SMAC Report on data analytics tool
Tool chosen - Power BI

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Dataset that we have chosen : Supermarket sales
The dataset is one of the historical sales of a supermarket company which has been recorded in 3 different branches for 3 months.

Attribute information

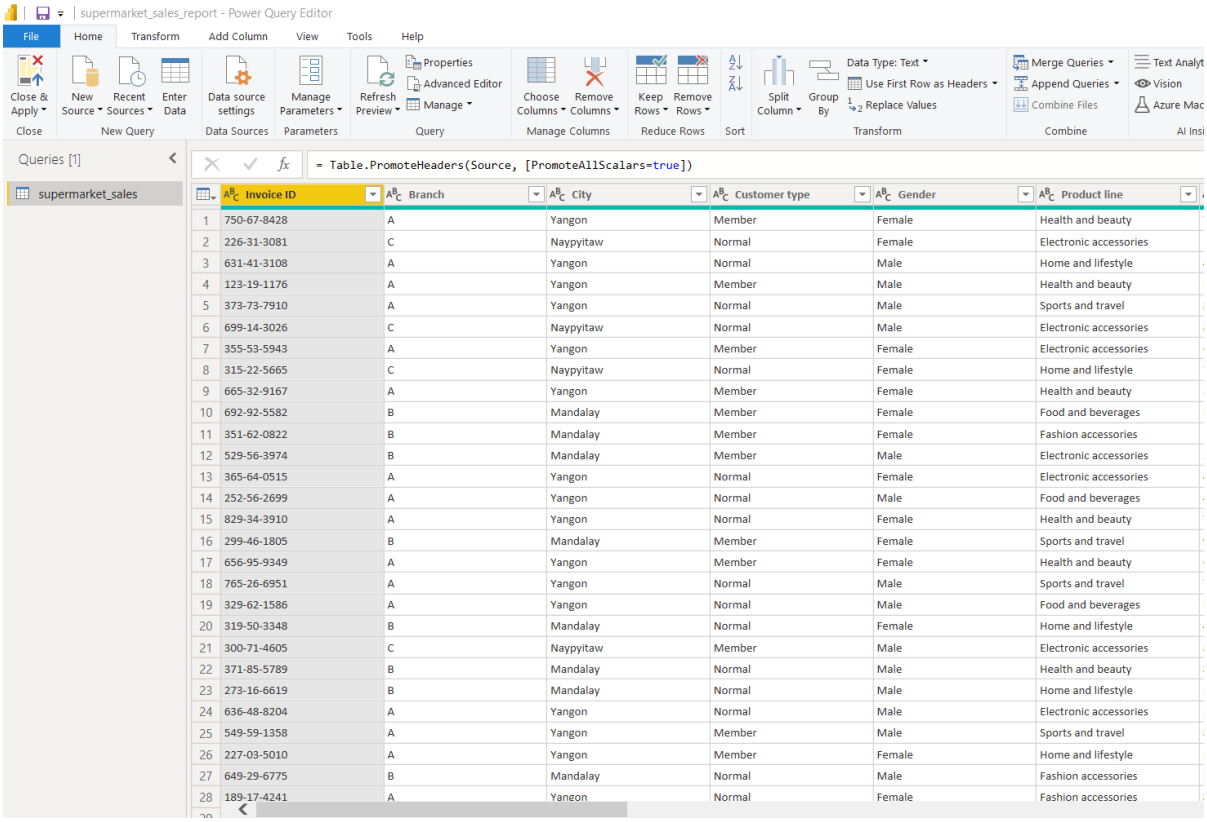
- Invoice id: Computer generated sales slip invoice identification number
- Branch: Branch of supercenter (3 branches are available identified by A, B and C).
- City: Location of supercenters
- Customer type: Type of customers, recorded by Members for customers using member card and Normal for without member card.
- Gender: Gender type of customer
- Product line: General item categorization groups - Electronic accessories, Fashion accessories, Food and beverages, Health and beauty, Home and lifestyle, Sports and travel
- Unit price: Price of each product in $
- Quantity: Number of products purchased by customer
- Tax: 5% tax fee for customer buying
- Total: Total price including tax
- Date: Date of purchase (Record available from January 2019 to March 2019)
- Time: Purchase time (10am to 9pm)
- Payment: Payment used by customer for purchase (3 methods are available – Cash, Credit card and Ewallet)
- COGS: Cost of goods sold
- Gross margin percentage: Gross margin percentage
- Gross income: Gross income
- Rating: Customer stratification rating on their overall shopping experience (On a scale of 1 to 10)

Objective of the report:

The aim of this report is to analyze the sales of 3 branches of supermarkets in order to gain meaningful insights so that the sales can be improved and best customer rating can be obtained.

Analysis of the dataset using Power BI

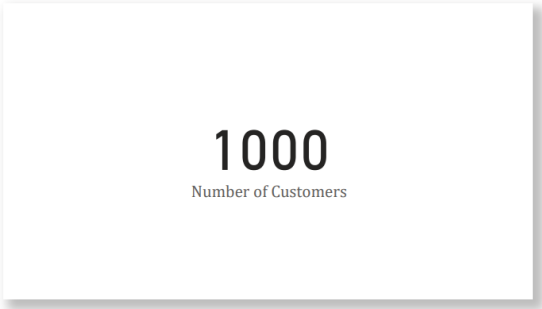
The csv file containing the data is loaded into the tool:

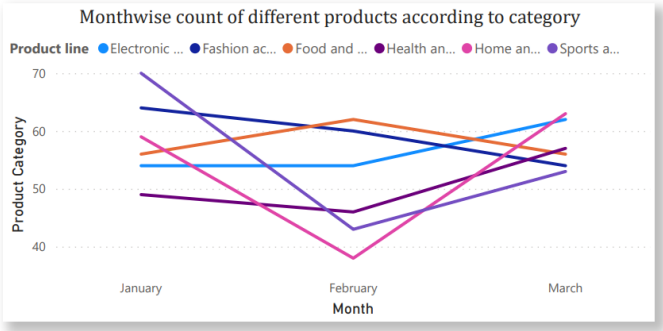


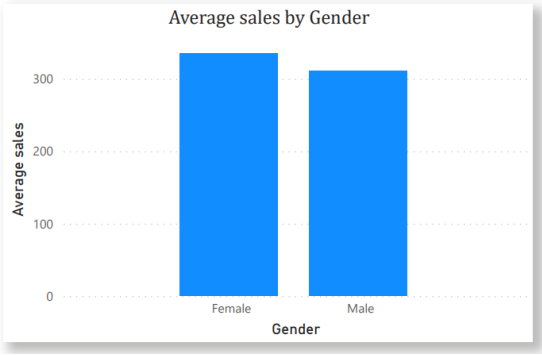
	Invoice ID	Branch	City	Customer type	Gender	Product line
1	750-67-8428	A	Yangon	Member	Female	Health and beauty
2	226-31-3081	C	Naypyitaw	Normal	Female	Electronic accessories
3	631-41-3108	A	Yangon	Normal	Male	Home and lifestyle
4	123-19-1176	A	Yangon	Member	Male	Health and beauty
5	373-73-7910	A	Yangon	Normal	Male	Sports and travel
6	699-14-3026	C	Naypyitaw	Normal	Male	Electronic accessories
7	355-53-5943	A	Yangon	Member	Female	Electronic accessories
8	315-22-5665	C	Naypyitaw	Normal	Female	Home and lifestyle
9	665-32-9167	A	Yangon	Member	Female	Health and beauty
10	692-92-5582	B	Mandalay	Member	Female	Food and beverages
11	351-62-0822	B	Mandalay	Member	Female	Fashion accessories
12	529-56-3974	B	Mandalay	Member	Male	Electronic accessories
13	365-64-0515	A	Yangon	Normal	Female	Electronic accessories
14	252-56-2699	A	Yangon	Normal	Male	Food and beverages
15	829-34-3910	A	Yangon	Normal	Female	Health and beauty
16	299-46-1805	B	Mandalay	Member	Female	Sports and travel
17	656-95-9349	A	Yangon	Member	Female	Health and beauty
18	765-26-6951	A	Yangon	Normal	Male	Sports and travel
19	329-62-1586	A	Yangon	Normal	Male	Food and beverages
20	319-50-3348	B	Mandalay	Normal	Female	Home and lifestyle
21	300-71-4605	C	Naypyitaw	Member	Male	Electronic accessories
22	371-85-5789	B	Mandalay	Normal	Male	Health and beauty
23	273-16-6619	B	Mandalay	Normal	Male	Home and lifestyle
24	636-48-8204	A	Yangon	Normal	Male	Electronic accessories
25	549-59-1358	A	Yangon	Member	Male	Sports and travel
26	227-03-5010	A	Yangon	Member	Female	Home and lifestyle
27	649-29-6775	B	Mandalay	Normal	Male	Fashion accessories
28	189-17-4241	A	Yangon	Normal	Female	Fashion accessories

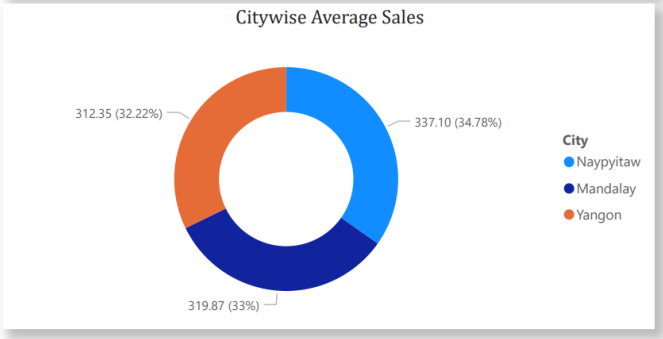
Then some transformations are applied on the data like changing the data type from text to number.

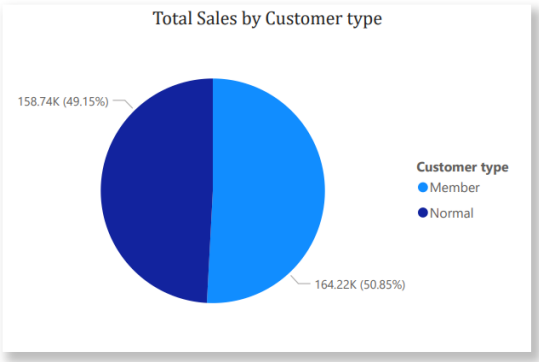
Visualizations using Power BI:

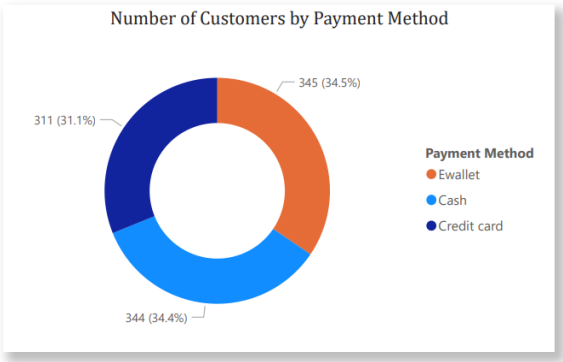


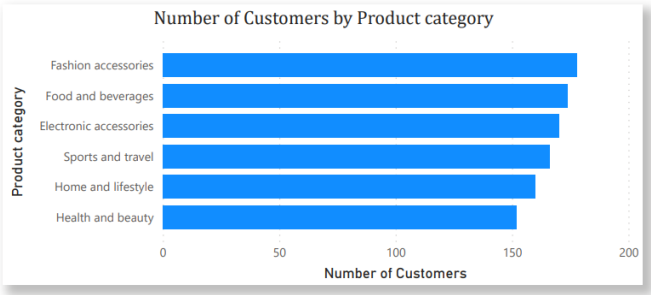


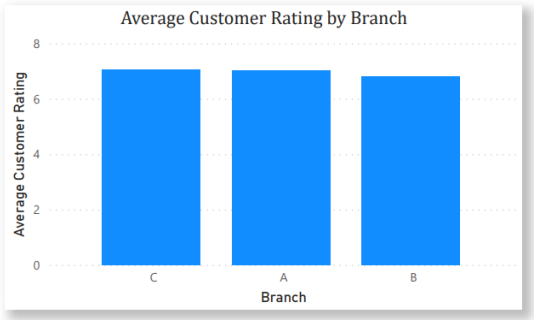












Findings and Analysis:

Using the visualizations the following insights can be noted:

Finding	**Analysis of Finding and Suggestions**
The average sales from female customers is more than male customers.	This data can be utilized to improve selling strategies, such as providing more product selections and improving customer service. A survey can also be done to get more information and conduct more investigation into why female customers have higher average sales than male customers.
The supermarket sells the Health and beauty category products the least as compared to others in January.	The marketing strategy can be improved by designing some strategy like a discount on a particular product of the week, centered around that category in the month of January.
It can also be noted that the sales of the Sports and Travel category have dropped significantly in the next month(February). There is a similar drop in sales of products of Home and Lifestyle category.	This is an indication that the reason for the same needs to be investigated to prevent this from happening and improve the sales.
It can be observed that there is not much difference in the total sales according to the customer type(member or normal).	This indicates that some strategies should be applied so that members tend to contribute more to the sales like some points should be given to customers who are members to improve customer loyalty.
It can be analyzed that the maximum number of customers buy products belonging to the Fashion accessories category followed by the Food and beverages category. The customers tend to buy less from the Health and beauty category.	Discounts can be given for products in this category in order to increase the sales. And one can even look into the feedback given to them from the customers about the products from the less profitable categories.

Compared to using credit cards for payment, more customers tend to opt for the ewallet and cash for payment.	The store should make these payment methods more accessible to customers in order to boost consumer ratings.
The average rating of branch C is the most among the 3 branches.	The employees of this branch should be given some reward so that the other branches try to improve their customer rating

Strengths of Power BI

- Data Connectivity

  Major advantage of using Power BI is that we can import data from a wide range of data sources. It offers data connectivity to data files (such as XML, JSON), Microsoft Excel, SQL Server databases, Azure sources, cloud-based sources, online services etc.

- Custom Visualizations

  Power BI offers a wide range of custom visualizations i.e. visualizations made by developers for a specific use. Custom visuals are available on Microsoft marketplace. In addition to the general set of visualizations available we can use Power BI custom visualizations in our reports and dashboards. The range of custom visualizations includes KPIs, maps, charts, graphs, R script visuals, etc.

- Affordability

  A major advantage that we observed while doing our research on Power BI is that it is affordable and relatively inexpensive. The Power BI Desktop version is free of cost. We can download and start using it to make reports and dashboards on your computer. For additional services as well, Power BI is offered at a fair price as compared to other BI tools.

- Interactive Visualizations

  It has a very attractive, intuitive and interactive visualization. We can use Power BI's easy drag-and-drop functionality to add different visualizations in a report. Also, we can interact with visualization by applying filters, making selections in it, etc. It is very easy to create and understand data through visualizations in Power BI.

- Power BI Embedded

  Power BI Embedded is another positive aspect of Power BI. Using this solution, an app developer can embed or include Power BI reports and features into web-based or other apps. By using this, we can add Power BI visuals and reports into emails or websites to increase its reach to users.

Limitations of Power BI

- Table Relationships

  Power BI is good with handling simple relationships between tables in a data model. But, if there are complex relationships between tables, that is, if they have more than one link between tables, Power BI might not handle them well. We need to create a data model carefully by having more unique fields so that Power BI does not confuse the relationships when it comes to complex relationships.

- Crowded User Interface

  The user interface of Power BI is often found crowded and bulky by the users. It is in the sense that there are many icons of options that block the view of the dashboard or report. Most users wish that the user interface or the report canvas was clearer with fewer icons and options. Also, creating scrolling dashboards is a native feature.

- Inflexible Formulas

  As we probably are aware, the articulation language used to manage information in Power BI is DAX. Be that as it may, you can play out a lot of activities utilizing the DAX equation in Power BI, it is as yet not the least demanding language to work with. Now and again the equations you make function admirably in Power BI, some of the time they don’t. You can connect up to two components however linking an overabundance of settling articulations.

Applications of Power BI

- Visualization = Inbuilt feature: Microsoft Power BI provides such tools that will let you visualize key data points accurately from various sources in a single dashboard. Power BI integration with Cortana can visualize data, interact with it in your OS, and search your data with Cortana's powerful AI systems.

- Server-Level Data Management: Power BI tools let you manage all the business-related data at the server level with the goal that you have more extensive and complete information systems than the data you collected from a program working on a few PCs.

- Analytics With Internal Software Systems: Power BI merges with any software platform used to manage the businesses. This consists of mail management, social media platforms, accounting software, CRMs, and traditional data platforms like Azure and MySQL.

- Provide complex data within software and apps: Power BI takes input from various sources and provides that data in various contexts, including embedded within your own apps through API by Microsoft. Moreover, Power BI offers tools to manage businesses allowing app customization.

- Enhance the marketing: Businesses spend intensely on online marketing to attract customers. But the huge mass is failing to convert while researching the solutions to their unique problems online. In this case, Power BI helps you create a chart to track the user behavior all through their online visit.

- Real-Time look at the company's financial performance: With Power BI, you can gaze into teams productivity, top-selling products, the income created by a specific division and numerous different perspectives. With Power BI, you will be able to get immediate attention on sudden financial drops and will be able to fix the issues before it turns into a huge concern.