

Section 1: The KPIs

Data Cleaning:

SQL Queries:

1. CREATE VIEW CUST_DB AS
SELECT * FROM CW.CUSTOMERS WHERE
CW.CUSTOMERS.DOB::DATE IS NOT NULL AND
CW.CUSTOMERS.FIRST IS NOT NULL
2. CREATE VIEW RECEIPT_LINES_DB AS
SELECT * FROM CW.RECEIPT_LINES WHERE
CW.RECEIPT_LINES.VALUE != 9999999 order by
CW.RECEIPT_LINES.VALUE desc
3. CREATE VIEW PRODUCTS_DB AS
SELECT * FROM CW.PRODUCTS WHERE
CW.PRODUCTS.CATEGORY_CODE>0

Information:

1. This is to create a separate view for customers with valid date of birth and first name credentials.
2. This is a view created by eliminating all rows with an infeasibly high receipt value as observed during data exploration.
3. This view includes products with only a positive category code.

KPI description (in words): Sales per store per month relative to store size

KPI formula:

1. Count(Unique customers) per store
2. Sum(value) per month per store
3. Monthly sales relative to store size for store

Steps to realize KPI:

1. Create a view to account for store size.

```
CREATE VIEW STORE_SIZE AS  
(SELECT CW.RECEIPTS.STORE_CODE AS STORE_CODE,  
COUNT(DISTINCT CW.RECEIPTS.CUSTOMER_ID) AS COUNT  
FROM CW.RECEIPTS  
JOIN RECEIPT_LINES_DB USING (RECEIPT_ID)  
GROUP BY 1  
ORDER BY 1)
```

2. Create a view for monthly sales per store.

```
CREATE VIEW MONTHLY_SALES AS  
(SELECT CW.RECEIPTS.STORE_CODE AS STORE_CODE,  
TO_CHAR(DATE_TRUNC('MONTH',CW.RECEIPTS.PURCHASED_AT),'YYYY-MM') AS MONTH,
```

```
SUM(RECEIPT_LINES_DB.VALUE) AS SALE
FROM CW.RECEIPTS
JOIN RECEIPT_LINES_DB USING (RECEIPT_ID)
GROUP BY 1,2
ORDER BY 2,1)
```

3. Join both views to display monthly sales relative to store size.

```
CREATE VIEW MONTHLY_SALES_RELATIVE AS
(SELECT MONTHLY_SALES.STORE_CODE AS STORE_CODE,
MONTHLY_SALES.MONTH AS MONTH,
ROUND(MONTHLY_SALES.SALE/STORE_SIZE.COUNT,2) AS
RELATIVE_SALE
FROM MONTHLY_SALES JOIN STORE_SIZE
ON MONTHLY_SALES.STORE_CODE=STORE_SIZE.STORE_CODE
ORDER BY 2,1)
```

4. Tableau visualizations attached in file Coursework_Workbook (Worksheet titled Monthly Sales) and file Coursework_Workbook2 (Worksheets titled Store Size and Relative Monthly Sales).

Additional Notes:

Store size is recorded in the view STORE_SIZE. Store size in this case is defined as the number of distinct customers at the store over the entire time period.

KPI description (in words): Active customers per month per store

KPI formula: Count(unique customer) per month per store

Steps to realize KPI:

1. Create a view to count number of active customers

```
CREATE VIEW ACTIVE_COUNT AS
(SELECT
TO_CHAR(DATE_TRUNC('MONTH',CW.RECEIPTS.PURCHASED_AT)::DATE,'Y
YYY-MM') AS MONTH,
CW.RECEIPTS.STORE_CODE AS STORE_CODE,
COUNT(DISTINCT CW.RECEIPTS.CUSTOMER_ID) AS ACTIVE_COUNT
FROM CW.RECEIPTS
GROUP BY 1,2
ORDER BY 1,2)
```

2. Tableau visualization attached in file Coursework_Workbook (Worksheet titled Active Customer Count).

Additional Notes: None

KPI description (in words): Average sales per active customer per month per store

KPI formula: Sum(value)/count(distinct customers) per month per store

Steps to realize KPI:

1. Create a view to record the monthly average sales per customer

per store.

```
CREATE VIEW AVG_CUST_VAL AS
(SELECT CW.RECEIPTS.STORE_CODE AS STORE_CODE,
TO_CHAR(DATE_TRUNC('MONTH',CW.RECEIPTS.PURCHASED_AT),'Y
YYY-MM') AS MONTH,
ROUND(SUM(RECEIPT_LINES_DB.VALUE)/COUNT(DISTINCT
CW.RECEIPTS.CUSTOMER_ID),2)
FROM CW.RECEIPTS JOIN RECEIPT_LINES_DB USING (RECEIPT_ID)
GROUP BY 1,2
ORDER BY 2,1)
```

2. Tableau visualization attached in file Coursework_Workbook (Worksheet titled Average Customer Spend).

Additional Notes:

The count of distinct customer ids accounts for all the unique active customers for the month be it repeating or non-repeating.

KPI description (in words): New customers per month per store

KPI formula:

1. Store_code, customer_id, date of first purchase
2. Count(customers) per month per store

Steps to realize KPI:

1. Create a view to record customers and their first purchase date for each store

```
CREATE VIEW FIRST_PURCHASE AS
(SELECT CW.RECEIPTS.STORE_CODE AS STORE_CODE,
CW.RECEIPTS.CUSTOMER_ID AS CUST_ID,
DATE_TRUNC('MONTH',MIN(CW.RECEIPTS.PURCHASED_AT))::DATE
AS FIRST_PURCHASE
FROM CW.RECEIPTS
JOIN RECEIPT_LINES_DB USING (RECEIPT_ID)
GROUP BY 1,2
ORDER BY 3,1,2)
```

2. Create a view to count of new customers for each month per store

```
CREATE VIEW NEW_CUST_COUNT AS
(SELECT FIRST_PURCHASE.STORE_CODE AS STORE_CODE,
TO_CHAR(DATE_TRUNC('MONTH',FIRST_PURCHASE.FIRST_PURCHA
SE),'YYYY-MM') AS MONTH,
COUNT(FIRST_PURCHASE.CUST_ID) AS NEW_CUST_COUNT
FROM FIRST_PURCHASE
GROUP BY 1,2
ORDER BY 2,1)
```

3. Tableau visualization attached in file Coursework_Workbook (Worksheet titled New Customer Count).

Additional Notes: None

KPI description (in words): Customer retention rate per store
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KPI formula:

1. Count(Unique customers) for each period (defined, as month) relative to first purchase per store.
2. Count(Total customers) for each cohort(defined, as first purchase date) per store.
3. Calculate percentage of returning customers during each relative period for each cohort per store.
4. Count number of customers per cohort. Add 'Total' column to cohort.

Steps to realize KPI:

1. Create a view for the count of returning customers in a period to their first purchase per store

```
CREATE VIEW COHORT_COUNT AS
(SELECT FIRST_PURCHASE.STORE_CODE AS STORE_CODE,
DATE_TRUNC('MONTH',FIRST_PURCHASE.FIRST_PURCHASE) AS
MONTH, EXTRACT(YEAR FROM
AGE(CW.RECEIPTS.PURCHASED_AT,FIRST_PURCHASE.FIRST_PURCH
ASE))*12+
EXTRACT(MONTH FROM
AGE(CW.RECEIPTS.PURCHASED_AT,FIRST_PURCHASE.FIRST_PURCH
ASE)) AS REL_PERIOD,
COUNT(DISTINCT FIRST_PURCHASE.CUST_ID) AS ACTIVE_COUNT
FROM FIRST_PURCHASE JOIN CW.RECEIPTS
ON FIRST_PURCHASE.CUST_ID = CW.RECEIPTS.CUSTOMER_ID
AND FIRST_PURCHASE.STORE_CODE = CW.RECEIPTS.STORE_CODE
WHERE
CW.RECEIPTS.PURCHASED_AT >= FIRST_PURCHASE.FIRST_PURCHAS
E
GROUP BY 1,2,3
ORDER BY 2,1,3)
```

2. Create a view to count the total number of customers for each cohort

```
CREATE VIEW COHORT_CUST_TOTALS AS
(SELECT FIRST_PURCHASE.STORE_CODE AS STORE_CODE,
FIRST_PURCHASE.FIRST_PURCHASE AS MTH,
COUNT(DISTINCT FIRST_PURCHASE.CUST_ID) AS TOTAL
FROM FIRST_PURCHASE
GROUP BY 1,2
ORDER BY 1,2)
```

3. Create a view to calculate the percentage of returning customers for each cohort

```
CREATE VIEW COHORT_PERCENT AS
(SELECT COHORT_COUNT.STORE_CODE AS STORE_CODE,
COHORT_COUNT.MONTH::DATE AS MTH,
COHORT_COUNT.REL_PERIOD AS RELATIVE_PERIOD,
ROUND(COHORT_COUNT.ACTIVE_COUNT::NUMERIC/COHORT_CUST
_TOTALS.TOTAL,2) AS ACTIVE_PERCENT
FROM COHORT_COUNT JOIN
COHORT_CUST_TOTALS ON
COHORT_COUNT.MONTH=COHORT_CUST_TOTALS.MTH
WHERE
COHORT_COUNT.STORE_CODE=COHORT_CUST_TOTALS.STORE_CO
DE
ORDER BY 1,2,3)
```

4. Create a complete cohort analysis view

```
CREATE VIEW STORE_COHORT_ANALYSIS AS
(SELECT COHORT_PERCENT.STORE_CODE AS STORE_CODE,
TO_CHAR(COHORT_PERCENT.MTH,'YYYY-MM') AS COHORT_DATE,
COHORT_PERCENT.RELATIVE_PERIOD::TEXT AS RELATIVE_PERIOD,
COHORT_PERCENT.ACTIVE_PERCENT AS VAL
FROM COHORT_PERCENT
UNION ALL
SELECT COHORT_CUST_TOTALS.STORE_CODE AS STORE_CODE,
TO_CHAR(COHORT_CUST_TOTALS.MTH,'YYYY-MM') AS
COHORT_DATE,
'TOTAL'::TEXT AS RELATIVE_PERIOD,
COHORT_CUST_TOTALS.TOTAL AS VAL
FROM COHORT_CUST_TOTALS)
```

5. Tableau visualization attached in file Coursework_Workbook2 (Worksheet titled Customer Retention Rate).

Additional Notes:

1. A cohort is defined as the first purchase date per store
2. Relative periods are calculated on a monthly basis for each store.

KPI description (in words): Average frequency of transactions of a customer per month per store

KPI formula:

1. Customer, Count(Unique receipt_id) per month per store
2. Store, Sum(Unique receipt_id)/Count(customers) per month per store

Steps to realize KPI:

1. Create a view to record frequency of transactions of each customer per month per store

```
CREATE VIEW TXN_FREQ AS
(SELECT
```

```

TO_CHAR(DATE_TRUNC('MONTH',CW.RECEIPTS.PURCHASED_AT)::DATE,'YYYY-MM') AS MONTH,
CW.RECEIPTS.STORE_CODE AS STORE_CODE,
CW.RECEIPTS.CUSTOMER_ID,
COUNT(DISTINCT CW.RECEIPTS.RECEIPT_ID) AS TXN_COUNT
FROM CW.RECEIPTS
GROUP BY 1,2,3
ORDER BY 1,2)

```

2. Create a view to record the average number of transactions per customer per month per store

```

CREATE VIEW AVG_TXN_FREQ AS
(SELECT TXN_FREQ.MONTH AS MONTH,
TXN_FREQ.STORE_CODE AS STORE_CODE,
ROUND(SUM(TXN_FREQ.TXN_COUNT)/COUNT(TXN_FREQ.CUSTOMER_ID),2) AS AVG_FREQ
FROM TXN_FREQ
GROUP BY 1,2
ORDER BY 1,2)

```

3. Tableau visualization attached in file Coursework_Workbook (Worksheet titled Average Transaction Frequency).

Additional Notes:

Section 2: Executive Summary

The report below, provides a comparative analysis and evaluation of the current performance in terms of growth, engagement and retention across the stores of FoodCorp in Nottingham, Birmingham and London using relevant evaluation metrics. The purpose is to identify a store based on performance for future marketing investments. The key performance indicators used for assessment are monthly revenue generation, average customer spend trend, active customer count, average monthly repeat rate, customer acquisition and retention. The results of the data analyzed show that relative to store size, the store in Nottingham outperforms all other stores in terms of profitability and engagement. On the other hand, despite a considerable store size, store 3 (London) is the weakest performer. All trends and statistics are visualized and are attached in the tableau files for perusal.

The report finds the prospects of store 1 (Birmingham) in its current position most promising in terms of high monthly repeat rate and high average customer spend value. Currently, it is a store which generates a decent revenue. However, the low customer acquisition and retention rates limit the generated revenue from being higher. These two aspects of customer engagement require remedial action by investing in marketing and distributional tactics.

The recommendations discussed include:

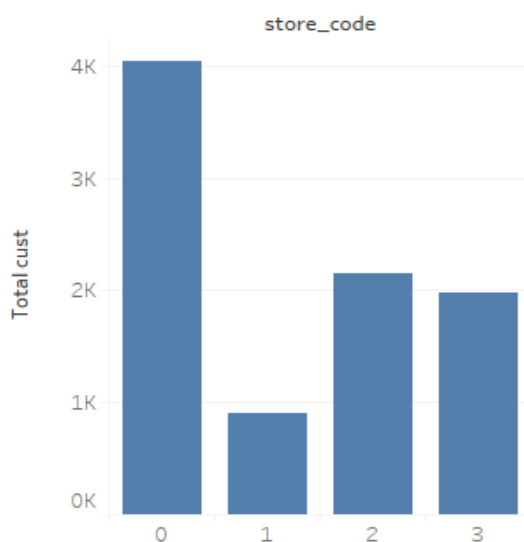
- 1) FoodCorp should focus its marketing spend on the store in Birmingham so as to increase customer acquisition and retention rates and ultimately its revenue.
- 2) Introduce offers and loyalty discounts to customers so as to reduce the churn rate and improve satisfaction. This will result in increased consumer value.

The report also investigates the fact that the analysis conducted has a serious limitation. The fixed and variable costs associated with the stores are not taken into account. Revenue alone cannot be a measure of gross margin. More information regarding the associated costs is therefore required to make a more educated decision. Further, no information about the ongoing marketing scheme is presented to study its efficiency relative to product categories or customer segments.

Section 3: Comparative Analysis

FoodCorp is a medium sized retail chain operating in four stores across three cities. We have received a dataset comprising all transactional records and relevant customer metrics. In line with the company's interest of investing in a marketing scheme for one of the stores, the performance of each store has to be evaluated for subsequent comparison. To evaluate and compare between the performance of the stores, six key performance indicators (KPIs) were picked as evaluation metrics. The selection of the KPIs is based on the need to focus on performance in terms of growth, engagement and retention store-wise.

Store size is defined here as the total number of customers who have purchased at the store during the time period. Since, customers are the sole source of revenue, this is a helpful baseline to realize a store's potential in maximizing profitability.



We can observe that store 0 (Nottingham) corresponds to the highest number of unique customers (4041) served during the time period. Based in London, stores 2 and 3 have a similar customer base in terms of size (2148 and 1975, respectively). Lastly, store 1 (Birmingham) caters to the lowest number of customers (899). To summarize, all three regions are distinct with respect to the total number of customers they are catering to.

To study growth in terms of revenue from transactions, month-wise sales have been evaluated and compared across the stores. The revenue being generated from sales is a helpful financial metric to gain insights on the profitability of the stores over the given time period. This KPI is highly helpful in identifying growth trends for each store. From the visualization of this KPI, it can be observed that despite having the lowest store size, store 1 is performing better than store 3 which has double the store size and half the revenue with respect to store 1. This can be attributed to store 1 engaging its customers more effectively. Given the huge customer base of store 0 in Nottingham, the store is quite naturally gathering the highest revenue.

The count of active customers for each month is an indicator of growth and engagement. This as the second KPI, can help in developing a fair idea about the revenue potential of each store. The count of active customers is the sum total of the count of new customers and returning

customers count. With the visualization, one similar characteristic can be observed for all the stores: the variation in the number of active customers over the time period is minimal for stores 1, 2 and 3 in particular. Though not highly significant, the fluctuations in case of store 0 are noticeable. Despite the variations, store 0 manages to maintain the highest number of active customers over the entire time period (avg. 1300) followed by store 2 with an average of about 650.

The key to evaluating performance in terms of engagement is by understanding the significance of an active customer's contribution to the monthly revenue based on his average spend. The third KPI, therefore, calculates the monthly average revenue from a customer across the stores. This measure can be a deciding factor while trading off between the possibility of churn and investment aimed at improving retention. From the visualization, it is noticeable that in line with our previous observation, store 3 has the lowest average customer monthly spend trend over the period, hence generating significantly low revenue. While store 1 and 2 have similar trends, 2 being slightly better than 1, store 0 outperforms them both by a considerable margin (avg. of £6). For a store of considerable size, a high average customer spend is an indicator of good engagement and customer satisfaction.

Calculating the count of new customers acquired in the month for each store provides insights on how through customer acquisition, each store is expanding its business to increase revenue collection. This, as the fourth KPI, can help analyze a store's success in acquiring new customers. For the purpose of this analysis, the first month for each store has been excluded. The patterns though erratic, are distinct for each store. Store 0 shows the best customer acquisition trend. This is however only slightly better than the similar acquisition trends of the London based stores (stores 2 and 3). It can be observed most noticeably that of all stores, store 1 acquires the least number of new customers every month.

The fifth KPI of retention rate over the time period is an indicator of retention. Churning out of customers implies that customer satisfaction levels are low. A low retention rate signifies a large percentage of the customer base being unhappy which in turn explains low levels of loyalty. This is a useful metric to gauge store performance in terms of the customer service and loyalty it invokes. On studying the retention trends through the visualization of this KPI, it can be observed that all stores do a better job at retaining the first-time customers during the first three months. Store 0 shows the best retention rate over the periods relative to the cohort while store 3 shows the worst retention rate trend. Store 1 is similar to store 2 when it comes to retaining customers of the cohort. However, it has to be kept in mind, that store 2 has a wider customer base and a higher customer acquisition rate.

For our final analysis, determining the average repeat rate of customers i.e., the average frequency of monthly transactions of a customer per store can help to provide insights on the tendency of customers to return after their first purchase. This can be then employed to segregate them into categories of habitual and one-time customers. From the visualization, it can be seen that store 3 has the lowest average repeat rate over the months whereas store 1 has the highest frequency, closely followed by store 0. This in conjunction with our second and third KPIs, helps us understand how despite a relatively small active customer count, store 1 manages to collect a fair amount of revenue over the months.

From our analysis of all the KPIs implemented, we can conclude that store 0 in Nottingham is the best performing store be it in terms of growth, engagement or retention. Store 3, on the other hand, lies on the opposite end of the spectrum, performing relatively poorest based on all the evaluation metrics. Marketing spend will be effective with respect to improving customer acquisition and retention rates which in turn will boost the revenue from sales at the stores. The strategy therefore aims at improving customer engagement at a decently performing store which has a huge scope of improvement in its acquisition and retention rates. So, considering its high average customer spend value and high repeat rate, if the store at Birmingham (store 1) manages to acquire and retain more customers, its monthly revenue will improve most significantly.

The dataset provided has one extremely serious limitation. It does not take the fixed and variable costs associated with the stores into account. It is important to understand that revenue alone cannot be a measure of gross margin. More information regarding the associated costs is therefore required to make a more educated decision. Further, no information about the ongoing marketing scheme is presented to study its efficiency relative to product categories or customer segments.

Recommendations include:

- 1) Investing in the store in Birmingham so as to increase customer acquisition and retention rates through diverse marketing and distributional tactics.
- 2) Introducing offers and loyalty discounts to customers so as to reduce the churn rate and increase consumer value.