

LAB - Part 2: ANALYZE CAMPAIGN EFFECTIVENESS

1. Tổng quan Lab

Mục tiêu

- So sánh hiệu suất giữa các RFM segments thông qua metrics và visualizations
- Phân tích độ chính xác của product recommendations từ LAB Part 1
- Xác định top-performing next best offers cho từng customer segment
- Tạo dashboard tương tác với AWS QuickSight để monitor campaign effectiveness

Những gì bạn sẽ xây dựng

Một dashboard hoàn chỉnh gồm 4 parts:

- Overview & Executive Summary - KPI cards, segment distribution, conversion funnel
- Segment Performance Analysis - Performance comparison table, trends, heatmap
- Next Best Offer Performance - Top recommendations, accuracy analysis
- Customer Feedback & Sentiment - Sentiment analysis, feedback patterns

Kết quả mong đợi

- Dashboard tương tác với 15+ visualizations
- Insights về hiệu suất từng customer segment
- Recommendations để optimize marketing campaigns
- Framework có thể tái sử dụng cho dự án thực tế

2. Yêu cầu

Checklist trước khi bắt đầu:

- Đã hoàn thành LAB Part 1 (RFM Model + AI Agent)
- Dữ liệu RFM segmentation đã được lưu trong S3
- Campaign performance data đã sẵn sàng

1.1: Đăng ký QuickSight

- Truy cập AWS Console → Tìm "QuickSight"
- Click "Sign up for QuickSight"
- Nhập account name: workshop-[your-name]
- Notification email: email cá nhân của bạn

1.2: Cấu hình Permissions và Access

1. Trong setup process, enable access to:
 - o Amazon S3 (chọn bucket chứa data từ LAB Part 1)
 - o Nhập thông tin đường dẫn đến bucket
2. Click "**Finish**" để hoàn tất setup
3. Đợi 2-3 phút để QuickSight khởi tạo

1.3: Kết nối Data Source

1. Từ QuickSight homepage, click "**Datasets**" → "**New dataset**"
2. Chọn data source type:
 - o **S3:** Nếu data ở S3 buckets
 - o **Upload file CSV manual:** Theo file CSV đã chuẩn bị
3. Nhập connection details và test connection

2.1: Import RFM Segmentation Data

1. Create dataset từ **AWS S3**
2. Review data types và field names
3. Ensure các trường sau có mặt:
 - o customer_id (String)
 - o rfm_segment (String: High-value, Medium, Low)
 - o recency_score (Integer: 1-5)
 - o frequency_score (Integer: 1-5)
 - o monetary_score (Integer: 1-5)
 - o total_revenue (Decimal)
 - o avg_order_value (Decimal)

2.2: Import Campaign Performance Data

1. Import **campaign_performance.csv** với các trường:

customer_id
segment
campaign_type
channel
impressions
clicks
conversions
revenue
sent_date

2.3: Data Preparation và Cleaning

1. Trong QuickSight dataset editor:
 - o Check for null values và handle appropriately
 - o Validate data types cho tất cả columns
 - o Remove duplicate records nếu có

- Format date fields properly
- Join datasets nếu cần thiết

2.4: Tạo Calculated Fields

Tạo các calculated fields quan trọng:

1. Conversion Rate: $\{conversions\} / \{impressions\} * 100$
2. Click-through Rate (CTR): $\{clicks\} / \{impressions\} * 100$
3. Revenue per Customer: $\{revenue\} / \{unique_customers\}$
4. Segment Performance Score: $(\{conversion_rate\} * 0.4) + (\{ctr\} * 0.3) + (\{revenue_per_customer\} / 100 * 0.3)$

3.1: Tạo New Analysis

1. Từ QuickSight homepage → "Analyses" → "New analysis"
2. Chọn dataset đã prepare → "Create analysis"

3.2: Build KPI Cards (4 metrics chính)

KPI Card 1: Total Customers

1. Add visual → chọn "KPI"
2. Value: $distinctCount(customer_id)$
3. Comparison: $previousPeriod(distinctCount(customer_id))$
4. Format: Số nguyên với thousands separator

KPI Card 2: Overall Conversion Rate

1. Add visual → "KPI"
2. Value: $sum(conversions)/sum(impressions)*100$
3. Format: Percentage với 1 decimal place
4. Conditional formatting: Green if >5%, Red if <2%

KPI Card 3: Total Revenue

1. Value: $sum(revenue)$
2. Format: Currency (\$) với K/M suffixes
3. Trend arrow: So với previous period

KPI Card 4: Average Order Value

1. Value: $sum(revenue)/sum(conversions)$
2. Format: Currency (\$)

3.3: Create Segment Distribution Pie Chart

1. Add visual → "Pie chart"
2. Group by: rfm_segment
3. Value: $distinctCount(customer_id)$
4. Show percentages và data labels

3.4: Create Revenue by Segment Bar Chart

1. Add visual → "**Vertical bar chart**"
2. X-axis: rfm_segment
3. Value: sum(revenue)
4. Sort: Descending by revenue
5. Apply same color scheme như pie chart
6. Format Y-axis: Currency với K/M notation

3.5: Build Conversion Funnel Visualization

1. Add visual → "**Horizontal bar chart**"
2. Y-axis: Funnel stages ["Impressions", "Clicks", "Add to Cart", "Purchase"]
3. Value: Calculated field cho từng stage
4. Color by: rfm_segment
5. Stack bars để compare segments

Conversion Funnel Calculated Fields: Impressions_Rate = 100 (base 100%)
 Clicks_Rate = sum(clicks)/sum(impressions)*100 AddToCart_Rate =
 $\text{sum(add_to_carts)}/\text{sum(impressions)}*100$ Purchase_Rate =
 $\text{sum(conversions)}/\text{sum(impressions)}*100$

Insight: Funnel chart cho thấy drop-off rates ở mỗi stage, giúp identify bottlenecks trong customer journey

4.1: Create Performance Comparison Table

1. Switch sang Sheet 2: "Segment Performance"
2. Add visual → "**Table**"
3. Rows: rfm_segment
4. Values (columns):
 - Customer Count: distinctCount(customer_id)
 - Response Rate: sum(clicks)/sum(impressions)*100
 - CTR: sum(clicks)/sum(impressions)*100
 - Conversion Rate: sum(conversions)/sum(impressions)*100
 - Revenue/Customer: sum(revenue)/distinctCount(customer_id)
 - AOV: sum(revenue)/sum(conversions)
 - Churn Risk: avg(churn_risk_score)
5. Apply conditional formatting:
 - Green cho high performance metrics
 - Red cho low performance metrics

4.2: Build Performance Trends Line Chart

1. Add visual → "**Line chart**"
2. X-axis: campaign_date (by week)
3. Value: conversion_rate
4. Color: rfm_segment
5. Show trend lines để identify patterns
6. Add reference lines cho average performance

Insight: Line chart giúp identify seasonal trends và performance changes theo thời gian cho từng segment

4.3: Create Engagement Heatmap

1. Add visual → "**Heat map**"
2. Rows: channel (Email, Mobile, Website)
3. Columns: rfm_segment
4. Values: avg(engagement_score)
5. Color scale: Gradient từ gray (low) đến red (high)

Engagement Score Calculation: (clicks/impressions * 0.3) + (conversions/clicks * 0.4) + (revenue/conversions * 0.3)

5.1: Top 10 Product Recommendations Chart

1. Switch sang Sheet 3: "Next Best Offers"
2. Import product recommendations data từ LAB Part 1
3. Add visual → "**Horizontal bar chart**"
4. Y-axis: product_name (top 10)
5. Value: recommendation_score hoặc conversion_rate
6. Sort: Descending
7. Color by: product_category

5.2: Accuracy vs Conversion Scatter Plot

1. Add visual → "**Scatter plot**"
2. X-axis: recommendation_accuracy (0-100%)
3. Y-axis: conversion_rate (0-100%)
4. Size: total_revenue
5. Color: product_category
6. Add trend line để show correlation

Business Insight: Scatter plot cho thấy relationship giữa accuracy của AI recommendations và actual conversion rates

5.3: Recommendations by Segment Table

1. Add visual → "**Table**"
2. Rows: product_name
3. Columns:
 - Target Segment
 - Recommendation Score
 - Conversion Rate
 - Revenue Generated
 - AI Confidence
4. Sort by conversion rate descending
5. Add conditional formatting cho high-performing recommendations

6.1: Sentiment Distribution Stacked Bar

1. Switch sang Sheet 4: "Customer Feedback"
2. Import customer feedback data với sentiment scores
3. Add visual → "**Stacked bar chart**"
4. X-axis: rfm_segment
5. Value: count(feedback_id)
6. Color (Stack): sentiment (Positive, Neutral, Negative)
7. Show as percentage stacked

6.2: Sentiment Trends Over Time

1. Add visual → "**Line chart**"
2. X-axis: feedback_date (by week/month)
3. Value: avg(sentiment_score)
4. Color: sentiment_category
5. Y-axis range: -1 to 1 (negative to positive)
6. Add reference line tại y=0 (neutral)

6.3: Common Themes Visualization (Word Cloud Alternative)

1. Tạo calculated field để extract top keywords
2. Add visual → "**Tree map**"
3. Group by: feedback_theme
4. Size: frequency_count
5. Color: sentiment_impact

6.4: Negative Feedback Patterns Table

1. Filter data cho sentiment = "Negative"
2. Add visual → "**Table**"
3. Rows: issue_category
4. Columns:
 - o Most Affected Segment
 - o Frequency (%)
 - o Avg Impact Score
 - o Resolution Time
5. Sort by frequency descending

Insight: Table này giúp identify pain points cần ưu tiên để improve customer experience

7: Publish Dashboard

1. Review tất cả visuals và ensure they work correctly
2. Add descriptions và tooltips cho clarity
3. Click "**Publish dashboard**"
4. Đặt tên: "**Customer Segmentation Analytics - Production**"
5. Add dashboard description và tags
6. Test published dashboard với different user roles

Key Insights Section

Cách phân tích từng Dashboard Page

Page 1: Overview & Executive Summary

- **KPI Cards:** Monitor overall health - growth in customers, conversion rates
- **Segment Distribution:** Understand customer portfolio composition
- **Revenue by Segment:** Identify which segments drive most revenue
- **Conversion Funnel:** Spot drop-off points in customer journey

Page 2: Segment Performance Analysis

- **Performance Table:** Compare metrics across segments để prioritize efforts
- **Trends Chart:** Identify seasonal patterns và campaign effectiveness over time
- **Engagement Heatmap:** Find best channel-segment combinations

Page 3: Next Best Offer Performance

- **Top Products:** Focus marketing budget on high-converting products
- **Accuracy vs Conversion:** Validate AI recommendation quality
- **Category Distribution:** Understand product preferences by segment

Business Insights to Look For

- **High-value segment trends:** Are they growing or declining?
- **Channel effectiveness:** Which channels work best for each segment?
- **Product recommendation accuracy:** Is AI delivering relevant suggestions?
- **Sentiment patterns:** Are there systematic issues affecting customer satisfaction?

Actionable Recommendations

1. **Segment Prioritization:** Allocate budget based on ROI per segment
2. **Channel Optimization:** Shift spend to high-performing channel-segment combinations
3. **Product Strategy:** Promote AI-recommended products với high conversion rates
4. **Customer Retention:** Proactive outreach to high-churn-risk customers
5. **Campaign Timing:** Use trends data để optimize send times

Workshop Support

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