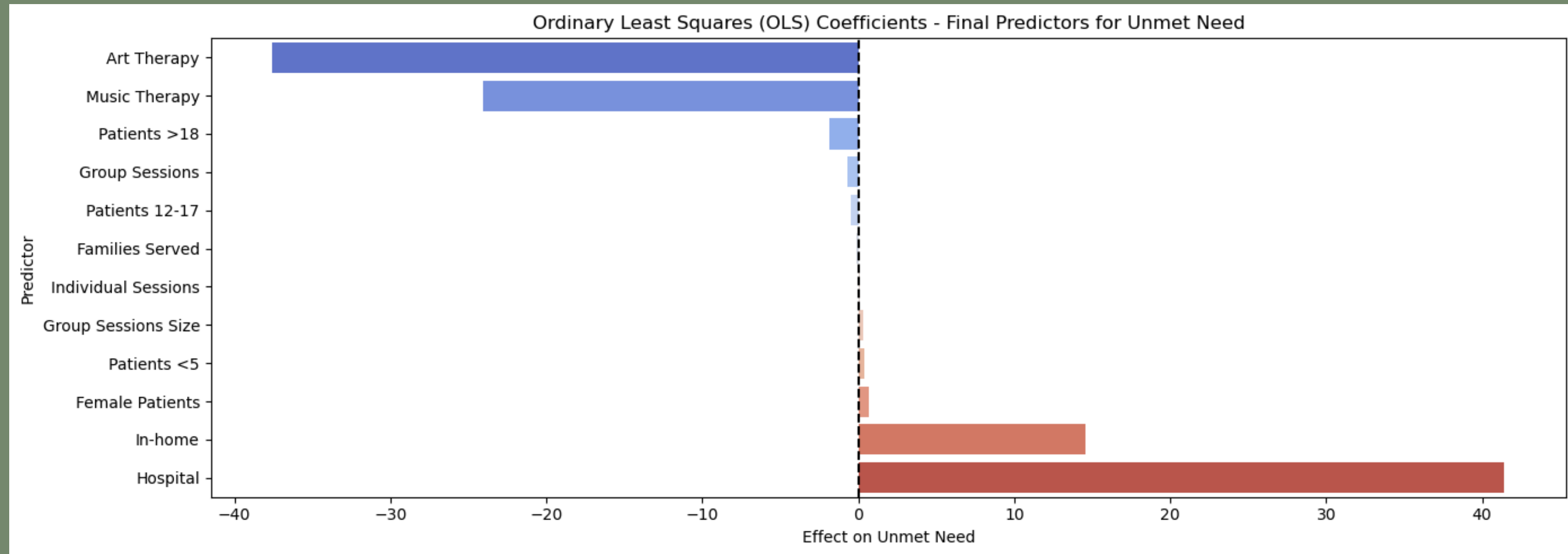
MOVING FORWARD: NEXT STEPS FOR SAM’S FANS



Donor Segment	When to Reach Out	Recommended Actions
Star Donors	Ongoing	<ul style="list-style-type: none">Quarterly deep-dive impact reportsOne-on-one touchpoints (notes, calls, visits)Insider access (strategy previews, naming)
Committed Contributors	9 - 10 months	<ul style="list-style-type: none">Propose a multi-year pledge or tiered upgradeHighlight special recognition
Emerging Partners	9 - 10 months	<ul style="list-style-type: none">Impact-update email tied to that initial giftInvite to an exclusive virtual “insider” eventPitch joining a monthly-giving circle
At-Risk Donors	0 - 3 months	<ul style="list-style-type: none">Personalized thank-you calls/SMS within 1 weekShort “micro-survey” to learn motivations\$10 matching-gift ask to drive a 2nd gift

WHERE SHOULD THE MONEY GO?

OLS Regression: What derives unmet need in our therapy programs?



RECOMMENDED ACTIONS

- Expand Art/Music Therapy
- Scale Group Sessions
- Diversify Inpatient Services
- Launch Gender-Inclusive Outreach

THANK YOU

AND DON'T FORGET TO DONATE TO SAM'S FANS :)



APPENDIX: WEIBULL AFT MODEL SUMMARY

- **Model Fit:** Concordance Index of 0.92 → **High accuracy**
- **Key Findings:**
 - "Star Donors" stay engaged much longer compared to "Committed Contributors" (**15× longer time**).
 - "At Risk", "Inactive", and "Emerging Partners" have much **shorter** donation durations.
 - All results are statistically significant ($p < 0.001$)