

Comparative Marketing Analysis for FoodCorp

Section 1: The KPIs

1.1 Growth Rate

KPI Description: Total sales per month per store and monthly year-on-year growth rate
KPI formula: Sum total sales per month per store. Compare year-on-year
Steps to realize KPI: 1)SQL query --total sales per month: select store_code, DATE_TRUNC('month',purchased_at) AS mth, sum(value) as total_sales from cw.receipt_lines2 join cw.receipts using (receipt_id) group by 1,2 --year-on-year increase with total_sales_mth as (select store_code, DATE_TRUNC('month',purchased_at) AS mth, sum(value) as total_sales from cw.receipt_lines2 join cw.receipts using (receipt_id) group by 1,2) select store_code, b.mth, a.total_sales, round(((b.total_sales-a.total_sales)/a.total_sales),4) as growth_rate_yearly from total_sales_mth a join total_sales_mth b using (store_code) where extract(year from a.mth)=extract(year from b.mth)-1 AND extract(month from a.mth)=extract(month from b.mth); 2) Visualized via Tableau as graph titled "total sales", "monthly year-on-year growth" and "total sales percentage". See the Tableau file
Additional Notes: None

1.2.1 Engagement: as new customers, existing customers and active customers

KPI Description: Active customers number per month per store. New customers and existing customers number and percentage per month per store.
KPI formula: Identify first purchased month for all customer. Group by first purchased month per store and count as new customer. Count distinct customer id from receipts per month as active customer.
Steps to realize KPI: 1)SQL Query: with new_customer_mth as

```

(select store_code,to_char(first_month,'YYYY-MM') as mth,
count(*) as new_customers
from (select store_code,customer_id,
      Date_trunc('month',min(purchased_at)) as first_month
      from cw.receipts
      group by store_code,customer_id)x
group by 1,first_month
order by 1,2),
active_customer as
(SELECT store_code,
      TO_CHAR(DATE_TRUNC('month',purchased_at),'YYYY-MM') AS mth,
      COUNT( DISTINCT customer_id ) AS active_customers
FROM cw.receipts
GROUP BY 1, DATE_TRUNC('month',purchased_at)
ORDER BY 1,2)
select a.store_code, a.mth, new_customers,
(active_customers-new_customers) as existing_customers,active_customers,
round(new_customers/active_customers::NUMERIC,4) as new_customers_pct
from new_customer_mth a join active_customer b
on a.store_code=b.store_code
And a.mth=b.mth;

```

2) Visualized via Tableau as graph titled "engagement" and "engagement2" . See the Tableau file

Additional Notes: None

1.2.2 loyalty customers

KPI Description (in words): number and percentage of loyalty customers defined as purchasing four times a week per store.

KPI formula: count receipts per customer per year per store. Count how many customers having count more than 48 per store per year.

Steps to realize KPI:

1)SQL Query:

```

with loyalty_customer as(
select store_code, count(distinct customer_id) as loyalty_customers from
      (select store_code, DATE_TRUNC('year',purchased_at) as mth,
      customer_id, count(receipt_id) as frequency
from cw.receipts group by 1,2,3
having count(receipt_id)>=48.0) x
group by 1),
total_customers as (
select store_code,count(distinct customer_id)as total_customers
from cw.receipts

```

group by 1)
 select store_code, loyalty_customers, total_customers
 from loyalty_customer join total_customers
 using (store_code)

2) Visualized via Tableau as graph titled "loyalty" . See the Tableau file

Additional Notes: None

1.3 Retention rate/churn rate

KPI Description : retention rate to measure engagement over time per store

KPI formula:Assign customers to cohort per store. Count the number of customer's active each in each subsequent period (monthly) per store. Convert counts to percents. Count the churn rate.

Steps to realize KPI:

1)SQL Query

--1) assign customers to cohorts

Create table cw.cohort_analysis as

with cohort_assignment as (

SELECT store_code,customer_id,
 DATE_TRUNC('month', MIN(purchased_at))::DATE as cohort_date
 FROM cw.receipts

GROUP BY 1,2),

--2)Count the number of customer's active each in each subsequent period

cohort_mth_cts as (

select receipts.store_code,cohort_date,extract('month' from age(purchased_at,cohort_date))+
 12*extract('year' from age(purchased_at,cohort_date))as relative_period,
 count(distinct customer_id) as active_ct

from cw.receipts left join cohort_assignment using (customer_id)

where receipts.store_code=cohort_assignment.store_code

group by 1,2,3),

--3)convert the counts to percents

cohort_totals as (

select store_code,cohort_date,count(distinct customer_id) as cohort_total
 from cohort_assignment

group by 1,2),

--4)count the number of users per cohort add column to table

cohort_mth_percent as(

select

cohort_mth_cts.store_code,cohort_mth_cts.cohort_date,relative_period,active_ct::NUMERIC/
 cohort_total

as active_percent from cohort_mth_cts join cohort_totals

using (store_code)

where cohort_mth_cts.cohort_date=cohort_totals.cohort_date)

```

select store_code, cohort_date as cohort_date, relative_period::TEXT as period,
round(active_percent,4) as retention_rate
,round((1-active_percent),4)::NUMERIC as churn_rate
from cohort_mth_percent
union all
select store_code,cohort_date as cohort_date,'total'::TEXT as period,
cohort_total as retention_rate,
0::NUMERIC as churn_rate
from cohort_totals
order by store_code,cohort_date,period;

```

2) Visualized via Tableau as graph titled "retention" . See the Tableau file

Additional Notes: Churn rate is 1-retention rate

1.4 Customer lifetime value

KPI Description:customer lifetime value per store

KPI formula: calculate average purchase value, calculate average purchase frequency rate, calculate customer lifetime span, times average purchase value with frequency rate and lifetime span

Steps to realize KPI:

1)SQL Query:

--Calculate average purchase value:

```

with average_purchase as (
select store_code,round(sum(value)/count(distinct receipt_id),4) as avg_purchase
from cw.receipts join cw.receipt_lines2 using (receipt_id)
group by store_code),

```

--Calculate average purchase frequency rate:

```

frequency_rate as (
select store_code,count(distinct receipt_id)/count(distinct customer_id)
as frequency_rate from cw.receipts join cw.receipt_lines2
using(receipt_id)
group by store_code),

```

--calculate customer churn rate

```

lifetime_span as(
select store_code, round(1.0/(sum(churn_rate)/count(*)),4) as lifetime_span
from cw.cohort_analysis
where churn_rate!=0
group by store_code)

```

```

select store_code, avg_purchase, frequency_rate,
(avg_purchase*frequency_rate) as customer_value, lifetime_span,
round(((avg_purchase*frequency_rate)*lifetime_span),2) as customer_lifetime_value
from average_purchase join frequency_rate using (store_code)
join lifetime_span using (store_code);

```

2) Visualized via Tableau as graph titled "Customer Lifetime Value" . See the Tableau file

Additional Notes:None

1.5 Department performance

KPI Description (in words):department performance (revenue as a proportion of sales) with total department contribution as benchmark

KPI formula: calculate average department performance, gross revenue per store, department revenue per store, merge store revenue and percentage together

Steps to realize KPI:

1)SQL Query
with benchmark as (
select department_name,sum(value) as gross_departrevenue,
round((sum(value)/2744085.00)::NUMERIC,4) as departcontribution
from cw.receipt_lines2
join cw.products2 using (product_code)
group by 1 order by 3 DESC),
--cacalute gross revenue per store
store_revenue as(
select store_code,sum(value) as store_gross_revenue
from cw.receipt_lines2
join cw.receipts using (receipt_id)
group by store_code),
--caculate department revenue per store
store_department_revenue as(
select store_code,department_name,sum(value) as store_gross_departrevenue
from cw.receipt_lines2
join cw.products2 using (product_code)
join cw.receipts using (receipt_id)
group by 1,2 order by 1,3 DESC),
--merge store revenue and percentage together
ab as (
select store_code,department_name,store_gross_departrevenue,
round((store_gross_departrevenue/store_gross_revenue),4) as storedepart_contribution
from store_revenue join store_department_revenue
using (store_code)
order by 1,4 DESC)
select store_code,department_name,store_gross_departrevenue,
storedepart_contribution,departcontribution
from ab join benchmark using(department_name)
order by 1,4 DESC;
2) Visualized via Tableau as graph titled "department performance" . See the Tableau file

Section 2: Executive Summary

As a medium sized company operating 4 stores in Birmingham, Nottingham and London for two years, it plans to increase marketing spending in one of the 4 stores. Based on the comparative analysis in section 3, Birmingham is recommended as a site can derive the highest return on investment. The key argument is at its highest customer lifetime value which is £53.9 higher than the second one: London 1. As Birmingham performs well in retaining repeat customers showing a higher retention rate and loyalty customer rate. In addition, suggesting by the by total sales contribution which Birmingham ranks as first. Effective marketing spending increase can drive a higher sales contribution overall. As recommendations, increased marketing spending should be concentrated on driving new customers and improve the performance on 'beverage' and 'paypoint'. In addition, in making new year marketing planning, more focus should be put on improving active customer rate and the department under performed for each store respectively. Beyond recommendations in marketing planning, the database should be carefully redesign to avoid missing value and duplicated records by setting more constraints especially referring the demographic data which is valuable in segmentation and uncover consumer behaviour.

Section 3: Comparative analysis

General performance

(Figures : tableau: 'total sales' , 'monthly year-on-year growth' and 'total sales percentage' worksheet)

Birmingham has the largest sales scale followed by stores in London 1, London 2 and Nottingham. To compare their growth, monthly year-on-year growth shows an increasing trend in London 2 while others demonstrate a decreasing trend. Comparing performance in November 2018 with November 2017, London 2 shows a positive 13.8% followed by -9.96%, -14.34% and -15.81% from London 1, Birmingham and Nottingham respectively. Although London 1 and Birmingham have a negative growth rate. Their contributions to total sales are higher. Around 75% total revenue comes from Birmingham followed by around 20% from London 1, 3% from London 2 and 1.5% from Birmingham.

Engagement, loyalty and retention

(Figures: tableau: 'engagement', 'engagement 2' and 'loyalty')

After analysing the general performance, the active customer component is assessed since existing customer normally drives more value and to obtain new customers implementing costs.

Capable to retain existing customers can lead to a high return on investment which indicating an effective marketing spending. Hence existing customer percentage in active customers monthly, loyalty rate and retention rate are accessed. All stores display a decreasing tendency in active customers through comparing monthly active customers with the their active customers in the third month(since the first two months data are unstable). London 2 presents -5.33% in latest performance with its third month performance followed by -10.20%, -10.32% and -10.76% in Birmingham, Nottingham and London 1 respectively result from their incapability in driving new customers. However, the existing customer active rate is positive in three stores. To exclude the influence of opening time, November 2017 is used as a reference point. Except the decrease of existing customers number in london 2, Other three stores well perform in maintaining existing customers. As the different scales of 4 stores, the percentage of new customers and existing customers is measured. Birmingham and london have higher existing customers active rate which is around 95%.

Referring to loyalty, Birmingham and London 1 rank as the top two which have 518 and 191 loyal customers respectively while London 1 has 11.58% loyalty customers among all customers, presenting 0.82% excess than Birmingham. In addition to monthly performance, the cohort analysis is also utilised to consider the retention rate over time. In the heat map, a darker color suggests a higher retention rate, the heat map for the retention rate in Birmingham display dark color in general which suggests it performs well in keeping with existing customers.

Customer lifetime value

(Figure: Tableau: 'customer life value')

In order to decide increasing marketing expense in one of the four stores, how much value can be obtained from one customer is important. Previous analysis indicates that Birmingham performs well in driving return customers which could suggest an average higher customer lifetime value. Hence, customer lifetime value is calculated as the product of average purchasing value from one transaction, purchasing frequency and lifetime span ($1/(1-\text{retention rate})$). The assumption is that increase in marketing spending will drive the same volume of customers. Birmingham and London 1 display as top 2 average transaction values as £16.085 and £12.008 respectively. In addition, they also indicate higher purchasing rate and lifetime span. Hence, Birmingham and london 1 have an average customer value £402.1 and £348.2 respectively. The customer lifetime value is a significant index in deciding which store to invest

as increasing marketing spending obtains the same amount customers higher CLV means a higher ROI.

Department performance

(Figure: tableau: 'department performance')

Above analysis provides a macro view assessing store performances. Department performance provides a detailed department contribution to sales per store. With 4 stores average as a benchmark, Nottingham perform well in 'provisions dairy', paypoint, bakery and frozen while under average in cigarettes & tobacco, beverages, grocery 1 and grocery 2. London 2 in fruit and vegetables and grocery. Although London 1 underperforms in provisional dairy, fruit & vegetables and grocery 1,2,3, cigarettes and tobacco, beverages and paypoint are 1.19%, 1.03%, 1.12% over average. All departments in Birmingham perform nearly average as it has the largest sales.

Recommendations

Based on all analysis, Birmingham is recommended as the selected store to increase marketing spending as its capability in previously analysed KPIs. Although Birmingham performs well in most departments. The increased marketing spending can be utilised to further improve its performance in 'beverage' and 'paypoint' as they display 0.34% and 0.59% below the average. Another suggestion is to invest more expense in driving new customers for Birmingham. As the excellent performance in keeping existing customer, there is still a decline in monthly active customers as a result of drop in new customers attraction. As the high conversion rate from new customers to existing customers, spending on driving new customers contributes to sales and customer loyalty incrementally.

As the entire analysis is based on data provided, there are some limitations in driving insights. Demographic data play a significant importance in evaluating consumer behaviour in finding segmentation, targeting and positioning. However, there are 85.96% of customer records containing missing values. Hence the analysis focuses more on sales data without segmenting customers with limited analysis on consumer patterns. For future improvement, the database should be adjusted by setting more constraints to avoid missing value, duplicate records by entry.