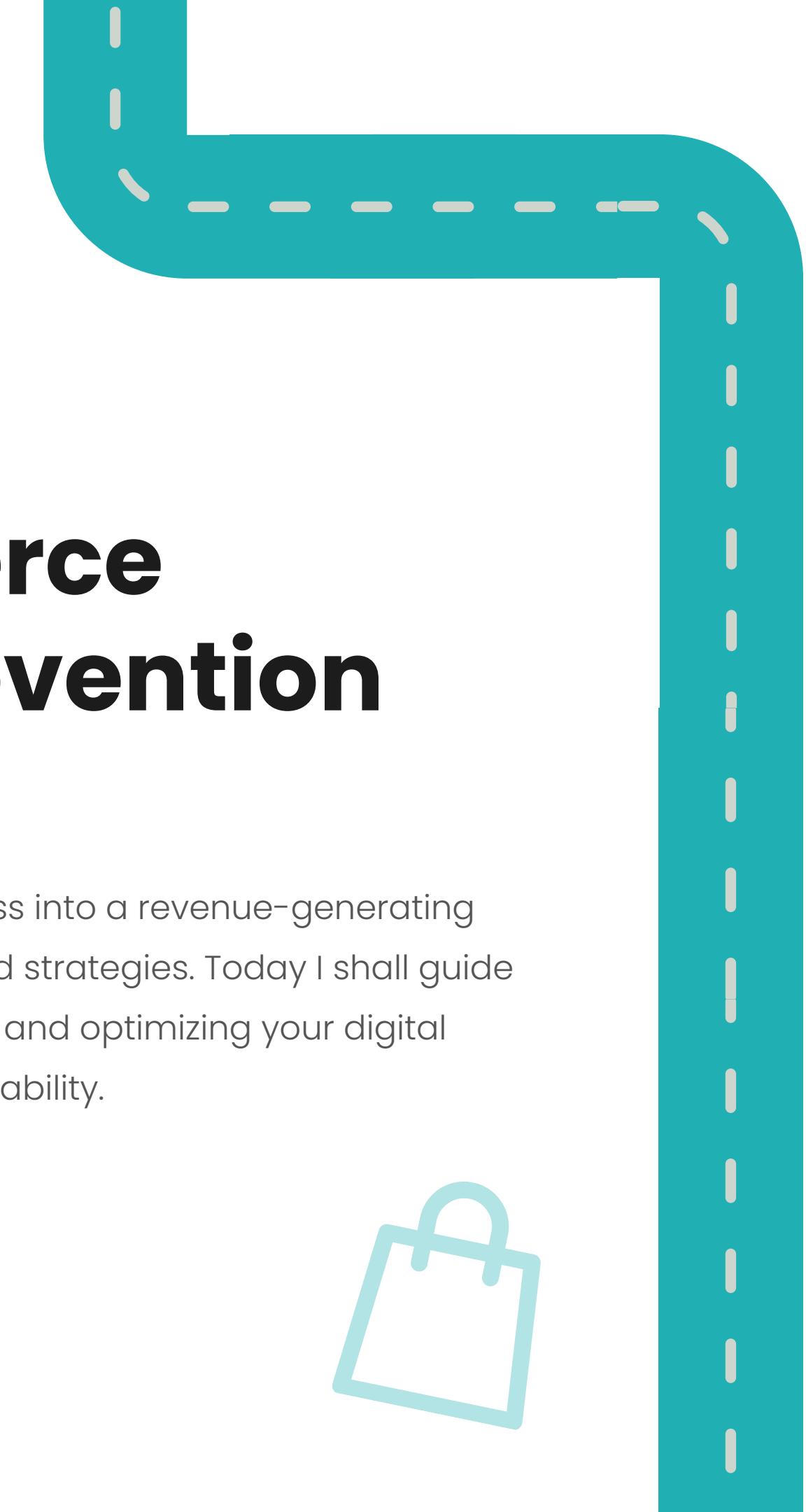




# E-commerce Churn Prevention Roadmap

Transform your online business into a revenue-generating powerhouse with personalized strategies. Today I shall guide you through building, scaling, and optimizing your digital storefront for maximum profitability.



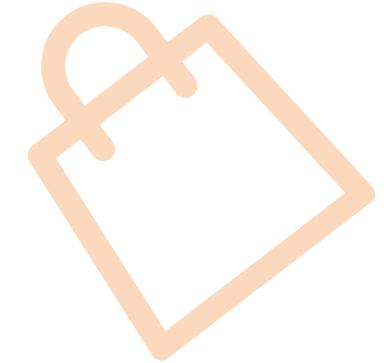
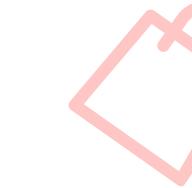
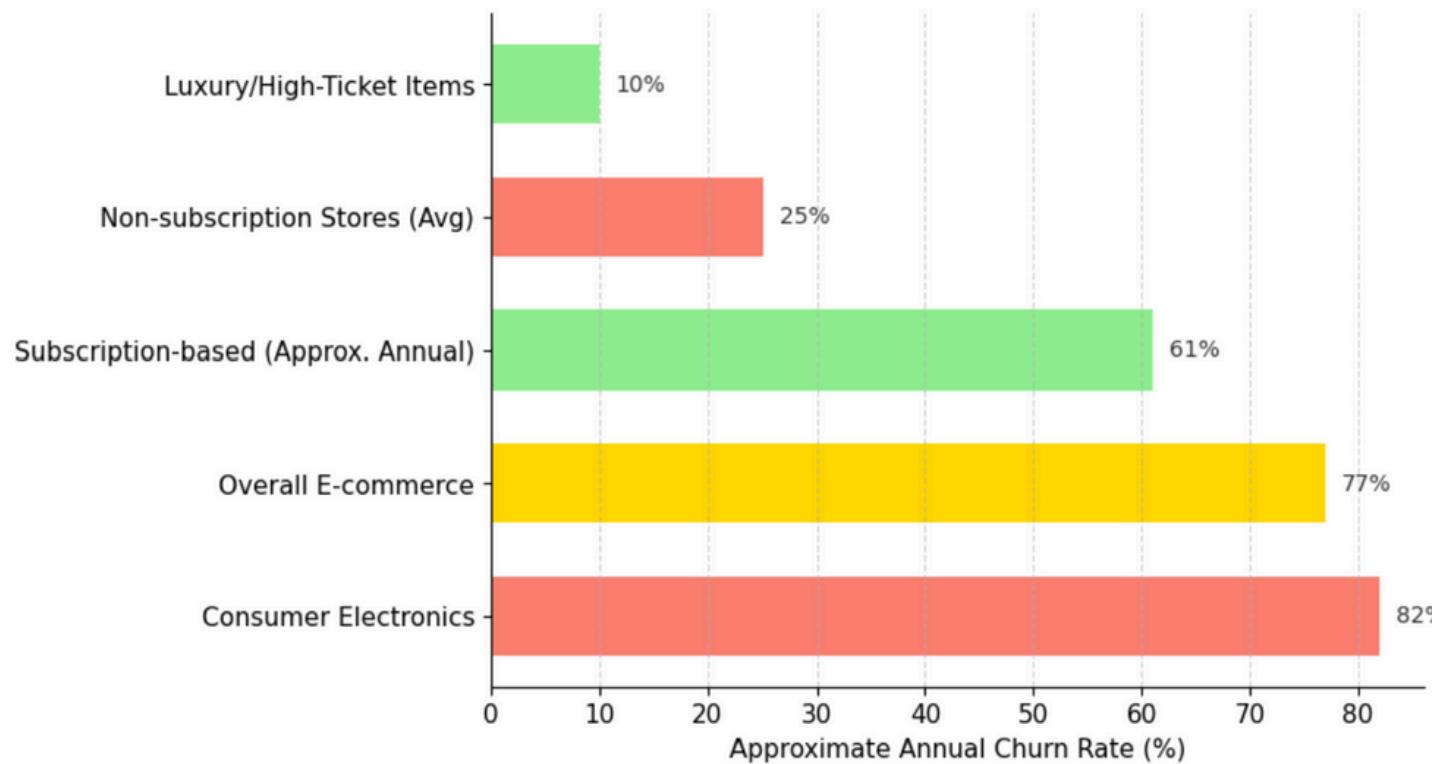


# E-commerce Churn Reduction using the AI Marketing Canvas

## Background

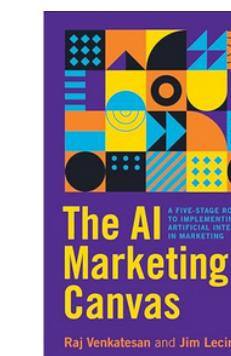


**E-commerce Annual Churn Rates by Category**



## Business Questions

- How can we reduce 'The churning rate' of a E-commerce business?
- How can we improve ROI?
- What number customers can be saved from churning annually?

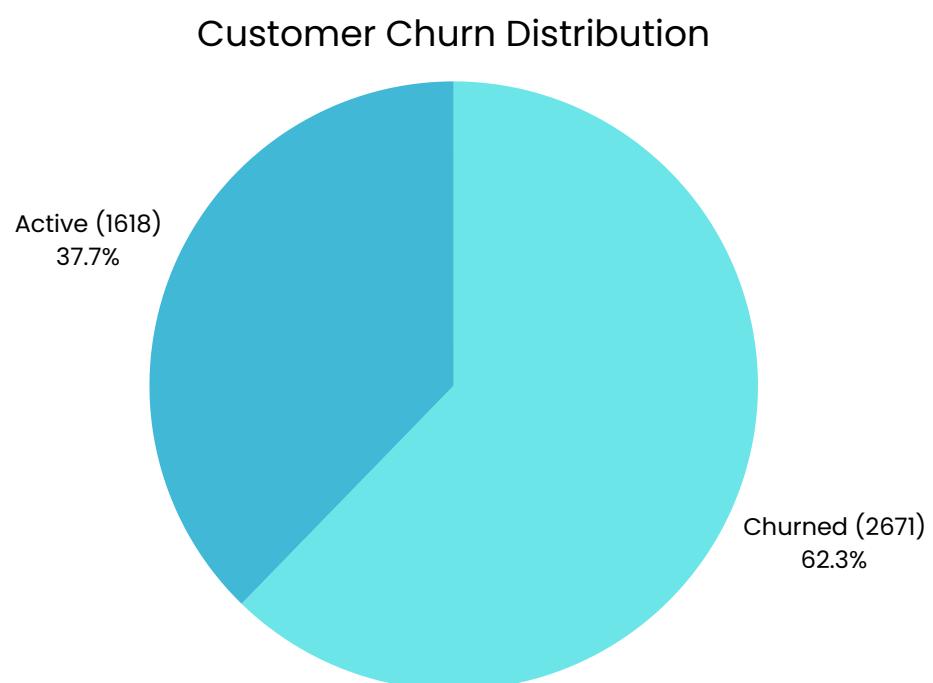


## The Solution (Using AI marketing Canvas)

- **Foundation:** Dataset, RFM, Churn Labeling
- **Experimentation:** EDA & Predictive modeling
- **Expansion:** Segmentation, Strategy, EV
- **Transformation:** Agentic AI, RAG Chatbot
- **Monetization:** Fin. Results & Future opportunity



# Foundation: Data & Infrastructure



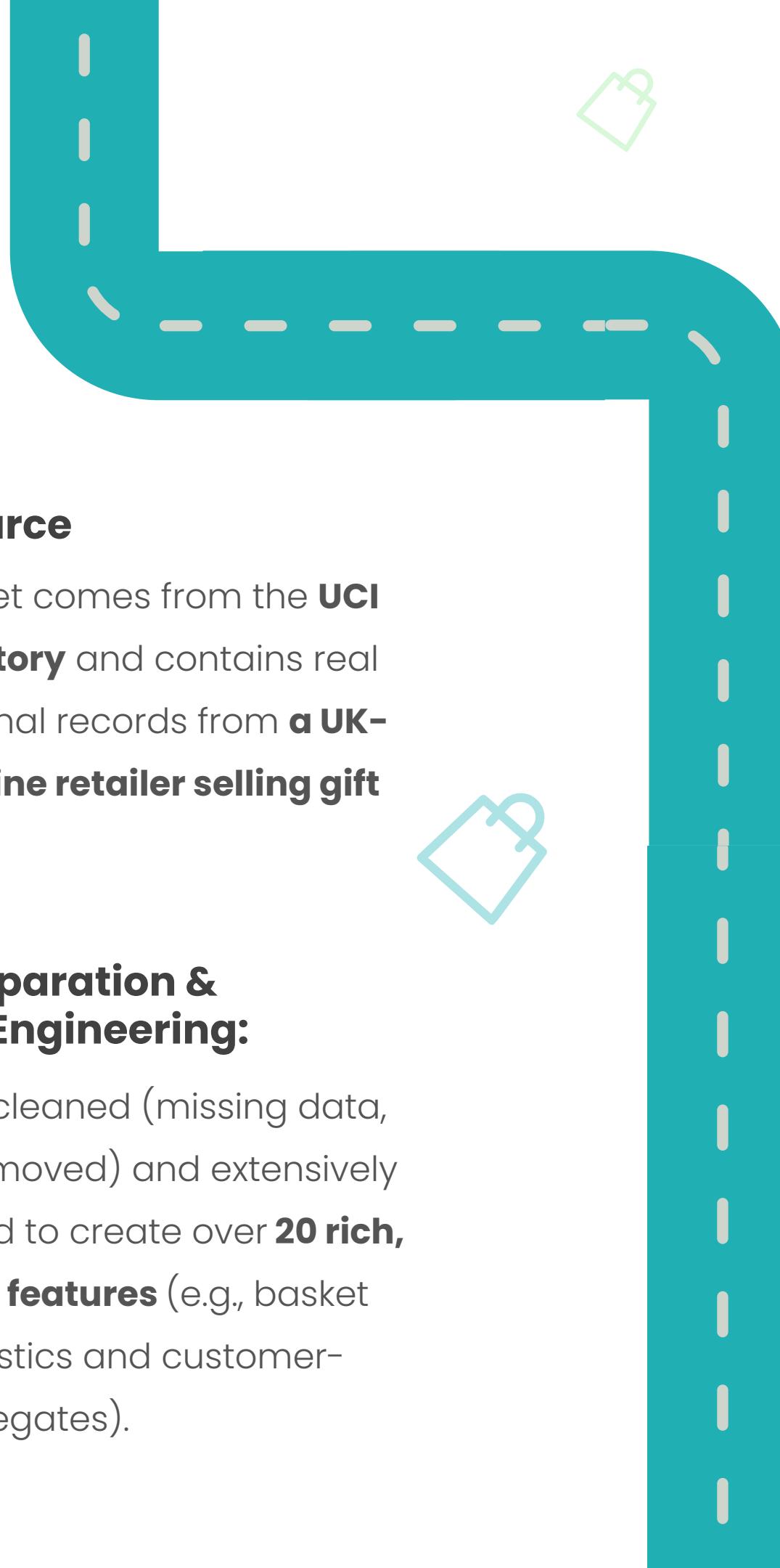
## Data Source

The dataset comes from the **UCI ML Repository** and contains real transactional records from **a UK-based online retailer selling gift products**.



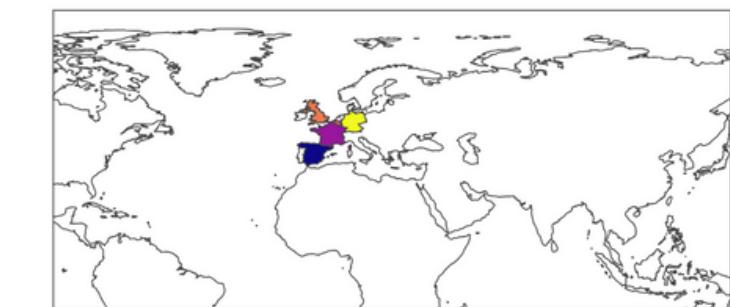
## Data Preparation & Feature Engineering:

Data was cleaned (missing data, outliers removed) and extensively engineered to create over **20 rich, predictive features** (e.g., basket characteristics and customer-level aggregates).



## Customer-Centric Schema (RFM)

Calculated core **Recency, Frequency, and Monetary (RFM)** metrics for all unique customers (4312).



Churn Rate

0.45  
0.4  
0.35  
0.3



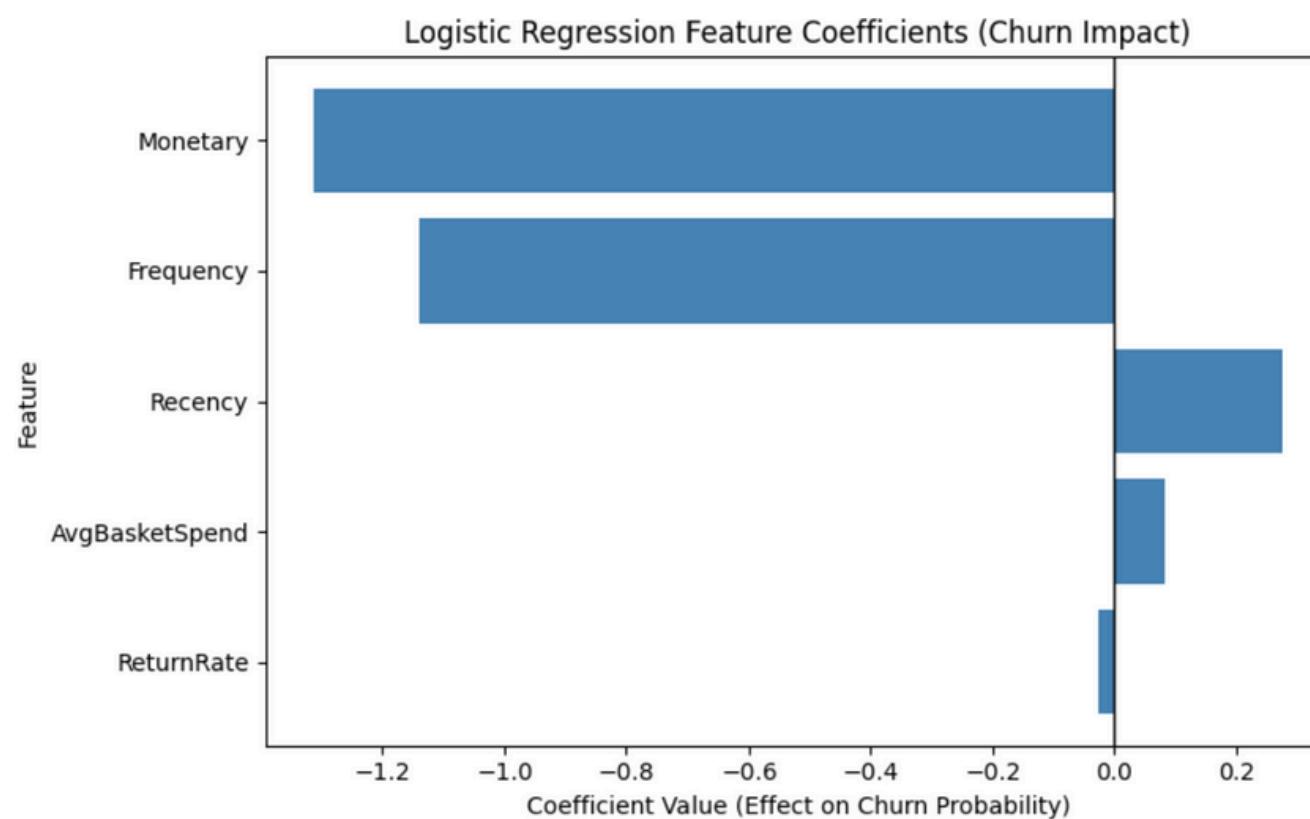
## Churn Labeling

Defined the Churn Label (the core predictive target) as no purchase within the last 90 days, establishing a binary metric for retention success.





# Experimentation: Testing Predictive AI & Insights



## Goal

Conduct initial, targeted pilots to generate business insights and validate the power of predictive models for customer retention.

## High Churn Risk

The current churn rate is **62.28% (2,671 out of 4,289 unique customers classified as churned)**, identifying retention as the immediate value pocket.

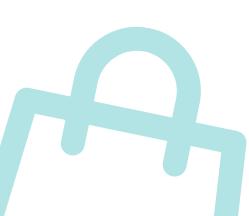


## Market Concentration Risk:

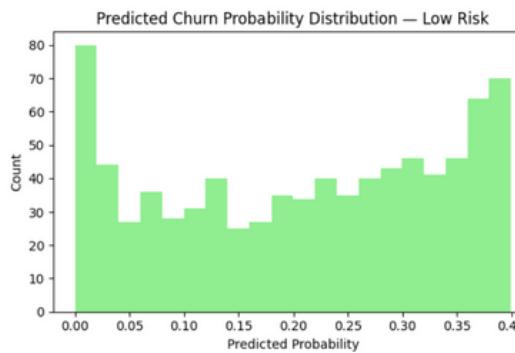
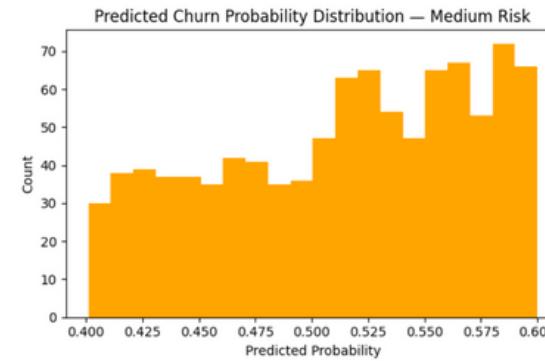
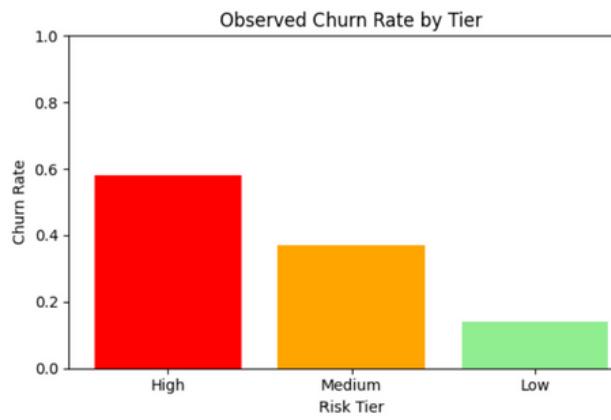
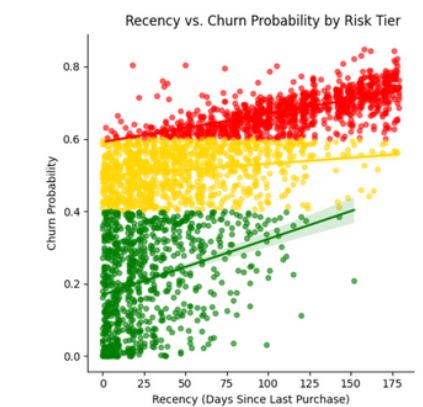
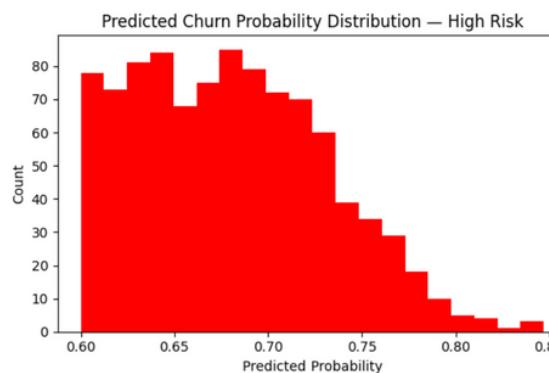
The business is overwhelmingly dependent on its domestic market, with the United Kingdom accounting for **83.3%** of all sales.

## Predictive Modeling

The churn model is predictive (**AUC: 0.723**), identifying *Monetary Value* and *Frequency* as the strongest drivers for customer retention.



# Expansion: Optimization & Segmentation



## Goal

Scale the validated predictive insights by creating a holistic, financially prioritized *prescriptive strategy* across defined customer segments.



### Risk-Based Segmentation

Grouped into **Low**, **Medium**, and **High** Risk tiers. **69.8%** of the customer base falls into the Medium or High-Risk tiers.



### Tiered Prescriptive Strategy

Hit the High-Risk customers with immediate, **low-cost win-back**, but upsell **loyalty by CLV** to the Low-Risk customers.



### Financial Optimization

Expected Value (EV) for every customer and action (e.g., email, sms, call+coupon) to optimize for the most profitable intervention.



# Transformation: Reinforcement Learning Implementation



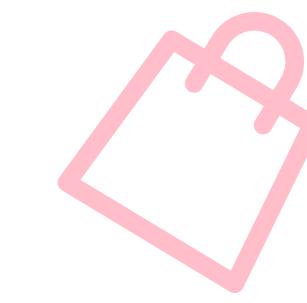
## Goal

Transform the marketing function by deploying dynamic AI systems for personalized interaction & human-in-the-loop decision making.



## Dynamic Policy Optimization

*LinUCB Contextual Bandit* model continuously learn & recommend the *single most optimal retention action* for every customer based on their unique **RFM**/Context features.

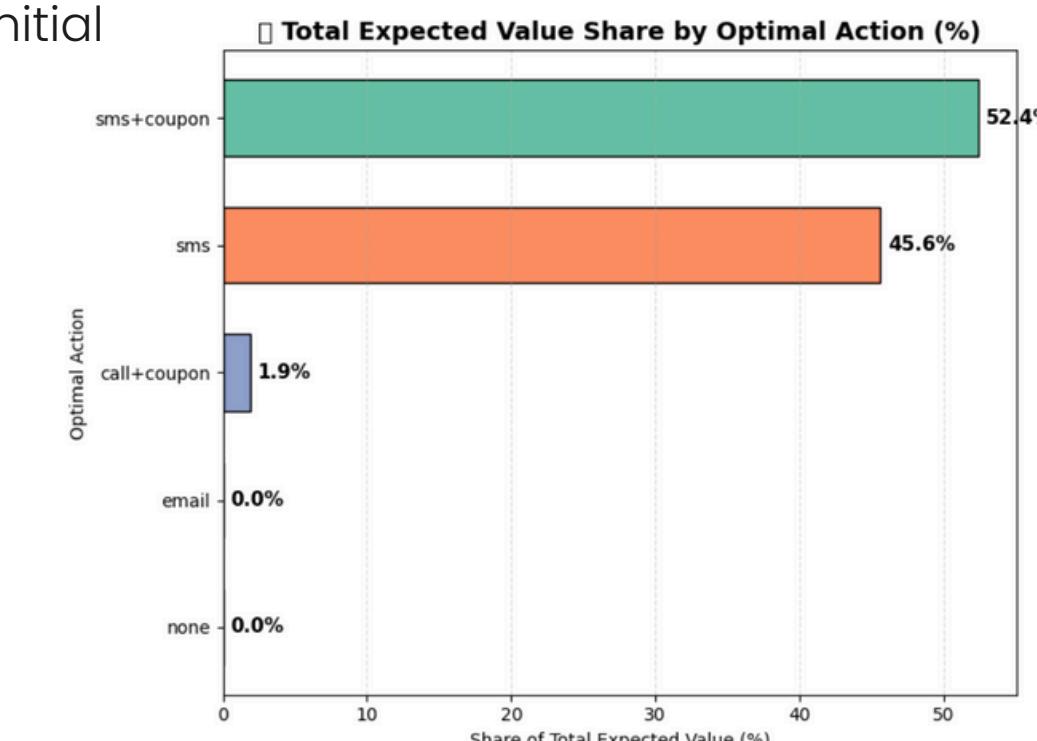
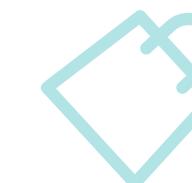


## RAG Chatbot

Gemini-powered *RAG Chatbot* to serve as a decision-support tool, enabling marketers to instantly query *optimal retention policies* and complex customer profiles using natural language.

## Results

The *bandit model* recommended the *sms+coupon action* for the largest number of customers in the initial simulation, indicating its high estimated reward.



# The Architecture

## Customer Intelligence Pipeline

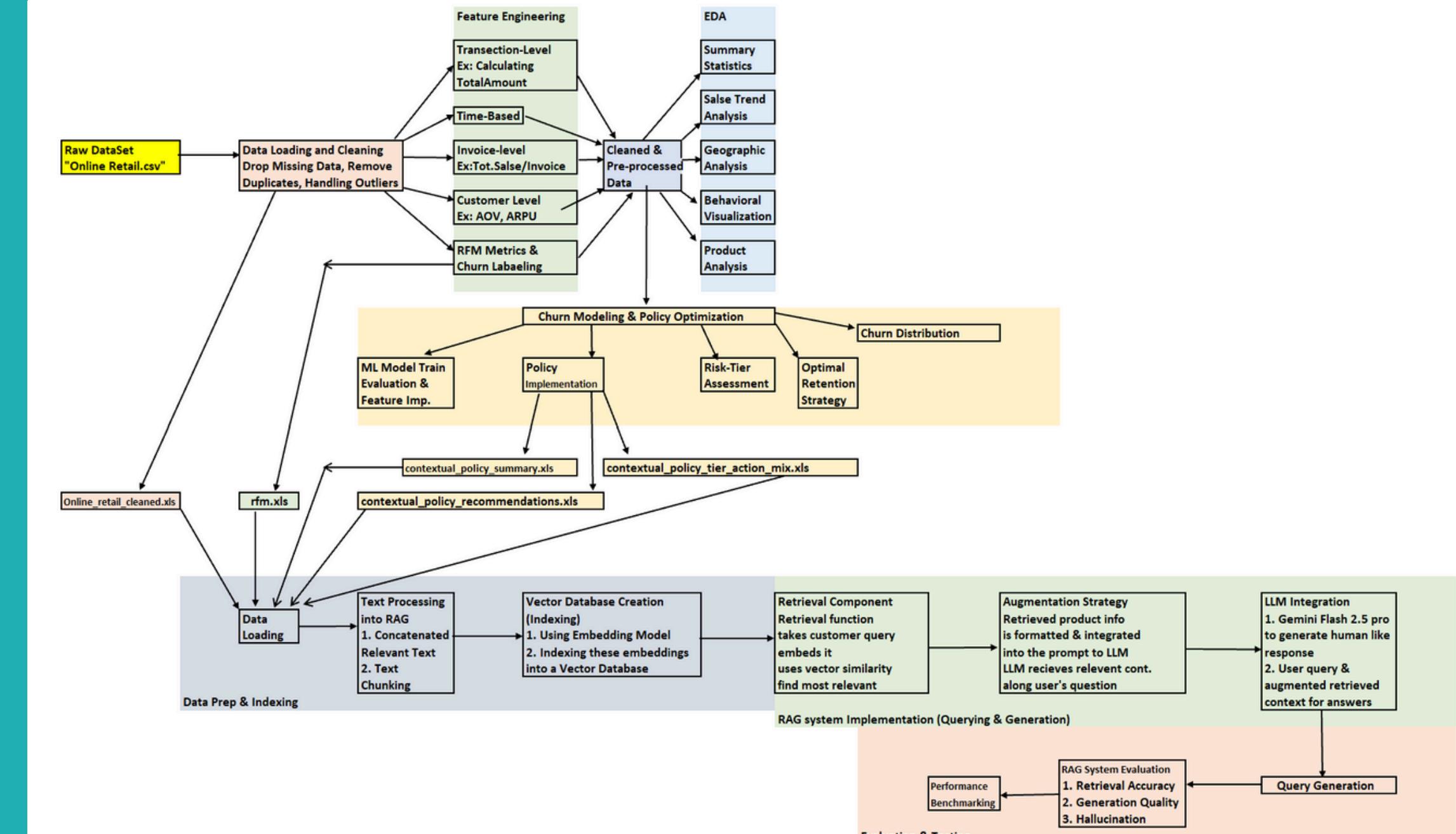
A unified system that transforms raw retail data into retention actions and intelligent recommendations.

## Predictive Modeling + Generative AI

An integrated design where machine learning informs strategies, and generative AI operationalizes them.

## Enterprise-Ready AI Workflow

A production-oriented framework designed for scalability, automation, and continuous evaluation.



# Monetization: Financial Results



4289



2671



1437



Total Revenue

£6M

Total Expected  
Retention Cost

£27k

Tot. Exp. Value after  
taking retention policies

£2M\*

New Expected Churn Rate

29%



# Monetization: Future Opportunity



## Dynamic Pricing Strategy

Use *churn probability* and *Monetary Value* to power a dynamic pricing engine, minimizing unnecessary discounts.



## Feature Enrichment

Incorporate external and unstructured data sources.. More feature = Better prediction =

Best ROI



## AI-As-A-Service (AIAAS) Productization

Combines the *Contextual Bandit* for dynamic action selection and the *Gemini-powered RAG Chatbot* for decision support.



# Limitations

## Metric Incompleteness

Total Expected Value is based only on revenue (sales) and does not account for the Cost of Goods Sold (COGS) or the Cost of Retention Strategies.



## The \$2M Value is not Guaranteed

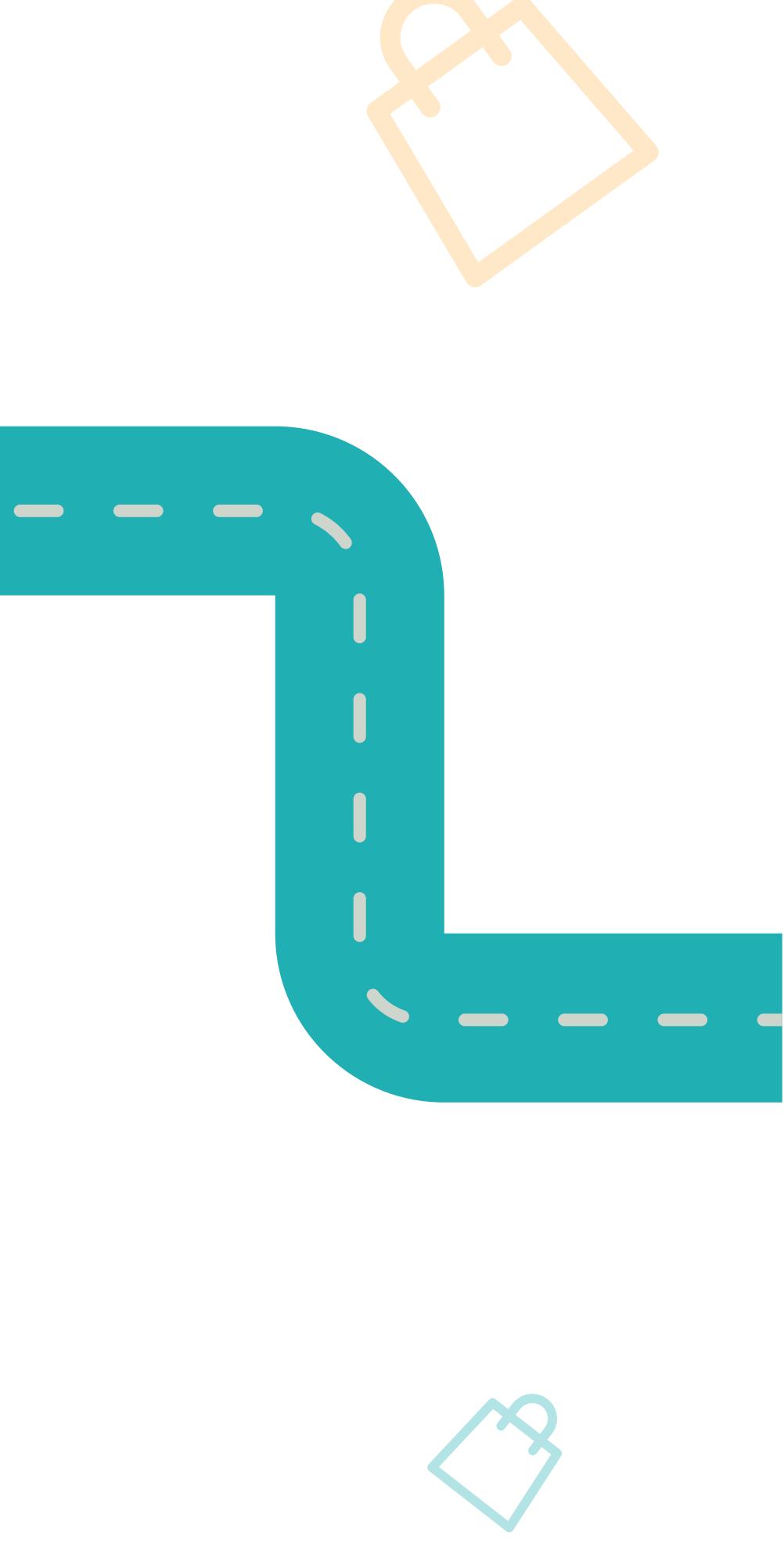
Total Expected Value is a statistical mean. By definition, an expected value, meaning the actual retained revenue could be higher or lower.

## Monetary Value Simplification

Ignores the time value of money & fails to account for potential upsells, cross-sells, or natural spending degradation over time.

## Data and Modeling Bias

The model relies only on RFM features, ignoring customer service history or product return rates data that are strong predictors of true churn.



**This is how we can prevent churning in a E-commerce business. Thanks You.**



**Any Questions?**

# Appendix

## Customer Insights & Profiles (all 2671 customers profile queries)

- **What is the RFM summary for Customer 13362, 18272??**
- Which customers have the highest Recency scores in the dataset?
- Identify customers with high Monetary value but low Frequency.
- Identify customers with highest Monetary value but low Frequency.
- Show me the top 3 most loyal customers based on purchase history.
- How many active customers made purchases in the last 30 days?
- What trends can you see in the purchasing behavior of repeat buyers?
- Which customers are most likely to upgrade to premium offers?

## Retention Policy & Recommended Actions

- What retention strategy is recommended for Customer 16660?
- **Which customers should receive discount-based campaigns?**
- Which action plan has the highest average ROI?

## ROI & Investment Analysis

- If I invest \$1 in a retention program, what's the expected return?
- Which campaign type delivers the highest ROI by segment?
- **Show the top 3 actions sorted by ROI per dollar invested.**
- Identify customers with negative or low ROI actions.

## Churn Prediction & RFM Segmentation

- Which factors contribute most to churn probability?
- Identify customers predicted to churn in the next 90 days.
- What's the average Monetary value for churned customers?
- What's the average Monetary value for non-churned customers?

## Knowledge Grounded Q&A (RAG Use)

- What are the main takeaways from the RFM segmentation analysis?
- Summarize the correlation between Recency and churn likelihood.
- Provide a short executive summary of this project's key findings.

On next slide,

**Red = High Risk customers**

**Yellow = Medium Risk Customers**

**Green = Low Risk Customers**

## Operational / Debug Questions

- Which embedding model is the RAG chatbot using?
- What parameters control chunk size and overlap?
- How does the chatbot retrieve and rank relevant documents?
- What's the difference between embedding and retrieval stages?

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