Business Intelligence & Business Analytics

IMPLEMENTATION REPORT

I. BALANCE SCORECARD & STRATEGIES

The Balanced Scorecard is a framework for strategy execution and management. It ties a vision with strategic goals, measures, targets, and programs. It combines financial metrics with success measures and goals relevant to the other areas of the company. It is a management instrument for corporate success. A balanced scorecard is divided into four important perspectives: Growth, Financial, Customer, and Internal Process perspective.

Growth - It is evaluated by investigating the tools of preparation and expertise. This first leg deals with how well data is gathered and how successful professionals use the data to turn it into a strategic edge over the industry.

Internal Process - To track any discrepancies, bottlenecks, shortages, or waste, organizational management is evaluated.

Customer - Customer satisfaction with the quality, price, and availability of products or services is calculated. Feedback on their satisfaction with new products is given by consumers.

Financial- To understand financial performance, financial statistics such as sales, investments, and profits are used. Financial percentages, spending variances, or sales targets can be used in these financial metrics.

A balanced scorecard for Doorstep is a competitive success measure for management used to define and optimize different internal company functions and their subsequent external effects.

II. SOLUTION DEVELOPMENT PROCESS

A. Test Data Generation

The first step in data preparation is to create proper fit data with the relevant entry points. The raw data related to the e-commerce domain consisting of data of customers, orders, products, reviews from customers, orders shipping information, etc. that is found from the well-known data hub [1] which is further prepared and processed using data generators available online. The random data generators [2][3] and Microsoft Excel are used to mockup the data. Accordingly, after looking at the data thoroughly, the data was updated, and few new fields were added to get some good insights from the data. Fields like customer's age, customer's marital status, etc, are added to get some relation between data.

B. Data Management Implementation

Microsoft SQL Workbench is used to create a database schema and store the generated data. Data preparation, transformation, and cleaning were done before using it for analysis.

Data Creation: All the related tables are created using Mysql.
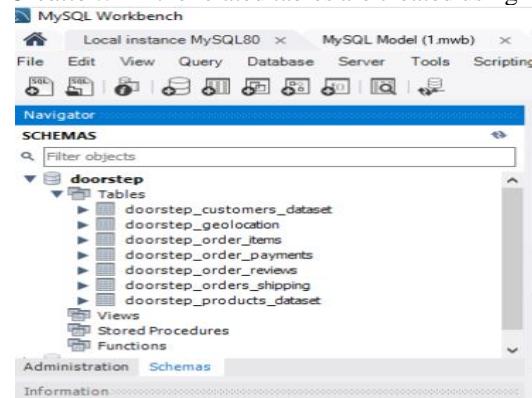

Figure1: The doorstep Database schema
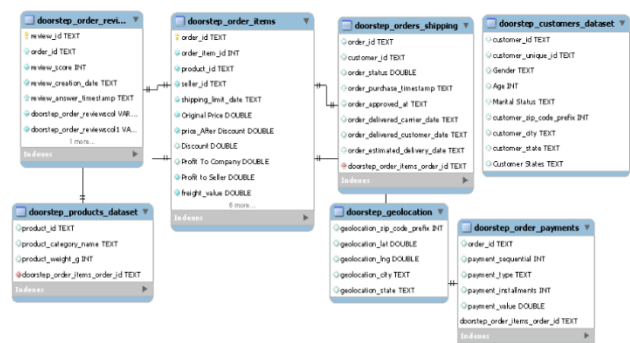
Database Entity Relation Diagram:

Figure2: Entity Relationship Diagram

To understand the relationship among different entities we create Entity Relationship Diagram. It helps us represent the Logical structure of the database. Relationships among different entities from several tables were mapped. All the Blanks, Null values were removed from all the columns. All the Date and Time formats converted to one single format.

III. IMPLEMENTATION OF THE SOLUTION

A. Dynamics 365 Sales Hub Integration

The sales hub interface of Microsoft Dynamics 365 is used to better grasp customer's expectations, contribute more actively, and win more offers. It is a Customer Relationship Management (CRM) system. This CRM system is inducted into the company's working architecture to remove the redundancies in data and make it an efficient process. Steps from start till the end of data capturing are shown in below screen captures.
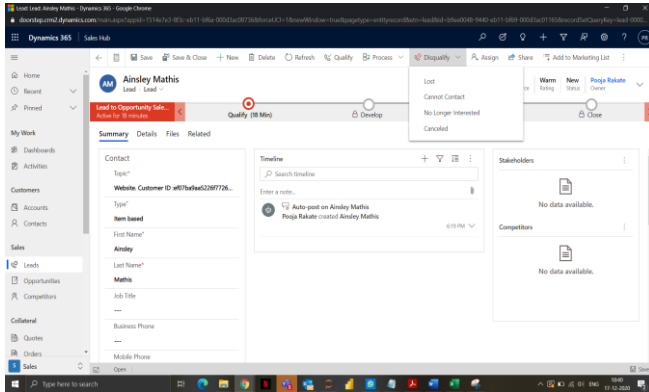

Figure3: CRM Lead's Page

*Step 1:*In this process, a lead is created on customer sign-up on the e-commerce portal with all their details. The customer begins getting advertising emails upon sign-up, updates about deals on the products that cause the customer to surf the web and check for the products of interest. On searching for products, customers become qualified in this CRM process. Searching products qualifies the customer in the process. It can be disqualified based on the parameters as displayed in figure3.
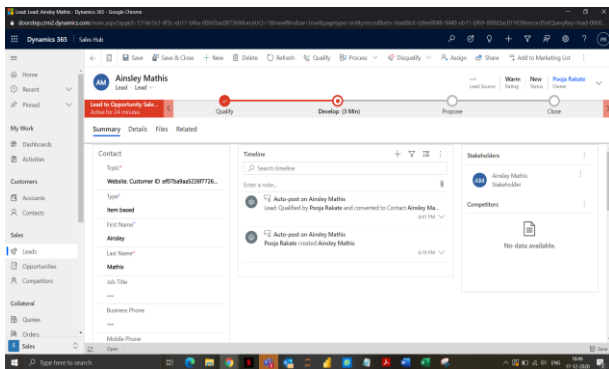

Figure4: Potential Customer in Develop Phase

Step 2: Once the lead is qualified it converts into an opportunity and then is progressed in the "Develop" phase of the workflow. A customer searching for a product and adding it to a cart makes it an opportunity. To proceed with their order, reminder notifications are sent to the customers that certain products are waiting in the cart and that they are yet to be ordered which converts them into the customer.
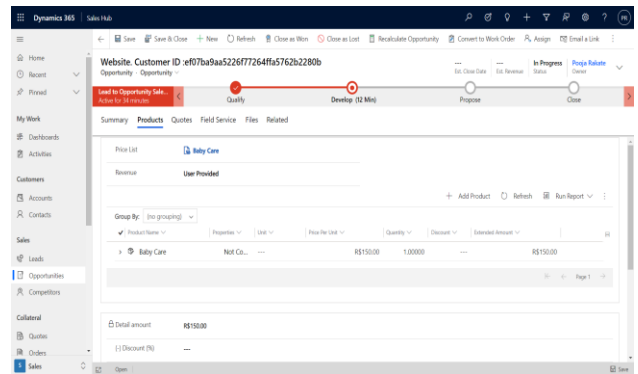

Figure5: Adding a product and selecting revenue type

Step 3: The price list of the preferred product is added in the "Products" on the opportunity step. 'User-provided' revenue type is selected to get the estimated revenue and to have the appropriate currency as shown in figure5. By giving all the required details, the estimated revenue of the product will be produced. Now, after this step, it is ready to generate the "Quote" which is a review order items summary on the portal.
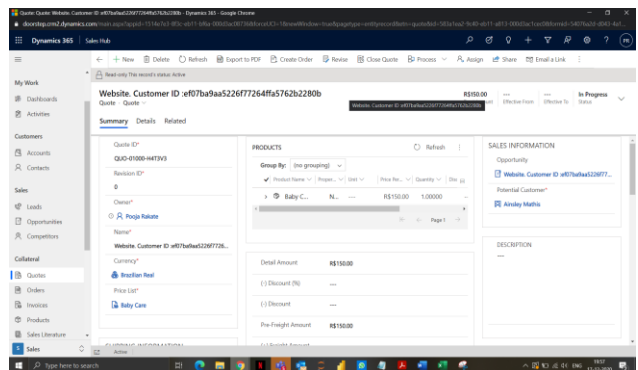

Figure6: Quote order page

Step 4: In this step, all details of the customer are re-checked before "activating" it (confirming the details and proceeding towards the payment page to generate the invoice) and sending it to the customer. Added products can be reviewed, the value of the cart can be reviewed, and can make any changes if required. On this Quote page, export to PDF functionality is also present to share it with the customer if asked.

Step 5: After activating the Quote, an invoice of the order is generated confirming the order. To track the payment of the order, the "Invoice Paid" menu is clicked and the status of the Invoice changes from "Active" to "Paid". It is shown in the below figure7.
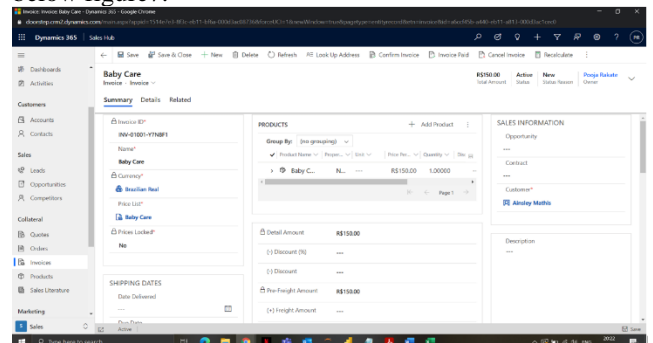

Figure7: Invoice page

Step 6: This is the paid invoice figure illustrating that the order has been paid by the customer and the invoice can be downloaded from the word template menu and can be sent to the customer through the mail. This is marked as paid when the customer's payment at the portal is completed.
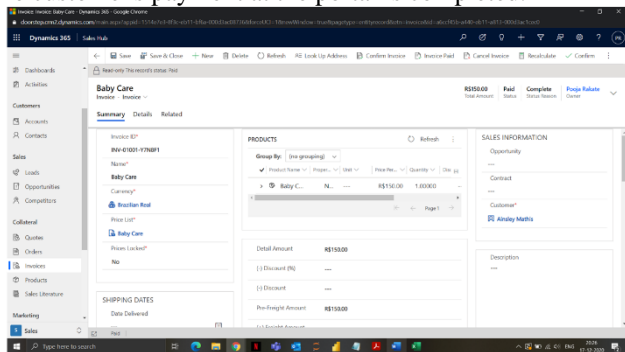

Figure8: Invoice Paid page

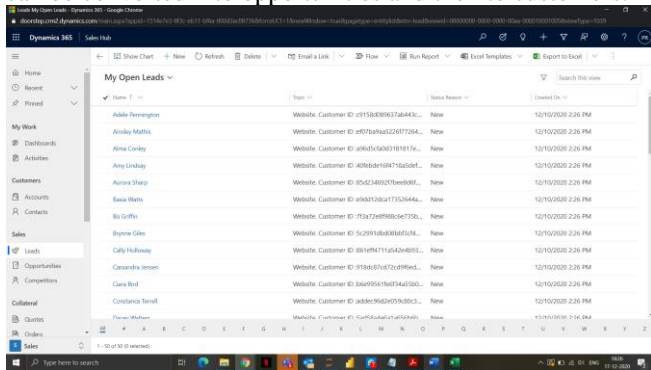*Step 7:* Figure9 displays the open leads to the company which can be converted into opportunities and then to customers.

Figure9: Leads Page

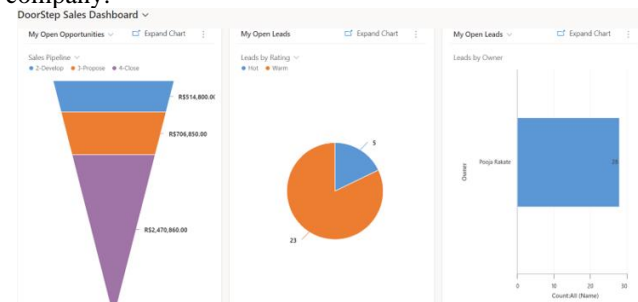*Step 8:* Figure10 displays the CRM Dashboard of the company.

Figure10: CRM Dashboard

B. *Power BI Dashboards*
1. *Revenue Dashboard*

The Revenue Dashboard shows an overview of the company's income, profit generated in a particular year, month, and quarter. Using such a dashboard company can quickly find out trends and variance in income. It becomes easy for analyzing and monitoring high and low-level revenue performance.
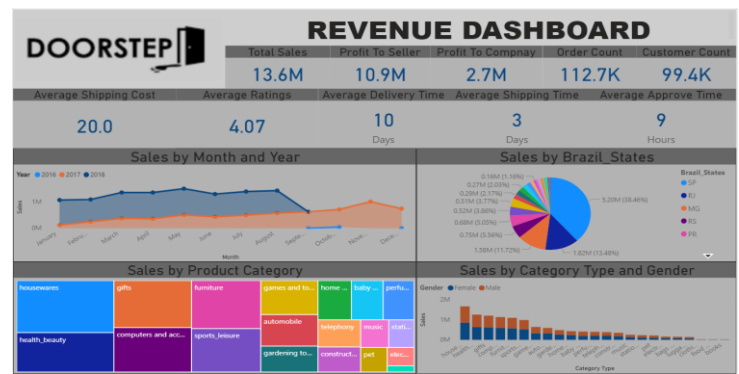

Figure10: Revenue Dashboard

- **Scorecards**:

Scorecards are used to measure and track several performances and key indicators of the organization.

a) **Total Sales:** Total Sales scorecard is used to present organization sales from the years 2016,2017,2018. We can use a slider to select a particular year, months, and quarters which will give us Total Sales from the selected period.

b) **Profit to Seller:** This scorecard is used to represent profit gained by sellers by selling their product on the doorstep company's e-commerce platform.

c) **Profit to Company:** For every order sold by the seller doorstep earns 20% of the order amount. Profit to Company scorecard indicates the cumulative profit earned by the company from the year 2016-2018.

d) **Order Count:** This scorecard is used to track the number of orders purchased by the customers.

e) **Customer Count:** This is one of the important scorecards for an e-commerce company as the number of customers increases, the sales pipeline is fueled with more leads as the first-time buyer has the potential to become a repeat customer.

f) **Average Shipping Cost:** Average Shipping Cost scorecard is used to monitor the cost of shipping paid by the customer for each order on an average. This scorecard needs close monitoring as the customer would not purchase the order if the shipping cost is high.

g) **Average Ratings:** This is the most important scorecard for an e-commerce company as it measures customer satisfaction. Ratings given by customers can be seen by other potential buyers and which could help them in product buying decision making.

h) **Average Delivery Time:** The order delivery timeline is one of the important aspects of the e-commerce business as it is also involved in measuring customer satisfaction. Deliveries of the order should always be on track with the communicated timeline. To monitor this, we must use the Average Delivery Time Scorecard.

i) **Average Approve Time:** Once the customer has created order, the next important step is to approve the order by confirming the payment status, if there is a delay in this step, the entire delivery timeline will affect. Using this scorecard, we can monitor the

approval time for orders created. We want to minimize this time frame as much as possible.

j) **Average Shipping Time:** Next step in the delivery timeline is order shipping. After payment confirmation, the order needs to be prepared, processed, and transferred to the delivery company. This period needs to be further reduced to achieve deliveries within estimated delivery dates.

● **Sales by Month and Year:**

Sales by Month and Year is represented by the Area Chart. Orange, Dark Blue, and Light Blue Lines represent the sales and their variation for the years 2018,2017, and 2016 respectively. This helps us analyze variation in the sales in a particular year also we can compare the sales in a particular month from different years. We can drill down the report to Quarter and Month view. Once we select the Year from the legend it does apply the filter to the entire dashboard.
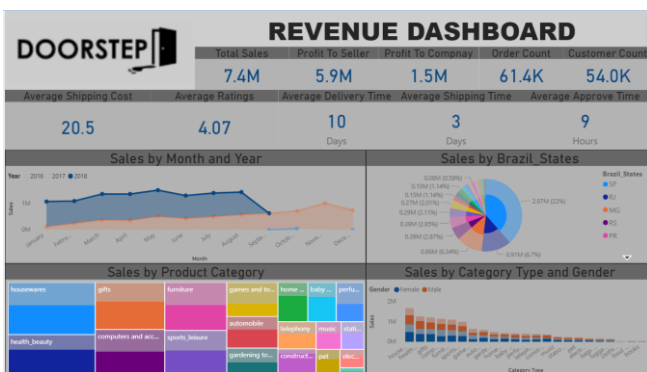

Figure11: Year-wise Filter selected for the year 2018 which has affected all the visuals on the page.

● **Sales by the Brazil States**:

This is used to represent the sales distribution by states of Brazil Country. The area of the circle is distributed as per the proportion of sales generated by the respective state. A larger color area represents the states with a high number of sales generated and vice versa. This helps us visualize and identify states with Low sales amounts.

● **Sales by Product Category**:

Treemap is used to visualize the sales distribution by product category, Categories with large sales amounts are represented using large squares and vice versa. This helps the company to identify categories with lower sales and perform further analysis of such categories to find out the reason behind low sales. After selecting a particular category, the filter is applied to an entire page which gives insights related to the selected category only.
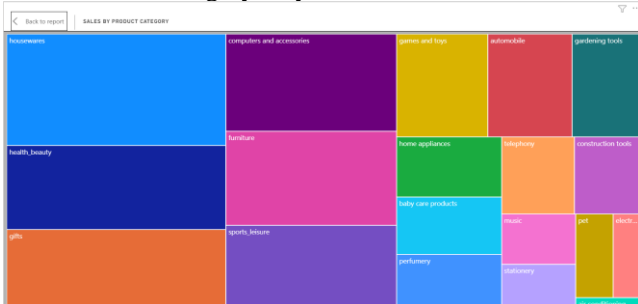

Figure12: Sales by Product Category.

● **Sales by Product Category and Gender:**

To visualize the sales among the different categories and their further distribution according to gender we have used a Stacked Column chart. This helps us to identify the product category for which sales are high and how much percentage of that sales is divided between gender Men and Women. This insight can be used to perform dedicated and separate marketing campaigns for Men and Women based on the sales distribution of categories.
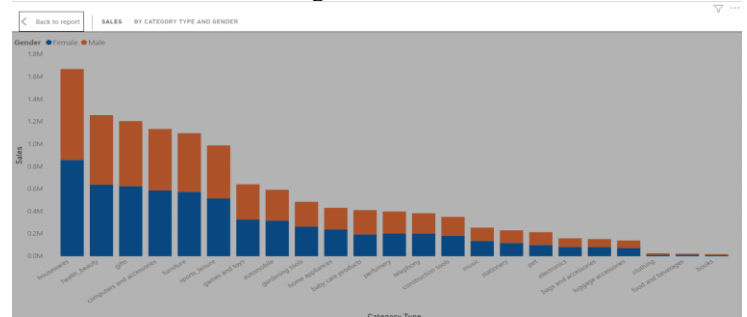

Figure13: Sales by Product Category and Gender.

2. *Orders Dashboard*

The Orders Dashboard helps to visualize the order details of the doorstep company to gain some insights from the orders of the products.
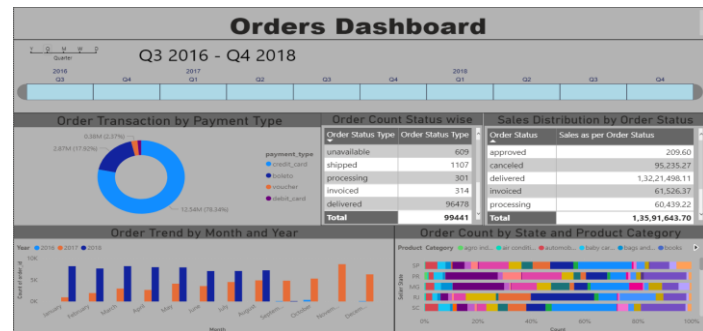

Figure14: Orders Dashboard

● **Timeline:**

The timeline slider helps to visualize the entire dashboard with the selected period. It filters out the graphs on the entire dashboard according to the selection on the slider, quarterly, monthly, weekly, yearly, or date wise orders. Figure15 shows data for Quarters 3 and 4 of the year 2017 and quarter 1 for the year 2018.
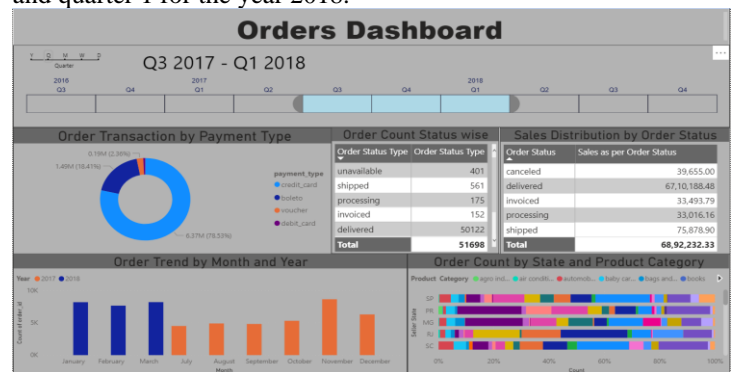

Figure15: Change in Orders Dashboard after Timeline Slider selection

● **Order Transaction by Payment Type**

The Order Transaction by Payment Type Donut chart shows the percentage of orders distribution by their payment type. All the payment types are noted and accordingly analyzed which helps the company to get insights about which payment type is considered the most by the customer. The chart shows that credit cards are the most used payment type by the customer compared to the other types like debit cards, boleto, and vouchers.
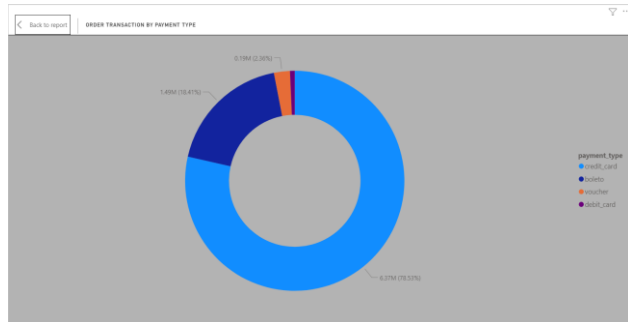

Figure16: Order Transactions by Payment type.

● **Order Trend by Month and Year**

The bar chart Order Trend by Month and Year shows the trend of the number of orders across different months and years. The graph depicts that the count of orders shows a visible increase over the years from 2016 to 2018.

● **Order Count Status Wise**

The Order Count Status Wise matrix displays the number of orders that are present in a particular status. Like for example, we have 1107 orders falling into "shipped" status which are presented in the second row. The largest number of orders are in "delivered" status.

● **Sales Distribution by Order Status**

The Sales Distribution by Order Status matrix helps to know the sales count by the order status. It depicts the total amount of sales of that order status.

● **Order Count by State and Product Category**

Order Count by State and Product Category uses a stacked bar chart to show the orders taken for each category in different states. It helps to know about the percentage of all the categories that are ordered in that state and the count of orders.

3. *Customers Dashboard*

The basic building block for a B2C type e-commerce company is its customers. They are the driving factors for the revenue generated by the company and the existence of the company. Thus, the business needs to know who its customers are and who should be its target audience in the future. The customer's dashboard shown in figure17 represents insights into the customers of Doorstep company.
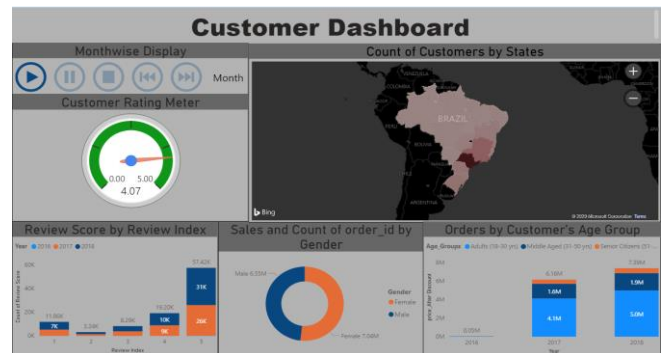

Figure17: Customers Dashboard

● **Month Wise Display:**

The Play Axis tool drives the dashboard once the play symbol is clicked. It plays month-wise data on every visual of the customer's dashboard continuously. As shown in figure18 once the play button is clicked, we can see data starting from January to December.
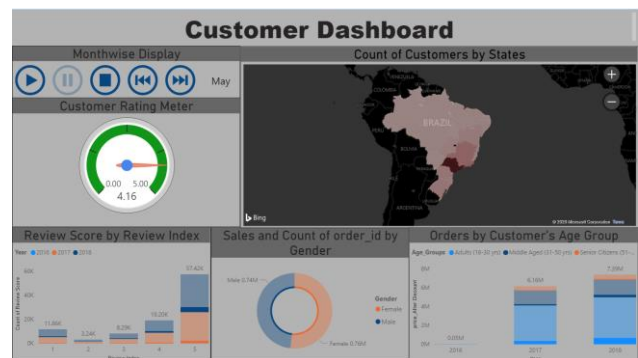

Figure18: Play Axis Visuals

● **Customer Rating Meter:**

Doorstep asks every buyer to provide a rating/review for every product they buy. The customer provides the rating on a scale of 1-5 for each order. This rating is important as it represents the level of customer satisfaction and provides feedback to the company about the improvements that need to be undertaken. The Meter indicator points to the average of the ratings from all the orders.

● **Count of customers by states:**

This map shows the distribution of the customers of Doorstep company throughout the states of the country of Brazil. Maximum customers of Doorstep are from the capital of Brazil i.e., Sao Paulo, followed by Minas Gerais and the rest of the states have quite a few customers.

Figure19: Count of Customers by state

- **Review Score by Review Index:**

The stacked column chart in the dashboard represents the total count for each review index (1 to 5) that the customers have provided for their orders. The chart shows a yearly comparison of the review score. Review index is the value defined by Doorstep which ranges from 1 to 5 with 1 being the least score and 5 the maximum score. The rating that the customer provides is the review score. As it is visible from the figure, in the year 2017 a maximum number of customers were highly satisfied with their purchases and hence rated a review score of 5. Followed by considerable review scores for index 4 and very few for review indexes 1,2, and 3 (Shown in orange color). A similar trend was observed in the following year (Shown in blue). There is a visible increase in customer satisfaction in the year 2018 as compared to 2017 as can be seen in the figure20. The dashboard can be filtered by selecting a particular year.
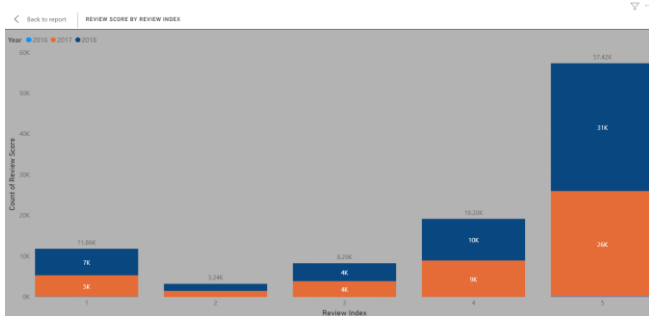

Figure20: Review Score

- **Sales By Customer's Gender:**

This Donut chart in the customer dashboard represents the gender-wise share in the total sales of the company. It is important to know this to understand if the company is providing products that can be fairly distributed among both genders. From the figure21, it can be noted that although the female customers have a higher share in the total sales of the company, the male customers also contribute almost equally with only some amount of less share as compared to females. This trend is the same for both the years, 2017 and 2018.
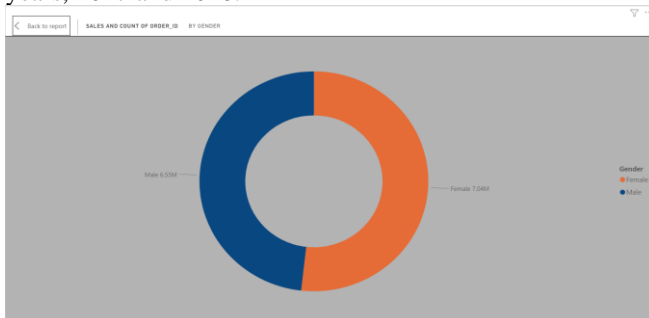

Figure21: Sales by Customer's Gender

- **Sales by Customer's Age group:**

Being sound with the age category of the customer base can help the company enhance the overall experience of the customer and thus increase its sales. To know which age category accounts for what amount of the company's total sales, the company has divided all their customer's ages into three groups namely Adults (18 to 30 yrs), Middle Aged (31 to 50 yrs), and Senior Citizens (51 to 70 yrs). From the figure22, it can be observed that customers between the ages of 18 to 30 account for the highest share in the total sales of the company. Followed by Middle ages customers and the least share is from the senior citizens of Brazil. The trend has continued for successive years with an increase in the total sales of the company.
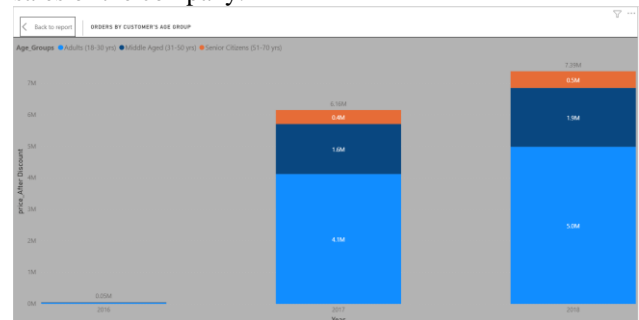

Figure22:Sales by Customer's Age group

IV. BENEFITS OF THE SOLUTION

1. Sales by Brazil State Visual helps us identify that the majority of the sales are generated by States Sao Paulo, Rio de Janeiro, Minas Gerais, and the Rio Grande do Sul but sales from the rest of the state are not significant. Doorstep as a company needs to expand in states other than Sao Paulo, Rio de Janeiro, Minas Gerais, the Rio Grande do Sul. This can be achieved by connecting more sellers and customers from those states. Advertisements and Marketing campaigns need to be used in states with low sales to make brand awareness.

2. Using Sales by Product Category visual we can list down the product categories which are getting sold less such as Pets, Construction Tools, Gardening Tools, Electronics, Musical Instruments. Analysis needs to be done to find out why these categories are underperforming which can be done by checking the product quality, brands which are selling these products, price of the products in comparison to competitors, reviews of the sold orders.

3. After looking at the Average Approve Time Scorecard, we can make out that it takes 9 hours for the order to get Approve which is relatively high. Orders need to get approved within a shorter period as it involves only steps such as Payment Confirmation, Stock Check. These steps need to be automated for a faster approval rate.

4. Average Shipping Time is 3 Days for approved orders which is a significant flaw in the delivery process that needs to be corrected. In ideal circumstances order should be shipped within 24 Hours to the Delivery Agent.

5. Average Delivery Time is 10 Days which needs to reduce, Priority Shipping needs to be implemented for the customer who wants the order to be received on an urgent basis which can result in more

customer satisfaction and sales as priority shipping can be a useful feature for customers and by charging a fee for priority shipping.

6. The average Shipping Cost is 20 Brazilian Dollars on each order which could be a factor in decision making for the customer to purchase the order or not. A company can implement Yearly, Monthly Subscription for customers to avail of free Delivery for an adequate Subscription Fee which could help increase the revenue as well as Orders.

7. On analyzing the customers' dashboard, the number of customers has been increasing for every quarter of the year. The company can find out measures to increase their reach to other states by undertaking promotions and advertisement campaigns.

8. From the Order transaction by payment type chart in the order's dashboard, it is visible that the most favoured payment method of the customers is using credit cards. The company can make use of this insight and can tie-up with the Banks in the country. The company can then propose discounts, promotional offers, and vouchers to the customers if they opt to pay by debit card or credit card from those select banks. Implementing this will pull the customers and also increase the company's overall sales revenue.

V.   *CONCLUSION*

After implementing the proposed solution, based on the statistics provided by the dashboards, the sales of the company can grow, the consumer base can be widened, the business can be expanded in multiple states, Customer Satisfaction and retention can be achieved and orders can be increased across different categories of products rather than the few. Overall, the advantages of this strategy far outweighed the initial costs and the attempts to prepare the workers for this method.

VI.   *FUTURE WORK*

1. In this project sales hub feature is used, Customer Hub feature of Microsoft dynamics 365 can be integrated to dive deeper into the customer side of the business.
2. Inventory management can be inculcated in this analysis to better manage the warehouses of the company.
3. Supply chain management can be included in the project to manage the logistics related field of the company.

4. Incorporating Sellers into Dynamic CRM Process, considering sellers as the Leads like Customers.

REFERENCES

[1] www.kaggle.com
[2] https://www.mockaroo.com/
[3] www.generatedata.com