INTRODUCTION OF DATAMANAGEMENT

PROJECT REPORT

(Project Semester January-April 2025)

(Supermarket Sales)

Submitted by

Joy Pyne

Registration No.-12310620

Programme and Section-K23EP

Course Code: INT217-INTRODUCTION OF DATAMANAGEMENT

Under the Guidance of

Dr. Mrinalini Rana

Discipline of CSE/IT

Lovely School of Computer Science and Engineering

Lovely Professional University, Phagwara

CERTIFICATE

This is to certify that Joy Pyne bearing Registration no. 12310620 has completed INT217 project titled, “Supermarket Sale” under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort and study.

Signature and Name of the Supervisor
Designation of the Supervisor
School of Computer Science and Engineering
Lovely Professional University
Phagwara, Punjab.

Date: 12-04-2025

DECLARATION

I Joy Pyne, student of Computer Science and Engineering under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 12-04-2025

Signature

Registration No. :- 12310620

Name of the student

Joy Pyne

1. Introduction:-

In the fast-paced and competitive retail landscape, supermarkets generate large volumes of sales data daily. Transforming this raw data into actionable insights is vital for improving operations, understanding customer preferences, and boosting revenue. This project centers around the development of an interactive **Supermarket Sales Dashboard** using Excel to visualize and analyze various performance metrics.

The dataset provides aggregated information on revenue, customer demographics, payment methods, product categories, and more — enabling a comprehensive understanding of store performance.

Key objectives of the dashboard:

- Track total revenue and sales performance across customer types and product categories.
- Understand payment method distribution and identify popular payment channels.
- Analyze trends based on gender and membership status.
- Monitor monthly revenue performance and peak periods.
- Identify underperforming segments and suggest improvements.

The dashboard employs interactive visuals such as bar graphs, pie charts, line graphs, and filterable tables, making it intuitive and accessible even for non-technical users. It empowers the coffee shop owner or manager to make data-driven decisions, such as adjusting inventory levels, offering discounts on slow-moving products, or developing targeted marketing campaigns.

2. Datasets:-

The dataset represents a **summary report** of supermarket transactions, preprocessed into pivot-ready format. It contains **aggregated sales data** derived from the original raw transactions, grouped across multiple customer and product dimensions

.

Data Points Included:

- **Customer Gender** (Male / Female)
- **Customer Type** (Member / Normal)
- **Product Categories** (e.g., Food, Electronic Accessories, Fashion Accessories)
- **Payment Methods** (Cash, Credit card, E-wallet)
- **Monthly Sales and Tax Values**
- **Total Revenue, Tax 5%, and Quantity Sold**

LINK-:

https://github.com/MainakRepositor/Datasets/blob/master/supermarket_sales.csv

Linkedin Link :- https://www.linkedin.com/posts/joypyne2807_exceldashboard-dataanalysis-covid19analysis-activity-7316874579883225088-NAKM?utm_source=social_share_send&utm_medium=member_desktop_web&rcm=ACoAAEhwk4QB1kpY8wY2LU_5ZBI8F0J8s78vkG0

3. Datasets Preprocessing:-

To prepare the Super Market Sales data for dashboard visualization and in-depth analysis, several preprocessing steps were applied to enhance its structure, readability, and analytical potential. These transformations are reflected in the file and are summarized below:

1. Data Cleaning:

- Removed unnecessary blank rows and columns.
- Filtered out NULL values and corrected inconsistent category labels.
- Standardized text (e.g., capitalization of gender labels and product types).

2. Pivot Table Preparation:

- Grouped data into separate pivot tables by **Customer Type**, **Gender**, **Payment Method**, and **Month**.
- Calculated key metrics such as **Total Sales**, **Average Sales per Customer**, and **Category-wise Tax Contribution**.

3. Monthly Aggregation:

- Grouped sales data by month to observe seasonality and promotional impacts.
- Cross-tabulated Payment Method vs. Monthly Sales to track adoption trends.

4. Visual Readiness:

- Applied consistent formatting (headers, coloring, fonts).
- Created charts using Excel's built-in tools: bar graphs, pie charts, and trend lines.
- Added **Slicers** to filter results by Customer Type, Gender, and Month.

Final Outcome:-

The resulting preprocessed dataset is now optimized for dashboarding tools like Excel, with clean, enriched, and structured data that supports meaningful visual insights.

4. Analysis on dataset (for each objective)

I. General Description:-

The supermarket operates through a single or centralized location (not segmented by branches), and the analysis

spans multiple customer types and product categories. Core metrics tracked include:

Each row in the dataset typically includes the following fields:

Field	Description
Customer Type	Loyalty classification: Member or Normal
Product Category	Food, Electronics, Fashion Accessories
Payment Method	Cash, Credit Card, E-Wallet
Month	Aggregated **monthly sales** data; useful for tracking seasonal trends.
Tax 5%	Value-added tax amount per transaction; useful for financial and compliance tracking.
Gross Income	Total income from sales excluding tax; calculated metric from total sales.
Total Sales	Final sale value including taxes; used for revenue tracking.
Quantity	Number of units sold per transaction or grouped category (if available).
City	Operational locations like **Yangon**, **Mandalay**, **Naypyitaw**
Branch	Logical grouping of customers or stores (e.g., **Segment A, B, C**); may reflect regions or customer types.

ii. Specific Requirements:

The dashboard is designed to fulfill the following analysis objectives:

Objective	Insights
Analyze Sales by Tax (VAT) Contribution	See which product lines or branches contribute most in VAT (tax).
Sales by Gender and Customer Type per Branch	Analyze the Sales and Customer Type with the branch as a Slicer

Sales by Day, City, and Customer Type	Analyze Sales Performance by Day, City, and Customer Segmentation
Branch-Wise Profit Share	Show the share of total gross income generated by each branch
Monthly sales by payment method	Compare how much each payment type contributes to monthly sales.

iii. Analysis Results (with Examples)

Here's a more detailed breakdown of the key visuals and what they represent:

- Here's a breakdown of major insights derived from the data:

  Customer Type Revenue

  - **Members** generated higher overall sales than non-members.
  - Suggests strong return on loyalty programs.

  Gender Analysis

  - **Female customers** made slightly more purchases in terms of value.
  - Can help in tailoring campaigns or promotions.

  Payment Preferences

  - **E-Wallets** were used more frequently, followed by **Credit Cards**.
  - Indicates rising digital payment trends.

  Category Contribution

  - **Food products** were the highest sold by volume.
  - **Electronic Accessories** generated higher per-unit revenue and tax.

  Monthly Trends

  - Sales peaked in **March** and **April**.
  - Likely due to seasonal shopping patterns or targeted promotions.

iv. Visualization Techniques

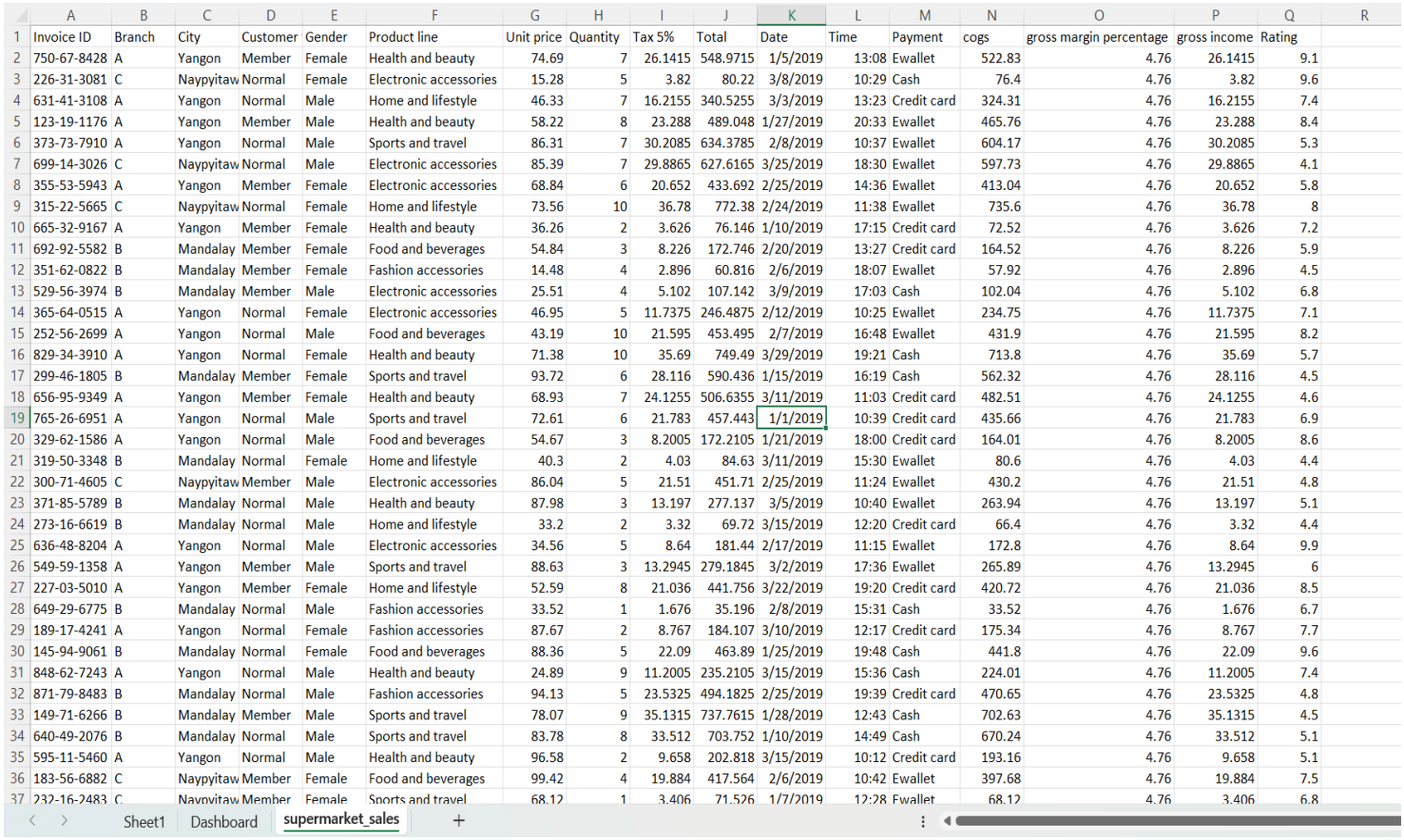
All visuals were created using Excel Pivot Tables and Pivot Charts. Key formatting & preprocessing steps include:

All visuals were created in Microsoft Excel using:

- **Pivot Tables** for dynamic summaries.

- **Bar Charts** to show revenue comparison by categories or genders.
- **Pie Charts** for distribution (e.g., Payment Method %).
- **Line Graphs** to show revenue trends over time.
- **Slicers** for filtering by Gender, Month, and Customer Type.
- Custom color schemes and consistent formatting were applied.

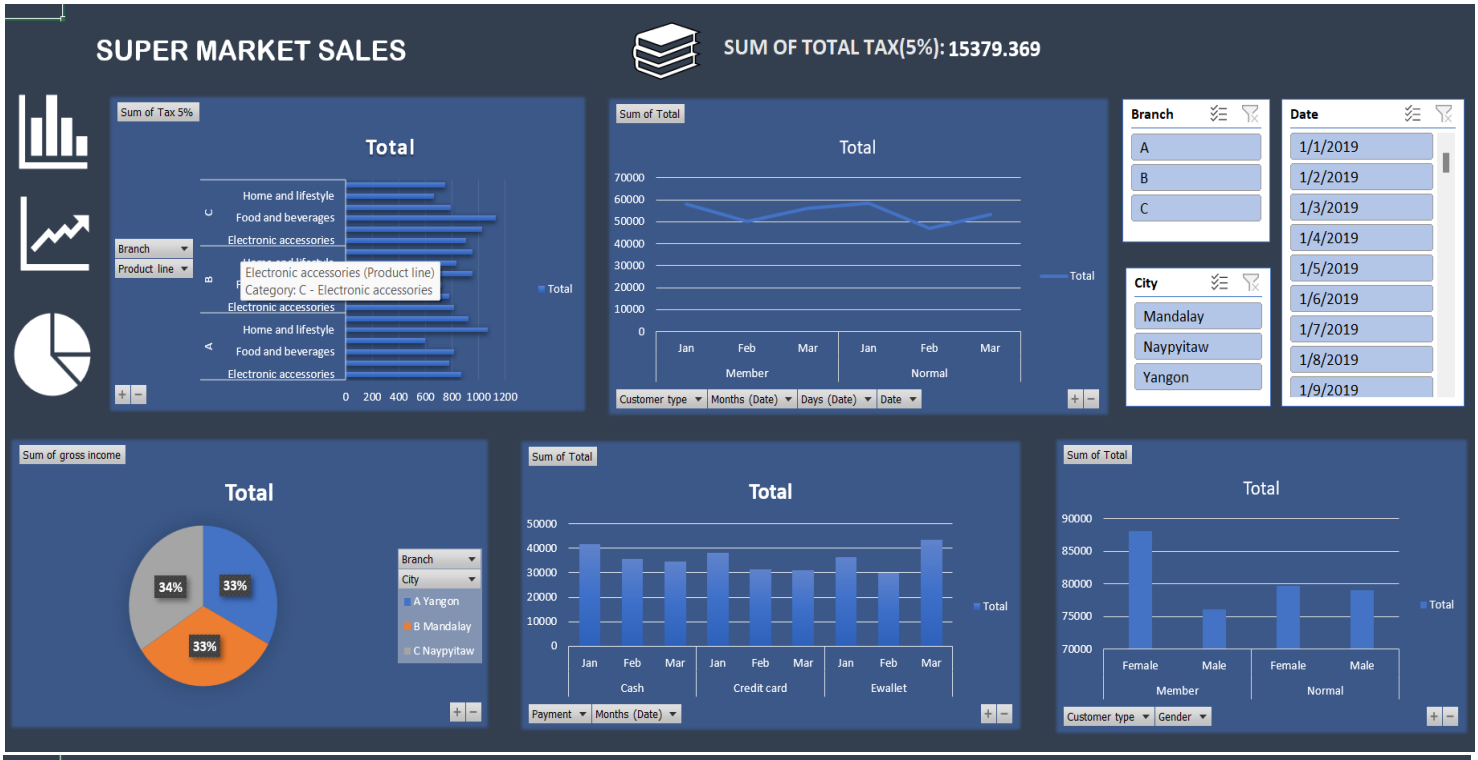
Raw Data Of Excel:-

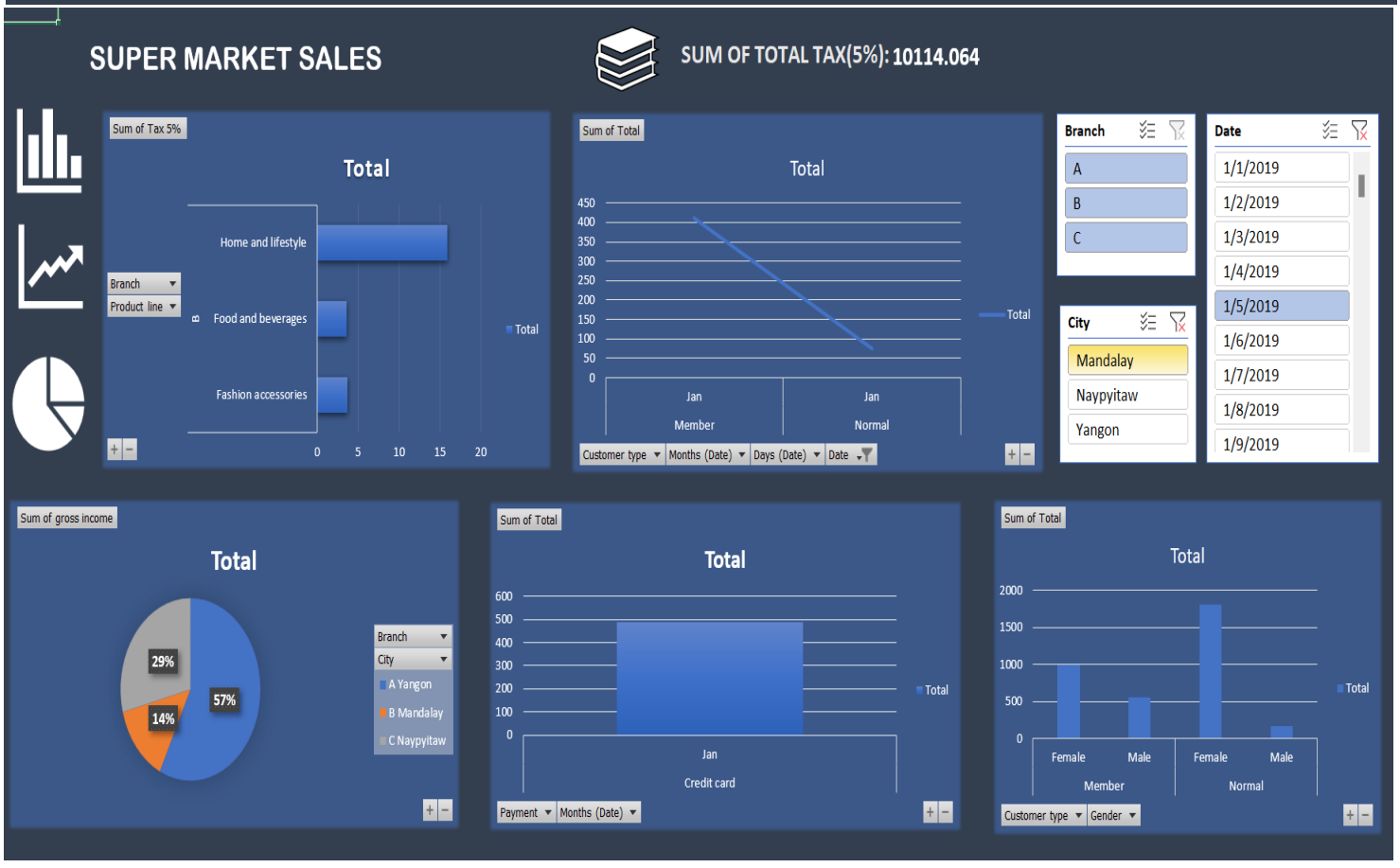


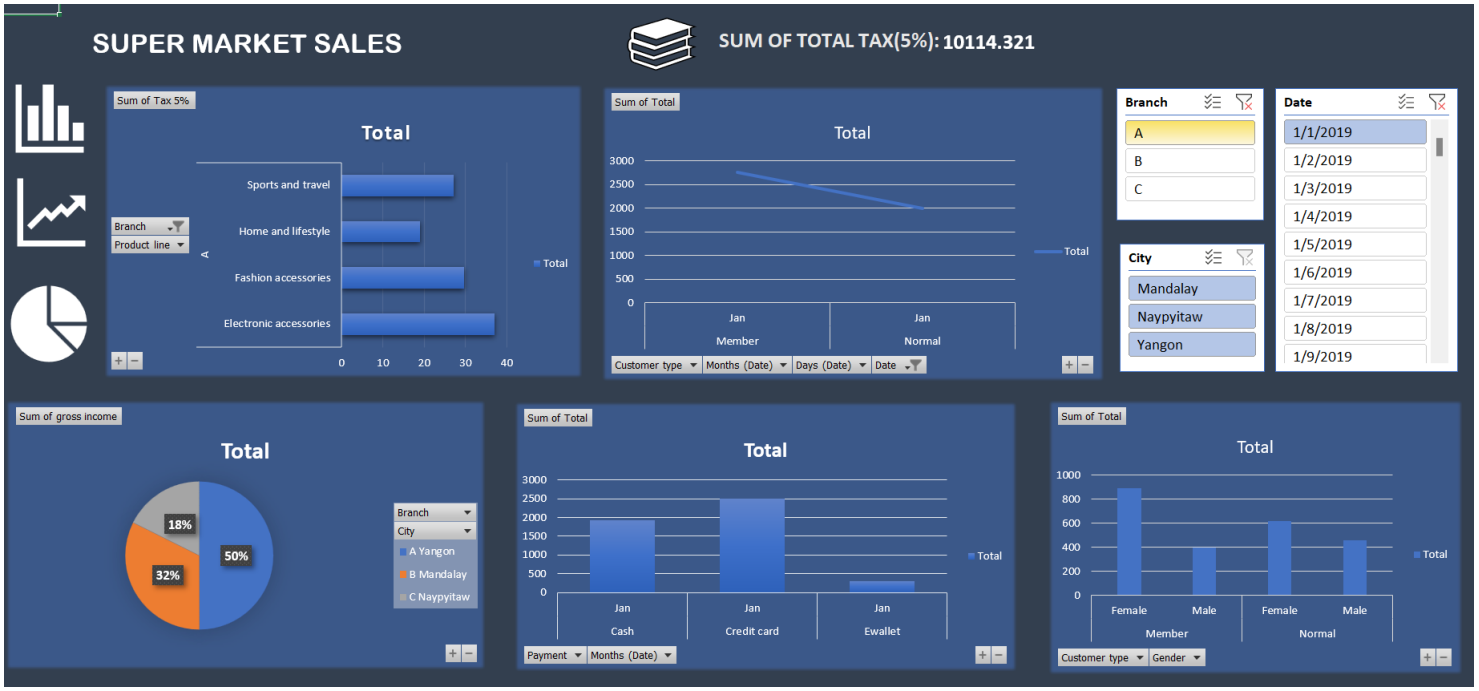
Invoice ID	Branch	City	Customer	Gender	Product line	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs	gross margin percentage	gross income	Rating
750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	1/5/2019	13:08	Ewallet	522.83	4.76	26.1415	9.1
226-31-3081	C	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.82	80.22	3/8/2019	10:29	Cash	76.4	4.76	3.82	9.6
631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	3/3/2019	13:23	Credit card	324.31	4.76	16.2155	7.4
123-19-1176	A	Yangon	Member	Male	Health and beauty	58.22	8	23.288	489.048	1/27/2019	20:33	Ewallet	465.76	4.76	23.288	8.4
373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2/8/2019	10:37	Ewallet	604.17	4.76	30.2085	5.3
699-14-3026	C	Naypyitaw	Normal	Male	Electronic accessories	85.39	7	29.8865	627.6165	3/25/2019	18:30	Ewallet	597.73	4.76	29.8865	4.1
355-53-5943	A	Yangon	Member	Female	Electronic accessories	68.84	6	20.652	433.692	2/25/2019	14:36	Ewallet	413.04	4.76	20.652	5.8
315-22-5665	C	Naypyitaw	Normal	Female	Home and lifestyle	73.56	10	36.78	772.38	2/24/2019	11:38	Ewallet	735.6	4.76	36.78	8
665-32-9167	A	Yangon	Member	Female	Health and beauty	36.26	2	3.626	76.146	1/10/2019	17:15	Credit card	72.52	4.76	3.626	7.2
692-92-5582	B	Mandalay	Member	Female	Food and beverages	54.84	3	8.226	172.746	2/20/2019	13:27	Credit card	164.52	4.76	8.226	5.9
351-62-0822	B	Mandalay	Member	Female	Fashion accessories	14.48	4	2.896	60.816	2/6/2019	18:07	Ewallet	57.92	4.76	2.896	4.5
529-56-3974	B	Mandalay	Member	Male	Electronic accessories	25.51	4	5.102	107.142	3/9/2019	17:03	Cash	102.04	4.76	5.102	6.8
365-64-0515	A	Yangon	Normal	Female	Electronic accessories	46.95	5	11.7375	246.4875	2/12/2019	10:25	Ewallet	234.75	4.76	11.7375	7.1
252-56-2699	A	Yangon	Normal	Male	Food and beverages	43.19	10	21.595	453.495	2/7/2019	16:48	Ewallet	431.9	4.76	21.595	8.2
829-34-3910	A	Yangon	Normal	Female	Health and beauty	71.38	10	35.69	749.49	3/29/2019	19:21	Cash	713.8	4.76	35.69	5.7
299-46-1805	B	Mandalay	Member	Female	Sports and travel	93.72	6	28.116	590.436	1/15/2019	16:19	Cash	562.32	4.76	28.116	4.5
656-95-9349	A	Yangon	Member	Female	Health and beauty	68.93	7	24.1255	506.6355	3/11/2019	11:03	Credit card	482.51	4.76	24.1255	4.6
765-26-6951	A	Yangon	Normal	Male	Sports and travel	72.61	6	21.783	457.443	1/1/2019	10:39	Credit card	435.66	4.76	21.783	6.9
329-62-1586	A	Yangon	Normal	Male	Food and beverages	54.67	3	8.2005	172.2105	1/21/2019	18:00	Credit card	164.01	4.76	8.2005	8.6
319-50-3348	B	Mandalay	Normal	Female	Home and lifestyle	40.3	2	4.03	84.63	3/11/2019	15:30	Ewallet	80.6	4.76	4.03	4.4
300-71-4605	C	Naypyitaw	Member	Male	Electronic accessories	86.04	5	21.51	451.71	2/25/2019	11:24	Ewallet	430.2	4.76	21.51	4.8
371-85-5789	B	Mandalay	Normal	Male	Health and beauty	87.98	3	13.197	277.137	3/5/2019	10:40	Ewallet	263.94	4.76	13.197	5.1
273-16-6619	B	Mandalay	Normal	Male	Home and lifestyle	33.2	2	3.32	69.72	3/15/2019	12:20	Credit card	66.4	4.76	3.32	4.4
636-48-8204	A	Yangon	Normal	Male	Electronic accessories	34.56	5	8.64	181.44	2/17/2019	11:15	Ewallet	172.8	4.76	8.64	9.9
549-59-1358	A	Yangon	Member	Male	Sports and travel	88.63	3	13.2945	279.1845	3/2/2019	17:36	Ewallet	265.89	4.76	13.2945	6
227-03-5010	A	Yangon	Member	Female	Home and lifestyle	52.59	8	21.036	441.756	3/22/2019	19:20	Credit card	420.72	4.76	21.036	8.5
649-29-6775	B	Mandalay	Normal	Male	Fashion accessories	33.52	1	1.676	35.196	2/8/2019	15:31	Cash	33.52	4.76	1.676	6.7
189-17-4241	A	Yangon	Normal	Female	Fashion accessories	87.67	2	8.767	184.107	3/10/2019	12:17	Credit card	175.34	4.76	8.767	7.7
145-94-9061	B	Mandalay	Normal	Female	Food and beverages	88.36	5	22.09	463.89	1/25/2019	19:48	Cash	441.8	4.76	22.09	9.6
848-62-7243	A	Yangon	Normal	Male	Health and beauty	24.89	9	11.2005	235.2105	3/15/2019	15:36	Cash	224.01	4.76	11.2005	7.4
871-79-8483	B	Mandalay	Normal	Male	Fashion accessories	94.13	5	23.5325	494.1825	2/25/2019	19:39	Credit card	470.65	4.76	23.5325	4.8
149-71-6266	B	Mandalay	Member	Male	Sports and travel	78.07	9	35.1315	737.7615	1/28/2019	12:43	Cash	702.63	4.76	35.1315	4.5
640-49-2076	B	Mandalay	Normal	Male	Sports and travel	83.78	8	33.512	703.752	1/10/2019	14:49	Cash	670.24	4.76	33.512	5.1
595-11-5460	A	Yangon	Normal	Male	Health and beauty	96.58	2	9.658	202.818	3/15/2019	10:12	Credit card	193.16	4.76	9.658	5.1
183-56-6882	C	Naypyitaw	Member	Female	Food and beverages	99.42	4	19.884	417.564	2/6/2019	10:42	Ewallet	397.68	4.76	19.884	7.5
232-16-2483	C	Naypyitaw	Member	Female	Sports and travel	68.12	1	3.406	71.526	1/7/2019	12:28	Ewallet	68.12	4.76	3.406	6.8

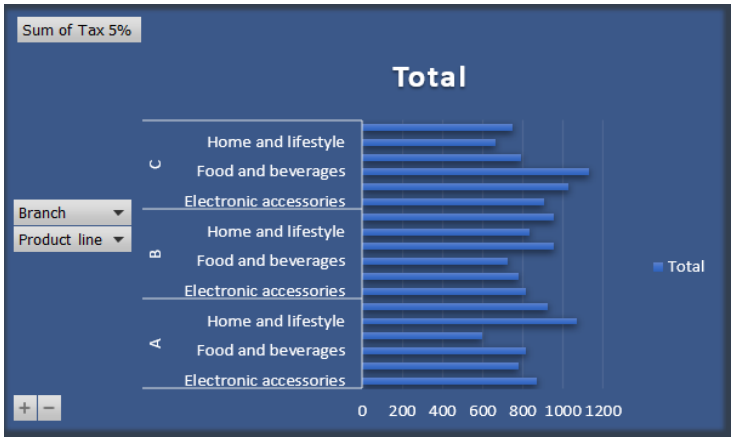
Sheet1 Dashboard supermarket_sales +

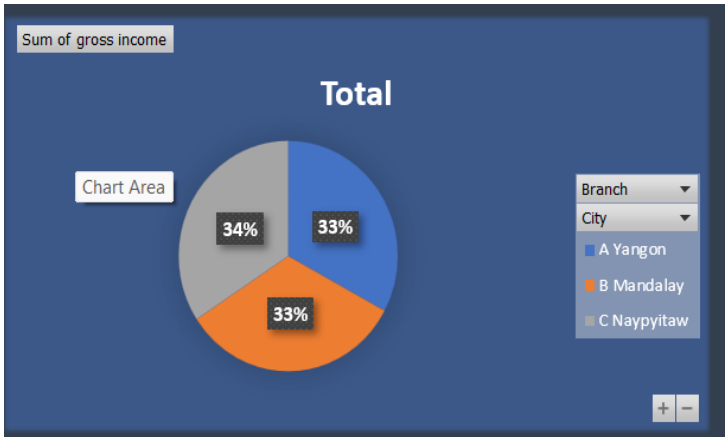
Dashboard:-

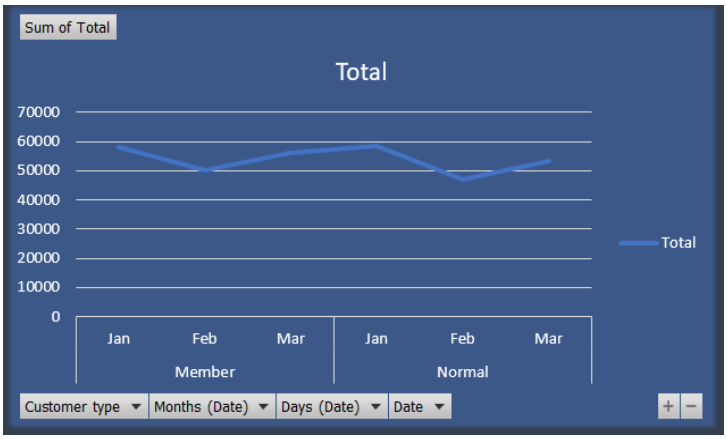

SUPER MARKET SALES
SUM OF TOTAL TAX(5%): 15379.369
Sum of Tax 5%
Total
Home and lifestyle
Food and beverages
Electronic accessories
Branch
Product line
Electronic accessories (Product line)
Category: C - Electronic accessories
Total
Sum of Total
Total
Jan Feb Mar Jan Feb Mar
Member
Normal
Customer type
Months (Date)
Days (Date)
Date
Branch
A
B
C
City
Mandalay
Naypyitaw
Yangon
Date
1/1/2019
1/2/2019
1/3/2019
1/4/2019
1/5/2019
1/6/2019
1/7/2019
1/8/2019
1/9/2019
Sum of gross income
Total
34%
33%
33%
Branch
City
A Yangon
B Mandalay
C Naypyitaw
Sum of Total
Total
Jan Feb Mar Jan Feb Mar Jan Feb Mar
Cash
Credit card
Ewallet
Payment
Months (Date)
Sum of Total
Total
Female Male Female Male
Member
Normal
Customer type
Gender

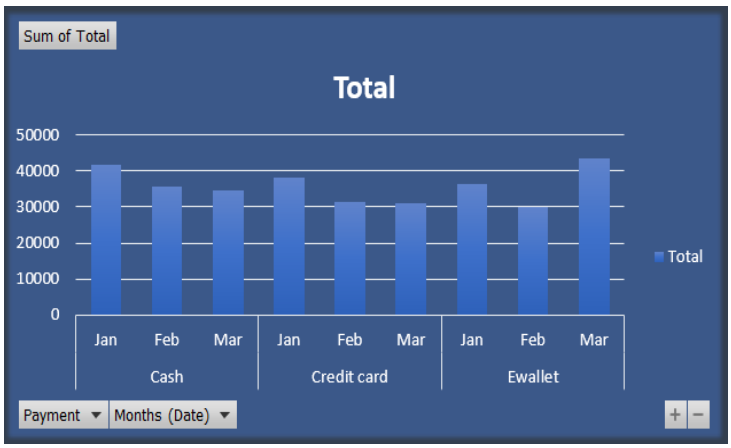

SUPER MARKET SALES
SUM OF TOTAL TAX(5%): 10114.064
Sum of Tax 5%
Total
Home and lifestyle
Food and beverages
Fashion accessories
Branch
Product line
Total
Sum of Total
Total
Jan Jan
Member
Normal
Customer type
Months (Date)
Days (Date)
Date
Branch
A
B
C
City
Mandalay
Naypyitaw
Yangon
Date
1/1/2019
1/2/2019
1/3/2019
1/4/2019
1/5/2019
1/6/2019
1/7/2019
1/8/2019
1/9/2019
Sum of gross income
Total
29%
57%
14%
Branch
City
A Yangon
B Mandalay
C Naypyitaw
Sum of Total
Total
Jan
Credit card
Payment
Months (Date)
Sum of Total
Total
Female Male Female Male
Member
Normal
Customer type
Gender


SUPER MARKET SALES
SUM OF TOTAL TAX(5%): 10114.321
Sum of Tax 5%
Total
Sports and travel
Home and lifestyle
Fashion accessories
Electronic accessories
Branch
Product line
Total
Sum of Total
Total
Jan
Member
Jan
Normal
Customer type
Months (Date)
Days (Date)
Date
Branch
A
B
C
City
Mandalay
Naypyitaw
Yangon
Date
1/1/2019
1/2/2019
1/3/2019
1/4/2019
1/5/2019
1/6/2019
1/7/2019
1/8/2019
1/9/2019
Sum of gross income
Total
18%
50%
32%
Branch
City
A Yangon
B Mandalay
C Naypyitaw
Sum of Total
Total
Jan
Cash
Jan
Credit card
Jan
Ewallet
Payment
Months (Date)
Sum of Total
Total
Female
Male
Female
Male
Member
Normal
Customer type
Gender

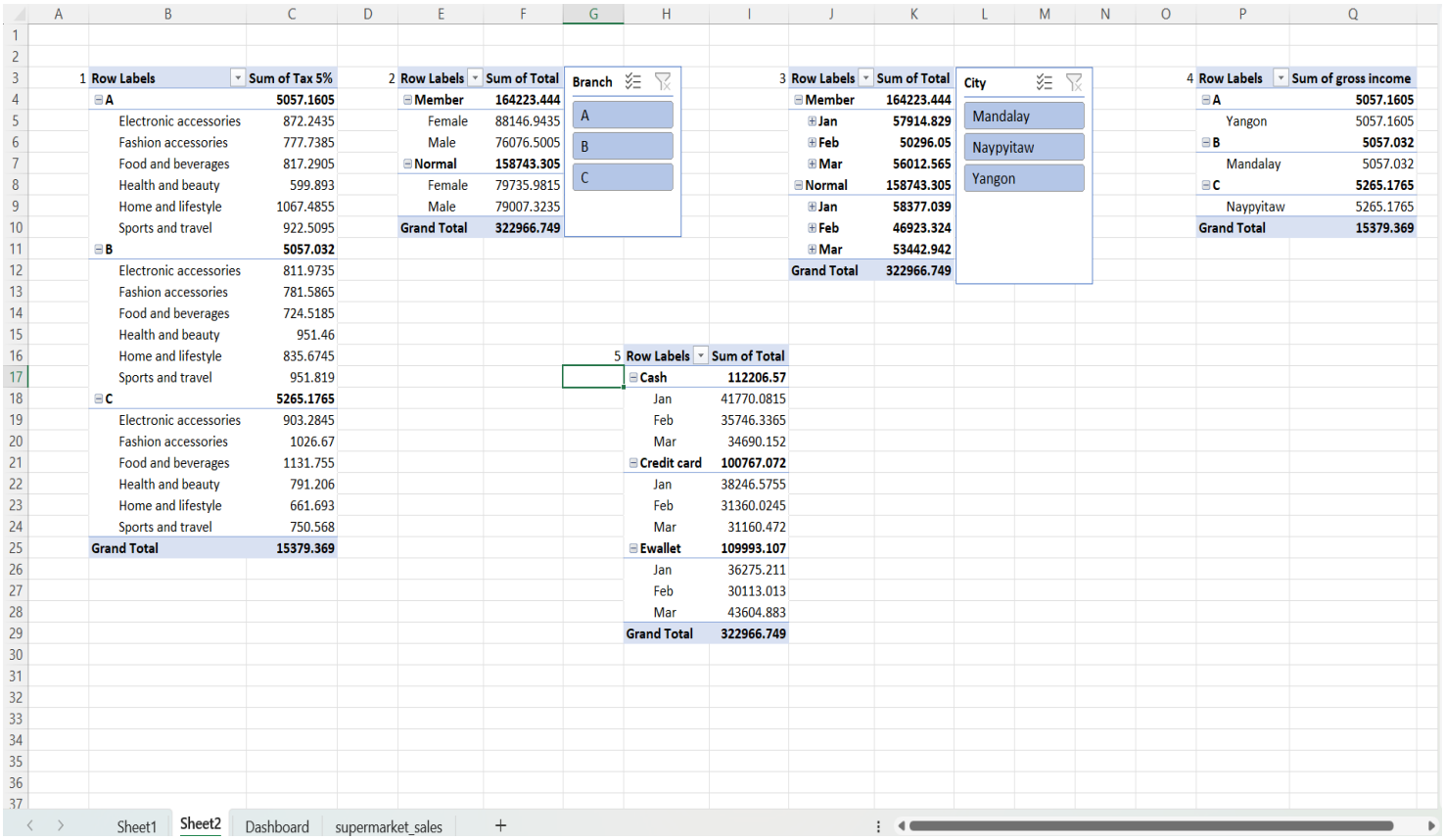

Sum of Tax 5%
Total
Home and lifestyle
Food and beverages
Electronic accessories
Home and lifestyle
Food and beverages
Electronic accessories
Home and lifestyle
Food and beverages
Electronic accessories
C
B
A
Branch
Product line
Total
0 200 400 600 800 1000 1200


Sum of gross income
Total
Chart Area
34%
33%
33%
Branch
City
A Yangon
B Mandalay
C Naypyitaw


Sum of Total
Total
70000
60000
50000
40000
30000
20000
10000
0
Jan
Feb
Mar
Jan
Feb
Mar
Member
Normal
Total
Customer type
Months (Date)
Days (Date)
Date


Sum of Total
Total
50000
40000
30000
20000
10000
0
Jan
Feb
Mar
Jan
Feb
Mar
Jan
Feb
Mar
Cash
Credit card
Ewallet
Total
Payment
Months (Date)

Pivot Table :-



1

Row Labels	Sum of Tax 5%
A	5057.1605
Electronic accessories	872.2435
Fashion accessories	777.7385
Food and beverages	817.2905
Health and beauty	599.893
Home and lifestyle	1067.4855
Sports and travel	922.5095
B	5057.032
Electronic accessories	811.9735
Fashion accessories	781.5865
Food and beverages	724.5185
Health and beauty	951.46
Home and lifestyle	835.6745
Sports and travel	951.819
C	5265.1765
Electronic accessories	903.2845
Fashion accessories	1026.67
Food and beverages	1131.755
Health and beauty	791.206
Home and lifestyle	661.693
Sports and travel	750.568
Grand Total	15379.369

2

Row Labels	Sum of Total
Member	164223.444
Female	88146.9435
Male	76076.5005
Normal	158743.305
Female	79735.9815
Male	79007.3235
Grand Total	322966.749

Branch: A, B, C

3

Row Labels	Sum of Total
Member	164223.444
Jan	57914.829
Feb	50296.05
Mar	56012.565
Normal	158743.305
Jan	58377.039
Feb	46923.324
Mar	53442.942
Grand Total	322966.749

City: Mandalay, Naypyitaw, Yangon

4

Row Labels	Sum of gross income
A	5057.1605
Yangon	5057.1605
B	5057.032
Mandalay	5057.032
C	5265.1765
Naypyitaw	5265.1765
Grand Total	15379.369

5

Row Labels	Sum of Total
Cash	112206.57
Jan	41770.0815
Feb	35746.3365
Mar	34690.152
Credit card	100767.072
Jan	38246.5755
Feb	31360.0245
Mar	31160.472
Ewallet	109993.107
Jan	36275.211
Feb	30113.013
Mar	43604.883
Grand Total	322966.749

Sheet1 | Sheet2 | Dashboard | supermarket_sales

5. Conclusion

In conclusion, the Supermarket Sales Dashboard serves as a powerful analytical tool that brings clarity to sales performance, customer preferences, and operational dynamics. Through structured pivot tables and visual insights, it becomes evident that **Member customers are the most valuable segment**, consistently generating higher sales across multiple branches. **Female shoppers** also emerge as key revenue contributors, especially in Segment A and C, reinforcing the need for targeted engagement strategies. The **dominance of E-Wallets** as a payment method suggests a growing reliance on digital transactions, highlighting the importance of maintaining efficient and secure POS systems. Branch-wise analysis shows that **Segment C slightly outperforms the others in gross income**, while **Yangon remains the top-performing city in terms of daily sales**. Mandalay experiences surges during weekends, and Naypyitaw maintains a steady flow of Member transactions, reflecting diverse regional shopping behaviors.

Furthermore, the **product category breakdown reveals that Electronic and Fashion Accessories contribute significantly to tax revenue**, despite Food and Beverages leading in transaction volume. This variation underscores the need to balance high-margin and high-volume inventory. The dashboard's ability to track **monthly trends**, **branch-wise profit share**, and **sales by demographic and location** makes it a crucial resource for strategic planning. With consistent data input, regular updates, and potential integration with real-time systems, this dashboard can evolve into a dynamic decision-support system that enhances business intelligence and drives long-term profitability.

6. Future scope

The current Supermarket Sales Dashboard provides a solid summary of performance metrics such as gross income, tax contributions, customer segmentation, and payment trends. However, the dataset is pre-aggregated and lacks raw transactional depth. To enhance the dashboard's analytical capabilities, the following future developments are recommended:

1. **Raw Data Integration:**
   Transitioning from pre-summarized pivot data to raw transactional data would allow deeper and more flexible analysis — such as tracking individual orders, time-of-day patterns, and basket sizes.

2. **Profit Margin Analysis:**
   The dashboard currently highlights gross income but doesn't reflect **costs or net profit**. Including cost data per product or category would allow calculation of **true profitability per segment**, enabling smarter inventory and pricing decisions.

3. **City-Level Deep Dive:**
   While cities like **Yangon**, **Mandalay**, and **Naypyitaw** are referenced in summaries, detailed city-wise breakdowns (e.g., top products per city or payment trends by location) could offer more granular insights into regional performance.

4. **Customer Behavior Trends Over Time:**
   Adding filters for **month-wise customer type and gender trends** could help detect shifting shopping patterns (e.g., rising use of digital payments among Female Members).

5. **Automated Dashboard Refresh:**
   Automating the data update process (e.g., linking to a monthly sales data sheet) would reduce manual work and keep the dashboard current, especially for routine performance reviews.

6. **More KPIs and Visual Enhancements:**
   Additional KPIs such as **average revenue per customer type**, **category-wise profit per branch**, or **VAT contribution by payment method** could be added. Visual charts can be refined with slicers for real-time filtering.

7. **Export & Reporting Features:**
   Building in options to export insights or generate automated reports (PDF snapshots or summaries) could make the dashboard more practical for presentations and decision-making meetings.

7. References

- The current Supermarket Sales Dashboard provides a solid summary of performance metrics such as gross income, tax contributions, customer segmentation, and payment trends. However, the dataset is

pre-aggregated and lacks raw transactional depth. To enhance the dashboard's analytical capabilities, the following future developments are recommended:

- The analysis in this project is based primarily on a preprocessed **Excel dashboard dataset** that summarizes supermarket sales across various dimensions, including product categories, customer types, payment methods, VAT contributions, and city-wise branch performance. The dashboard was developed using **Microsoft Excel (2024)**, leveraging tools such as pivot tables, slicers, and calculated fields for interactive data visualization and analysis. Concepts related to business intelligence and data-driven decision-making were supported by academic literature, including the work of **Chaudhuri, Dayal, and Narasayya(2011)**, which provided insights into the role of analytics in improving operational efficiency. Additionally, **Google's data visualization guidelines (2024)** were referenced to apply best practices in the creation of a user-friendly and readable dashboard. Finally, market research from **Statista (2024)** was used to validate digital payment trends, supporting findings related to the popularity of E-Wallets observed in the dataset.