VISUALIZING WALMART SALES

THROUGH POWERBI

A CAPSTONE PROJECT

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BATCH – BADM-5

SUMMARY

The following analysis presents a look at Walmart's Sales Performance through various Key Performance Indicators (KPIs) and multiple data evaluations for the years spanning from 2011-2014.

The annual sales of Walmart's several superstores have a steady Revenue Stream of $725,000. However, investing in targeted marketing and promotional campaigns is recommended to further drive sales growth. By leveraging customer data, Walmart may have client groups to evolve in sales and marketing. Additionally, enhancing the sales team's performance through training and incentives can positively impact sales performance.

Cost control and management are very important for sustainable business success. With costs amounting to $617,000, it is suggested to focus on supply chain control, vendor relationships, and process efficiency. Streaming the supply chain, and eliminating process inefficiencies, operating in a sustainable mindset can help reduce operational costs and enhance overall cost-effectiveness.

The total profit achieved during this period was $108,000. To maximize profitability, optimizing cost structures, negotiations, identifying lagging areas, and implementing measures are appreciated. It could also ass pricing models to ensure optimal pricing levels and involve several updated selling techniques to increase profit margins.

SUMMARY

To increase the total quantity of goods sold which is currently 12,000 units, it is recommended to enhance product visibility through proper placement and effective signs. Customer-behavior-oriented marketing will help bring out old customers and also improve new customer sales.

In the future, Walmart should consider expanding new market segments, enhancing customer experience, planning e-commerce dominance, and diversifying revenue streams that can drive growth and profitability.

In Conclusion, Walmart can achieve growth through the recommended business solutions. As more and more customers focus on sustainability in their everyday life, it is highly recommended to turn the paths right to sustainability, reducing carbon footprints to get customer focus right away. The other major solutions provided above should be continuously monitored and the strategies should be adopted, to position Walmart for consistent success in the dynamic and ever-evolving retail industry.

INTRODUCTION

BACKGROUND AND REPORT PURPOSE

Background: Walmart, the world's largest retailer, collects massive volumes of sales data. This data must be analyzed to identify sales patterns, improve inventory management, and improve consumer insights. Power BI, a powerful data visualization tool, can efficiently visualize and analyze this data.

Report Purpose: The purpose of this report is to use Power BI to visualize Walmart's sales data to unearth important insights and make actionable suggestions. The research intends to promote data-driven decision-making, enhance sales tactics, improve inventory management, and improve overall company performance for Walmart by analyzing key performance indicators, or KPIs, such as sales, profit, inventory, and consumer behavior.

OBJECTIVES AND SCOPE

Objectives:

- Examine Walmart's sales data to learn more about sales performance, revenue, and profitability.
- Recognize trends, patterns, and correlations in data to help influence corporate strategy and decisions.
- To enhance customer happiness and loyalty, investigate consumer behavior, preferences, and demographics.
- Examine inventory management indicators to optimize stock levels and lower carrying costs.
- Examine store performance indicators to find areas for improvement and to increase operational efficiency.

Scope:

This project will utilize Power BI to visualize and analyze Walmart's sales data. Key performance metrics, consumer insights, inventory management, and retail performance are all covered in the report. The scope comprises data from a certain time, intending to provide actionable recommendations to improve Walmart's sales strategy, inventory management, and overall business performance.

METHODOLOGY

DATA COLLECTION

Step 1: Data for Walmart Sales was collected from the Internal Sources of Walmart file.

Step 2: This includes Sales records, Dates, Customer information, product quantity, Geographical data, and profit values.

DATA PREPARATION AND CLEANING

The Data preparation and cleaning were handled through ETL Methodology

Step 1: E – Extract Data – The Data is collected as a CSV file and converted as a table.

Step 2: C – Clean Data – The Data is checked for errors/ blank values/ improper variables and eliminated simultaneously.

Step 3: T- Transform Data – The data is evaluated and transformed regarding the data models that are required for further data analysis. Example: Segregating the data year-wise for a better understanding of yearly data compared to the total data.

Step 4: L- Load Data – The Transformed data is now loaded to Power Bi for visualization.

Step 5: A- Analyze Data – Big data analysis is processed with DAX measures, enabling gaining insights on various metrics.

DATA ANALYSIS TECHNIQUE

Through Power B, the sales data was analyzed using various techniques such as

Data Modeling

Visualization

Statistical analysis

# TOOLS AND TECHNOLOGIES USED IN POWER BI

DATA MODELING

- Created relationships for the Transformed data tables named Walmart, 2011 -CA (Customer Analysis), 2012-CA, 2013-CA, 2014-CA, and Store.

- The connecting variable for all four tables (2011-CA, 2012-CA, 2013-CA, 2014-CA) with WALMART was the CUSTOMER ID.

- The connecting variable for the table STORE with WALMART was the POSTAL CODE.

DATA VISUALIZATION

Data Visualization was Created as a total of 8 slides, to get insights on various metrics such as profitability, forecasting, and the 80/20 Rule i.e., 80 percent of the sales comes from 20 percent of the customers, Sales, and Revenue which highlights the store's sales and revenue over time, Customer Insights that talks about customer metrics, and customer behavior, and Store Performance which exhibits sales per sq. ft, employee productivity.

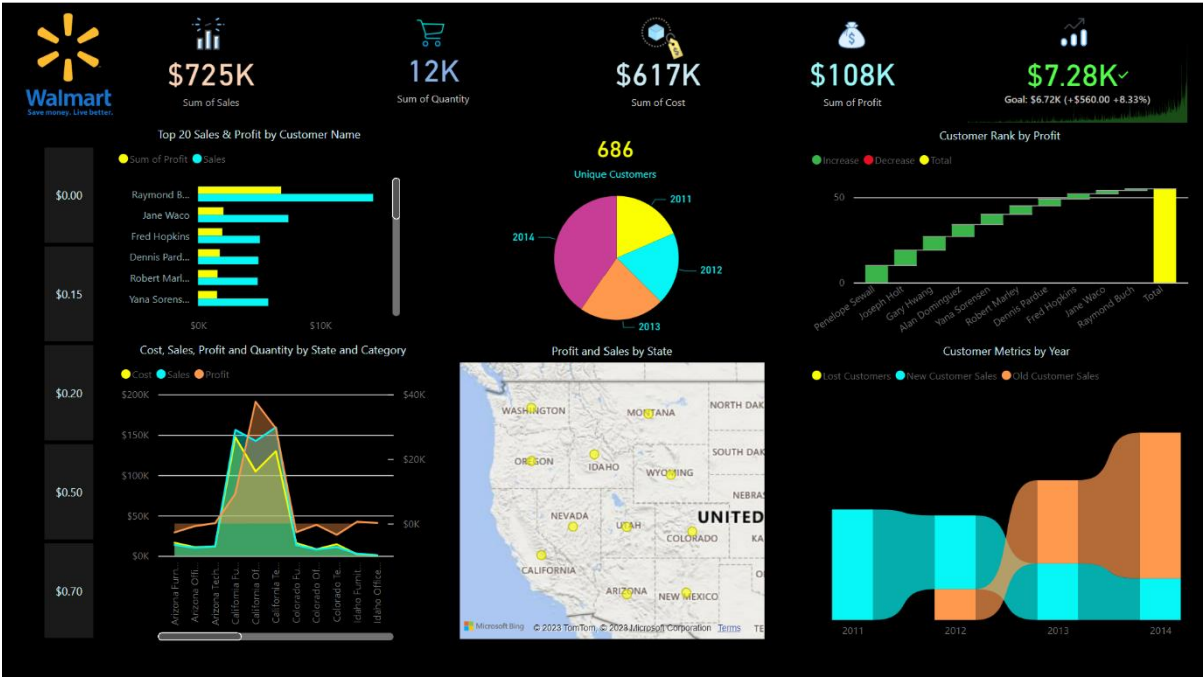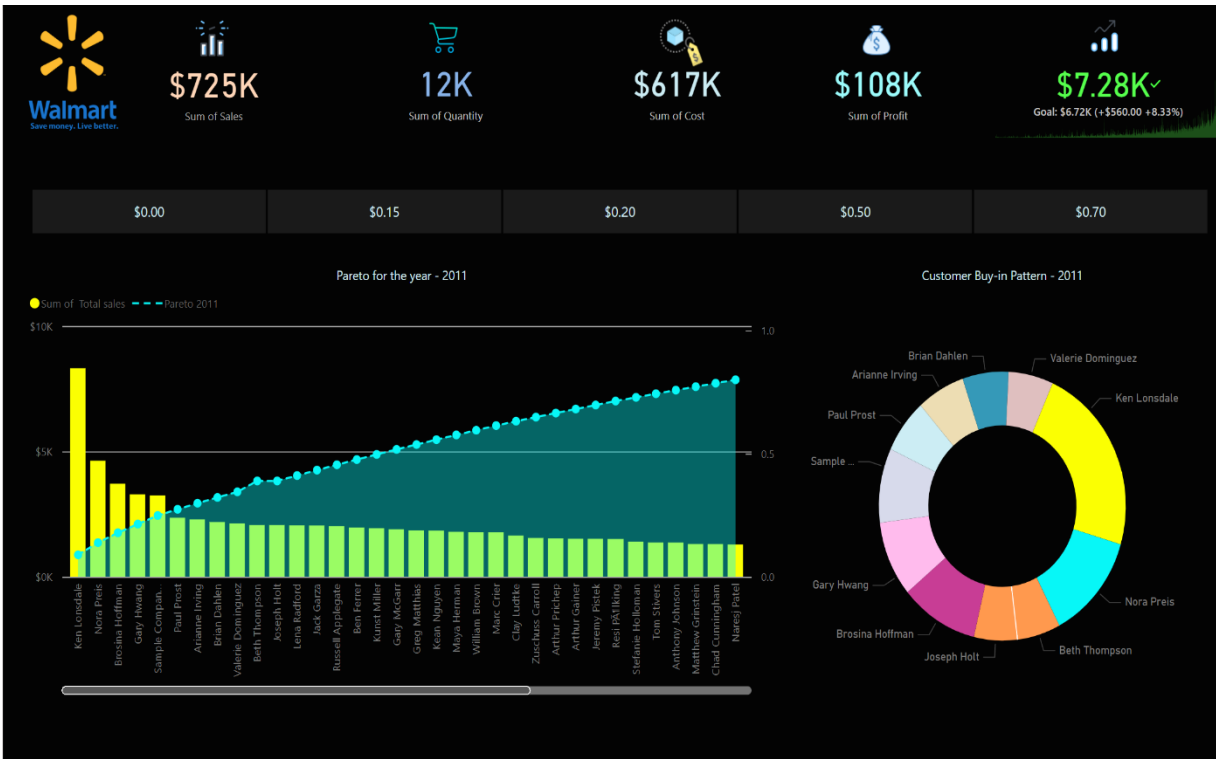Given below are the data visualized through Power Bi.
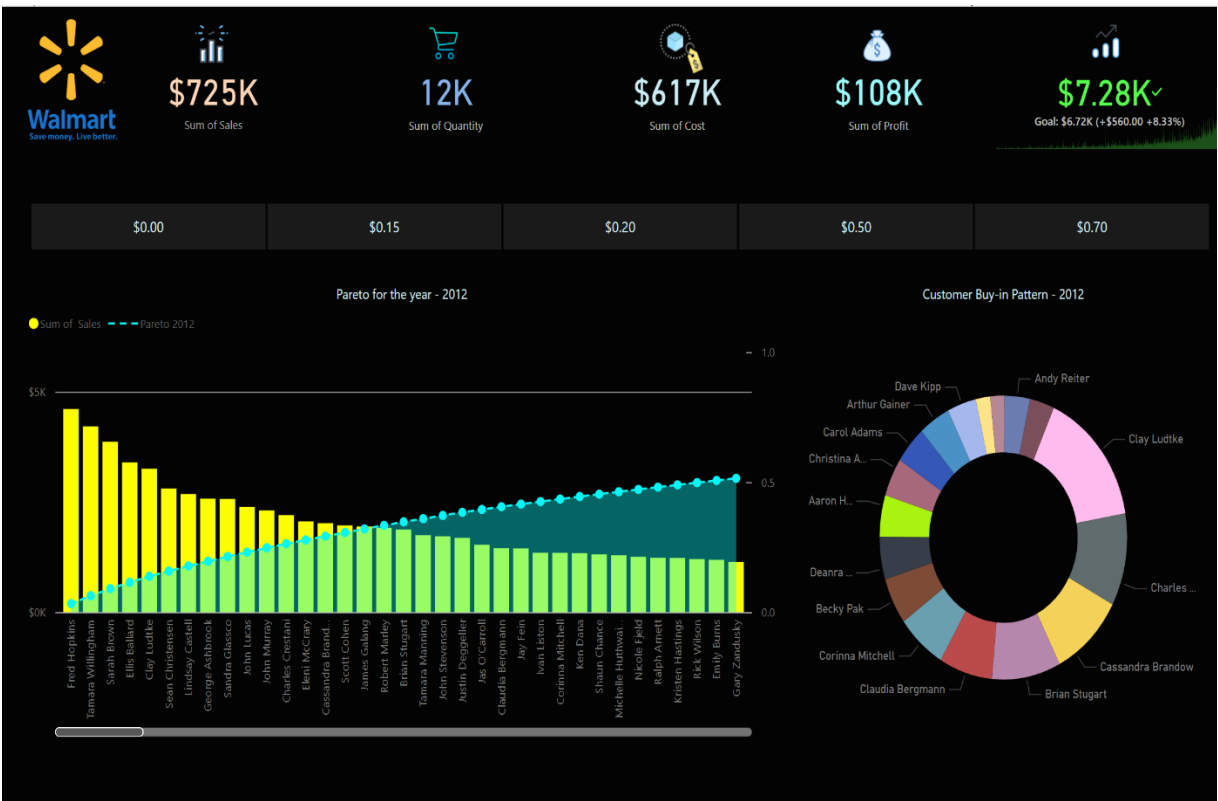
Financial Portfolio
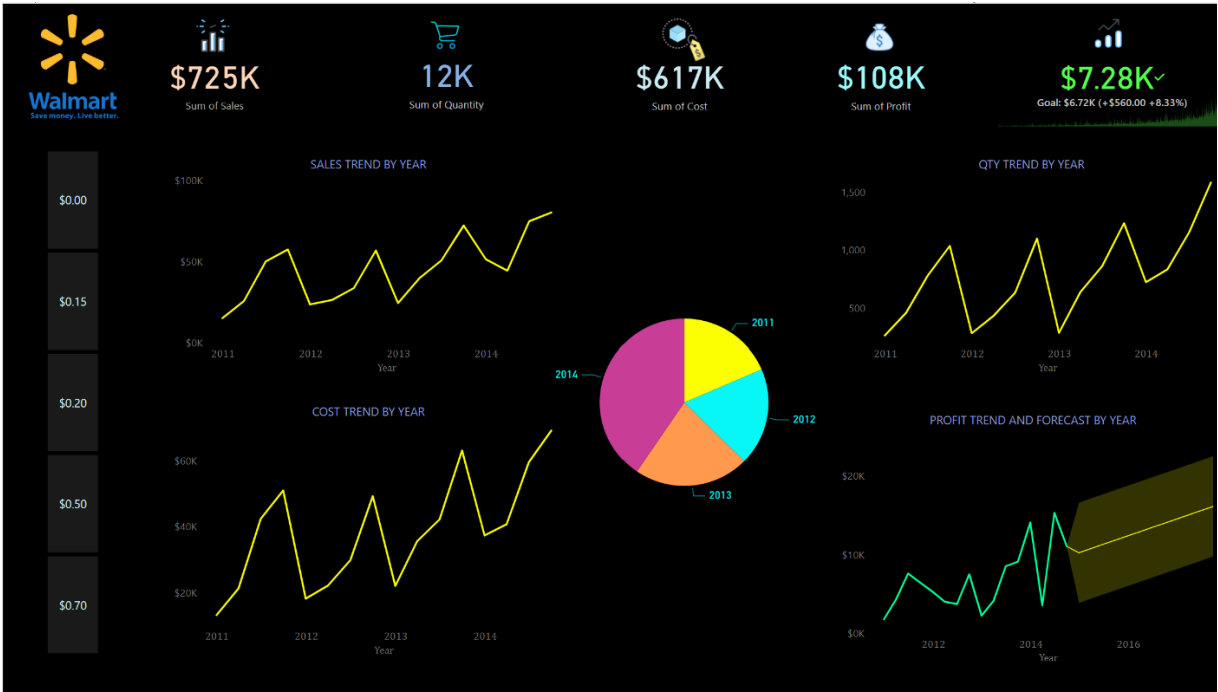
Category Portfolio
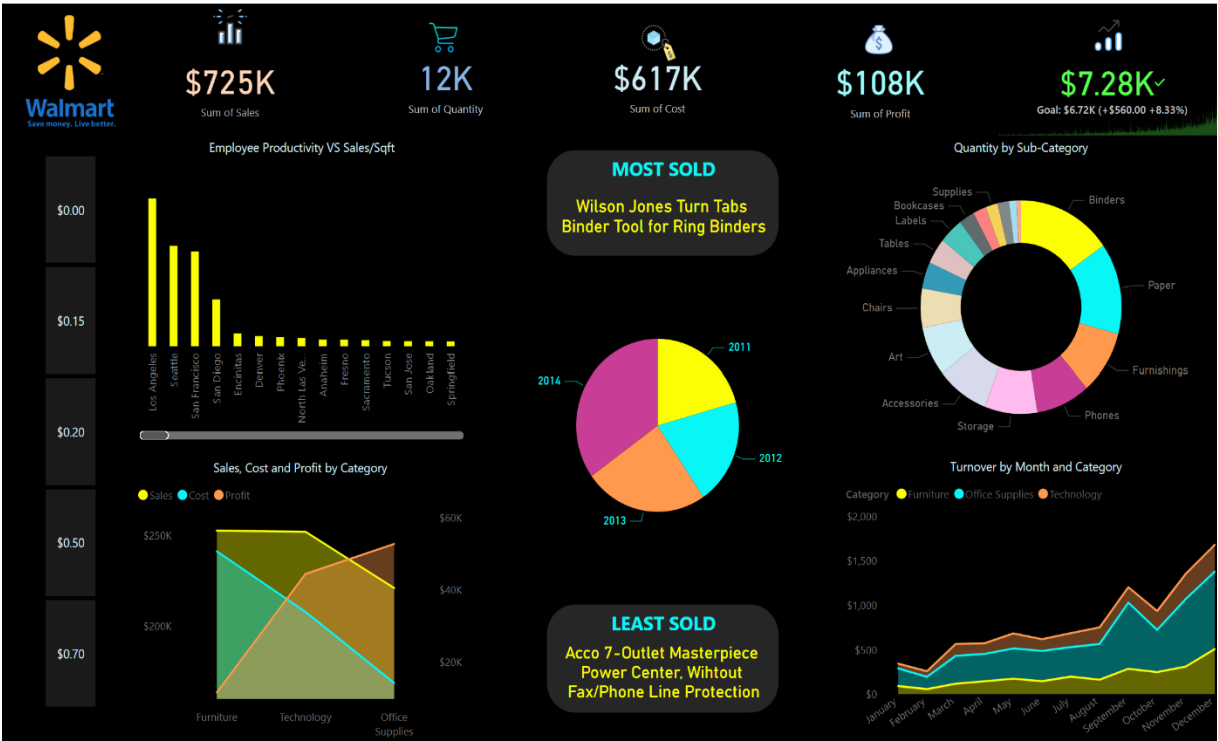
Customer Portfolio

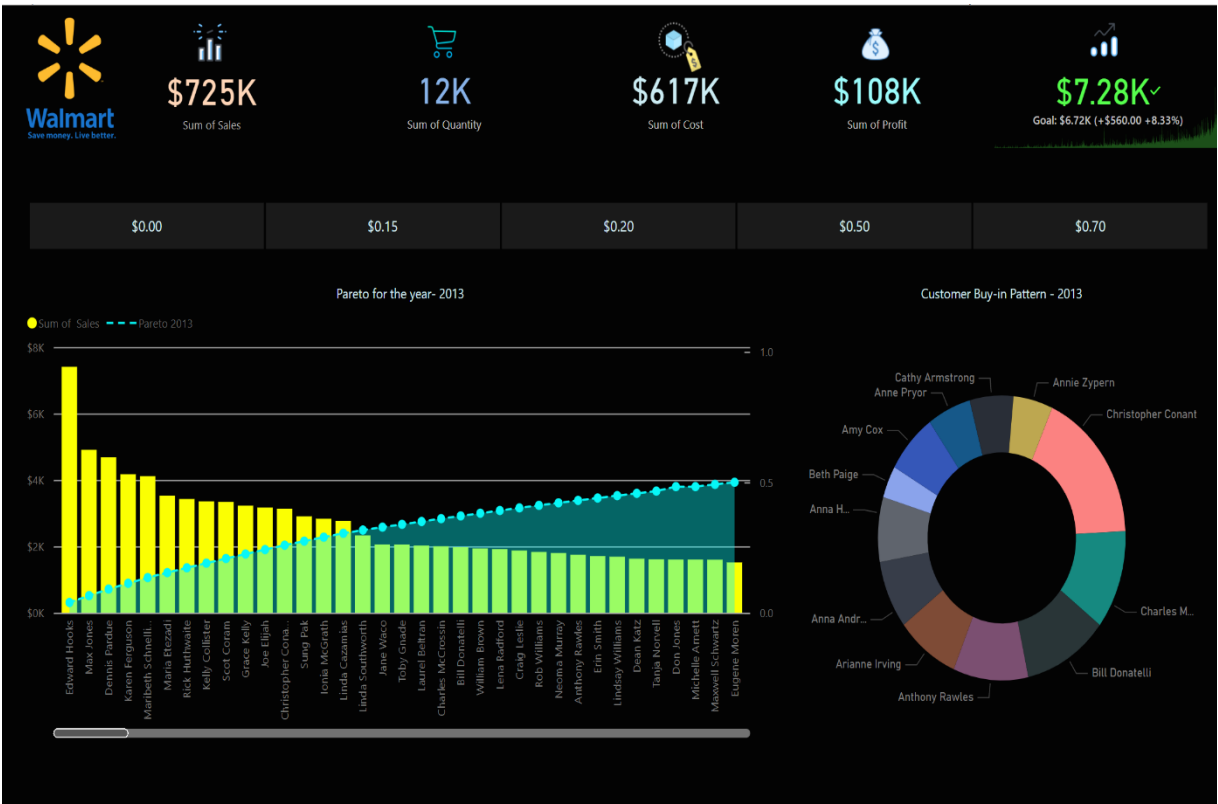# Vital Few, Trivial Many – 2011

Vital Few, Trivial Many – 2012

Vital Few, Trivial Many – 2013

Vital Few, Trivial Many – 2014
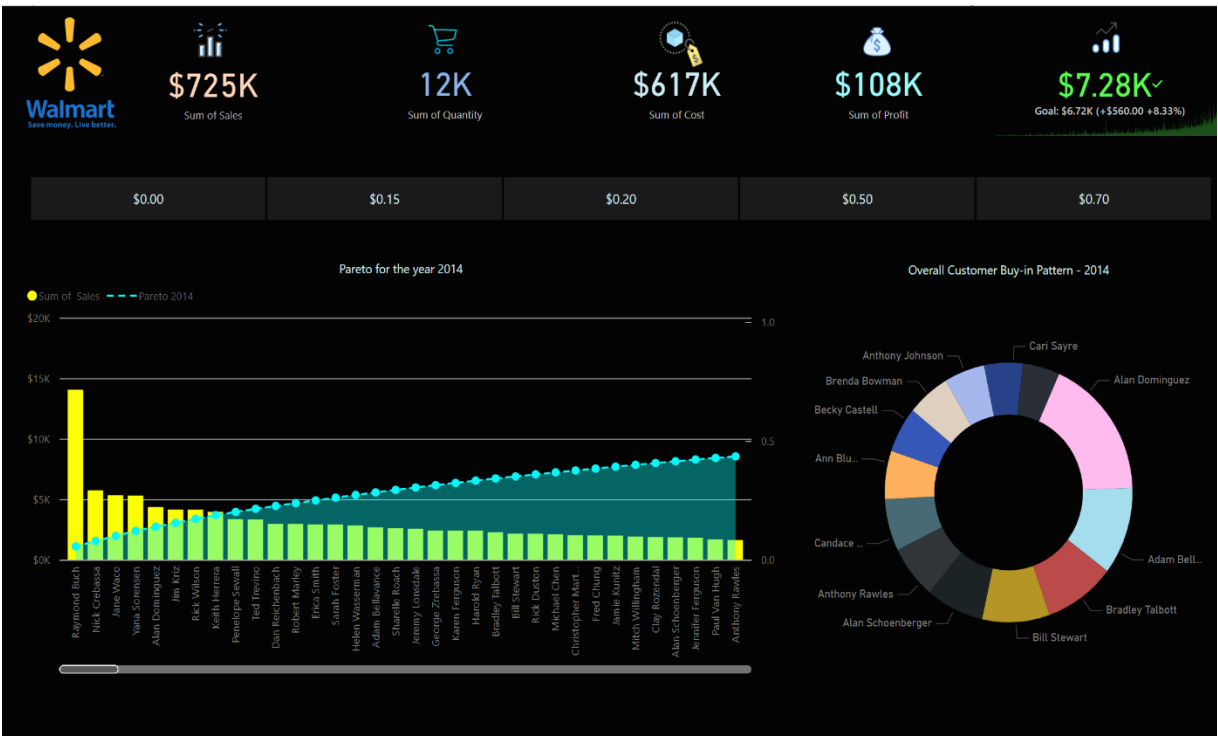
DATA INTEGRATION

DAX MEASURES

Loaded the Data files to Power Bi and opted for data transformation through Power Query. Below are the DAX Measures added through power query for obtaining better data insights.

SL.No	TERM	DAX MEASURE	INSIGHTS GAINED
1	COST (CustomColumn)	[SALES] – [PROFIT]	The cost that has been acquired for the financial year of 2011-2014
2	AVG PRICE (Custom Column)	[SALES] / [QUANTITY]	The average price of each product that has been sold in the financial year of 2011-2014
3	TURNOVER RATE (Custom Column)	[COST] / [AVG PRICE]	Turn Over Rate is calculated to get insights into monthly inventory management and to optimize the supply of popular products
4	TOTAL SALES (Measure)	SUM(WALMART [SALES])	Created DAX measure named Total sales

5	TOTAL COST (Measure)	SUMX('WALMART', ('WALMART'[SALES] – 'WALMART'[PROFIT])	Created DAX measure named Total Cost
6	TOTAL PROFIT (Measure)	[TOTAL SALES] – [TOTAL COST]	Created DAX measure named Total Profit
7	CUSTOMER RANK (Measure)	RANKX (ALL(WALMART[CUSTOMER NAME]), [TOTAL PROFIT], , DESC)	The customer ranking was analyzed based on the profit they have benefitted for the store in the overall 4 years (2011-2014)
8	UNIQUE CUSTOMERS (Measure)	DISTINCTCOUNT (WALMART[CUSTOMER ID])	Unique customers were identified to know the net customer value of the Walmart store in four years (2011-2014)
9	SALES LAST PERIOD (Measure)	CALCULATE(SUM(WALMART[SALES]), DATESINPERIOD(WALMART[ORDER DATE].[DATE], LASTDATE(WALMART[ORDER DATE].[DATE]),	This was calculated for the year before the last i.e., 2013 (2014- 12 months) to further

		-12, MONTH))	investigate customer metrics.
10	LOST CUSTOMERS (Measure)	IF([SALES LAST PERIOD],0,1)	The customers that were lost for the past year (2013) were analyzed using this measure. Further giving a guide to how we should get them back on track for shopping.
11	NEW CUSTOMERS SALES (Measure)	VAR CUSTOMERS = VALUES(WALMART[CUSTOMER ID]) RETURN CALCULATE([TOTAL SALES], FILTER(CUSTOMERS, CALCULATE(COUNTROWS(WALMART), FILTER (ALLSELECTED(WALMART[ORDER DATE].[DATE]), WALMART[ORDER DATE].[DATE] < MIN(WALMART[ORDER DATE].[DATE])))=0))	This measure deals with analyzing new customers that contributed each year based on their sales contribution.

12	OLD CUSTOMER SALES (Measure)	[TOTAL SALES]-[NEW CUSTOMER SALES]	This measure helps us know our loyal customers who keep coming back, therefore, helping us to visualize what makes the customer repeat sales with us, year after year.
13	MOST SOLD PRODUCT (Measure)	CALCULATE(MAX(Walmart[Product Name]), FILTER(Walmart, Walmart[Quantity]= MAX(Walmart[Quantity])))	Through this, the most-sold product could be identified and help us to ensure adequate stock levels and supply.
14	LEAST SOLD PRODUCT (Measure)	CALCULATE(MIN(WALMART[PRODUCT NAME]), FILTER(WALMART, WALMART[QUANTITY]= MAX(WALMART[QUANTITY])))	This displays the least sold item, the data will help analyze customer behavior and taste to optimize the supply chain.
15	PARETO-2011 (Measure)	VAR TOTALREVENUE = CALCULATE(SUM('2011-CA'[TOTAL SALES]),ALLSELECTED('2011-CA')) VAR CURRENTREVENUE = SUM('2011-CA'[TOTAL SALES]) VAR SUMMARIZEDTABLE =	This Pareto measure was predominantly created for the fiscal year 2011.

		SUMMARIZE(ALLSELECTED('2011-CA'), '2011-CA'[CUSTOMER NAME], "REVENUE", SUM('2011-CA'[TOTAL SALES])) VAR CUMULATIVESUM= SUMX(FILTER(SUMMARIZEDTABLE, [REVENUE] >= CURRENTREVENUE), [REVENUE]) RETURN CUMULATIVESUM/TOTALRE VENUE	
16	PARETO-2012 (Measure)	VAR TOTALREVENUE = CALCULATE(SUM('2012-CA'[SALES]),ALLSELECTED('2012-CA')) VAR CURRENTREVENUE = SUM('2012-CA'[SALES]) VAR SUMMARIZEDTABLE = SUMMARIZE(ALLSELECTED('2012-CA'), '2012-CA'[CUSTOMER NAME], "REVENUE", SUM('2012-CA'[SALES])) VAR CUMULATIVESUM= SUMX(FILTER(SUMMARIZEDTABLE, [REVENUE] >=	This Pareto measure was predominantly created for the fiscal year 2012.

		CURRENTREVENUE), [REVENUE]) RETURN CUMULATIVESUM/TOTALRE VENUE	
17	PARETO- 2013 (Measure)	VAR TOTALREVENUE = CALCULATE(SUM('2013-CA'[SALES]),ALLSELECTED('2013-CA')) VAR CURRENTREVENUE = SUM('2013-CA'[SALES]) VAR SUMMARIZEDTABLE = SUMMARIZE(ALLSELECTED('2013-CA'), '2013-CA'[CUSTOMER NAME], "REVENUE", SUM('2013- CA'[SALES])) VAR CUMULATIVESUM= SUMX(FILTER(SUMMARIZEDTABLE, [REVENUE] >= CURRENTREVENUE), [REVENUE]) RETURN CUMULATIVESUM/TOTALRE VENUE	This Pareto measure was predominantly created for the fiscal year 2013.

| 18 | PARETO-2014 (Measure) | VAR TOTALREVENUE = CALCULATE(SUM('2014-CA'[SALES]),ALLSELECTED('2014-CA'))

 VAR CURRENTREVENUE = SUM('2014-CA'[SALES])

 VAR SUMMARIZEDTABLE = SUMMARIZE(

 ALLSELECTED('2014-CA'),

 '2014-CA'[CUSTOMER NAME],

 "REVENUE", SUM('2014-CA'[SALES])

)

 VAR CUMULATIVESUM= SUMX(

 FILTER(SUMMARIZEDTABLE, [REVENUE] >= CURRENTREVENUE), [REVENUE]

)

 RETURN

 CUMULATIVESUM/TOTALREVENUE | This Pareto measure was predominantly created for the fiscal year 2014. |

EXCEL MEASURES

Some of the Excel measures used for the data explorations are given below,

SUMIF for getting total values from unique variables derived from multiple variables.

i.e., getting the total sales of each postal code.

Sales per sq. ft

= [Total sales per postalcode**] / [Est. sq. ft]
**It is assumed that every postal code has a discount store

Employee Productivity

 = [Total sales per postal code] / [Est.employee No]

REPORT DEVELOPMENT

Some of the steps I followed to create the report in Power Bi are,

Data modeling: Defined relationships, created calculated columns, and designed measures to ensure data accuracy and consistency.

Visualization designs: Selected appropriate visualization and arranged them in the canvas to create meaningful dashboards and reports.

Interactivity: Added filters such as years, and slicers such as discounts, to enhance user interactivity and data exploration.

Report formatting: Created brand-based theme, and ensured cohesive and visually appealing presentation.

Project summary: Created a detailed project report to help people who go through my visualizations understand better.

VISUALIZATION NARRATIVE

FINANCIAL PORTFOLIO

- The sum of Sales trended up, resulting in a 434.13% increase between January 2011 and October 2014.
- The sum of Sales started trending up on January 2013, rising by 229.60% ($55,833) in 7 quarters.
- The Sum of Cost jumped from $22,074.17 to $69,117.18 during its steepest incline between January 2013 and October 2014.
- The Sum of Quantity experienced the longest period of growth (+1298) between January 2013 and October 2014.
- The sum of Quantity rose by 431 in the last Quarter.
- The sum of Profit averaged $6,776.15 per quarter between January 2011 and October 2014.
- The sum of Profit peaked at $15,252.94 in July 2014, after hitting a low point of $1,784.03 in January 2011.
- The profit trend was forecasted for the next 3 years (2015-2017), with a 95% Confidence bound.

PROFIT TREND FORECAST

Year, Quarter	Sum of Profit	forecastValue	confidenceHighBound	confidenceLowBound
2011, Qtr 1	$1,784.03			
2011, Qtr 2	$4,274.83			
2011, Qtr 3	$7,583.11			
2011, Qtr 4	$6,423.72			
2012, Qtr 1	$5,277.84			
2012, Qtr 2	$4,008.29			
2012, Qtr 3	$3,714.44			
2012, Qtr 4	$7,491.62			
2013, Qtr 1	$2,242.86			
2013, Qtr 2	$4,116.52			
2013, Qtr 3	$8,504.78			
2013, Qtr 4	$9,095.78			
2014, Qtr 1	$14,055.26			
2014, Qtr 2	$3,559.69			
2014, Qtr 3	$15,252.94			
2014, Qtr 4	$11,032.74	11032.7411	11032.7411	11032.7411
2014, Qtr 4	$11,032.74	11032.7411	11032.7411	11032.7411
,		10223.530055796995	16586.146062628257	3860.914048965732
,		10756.553866885492	17119.198505424363	4393.90922834662
,		11289.577677973988	17652.273217008264	4926.882138939713
,		11822.601489062485	18185.376559305652	5459.826418819318
,		12355.625300150981	18718.51489358855	5992.73570671341
,		12888.649111239478	19251.694580157346	6525.60364232161
,		13421.672922327974	19784.921977959304	7058.423866696643
,		13954.696733416471	20318.20344414378	7591.190022689161
,		14487.720544504968	20851.545333554124	8123.89575545581
,		15020.744355593464	21384.953998156558	8656.53471303037
,		15553.76816668196	21918.435786406175	9189.100546957747
,		16086.791977770457	22451.997042550385	9721.586912990531

CATEGORY PORTFOLIO

- Los Angeles accounted for 23.50% of the Sum of EMPLOYEE PRODUCTIVITY**.

- Sales and total Costs are positively correlated with each other.

- Office Supplies had $2,20,853 Sales, $1,68,243.78 Cost, and $52,609.85 Profit.

- Furniture had $2,52,613 Sales, $2,41,107.85 Cost, and $11,504.95 Profit.

- Technology had $2,51,992 Sales, $2,07,688.15 Cost, and $44,303.65 Profit.

** The employee numbers and Store square feet values were taken from the actual web sources as 200 employees for each Walmart discount store, and the sq. ft was taken as 106,000 sq. ft per postal code similarly.

CUSTOMER PORTFOLIO

- At $14,345, Raymond Buch had the highest Sales and was 236.18% higher than Jim Kriz, which had the lowest Sales at $4,267.
- Raymond Buch accounted for 11.72% of Sales.
- Furniture had the highest total Cost at $2,41,107.85, followed by Technology at 2,07,688.15 and Office Supplies at 1,68,243.78.
- Cost and total Sales are positively correlated with each other. California in Category made up 23.81% of the Cost.
- Across all 20 Customer Names, Profit ranged from $367.71 to $6,807.09.

VITAL FEW TRIVIAL MANY

Vital few trivial many deals with the Pareto principle, which deals with the fact that 80% of the sales (effect) comes from 20% of the customers (cause of the event). The Pareto principle is also called the law of the vital few. It is concluded that if the sectors/ the companies break free from this, the profits will be increased.

It also deals with customer retention based on geographical representation, the number of customers that fall within 20% of the total, and customer buying trends. Some of the effective ways of customer retention are through loyalty/ subscription programs and also constant reconnections/ reminders such as personalized product notifications/ customer birthday month discounts.

Even though the pros help us to understand, grow, focus, and structural framework for loyal customers, it is also important for us to be reminded that we need to be more data-driven, constantly evolve as the market evolution, and also consider the remaining 80% of the customers in our point while looking forward to overall company success.

The Pareto principle was evaluated separately for each fiscal year ranging from 2011 to 2014.

VITAL FEW TRIVIAL MANY – 2011

- The Sum of Total sales and total Pareto 2011 are negatively correlated with each other.
- Ken Lonsdale accounted for 8.92% of the Sum of Total sales.
- The sum of Total sales and Pareto 2011 diverged the most when the Customer Name was Ken Lonsdale when the Sum of Total sales was $8,318.9 higher than Pareto 2011.

VITAL FEW TRIVIAL MANY – 2012

- At $4,607.3, Fred Hopkins had the highest Sum of Sales and was 2,30,265.00% higher than Thais Sissman, which had the lowest Sum of Sales at $2.
- The sum of Sales and total Pareto 2012 are negatively correlated with each other.
- Fred Hopkins accounted for 3.29% of the Sum of Sales.
- The sum of Sales and Pareto 2012 diverged the most when the Customer Name was Fred Hopkins when the Sum of Sales was $4,607.27 higher than Pareto 2012.

VITAL FEW TRIVIAL MANY – 2013

- At $7,408.1, Edward Hooks had the highest Sum of Sales and was 1,85,102.50% higher than Jack Lebron, which had the lowest Sum of Sales at $4.
- The sum of Sales and total Pareto 2013 are negatively correlated with each other.
- Edward Hooks accounted for 3.96% of the Sum of Sales.
- The sum of Sales and Pareto 2013 diverged the most when the Customer Name was Edward Hooks when the sum of Sales was $7,408.060379788403 higher than Pareto 2013.

VITAL FEW TRIVIAL MANY – 2014

- At $14,052.5, Raymond Buch had the highest Sum of Sales and was 12,77,400.00% higher than Tamara Dahlen, which had the lowest Sum of Sales at $1.1.

- The sum of Sales and total Pareto 2014 are negatively correlated with each other.

- Raymond Buch accounted for 5.61% of the Sum of Sales.

- The sum of Sales and Pareto 2014 diverged the most when the Customer Name was Raymond Buch when the Sum of Sales was $14,052.44393227745 higher than Pareto 2014.

CONCLUSION

In conclusion, the analysis of Walmart's sales data through Power BI has provided valuable insights into the company's performance and identified areas for improvement.

The **sales and revenue analysis** revealed a total sales amount of $725k, showcasing a steady revenue stream. Sales trends over time highlighted patterns and fluctuations, enabling the identification of key factors influencing sales performance. Sales by product category and region/store location provided an understanding of customer preferences and regional variations, allowing for targeted strategies and resource allocation.

Profit analysis indicated a positive financial outcome with a profit of $108k. Further exploration of profit drivers can help optimize profitability and identify growth opportunities. Cost analysis emphasized the importance of efficient cost management to enhance the bottom line.

Additionally, the **quantity sold analysis** indicated the volume of products sold (12k units) during the specified period, showcasing customer demand and market penetration.

Overall, the insights derived from the analysis of Walmart's sales data using Power BI offer actionable recommendations to drive sales growth, optimize costs, and enhance profitability. By leveraging these insights, Walmart can make data-driven decisions, and refine its strategies.

It is crucial for Walmart to continuously monitor sales trends, customer preferences, and market dynamics to remain competitive. Through the effective utilization of Power BI and ongoing analysis, Walmart can adapt and innovate to meet evolving customer needs and achieve growth.

KEY TAKEAWAYS

Walmart can achieve growth through the recommended business solutions.

- Globally, it is now a period of seeking sustainability, and finding purpose, hence it is highly recommended to turn the viewpoint from being just a commercial retail chain to a sustainable, and responsible giant by reducing carbon footprints, providing affordable ethically safe products in an affordable cost will make the customer experience with Walmart, a true phenomenon.

The other major solutions such as

- Expanding e-commerce and conducting targeted customer-centric marketing.

- customer retention

- strategic and targeted marketing

- supply chain monitoring and cost control, should be continuously monitored and adopted, to position Walmart for consistent success in the dynamic and ever-evolving retail industry

In total, the analysis conducted in this report provides valuable insights into Walmart's sales performance, offering opportunities for strategic improvements and better decision-making. By leveraging the power of data and Power BI, Walmart can continue to thrive in the dynamic retail industry.