

3 Branches, 3 Months, 1 Goal: Decoding Supermarket Sales Patterns

MARK ANTHONY A. BUNA
Data Analyst

CONTEXT

- Supermarkets are rapidly expanding in densely populated cities, leading to increased market competition. This dataset captures historical sales from a supermarket company, recorded across three branches over a three-month period. While limited in time range, the dataset is structured in a way that makes it suitable for applying predictive and exploratory data analytics techniques.

BUSINESS PROBLEM

- With supermarkets rapidly expanding in dense urban areas, competition is intensifying. This project aims to analyze short-term sales data from three branches to uncover performance patterns and product trends. Despite the limited timeframe, the goal is to support strategic decisions in inventory, marketing, and operations to enhance competitiveness and drive growth.

LINK

- Kaggle: <https://www.kaggle.com/datasets/aungpyaeap/supermarket-sales/data>

DASHBOARD



(right click + open link)

DATA TO BE IDENTIFIED

1. SALES & REVENUE INSIGHTS

- 1.1 What is the total revenue, and how does it vary across different branches?
- 1.2 Which product line generates the highest revenue?
- 1.3 Which product line sells the most in terms of quantity?
- 1.4 Which branch is the most profitable, and why?
- 1.5 What are the peak sales hours and days of the week?

2. CUSTOMER BEHAVIOR ANALYSIS

- 2.1 Which gender spends more on average, and in which product line?
- 2.2 Which customer type (Member vs. Normal) contributes more to total revenue?
- 2.3 Is there a difference in purchasing behavior across different cities?

2.4 How does customer spending vary by payment method?

3. PRODUCT & INVENTORY ANALYSIS

- 3.1 Which product lines have the highest and lowest sales?*
- 3.2 Is there a correlation between unit price and quantity sold?*
- 3.3 Are some product lines consistently underperforming?*
- 3.4 Which product lines have the highest gross margin?*

4. PRICING & DISCOUNT ANALYSIS

- 4.1 How does the tax impact total sales and profitability?*
- 4.2 Do higher-priced products sell less compared to lower-priced ones?*
- 4.3 Which branch offers the highest average unit price?*

5. CUSTOMER SATISFACTION (RATINGS ANALYSIS)

- 5.1 Which branch has the highest and lowest customer ratings?*
- 5.2 Which product line has the best and worst ratings?*
- 5.3 Is there a relationship between total sales and customer ratings?*
- 5.4 Do high-spending customers leave better ratings?*

6. PAYMENT & TRANSACTION ANALYSIS

- 6.1 Which payment method is most commonly used?*
- 6.2 Are there differences in spending based on the payment method? Do customers using a specific payment method buy more expensive products?*

7. TREND & TIME-BASED ANALYSIS

- 7.1 Are there seasonal trends in supermarket sales by branch?*
- 7.2 Is revenue increasing or decreasing over time?*

DATA PREPARATION

1. Removed duplicate entries to ensure data accuracy and consistency.

The screenshot shows the Microsoft Excel interface with a data table titled 'Supermarket Sales - Excel'. A dialog box is displayed in the center, stating 'No duplicate values found.' with an 'OK' button. The data table has the following columns: Invoice ID, Branch, City, Customer type, Gender, Product line, Unit price, Quantity, Tax 5%, Total Purchase Price, Date, Day of the Week, Time, Payment, Cost of Goods Sold, and gross margin per. The table contains 29 rows of data.

Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Tax 5%	Total Purchase Price	Date	Day of the Week	Time	Payment	Cost of Goods Sold	gross margin per
750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.14	548.97	1/5/2019	Sat	13:08	Ewallet	522.83	
631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.22	340.53	3/3/2019	Sun	13:23	Credit card	324.31	
123-19-1176	A	Yangon	Member	Male	Health and beauty	58.22	8	23.29	489.05	1/27/2019	Sun	20:33	Ewallet	465.76	
373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.21	634.38	2/8/2019	Fri	10:37	Ewallet	604.17	
355-53-5943	A	Yangon	Member	Female	Electronic accessories	68.84	6	20.65	433.69	2/25/2019	Mon	14:36	Ewallet	413.04	
665-32-9167	A	Yangon	Member	Female	Health and beauty	36.26	2	3.63	76.15	1/10/2019	Thu	17:15	Credit card	72.52	
365-64-0515	A	Yangon	Normal	Female	Electronic accessories	46.95	5	11.74	246.49	2/12/2019	Tue	10:25	Ewallet	234.75	
252-56-2699	A	Yangon	Normal	Male	Food and beverages	43.19	10	21.60	433.90	2/7/2019	Thu	16:48	Ewallet	431.90	
829-34-3910	A	Yangon	Normal	Female	Health and beauty	71.38	10	35.69	713.80	3/29/2019	Fri	19:21	Cash	713.80	
656-95-9349	A	Yangon	Member	Female	Health and beauty	68.93	7	24.13	506.64	3/11/2019	Mon	11:03	Credit card	482.51	
765-26-6951	A	Yangon	Normal	Male	Sports and travel	72.61	6	21.78	457.44	1/1/2019	Tue	10:39	Credit card	435.66	
329-62-1586	A	Yangon	Normal	Male	Food and beverages	54.67	3	8.20	172.21	1/21/2019	Mon	18:00	Credit card	164.01	
636-48-8204	A	Yangon	Normal	Male	Electronic accessories	34.56	5	8.64	181.44	2/17/2019	Sun	11:15	Ewallet	172.80	
549-59-1358	A	Yangon	Member	Male	Sports and travel	88.63	3	13.29	279.18	3/2/2019	Sat	17:36	Ewallet	265.89	
227-03-5010	A	Yangon	Member	Female	Home and lifestyle	52.59	8	21.04	441.76	3/22/2019	Fri	19:20	Credit card	420.72	
189-17-4241	A	Yangon	Normal	Female	Fashion accessories	87.67	2	8.77	184.11	3/10/2019	Sun	12:17	Credit card	175.34	
848-62-7243	A	Yangon	Normal	Male	Health and beauty	24.89	9	11.20	235.21	3/15/2019	Fri	15:36	Cash	224.01	
595-11-5460	A	Yangon	Normal	Male	Health and beauty	96.58	2	9.66	202.82	3/15/2019	Fri	10:12	Credit card	193.16	
129-29-8530	A	Yangon	Member	Male	Sports and travel	62.62	5	15.66	328.76	3/10/2019	Sun	19:15	Ewallet	313.10	
272-65-1806	A	Yangon	Normal	Female	Electronic accessories	60.88	9	27.40	575.32	1/15/2019	Tue	17:17	Ewallet	547.92	
162-48-8011	A	Yangon	Member	Female	Food and beverages	44.59	5	11.15	234.10	2/10/2019	Sun	15:10	Cash	222.95	
106-35-6779	A	Yangon	Member	Male	Home and lifestyle	44.34	2	4.43	93.11	3/27/2019	Wed	11:26	Cash	88.68	
635-40-6220	A	Yangon	Normal	Male	Health and beauty	89.6	8	35.84	752.64	2/7/2019	Thu	11:28	Ewallet	716.80	
817-48-8732	A	Yangon	Member	Female	Home and lifestyle	72.35	10	36.18	759.68	1/20/2019	Sun	15:55	Cash	723.50	
199-75-8169	A	Yangon	Member	Male	Sports and travel	15.81	10	7.91	166.01	3/6/2019	Wed	12:27	Credit card	158.10	
877-22-3308	A	Yangon	Member	Male	Health and beauty	15.87	10	7.94	166.64	3/13/2019	Wed	16:40	Cash	158.70	
232-11-3025	A	Yangon	Normal	Male	Sports and travel	78.77	10	39.39	827.09	1/24/2019	Thu	10:04	Cash	787.70	
382-03-4532	A	Yangon	Member	Female	Health and beauty	18.33	1	0.92	19.25	2/2/2019	Sat	18:50	Cash	18.33	

2. Applied filters to easily identify any typos or missing values.

The screenshot shows the Microsoft Excel interface with the same data table. Filters are applied to the columns: Unit price, Quantity, Tax 5%, Total Purchase Price, Date, Day of the Week, Time, Payment, Cost of Goods Sold, gross margin percentage, gross income, Rating, and Spender. A dropdown menu is visible for the 'Spender' column, showing options like 'Sort A to Z', 'Sort Z to A', 'Custom Sort...', 'Filter', 'Clear', and 'Reapply'.

Unit price	Quantity	Tax 5%	Total Purchase Price	Date	Day of the Week	Time	Payment	Cost of Goods Sold	gross margin percentage	gross income	Rating	Spender
74.69	7	26.14	548.97	1/5/2019	Sat	13:08	Ewallet	522.83	4.76	26.14	9.10	High Spender
46.33	7	16.22	340.53	3/3/2019	Sun	13:23	Credit card	324.31	4.76	16.22	7.40	Medium Spender
58.22	8	23.29	489.05	1/27/2019	Sun	20:33	Ewallet	465.76	4.76	23.29	8.40	High Spender
86.31	7	30.21	634.38	2/8/2019	Fri	10:37	Ewallet	604.17	4.76	30.21	5.30	High Spender
68.84	6	20.65	433.69	2/25/2019	Mon	14:36	Ewallet	413.04	4.76	20.65	5.80	High Spender
36.26	2	3.63	76.15	1/10/2019	Thu	17:15	Credit card	72.52	4.76	3.63	7.20	Low Spender
46.95	5	11.74	246.49	2/12/2019	Tue	10:25	Ewallet	234.75	4.76	11.74	7.10	Medium Spender
43.19	10	21.60	433.90	2/7/2019	Thu	16:48	Ewallet	431.90	4.76	21.60	8.20	High Spender
71.38	10	35.69	713.80	3/29/2019	Fri	19:21	Cash	713.80	4.76	35.69	5.70	High Spender
68.93	7	24.13	506.64	3/11/2019	Mon	11:03	Credit card	482.51	4.76	24.13	4.60	High Spender
72.61	6	21.78	457.44	1/1/2019	Tue	10:39	Credit card	435.66	4.76	21.78	6.90	High Spender
54.67	3	8.20	172.21	1/21/2019	Mon	18:00	Credit card	164.01	4.76	8.20	8.60	Medium Spender
34.56	5	8.64	181.44	2/17/2019	Sun	11:15	Ewallet	172.80	4.76	8.64	9.90	Medium Spender
88.63	3	13.29	279.18	3/2/2019	Sat	17:36	Ewallet	265.89	4.76	13.29	6.00	Medium Spender
52.59	8	21.04	441.76	3/22/2019	Fri	19:20	Credit card	420.72	4.76	21.04	8.50	High Spender
87.67	2	8.77	184.11	3/10/2019	Sun	12:17	Credit card	175.34	4.76	8.77	7.70	Medium Spender
24.89	9	11.20	235.21	3/15/2019	Fri	15:36	Cash	224.01	4.76	11.20	7.40	Medium Spender
96.58	2	9.66	202.82	3/15/2019	Fri	10:12	Credit card	193.16	4.76	9.66	5.10	Medium Spender
62.62	5	15.66	328.76	3/10/2019	Sun	19:15	Ewallet	313.10	4.76	15.66	7.00	Medium Spender
60.88	9	27.40	575.32	1/15/2019	Tue	17:17	Ewallet	547.92	4.76	27.40	4.70	High Spender
44.59	5	11.15	234.10	2/10/2019	Sun	15:10	Cash	222.95	4.76	11.15	8.50	Medium Spender
44.34	2	4.43	93.11	3/27/2019	Wed	11:26	Cash	88.68	4.76	4.43	5.80	Low Spender
89.6	8	35.84	752.64	2/7/2019	Thu	11:28	Ewallet	716.80	4.76	35.84	6.60	High Spender
72.35	10	36.18	759.68	1/20/2019	Sun	15:55	Cash	723.50	4.76	36.18	5.40	High Spender
15.81	10	7.91	166.01	3/6/2019	Wed	12:27	Credit card	158.10	4.76	7.91	8.60	Medium Spender
15.87	10	7.94	166.64	3/13/2019	Wed	16:40	Cash	158.70	4.76	7.94	5.80	Medium Spender
78.77	10	39.39	827.09	1/24/2019	Thu	10:04	Cash	787.70	4.76	39.39	6.40	High Spender
18.33	1	0.92	19.25	2/2/2019	Sat	18:50	Cash	18.33	4.76	0.92	4.30	Low Spender

3. Standardized decimal places to two for a more uniform and readable format.

Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Tax 5%	Total Purchase Price	Date	Day of the Week	Time	Payment	Cost of Goods Sold	gross margin percentage	gross income	Rating	Spending Type
750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.14	548.97	7/2019	Sat	13:08	Credit card	324.31	4.76	26.14	9.18	High Spender
631-41-0108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.22	340.53	3/2019	Sun	13:33	Credit card	172.26	4.76	16.22	7.40	Medium Spender
125-19-1176	A	Yangon	Member	Male	Health and beauty	58.23	8	23.29	489.05	1/27/2019	Sun	20:35	EWallet	244.53	4.76	23.29	8.46	High Spender
373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.21	634.38	8/2019	Fri	10:37	EWallet	317.19	4.76	30.21	5.30	High Spender
355-53-5943	A	Yangon	Member	Female	Electronic accessories	68.84	6	20.65	433.69	2/15/2019	Mon	14:36	EWallet	216.85	4.76	20.65	5.80	High Spender
665-32-6187	A	Yangon	Member	Female	Health and beauty	36.36	3	3.63	76.15	1/20/2019	Thu	17:15	Credit card	38.08	4.76	3.63	7.20	Low Spender
365-64-0515	A	Yangon	Normal	Female	Electronic accessories	46.95	5	11.74	246.49	2/2/2019	Tue	10:25	EWallet	123.25	4.76	11.74	7.10	Medium Spender
252-56-2699	A	Yangon	Normal	Male	Food and beverages	43.19	10	21.60	453.50	7/2019	Tue	16:48	EWallet	226.75	4.76	21.60	8.20	High Spender
626-56-9510	A	Yangon	Normal	Female	Health and beauty	71.38	10	35.69	749.49	2/20/2019	Fri	19:21	Cash	374.75	4.76	35.69	5.70	High Spender
656-95-9249	A	Yangon	Member	Female	Health and beauty	68.93	7	24.13	506.64	3/1/2019	Mon	11:03	Credit card	253.32	4.76	24.13	4.60	High Spender
765-26-6951	A	Yangon	Normal	Male	Sports and travel	72.63	6	21.78	435.44	1/2/2019	Tue	10:39	Credit card	217.72	4.76	21.78	6.90	High Spender
129-62-1586	A	Yangon	Normal	Male	Food and beverages	54.67	5	8.20	172.29	1/10/2019	Mon	18:00	Credit card	86.15	4.76	8.20	8.60	Medium Spender
636-48-8204	A	Yangon	Normal	Male	Electronic accessories	34.56	5	8.64	181.44	2/7/2019	Sun	11:15	EWallet	90.72	4.76	8.64	9.90	Medium Spender
549-59-1358	A	Yangon	Member	Male	Sports and travel	88.63	8	13.29	779.18	2/2/2019	Sat	17:38	EWallet	389.59	4.76	13.29	6.00	High Spender
127-03-5010	A	Yangon	Member	Female	Home and lifestyle	52.58	8	21.04	441.76	2/2/2019	Fri	19:20	Credit card	220.88	4.76	21.04	8.50	High Spender
189-17-4241	A	Yangon	Normal	Female	Fashion accessories	87.67	2	8.77	184.11	1/30/2019	Sun	12:17	Credit card	92.06	4.76	8.77	7.70	Medium Spender
848-62-7243	A	Yangon	Normal	Male	Health and beauty	24.89	9	11.20	235.21	3/5/2019	Fri	15:36	Cash	117.61	4.76	11.20	7.40	Medium Spender
595-11-4460	A	Yangon	Normal	Male	Health and beauty	98.54	2	9.86	202.82	3/5/2019	Fri	10:12	Credit card	101.41	4.76	9.86	5.10	Medium Spender
129-28-8550	A	Yangon	Member	Male	Sports and travel	62.63	5	15.66	318.15	3/20/2019	Sun	19:15	EWallet	159.08	4.76	15.66	7.00	Medium Spender
272-65-1806	A	Yangon	Normal	Female	Electronic accessories	60.88	9	27.40	575.31	1/5/2019	Tue	17:17	EWallet	287.66	4.76	27.40	4.70	High Spender
162-48-8011	A	Yangon	Member	Female	Food and beverages	44.59	5	11.15	234.12	2/20/2019	Sun	15:10	Cash	117.06	4.76	11.15	8.50	Medium Spender
106-35-6779	A	Yangon	Member	Male	Home and lifestyle	44.34	2	4.43	93.13	2/7/2019	Wed	11:26	Cash	46.57	4.76	4.43	5.80	Low Spender
635-40-6220	A	Yangon	Normal	Male	Health and beauty	89.6	8	35.84	752.64	7/2019	Thu	11:28	EWallet	376.32	4.76	35.84	6.60	High Spender
617-48-8732	A	Yangon	Member	Female	Home and lifestyle	72.35	10	36.18	759.68	1/20/2019	Sun	15:55	Cash	379.84	4.76	36.18	5.40	High Spender
199-75-6169	A	Yangon	Member	Male	Sports and travel	15.81	10	7.91	166.01	1/6/2019	Wed	12:27	Credit card	83.01	4.76	7.91	8.60	Medium Spender
877-22-3308	A	Yangon	Member	Male	Health and beauty	15.87	10	7.94	166.64	3/3/2019	Wed	16:40	Cash	83.32	4.76	7.94	5.80	Medium Spender
232-11-3025	A	Yangon	Normal	Male	Sports and travel	78.77	10	39.39	827.09	1/24/2019	Thu	10:04	Cash	413.55	4.76	39.39	6.40	High Spender
182-03-4331	A	Yangon	Member	Female	Home and lifestyle	18.83	1	0.92	18.90	1/20/2019	Sat	18:30	Cash	9.45	4.76	0.92	4.30	Low Spender
287-21-9061	A	Yangon	Normal	Male	Home and lifestyle	74.63	9	33.60	686.55	1/22/2019	Tue	10:55	EWallet	343.28	4.76	33.60	9.40	High Spender
381-20-0914	A	Yangon	Member	Female	Fashion accessories	20.01	9	9.00	189.09	3/3/2019	Sat	19:48	Credit card	94.55	4.76	9.00	5.70	Medium Spender
633-44-5566	A	Yangon	Member	Male	Food and beverages	49.58	7	17.28	362.94	2/7/2019	Wed	20:35	Credit card	181.47	4.76	17.28	7.30	Medium Spender
304-35-8843	A	Yangon	Normal	Male	Sports and travel	42.47	1	3.12	44.39	2/5/2019	Wed	16:57	Cash	22.20	4.76	3.12	5.70	Low Spender
873-51-0671	A	Yangon	Normal	Female	Sports and travel	21.98	7	7.69	161.51	1/20/2019	Thu	16:42	EWallet	80.76	4.76	7.69	5.10	Low Spender
994-34-4444	A	Yangon	Normal	Male	Electronic accessories	97.16	1	4.86	102.02	1/6/2019	Fri	20:38	EWallet	51.01	4.76	4.86	7.20	Low Spender
860-92-6136	A	Yangon	Normal	Male	Food and beverages	51.75	5	7.91	166.16	2/2/2019	Sat	10:16	EWallet	83.08	4.76	7.91	9.30	Medium Spender
212-62-1842	A	Yangon	Normal	Male	Food and beverages	58.26	6	17.48	367.87	3/8/2019	Thu	16:44	Cash	183.94	4.76	17.48	9.90	Medium Spender
704-48-3927	A	Yangon	Member	Male	Electronic accessories	88.67	10	44.34	931.01	1/2/2019	Sat	14:50	EWallet	465.51	4.76	44.34	7.30	High Spender
620-74-5166	A	Yangon	Normal	Male	Sports and travel	62.13	6	18.64	391.42	2/3/2019	Fri	20:19	Cash	195.71	4.76	18.64	7.40	High Spender
645-44-1170	A	Yangon	Member	Male	Home and lifestyle	58.07	9	26.13	548.78	1/3/2019	Sat	20:07	EWallet	274.39	4.76	26.13	4.30	High Spender
642-32-2990	A	Yangon	Normal	Female	Food and beverages	10.96	10	5.48	115.08	2/2/2019	Sat	20:48	EWallet	57.54	4.76	5.48	6.00	Low Spender

4. Renamed the "Total" column to "Total Purchase Price" for better clarity.

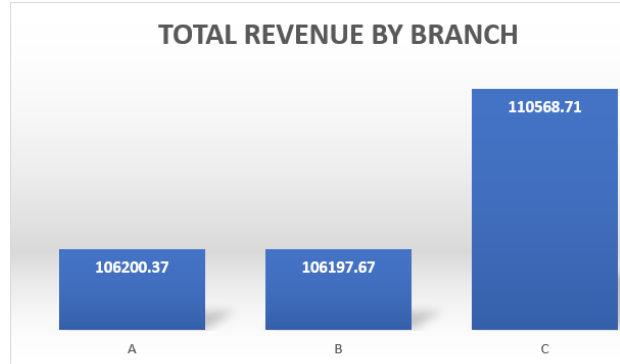
J	Total	Date
415	548.9715	1/5/
32	80.22	3/8/
155	340.5255	3/3/
288	489.048	1/27/
085	634.3785	2/8/
865	627.6165	3/25/
352	433.692	2/25/
78	772.38	2/24/
26	172.746	2/20/
96	60.816	2/6/
02	107.142	3/9/
375	246.4875	2/12/
595	453.495	2/7/
69	749.49	3/29/
116	590.436	1/15/
255	506.6355	3/11/
783	457.443	1/1/
305	172.2105	1/21/
33	84.63	3/11/
51	451.71	2/25/
197	277.137	3/5/
32	69.72	3/15/
54	181.44	2/17/
945	279.1845	3/2/
336	441.756	3/22/
76	35.196	2/8/
67	184.107	3/10/

J	Total Purchase Price	Date
415	548.97	1/5/
32	16.22	3/8/
155	340.53	3/3/
288	489.05	1/27/
085	634.38	2/8/
865	433.69	2/25/
352	76.15	1/1/
78	246.49	2/24/
26	453.50	2/20/
96	749.49	3/25/
02	506.64	3/1/
375	457.44	1/1/
595	172.21	1/2/
69	181.44	2/1/
116	279.18	3/3/
255	441.76	3/2/
783	184.11	3/1/
305	235.21	3/1/
33	202.82	3/1/
51	328.76	3/1/
197	575.32	1/1/
32	234.10	2/1/
54	93.11	3/2/
945	752.64	2/2/
336	759.68	1/2/
76	166.01	3/1/
67	166.64	3/1/
	827.09	1/2/
	19.25	2/2/

INTERPRETATION AND REPORTING

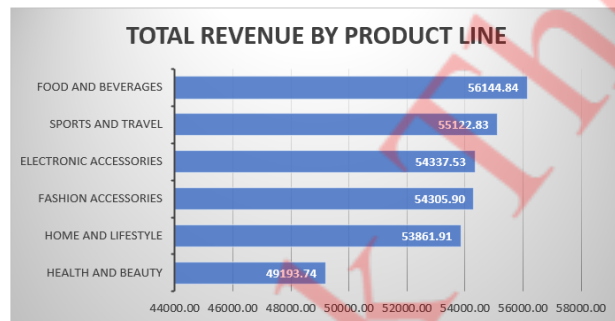
1. SALES & REVENUE INSIGHTS

1.1 What is the total revenue, and how does it vary across different branches?



The total revenue of the three branches is \$322,966.75 and as the details show, there's a little difference between branch A and B while the branch C garnered the highest number of sales.

1.2 Which product line generates the highest revenue?



The product line that generates the highest revenue is Food and Beverages having \$56,144.83 in total revenue.

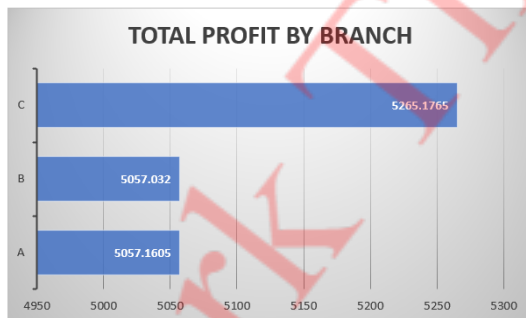
1.3 Which product line sells the most in terms of quantity?



The product line that sells the most in terms of quantity is Electronics Accessories which sold a quantity of **971** in total across the 3 branches.

Product Line	Sum of Quantity
Electronic accessories	971
Food and beverages	952
Sports and travel	920
Home and lifestyle	911
Fashion accessories	902
Health and beauty	854
Grand Total	5510

1.4 Which branch is the most profitable?



The most profitable branch is Branch C, which has a total gross income of **\$5,265.18**. It is also worth noting that Branch C has the highest total purchase amount among the three branches, totaling \$110,568.71.

Branch	Sum of Total Purchase Price (\$)	Sum of Cost of Goods Sold (\$)	Sum of gross in
A	106200.37	101143.21	5057.16
B	106197.67	101140.64	5057.03
C	110568.71	105303.53	5265.18
Grand Total	322966.75	307587.38	15379.3

1.5 What are the peak sales hours and days of the week?

PEAK SALES BY HOUR AND DAY									
Sum of Total Purchase Price		Day of the Week							
Purchase Time		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Grand Total (\$)
10 AM	+	4067.34	3738.42	4585.48	3177.33	6885.23	5671.69	3295.99	31421.48
11 AM	+	4736.77	2872.63	5223.88	5004.96	4402.89	2649.29	5486.91	30377.33
12 PM	+	4728.20	4726.10	3739.07	3238.33	2564.09	2159.24	4910.85	26065.88
1 PM	+	5159.55	3758.63	3962.53	6734.34	2594.22	6824.31	5689.64	34723.23
2 PM	+	4676.12	2004.35	4953.17	3212.57	5474.05	5166.27	5341.88	30828.40
3 PM	+	2681.86	5141.35	7020.21	4855.94	4313.09	3696.06	3471.02	31179.51
4 PM	+	2241.23	4690.99	3831.44	3229.62	4327.19	3092.34	3813.52	25226.32
5 PM	+	4169.34	3179.26	2975.53	3101.27	4056.59	1893.41	5069.81	24445.22
6 PM	+	3637.27	2806.09	2417.58	4233.77	3021.57	3175.29	6738.75	26030.34
7 PM	+	5963.64	2598.62	9198.67	4160.17	3185.09	5475.93	9117.38	39699.51
8 PM	+	2396.56	2382.63	3574.69	2782.84	4525.24	4122.50	3185.07	22969.53
Grand Total (\$)		44457.89	37899.08	51482.25	43731.14	45349.25	43926.34	56120.81	322966.75

As per data, peak sales by hour happen around 7pm (7:00 – 7:49pm) and while by day, it occurs during Saturday.

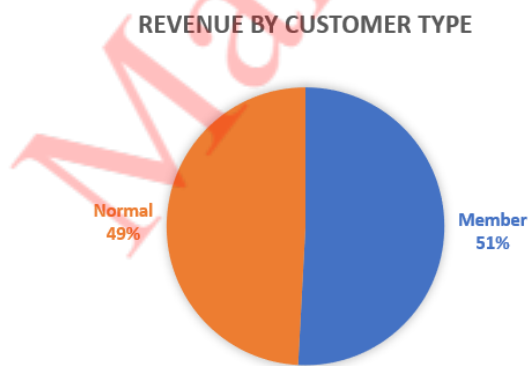
2. CUSTOMER BEHAVIOR ANALYSIS

2.1 Which gender spends more on average, and in which product line?

GENDER SPENDING TRENDS BY PRODUCT LINE							
Sum of Total Purchase Price	Column Labels						
Row Labels		Electronic accessories	Fashion accessories	Food and beverages	Health and beauty	Home and lifestyle	Sports and travel
Female		27102.02	30437.40	33170.92	18560.99	30036.88	28574.72
Male		27235.51	23868.50	22973.93	30632.75	23825.04	26548.11
Grand Total (\$)		54337.53	54305.90	56144.84	49193.74	53861.91	55122.83

Female spends more on average than the male gender and the product line that they spent with the highest is Food and Beverages with a total amount of \$33,170.92.

2.2 Which customer type (Member vs. Normal) contributes more to total revenue?



The customer type that contributes more to total revenue is Member type of customers having purchased a total amount of \$164,223.44.

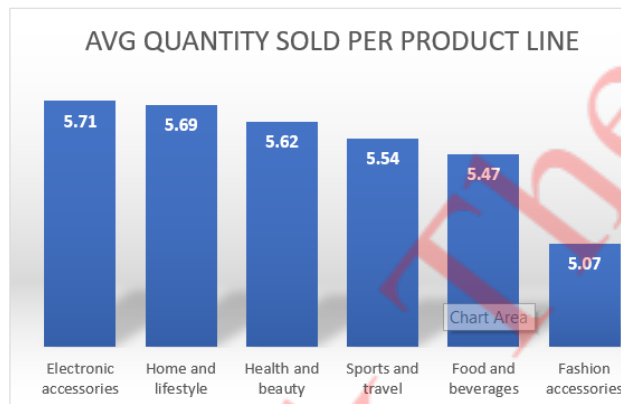
REVENUE BY CUSTOMER TYPE	
Customer Type	Total Purchase Price (\$)
Member	164223.44
Normal	158743.31
Grand Total	322966.75

2.3 Is there a difference in purchasing behavior across different cities?

PURCHASING BEHAVIOR DIFFERENCES ACROSS CITIES				
City <input type="text"/>				
Branch <input type="text"/>	Mandalay	Naypyitaw	Yangon	Total Revenue (\$)
A			106200.37	106200.37
B	106197.67			106197.67
C		110568.71		110568.71
Total Revenue (\$)	106197.67	110568.71	106200.37	322966.75

There is not much difference among the three branches in terms of total revenue, however, it can also be noted that branch C which is located in Naypyitaw gathered the most amount in total revenue of \$110,568.71.

2.3 What is the average number of items per transaction for each product line?



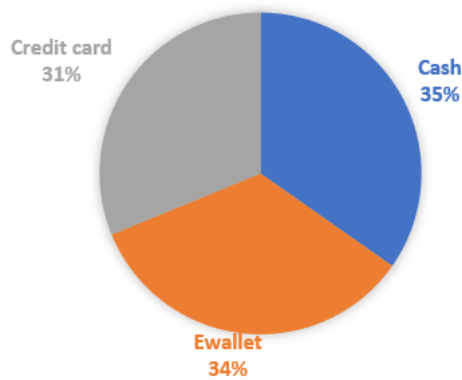
Electronics and accessories had the highest average number of items per transaction, resulting in an average quantity of 5.71, followed by Home and Lifestyle, Health and Beauty, Sports and Travel, Food and Beverages, and lastly, Fashion Accessories.

Overall, customers purchase approximately 5.51~6 items per transaction on average.

AVG QUANTITY SOLD PER PRODUCT LINE	
Product Line <input type="text"/>	Average of Quantity
Electronic accessories	5.71
Home and lifestyle	5.69
Health and beauty	5.62
Sports and travel	5.54
Food and beverages	5.47
Fashion accessories	5.07
Grand Total	5.51

2.4 How does customer spending vary by payment method?

SPENDING VARIATION BY PAYMENT METHOD



Paying by Cash comes first with a total amount of \$112,206.57, followed by Ewallet worthing \$109,993.11 and lastly paying through credit card with \$100,767.07.

CUSTOMER SPENDING VARIATION BY PAYMENT METHOD	
Payment Method	Total Purchase Price (\$)
Cash	112206.57
Ewallet	109993.11
Credit card	100767.07
Grand Total	322966.75

3. PRODUCT & INVENTORY ANALYSIS

3.1 Which product lines have the highest and lowest sales?



The product line that has the highest sales is Food and Beverages with \$56,144.84 while the lowest is Health and Beauty with \$49,193.74.

HIGHEST AND LOWEST SALES BY PRODUCT LINE		
Product Line	Total Purchase Price (\$)	
Food and beverages	56144.84	highest
Sports and travel	55122.83	
Electronic accessories	54337.53	
Fashion accessories	54305.90	
Home and lifestyle	53861.91	
Health and beauty	49193.74	lowest
Grand Total	322966.75	

3.2 Is there a correlation between unit price and quantity sold?

CORRELATION 0.01078



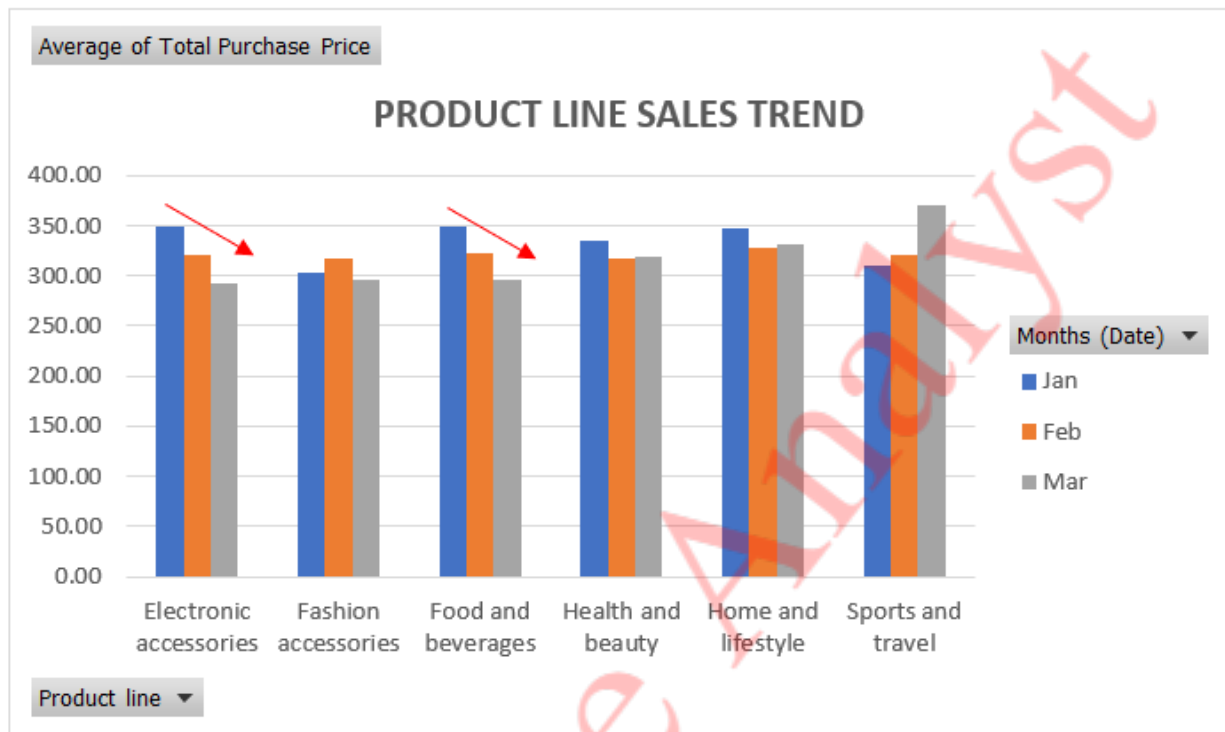
A correlation of 0.0108 indicates an *extremely weak positive correlation* between the two variables, in this case, *unit price* and *quantity sold*.

This means:

- There is *almost no relationship* between unit price and quantity sold, as the correlation is very close to 0.
- The tiny positive value suggests that, if anything, as unit price increases, quantity sold might increase very slightly, but this relationship is *almost negligible*.

In practical terms, this result suggests that unit price and quantity sold are virtually unrelated in this dataset.

3.3 Are some product lines consistently underperforming?

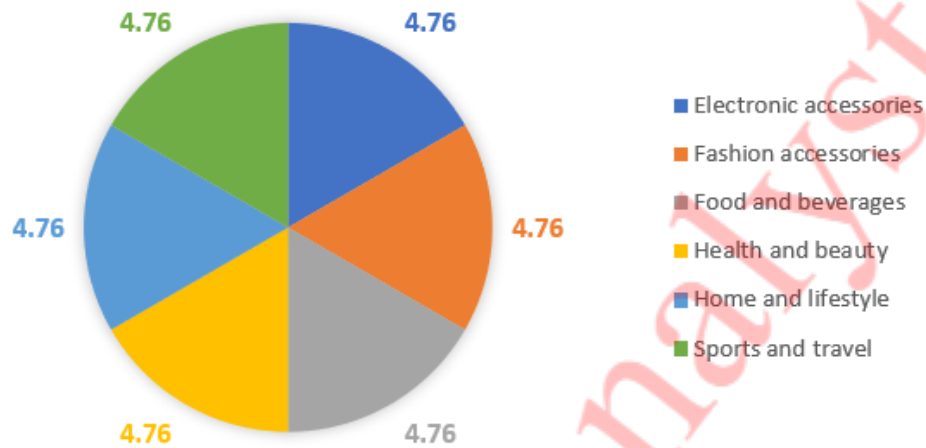


Average of Total Purchase Price	Month				
Product Line	Jan	Feb	Mar	Total Average (\$)	
Electronic accessories	348.73	321.54	292.63	319.63	declining
Fashion accessories	302.27	316.83	295.39	305.09	
Food and beverages	349.47	322.59	295.96	322.67	declining
Health and beauty	334.35	317.44	319.44	323.64	
Home and lifestyle	347.37	327.22	332.27	336.64	
Sports and travel	309.53	321.15	370.68	332.07	
Total Average (\$)	330.37	320.86	317.26	322.97	

Based on the 3-month sales result from the dataset, it can be observed that product lines that are **declining** in sales performance are Electronics Accessories and Food and beverages. Both product lines have been declining over time.

3.4 Which product lines have the highest gross margin?

GROSS MARGIN PER PRODUCT LINE %



GROSS MARGIN BY PRODUCT LINE		
Product Line	Average of gross margin percentage (%)	Average of gross income (\$)
Electronic accessories	4.76	15.22
Fashion accessories	4.76	14.53
Food and beverages	4.76	15.37
Health and beauty	4.76	15.41
Home and lifestyle	4.76	16.03
Sports and travel	4.76	15.81
Grand Total	4.76	15.38

It can be noted that all three branches use the same gross margin percentage of 4.76% with Home and Lifestyle having the highest average gross income of \$16.03.

4. PRICING & DISCOUNT ANALYSIS

4.1 How does the tax impact total sales and profitability?

IMPACT OF TAX ON TOTAL SALES AND PROFITABILITY			
Row Labels	Sum of Tax 5%	Sum of Total Purchase Price	Sum of gross income
Electronic accessories	2587.50	54337.53	2587.50
Fashion accessories	2586.00	54305.90	2586.00
Food and beverages	2673.56	56144.84	2673.56
Health and beauty	2342.56	49193.74	2342.56
Home and lifestyle	2564.85	53861.91	2564.85
Sports and travel	2624.90	55122.83	2624.90
Grand Total	15379.37	322966.75	15379.37

The store's pricing model is designed so that the 5% tax applied to each item also **represents the gross income per item**. This structure indicates that **the store's profitability is entirely reliant on sales volume rather than expanding profit margins, as the tax essentially covers the entire profit margin.**

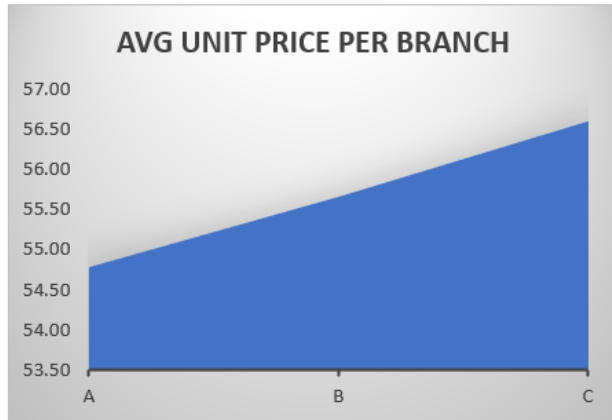
4.2 Do higher-priced products sell less compared to lower-priced ones?

CORRELATION 0.010777564



The correlation between product price and quantity sold is **0.0108**, indicating a **negligible linear relationship**. This suggests that, based on the data analyzed, **price does not significantly impact sales volume**.

4.3 Which branch offers the highest average unit price?

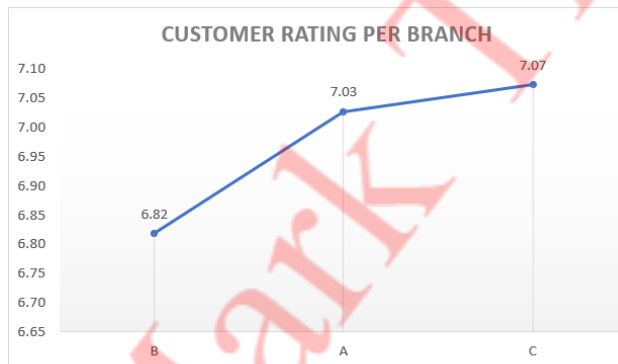


The branch that offers the highest average unit price is **Branch C** which has **\$56.61** per item.

AVERAGE UNIT PRICE PER BRANCH	
Branch	Average of Unit price (\$)
A	54.78
B	55.66
C	56.61
Grand Total	55.67

5. CUSTOMER SATISFACTION (RATINGS ANALYSIS)

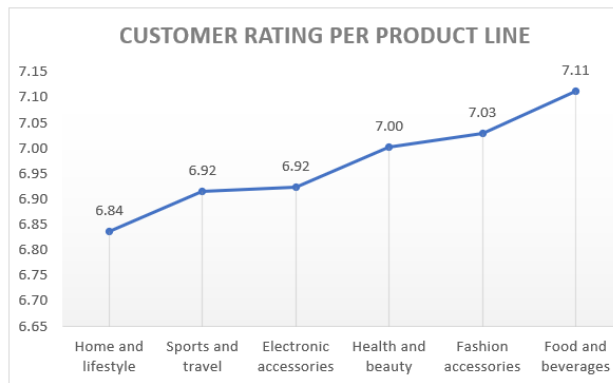
5.1 Which branch has the highest and lowest customer ratings?



The branch the has the **highest rating** is **Branch C**, while the **lowest** is **Branch B**.

CUSTOMER RATING PER BRANCH	
Branch	Average of Rating
B	6.82
A	7.03
C	7.07
Grand Total	6.97

5.2 Which product line has the best and worst ratings?

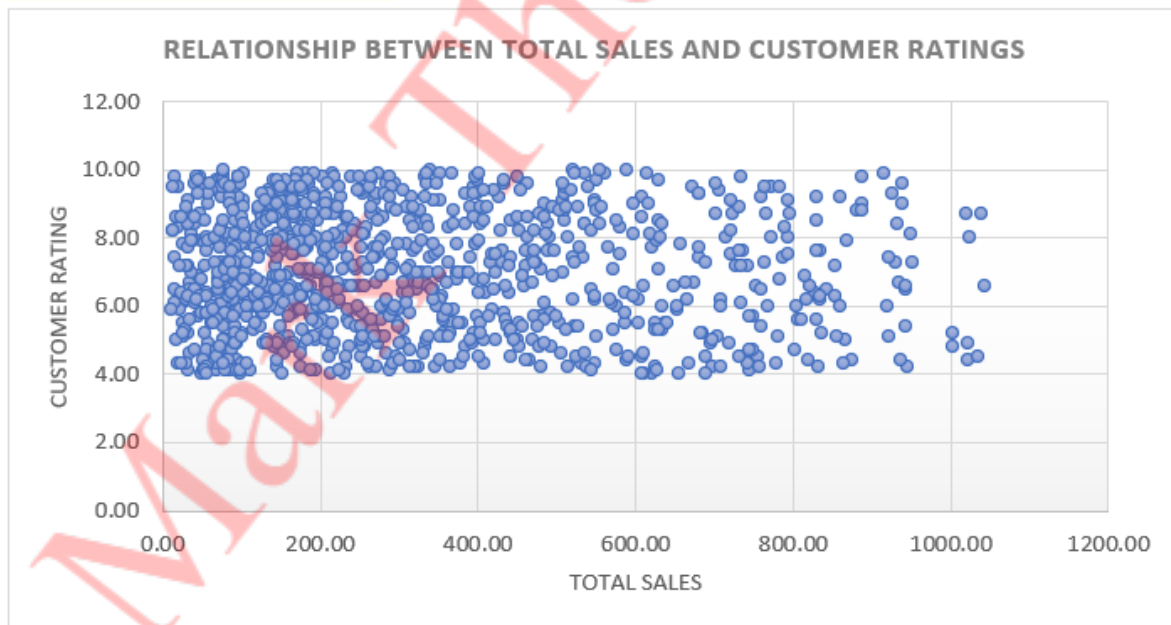


The product line that has the **best rating** is Food and Beverages having a rating of 7.11/10 while the **worst** is Home and Lifestyle with 6.84/10.

CUSTOMER RATING PER PRODUCT LINE		
Product Line	Average of Rating	
Home and lifestyle	6.84	worst rating
Sports and travel	6.92	
Electronic accessories	6.92	
Health and beauty	7.00	
Fashion accessories	7.03	
Food and beverages	7.11	best rating
Grand Total	6.97	

5.3 Is there a relationship between total sales and customer ratings?

CORRELATION -0.036441705



The correlation between total sales and customer ratings is -0.036, indicating a very weak negative relationship. This suggests that there is little to no meaningful relationship between total sales and customer ratings in this dataset.

RELATIONSHIP BETWEEN TOTAL SALES AND CUSTOMER RATINGS - REGRESSION ANALYSIS								
Regression Statistics								
Multiple R	0.036441705							
R Square	0.001327998							
Adjusted R Square	0.000327325							
Standard Error	1.718299005							
Observations	1000							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	3.91834363	3.91834363	1.327104259	0.24959691			
Residual	998	2946.646366	2.952551469					
Total	999	2950.56471						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	7.054960946	0.089730264	78.6240965	0	6.878879314	7.231042578	6.878879314	7.231042578
X Variable 1	-0.000254704	0.000221097	-1.152000112	0.24959691	-0.000688573	0.000179165	-0.000688573	0.000179165

The **R-squared** value is **0.0013**, indicating that the independent variable (**total sales**) explains only 0.13% of the variation in the dependent variable (**customer ratings**), which suggests a **very weak relationship between the two variables.**

The **coefficient** for total sales is **-0.00025**, suggesting that for every unit increase in total sales, customer ratings decrease slightly. However, the **p-value** for this coefficient is **0.25**, which is greater than the **0.05 threshold**, meaning that this relationship is **not statistically significant** and the result could be due to random chance.

In summary, based on these results, there is no meaningful or statistically significant relationship between total sales and customer ratings.

5.4 Do high-spending customers leave better ratings?

Percentile	Values	Spending Type
33rd percentile	< 163.36	Low Spender
66th Percentile	163.37 - 382.80	Medium Spender
100th percentile	> 382.80	High Spender

IMPACT OF HIGH SPENDING ON CUSTOMER RATINGS			
Spending Type	Number of Spender	Rating Average	Average of Total Purchase Price (\$)
High Spender	340	6.93	615.03
Medium Spender	330	7.06	256.46
Low Spender	330	6.93	88.56
Grand Total	1000	6.97	322.97
		CORRELATION	-0.196856012

The correlation between total spending and customer ratings is **-0.197**, indicating a weak negative relationship. This suggests that there is a slight inverse trend, where **higher spending may be weakly associated with lower ratings, although the relationship is not strong enough to draw definitive conclusions**

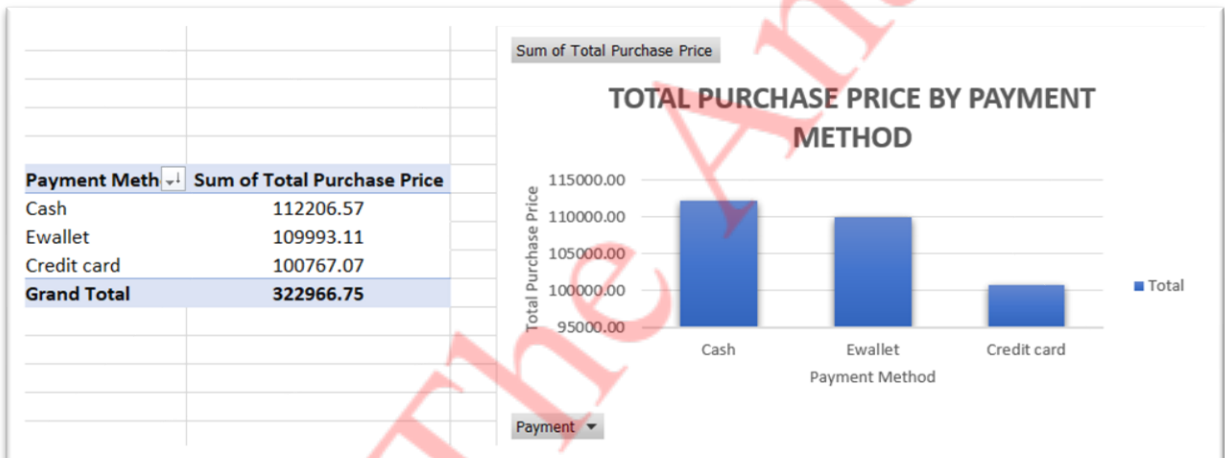
6. PAYMENT & TRANSACTION ANALYSIS

6.1 Which payment method is most commonly used?

CUSTOMER'S PAYMENT METHOD	
Payment Method	Number of Customer
Ewallet	345
Cash	344
Credit card	311
Grand Total	1000

The most commonly used payment method is the Ewallet, which has 345 customers.

6.2 Are there differences in spending based on the payment method? Do customers using a specific payment method buy more expensive products?

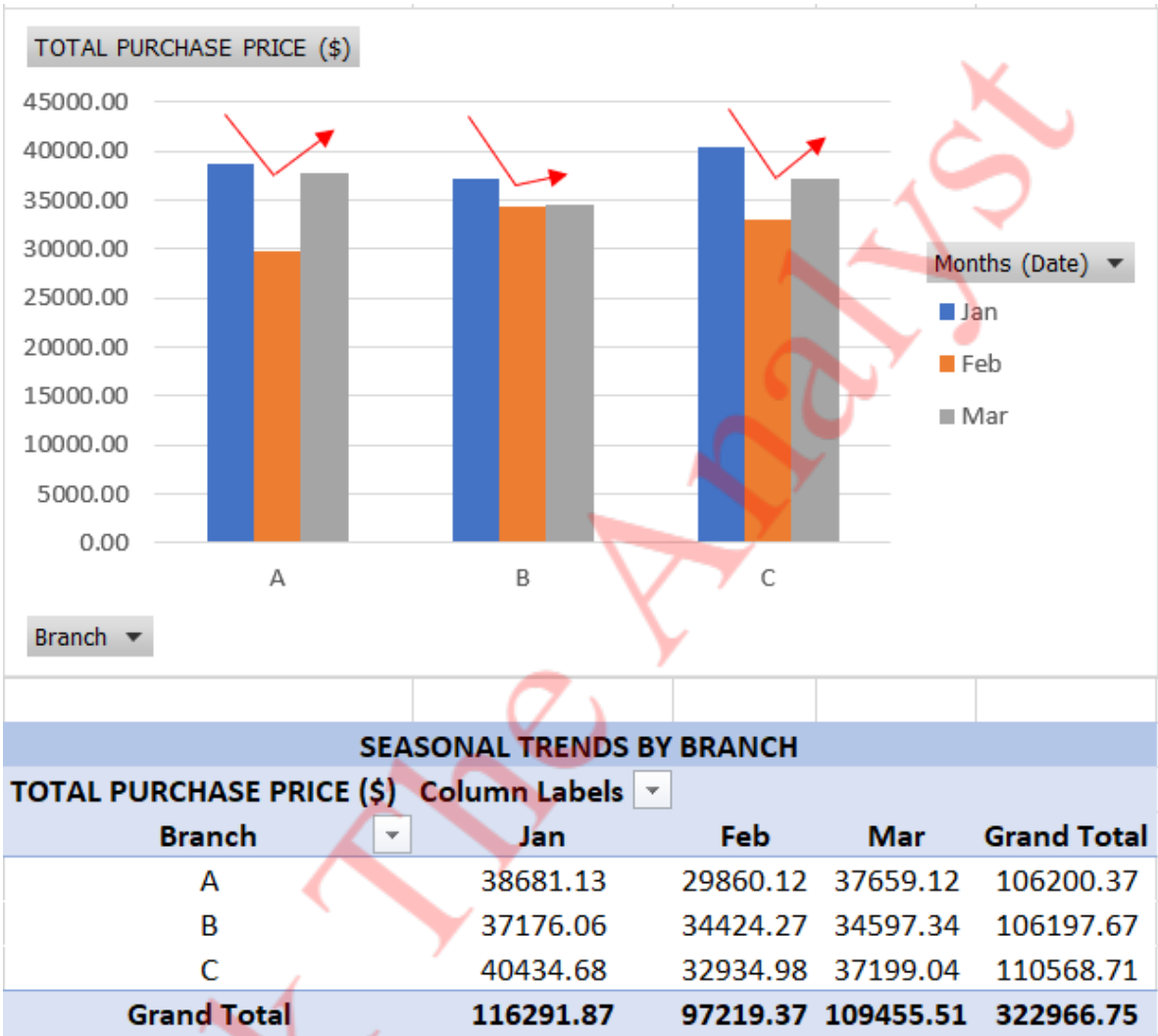


CUSTOMER'S PAYMENT METHOD		
Payment Meth	Number of Customer	Sum of Total Purchase Price
Ewallet	345	109993.11
Cash	344	112206.57
Credit card	311	100767.07
Grand Total	1000	322966.75
CORRELATION		0.97818108

The correlation between payment method and total purchase price is **0.978**, indicating a very strong positive relationship. This suggests that a customer's total purchase price is closely linked to the payment method they choose. Specifically, customers using **Cash** are expected to have the **highest total purchase price**, followed by those using **Ewallet**, with **Credit card** users generally making the lowest total purchases.

7. TREND & TIME-BASED ANALYSIS

7.1 Are there seasonal trends in supermarket sales by branch?



Overview

Based on the sales data from January to March, there is a clear seasonal trend across all branches. January recorded strong sales, but February experienced a significant decline, followed by a recovery in March.

Key Findings

- **January Sales:** Sales were at their highest, indicating strong consumer demand at the beginning of the year.
- **February Dip:** There was a noticeable drop in sales across all branches, suggesting a potential seasonal slowdown.
- **March Recovery:** Sales increased again, indicating a return of consumer demand.

Recommendations

To mitigate the sales decline in February, the following strategies can be implemented:

1. **Promotional Campaigns:** Introduce discounts, bundled offers, or loyalty rewards to attract more customers.
2. **Seasonal Marketing Strategies:** Align promotions with events such as Valentine's Day or other seasonal trends.
3. **Product Mix Optimization:** Identify high-performing products from January and March and promote them more in February.
4. **Customer Engagement:** Enhance marketing efforts through targeted ads, email promotions, and in-store activations.

By implementing these strategies, we can work towards minimizing the sales dip in February and ensuring a more stable revenue flow throughout the first quarter.

7.2 Is revenue increasing or decreasing over time?

Revenue Trend Analysis (January - March)

From the recorded sales data, **January had the highest revenue**, but there was a **notable decline in February** across all branches. However, **in March, sales rebounded**, indicating a recovery.

- **January → February:** Revenue **decreased** significantly.
- **February → March:** Revenue **increased** again.

Since the data covers only **three months**, it is difficult to determine a **long-term trend**. However, the short-term pattern suggests **fluctuations rather than a consistent increase or decrease**. To establish a clearer trend, it would be beneficial to analyze sales over a longer period, ideally a year or more.

SUMMARY OF FINDINGS

1. SALES & REVENUE INSIGHTS

- *The total revenue across the three branches is \$322,966.75, with Branch C generating the highest sales at \$110,568.71. There isn't much variation in total revenue among the branches. The Food and Beverages product line leads in revenue, bringing in \$56,144.83, while Electronics Accessories is the top-selling product by quantity, with 971 units sold across all branches. Peak sales occur around 7:00–7:49 PM, and Saturdays see the highest sales by day.*

2. CUSTOMER BEHAVIOR ANALYSIS

- *Females tend to spend more on average than males, with their highest expenditure on the Food and Beverages product line, totaling \$33,170.92. Member-type customers contribute significantly to total revenue, having spent \$164,223.44 in total. On average, customers purchase around 5.51~6 items per transaction. Cash payments lead with \$112,206.57, followed by Ewallets at \$109,993.11, and credit card payments at \$100,767.07.*

3. PRODUCT & INVENTORY ANALYSIS

- *Food and Beverages leads sales at \$56,144.84, while Health and Beauty trails at \$49,193.74. The correlation of 0.0108 shows a very weak link between unit price and quantity sold. Over the last three months, Electronics Accessories and Food and Beverages have declined in sales. All three branches share a 4.76% gross margin, with Home and Lifestyle achieving the highest average gross income of \$16.03.*

4. PRICING & DISCOUNT ANALYSIS

- *The store's profitability depends mainly on sales volume, as taxes cover most of the profit margin. The correlation between product price and quantity sold is 0.0108, indicating a negligible relationship, suggesting that price doesn't significantly impact sales volume. Branch C offers the highest average unit price at \$56.61 per item.*

5. CUSTOMER SATISFACTION (RATINGS ANALYSIS)

- *Branch C leads in ratings, while Branch B ranks lowest. Food and Beverages scores the highest with 7.11/10, and Home and Lifestyle the lowest at 6.84/10. The weak negative correlations between total sales (-0.036) and spending (-0.197) with customer ratings suggest no strong connection, though a slight inverse trend is observed with higher spending.*

6. PAYMENT & TRANSACTION ANALYSIS

- *The Ewallet is the most commonly used payment method, with 345 customers. The strong correlation of 0.978 between payment method and total purchase price shows that payment method is closely linked to purchase amounts. Cash users typically have the highest total purchases, followed by Ewallet users, while credit card users make the lowest purchases.*

7. TREND & TIME-BASED ANALYSIS

- *The sales data from January to March shows a seasonal trend, with strong sales in January, a decline in February, and a recovery in March. The short-term pattern indicates fluctuations, making it difficult to identify a long-term trend. Analyzing sales over a longer period would provide a clearer picture.*

RECOMMENDATION

To sustain revenue and improve profitability, the business should:

1. Monitor product trends more closely, particularly the decline in Electronics Accessories and Food and Beverages, and adjust marketing or bundling strategies accordingly.
2. Capitalize on peak hours (7:00–7:49 PM) and weekends, optimizing staffing, inventory, and promotions during these periods.
3. Segment marketing efforts by gender and membership status, since female customers and members contribute more significantly to revenue.
4. Investigate product performance beyond price, as pricing appears to have minimal impact on sales volume; instead, focus on product placement, bundling, or loyalty perks.
5. Improve satisfaction for underperforming categories like Home and Lifestyle by gathering direct feedback and enhancing the product experience.
6. Extend sales tracking beyond the current 3-month window to detect long-term trends and forecast seasonal performance with greater accuracy.

REFLECTION & NEXT STEPS

- This project improved my ability to analyze retail data in Excel and draw insights from customer behavior, sales patterns, and product trends. Next, I plan to extend the dataset and explore advanced Excel tools like pivot charts and forecasting for deeper analysis.