# Customer Offer Engagement

## 1. Project Overview

### About

This project delivers an interactive **Customer Offer Engagement Dashboard** in Power BI, integrating customer demographics, offer details, and event transactions. The dashboard provides end-to-end visibility into the marketing offer lifecycle — from distribution, to viewing, to completion, and finally to transaction impact. It enables users to drill into customer segments, compare offer types, and monitor engagement trends in real time.

### Data Sources

- Event.csv - All customer interactions and transactions
- Offer.csv - Marketing offer types and distribution channels
- Data_dictionary.csv  - Field-level metadata for all tables
- Customer.csv -  Customer demographics and signup date

## 2. Insights, Findings, and Recommendations (Page-wise)

| Page | Insights | Findings | Recommendations |
|---|---|---|---|
| **Page 1: Overview** | High-level engagement and revenue KPIs. | - Redemption rate is 28% overall.<br>- Average transaction amount is higher for customers who completed offers.<br>- BOGO offers dominate total completions. | - Focus on increasing offer views through better targeting.<br>- Promote high-performing offers with higher reward-to-difficulty ratio. |
| **Page 2: Offer Funnel** | Drop-off analysis at each stage. | - Major drop-off occurs between "offer sent" and "offer viewed".<br>- Completion rate higher when offers are viewed within first 24 hours. | - Improve visibility and timing of offer delivery.<br>- Test multiple communication channels for faster views. |
| **Page 3: Customer Segmentation** | Engagement by demographic groups. | - 25–34 age group has highest redemption rate.<br>- High-income customers redeem less but have larger transaction amounts.<br>- Male customers slightly more responsive to discount offers. | - Run targeted campaigns for younger customers with quick-redeem offers.<br>- Test luxury offers for high-income customers to boost engagement. |
| **Page 4: Offer Performance** | Effectiveness by offer type, reward, and channel. | - BOGO offers have highest completion rate.<br>- Discounts work best on social and web channels.<br>- Email channel underperforms in completions. | - Shift low-performing offers away from email.<br>- Focus BOGO offers on high-response channels.<br>- Rework or retire low-redemption offer types. |

# 3. Technical Documentation

## 3.1 Data Model (Star Schema)

### ➢ Fact Tables:

1. Customers – Customer demographics and join date.
   Fields: customer_id, became_member_on, gender, age, income.
2. Offers – Offer contains details of marketing offers and channel distribution.
   Fields: offer_id, offer_type, difficulty, reward, duration, channels.
3. Events – Records of transactions and tracks all customer interactions.
   Fields: customer_id, event, value (offer id/amount), time (relative to Membership start)
4. Offer Channels - Lists the communication channels for each offer
   Fields: Channel offer (email, web, mobile, social).

### ➢ Data Transformation:

#### ◆ Customers Table

- **Purpose:** Holds demographic information for each customer.
- **Key Fields:** customer_id, age, gender, income, became_member_on.
- **Cleaning Performed:**
  - Removed duplicates.
  - Handled missing income by replacing with "not disclose".
  - Corrected age outliers (removed invalid ages like 0 or >100).
  - Created Age Group column for segmentation.

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#### ◆ Offers Table

- **Purpose:** Stores details of marketing offers.
- **Key Fields:** offer_id, offer_type, difficulty, reward, duration, channels.
- **Cleaning Performed:**
  - Parsed channels JSON into list and expanded to rows.
  - Created Offer Category column (BOGO, Discount, Informational).
  - Verified logical consistency (difficulty = 0 and reward = 0 → Informational).

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#### ◆ Events Table

- **Purpose:** Records customer interactions (offer received, viewed, completed, transaction).
- **Key Fields:** customer_id, event, time, value.
- **Cleaning Performed:**
  - Parsed value JSON to extract offer_id and amount.
  - Steps Select Value column – Parse – Json- Extract value – Rename column Offer_id_extract

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◆ **Offer Channels Table** *(derived from Offers)*

- **Purpose:** Normalized table for offer distribution channels.
- **Key Fields:** offer_id, channel.
- **Cleaning Performed:**
  - Extracted each channel from channels JSON array.
  - Removed duplicates.

## ➢ Relationships:

1. customers[customer_id] ↔ events[customer_id] (One-to-Many)
2. offers[offer_id] ↔ events[value.offer id] (One-to-Many after parsing value)
3. offers[offer_id] ↔ offer_Channel[offer_id_extracted]
4. All are **one-to-many** relationships.
5. This star schema keeps fact data (Events) in the center, surrounded by dimension tables (Customers, Offers, Offer Channels).

### 3.2 Transformations in Power Query

- Parsed value column from JSON-like text into offer_id or transaction amount.
- Converted became_member_on to Date, extracted Year for trend analysis.
- Removed unrealistic ages (>100/ 118) or treated as data quality issues.
- Created calculated columns for event_category and offer_channel_count.
- Mapped channels from JSON array to individual rows for analysis.

# 4. Dax Measures

| Metric | DAX Expression (Simplified) | Purpose / Explanation |
|---|---|---|
| **1. Offers Sent** | COUNTROWS(events WHERE event = "offer received") | Total number of offers delivered to customers |
| **2. Offers Viewed** | COUNTROWS(events WHERE event = "offer viewed") | Measures customer interest by counting how many offers were opened |
| **3. Offers Completed** | COUNTROWS(events WHERE event = "offer completed") | Indicates how many offers led to a successful completion |
| **4. Redemption Rate** | Offers Completed / Offers Sent | % of offers completed out of those sent – measures campaign success |
| **5. Total Transactions** | COUNTROWS(events WHERE event = "transaction") | Total number of purchase events unrelated to specific offers |
| **6. Total Revenue** | SUM(events[amount] WHERE event = "transaction") | Total monetary value of all transactions |
| **7. Avg Transaction** | AVERAGE(events[amount] WHERE event = "transaction") | Average amount spent per transaction |
| **8. Total Customers** | DISTINCTCOUNT(customers[customer_id]) | Total number of unique customers in the dataset |
| **10. Income Bracket** | SWITCH(TRUE(), customers[income] = "Unknown", "Unknown", customers[income] < 40000, "<40K", customers[income] < 70000, "40K–70K", | Categorizes customers into income ranges: <40K, 40K–70K, etc. for segmentation |

| | | |
|---|---|---|
| | customers[income] < 100000, "70K–100K", customers[income] >= 100000, "100K+") | |
| **11. Completion Rate by Type** | DIVIDE(CALCULATE(COUNTROWS(events), events[event] = "offer completed"), CALCULATE(COUNTROWS(events), events[event] = "offer received")) | Tracks success rate for each offer category (BOGO, Discount, Informational) |

# 5. User Guide

## 5.1 Navigation

- Overview – Key KPIs: customers, transactions, redemption rate.
- Demographics – Gender, age, income distributions.
- Offer Performance – Difficulty vs. reward, redemption by type.
- Engagement Funnel – Offer lifecycle: received → viewed → completed.
- Channel Analysis – Offer performance by communication channel.

## 5.2 Interaction

- Use slicers for Gender, Age Group, Offer Type, and Year to show year wise data.
- Hover tooltips for detailed transaction and redemption metrics.
- Add Buttons to go any page from one page.
- Add Slicer Sync for change filter that change over all dashboard data according to filter.

## 5.3 Data Refresh

1. Open PBIX in Power BI Desktop.
2. Home → Transform Data → Data Source Settings → Update paths.
3. Home → Refresh to load latest CSV files.
4. Save and publish to Power BI Service.