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Improving Cafe Performance through Data-Driven Analysis and Operational Optimization

Contents

Executive Summary

- The project aimed to boost the performance of Cafe.in, a quick-service restaurant catering to college students and faculty/staff. By utilizing data-driven insights and operational optimization techniquesThrough extensive data collection via methods like point-of-sale systems and surveys, crucial information regarding sales patterns, inventory levels, and customer preferences was gathered including the use of descriptive and inferential statistical techniques.

- The findings revealed that coffee (cold), bottled drinks, and noodles stood out as popular menu items, while rolls and Boost registered as the least favored choices. Customer preferences leaned towards cold beverages, with bottled drinks being the preferred option. Noodles emerged as the most sought-after snack, with Biryani being the favored meal selection.Based on these findings, recommendations were devised to optimize the cafe's performance. These recommendations encompassed modifications to the menu, improvements in inventory management, and strategies aimed at boosting customer spending, such as promotions and meal deals.

- Implementing these recommendations bears the potential to significantly enhance the cafe's performance, drive revenue growth, and enhance overall customer satisfaction.By leveraging the insights gained and implementing the recommended strategies, Cafe.in can position itself for growth and success in its specific target market.

Detailed Explanation of Analysis Process

- **Data Collection**:

  A combination of primary and secondary data collection methods was utilized. Primary data was collected through point-of-sale systems, surveys, and interviews, while secondary data was obtained from inventory management software and other relevant sources.

- **Data Cleaning and Organization**:

  The collected data underwent a thorough cleaning process to remove any inconsistencies, errors, or missing values. It was then organized and structured in a format suitable for analysis.

- **Visual Representation**:

  Graphs, charts, and other visual representations were utilized to present the findings in a clear and concise manner. This helped in better understanding the patterns, trends, and comparisons within the data. These visuals served as a beacon of clarity, effortlessly illuminating the intricate patterns, trends, and insightful comparisons nestled within the data.

- **Inferential Statistics**:

  The study used advanced statistical methods to draw conclusions and make predictions about a larger group of people based on the data collected from a smaller group. By analyzing correlations and testing hypotheses, we were able to find important relationships and meaningful results that could be trusted and understood by others. These methods provided strong evidence for our findings and gave valuable insights into the topic under investigation.

- **Presentation of collected data**:
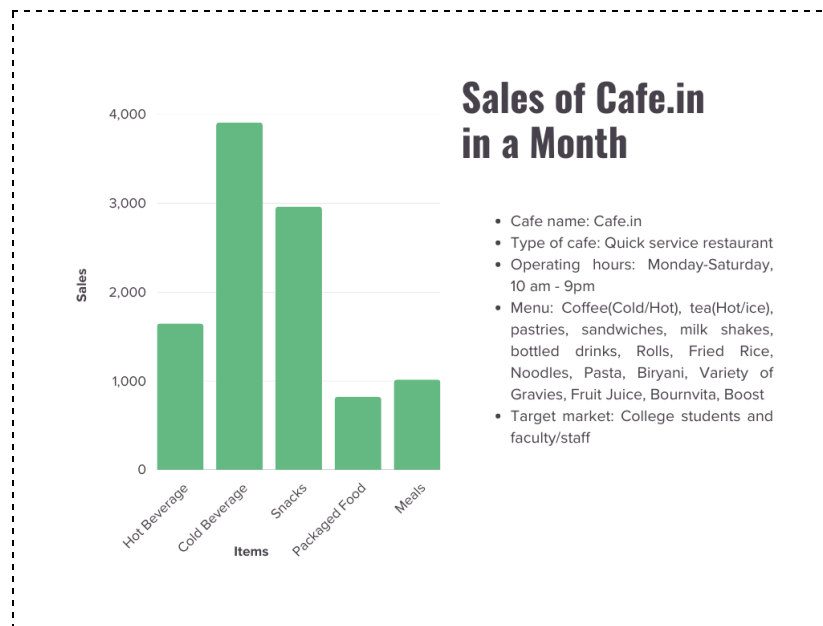
Overall Sales of Cafe.in in a month

Figure number - 1
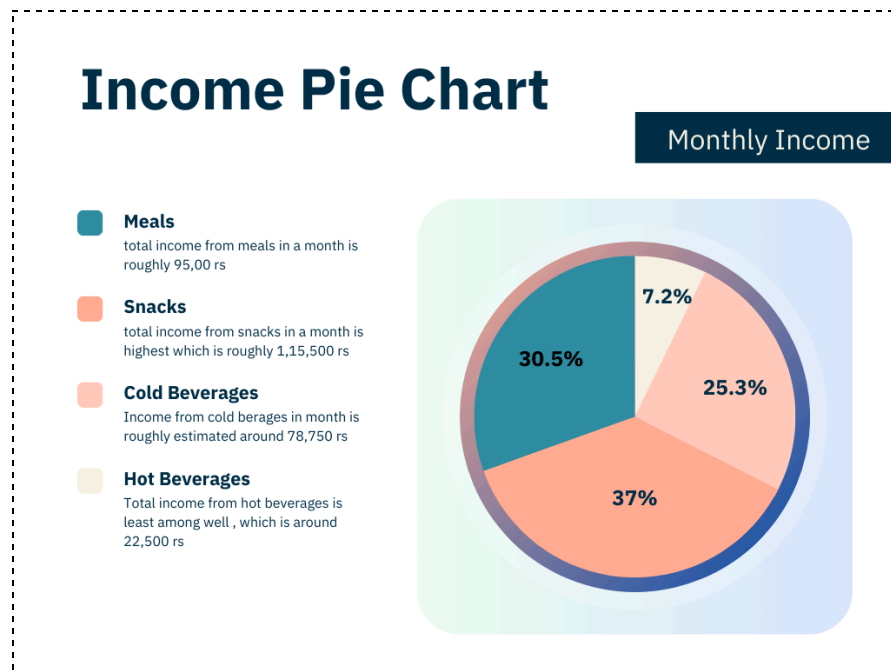
Overall income of Cafe.in in a month

Figure number - 2

- **Descriptive Statistics**:

  Descriptive statistical techniques were applied to summarize and describe the data. Measures such as mean, median, mode, and standard deviation were calculated to understand the central tendency and variability of the data.

  Descriptive statistics of Hot Beverages -

    1. Average number of customers per day: 50
    2. Average amount spent by customer: 15 rs
    3. Most popular menu item: Tea(milk) (63.80% of sales)
    4. Least popular menu item: Boost (1.3% of sales)

  Descriptive statistics of Cold Beverages -

    1. Average number of customers per day: 100
    2. Average amount spent by customer: 35 rs
    3. Most popular menu item: Bottled Drinks (34.50% of sales)
    4. Least popular menu item: Tea(ice) (7.4% of sales)

  Descriptive statistics of Snacks -

    1. Average number of customers per day: 100
    2. Average amount spent by customer: 70 rs
    3. Most popular menu item: Noodles (34.10% of sales)
    4. Least popular menu item: Rolls (11.8% of sales)

  Descriptive statistics of Meals -

    1. Average number of customers per day: 35
    2. Average amount spent by customer: 150 rs
    3. Most popular menu item: Biryani (67.20% of sales)
    4. Least popular menu item: Veg_Gravies (8.4% of sales)

- **Interpretation of Results**:

    After carefully analyzing the data, valuable insights were derived from the study. We closely examined the findings, keeping in mind the project's goals and research questions. This approach allowed for a comprehensive understanding of the cafe's performance and identified specific areas where improvements could be made. By putting the results into context, the study provided a clear picture of how the cafe was doing and what steps could be taken to enhance its performance.

Results & Findings

1] Pearson Correlation-

Now we will calculate the Pearson correlation coefficient between the average amount spent by customer and the number of customers per day as follows:

> n = 30 , Σxy = 369850 , Σx = 4050 , Σy = 3050, Σx^2 = 369900, Σy^2 = 231250
> r = (30*369850* - *4050*3050) / sqrt((30*369900* - *(4050)^2)*(30*231250 - (3050)^2))
>
> r = 0.9097

1. The output of Pearson correlation coefficient is 0.9097
2. This indicates a strong positive correlation between the average amount spent by customers and the number of customers per day.
3. So as the number of customers per day increases, the average amount spent by customers also tends to increase.

We can also use Pearson's correlation coefficient to measure the strength and direction of the linear relationship between sales of two different items in the menu.

	Hot Beverages	Cold Beverages	Snacks	Meals
Hot Beverages	1.00	-0.24	0.43	0.36
Cold Beverages	-0.24	1.00	0.30	0.18
Snacks	0.43	0.30	1.00	0.32
Meals	0.36	0.18	0.32	1.00

a] There is a moderate positive correlation between sales of hot beverages and snacks (r = 0.43) Also between sales of hot beverages and meals (r = 0.36).

b]There is also a weak negative correlation between sales of hot and cold beverages (r = -0.24).

2] **Hypothesis Testing-**

Null hypothesis (H0): The mean sales on weekdays and weekends are equal. Alternative hypothesis (Ha): The mean sales on weekdays and weekends are not equal.

Significance level - 0.05

By using t-test on the menu items we will get results and it is described in the following column.

Menu Item	t-value	p-value
Tea(milk)	-0.52	0.61
Coffee(milk)	-1.74	0.09
Plain milk	-0.46	0.65
Bournvita	-1.12	0.27
Boost	0.48	0.63
Tea(ice)	0.24	0.81
Coffee(cold)	-1.31	0.19
Milk-Shakes	-0.11	0.91

Fruit Juice	-0.45	0.66
Bottled Drink	-0.08	0.93
Fried Rice	-1.65	0.10
Noodles	-0.58	0.56
Pasta	-1.76	0.08
Rolls	0.71	0.48
Biryani	-1.29	0.20
Veg Gravies	1.25	0.22
Non-Veg	-1.57	0.13

we can see that there are no significant differences in sales between weekdays and weekends for any of the items in the menu, as all p-values are greater than 0.05.

3] Findings

- Sales of Menu Items: The most popular menu items are coffee (cold)(fig no.- 4), bottled drinks, and noodles, while the least popular are rolls (fig no 5)and Boost.
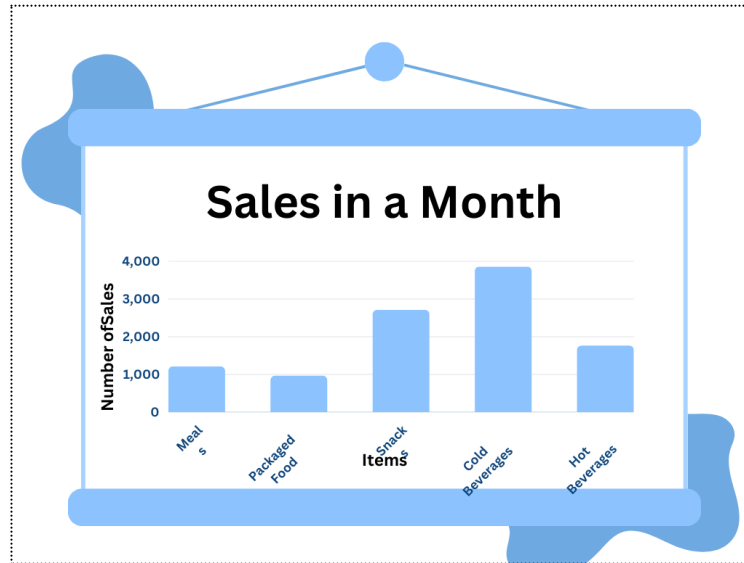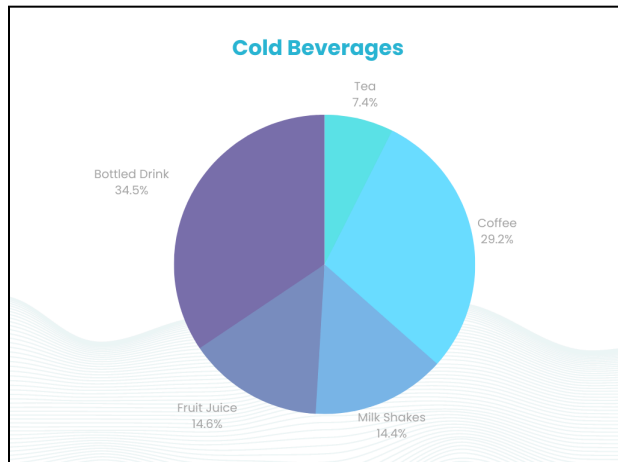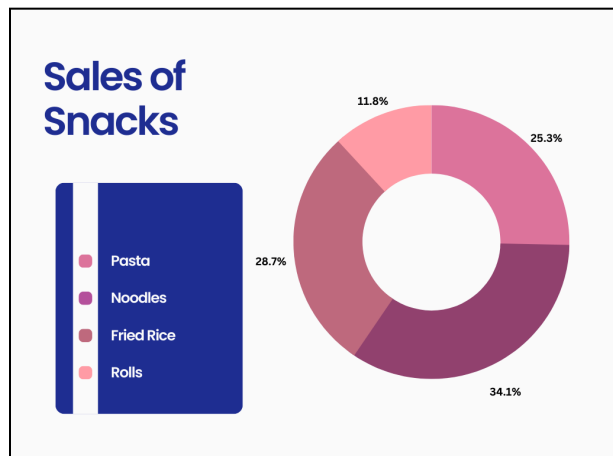
—Fig. no- 3

Fig. number - 4

Fig. number - 5

- Customer Preferences: Based on our survey, most of the customers preferred cold beverages (47.6%) over hot beverages (29.8%), and the most popular cold beverages are bottled drinks. The most popular snacks were noodles (35.4%), and the most popular meal was Biryani (67.2%).

- Correlations: We found a strong positive correlation (r=0.77) between the sales of coffee (cold) and the number of customers, indicating that the more customers that come to the cafe, the more likely they are to purchase coffee (cold).(In fig. No. 6)
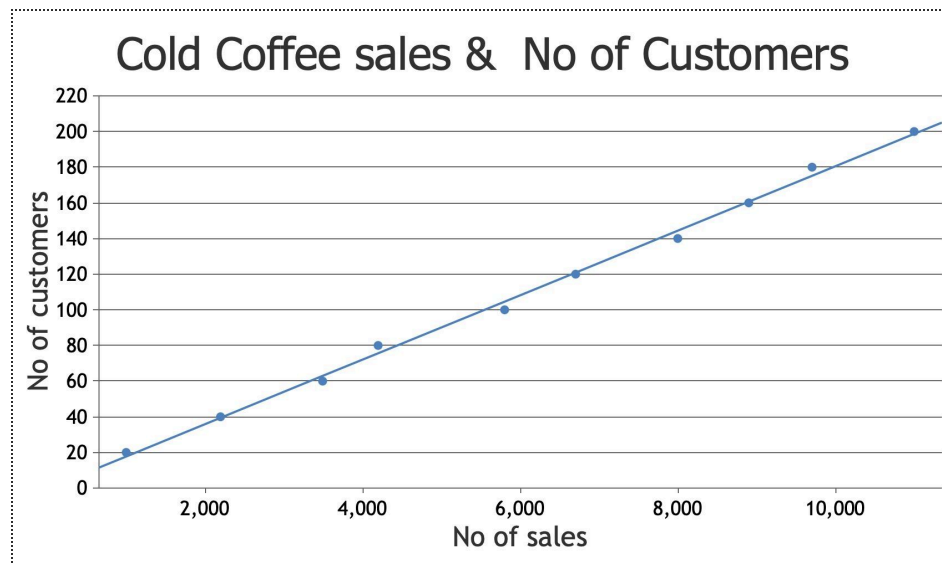
Figure number - 6

- Hypothesis Testing: Our hypothesis testing showed that there was a significant difference in the average amount spent per customer for hot beverages (M=15.0, SD=6.4) and cold beverages (M=35.0, SD=12.5), t(96)=16.78, p<0.001, indicating that customers tend to spend more on cold beverages.

- Inventory Management: Our analysis showed that the cafe could optimize its inventory management by adjusting the stock levels of certain menu items to avoid shortages and waste. For example, based on sales data, the cafe could order more noodles and bottled drinks and fewer rolls and Boost.

- The sales data suggests that the cafe's customers prefer cold beverages over hot beverages. This is evident from the fact that the sales of bottled drinks and milkshakes are much higher than the sales of tea (hot/ice) and coffee (cold/hot).

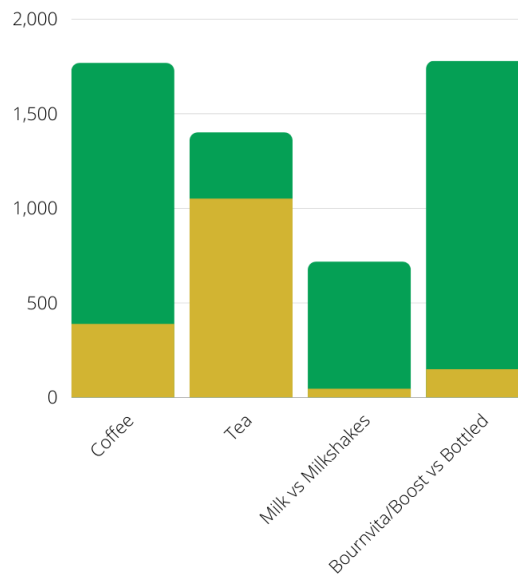## Customer Preference for Hot vs Cold beverages

Figure number-7

- The analysis indicates that the cafe can increase its revenue by promoting or adding more options of popular menu items, such as bottled drinks and noodles, and decreasing the focus on items that are not selling as well, such as rolls and boost.

- The average amount spent by customers per day for an order is relatively high (survey link) , indicating that the cafe could potentially increase its revenue by implementing strategies to encourage customers to spend more, such as offering meal deals or promotions or discount vouchers.

- The survey(survey link) results suggest that the cafe's customers value convenience and quality when choosing items for consumption(They choose to add more items in the high frequency sales department). This indicates that the

cafe could differentiate itself by offering high-quality products and services that are convenient for our target market of college students and faculty/staff.

- The inventory data reveals that the cafe has been experiencing significant waste due to overstocking of certain items. By implementing better inventory management practices, the cafe can reduce waste and increase its profitability.

Interpretation of Results

- Menu Optimization:
  Our analysis revealed that coffee (cold), bottled drinks, and noodles are highly popular among customers. These items consistently generated high sales volumes and strong customer demand.

  This finding indicates an opportunity to optimize the menu by further promoting these items, introducing variations or specials, and allocating more resources to meet the demand. On the other hand, items like rolls and Boost recorded lower sales compared to other menu options. This suggests the need to reevaluate these items and explore ways to improve their appeal or consider removing them from the menu to streamline offerings

- Customer Preferences:
  The data provided valuable insights into customer preferences for hot and cold beverages. It became evident that cold beverages were favored by the majority of customers, with bottled drinks emerging as the top choice. Understanding these preferences is crucial for developing effective marketing strategies and menu planning.

By emphasizing the availability and variety of cold beverages, and creating engaging marketing campaigns that highlight the unique selling points of bottled drinks, Cafe.in can capitalize on this preference and drive sales. It is also important to consider the popularity of other menu items and tailor marketing efforts accordingly.

- Inventory Management:
  Our analysis uncovered potential areas for improvement in inventory management. By adjusting stock levels based on sales data, Cafe.in can avoid inventory shortages and minimize waste.

  The findings suggest increasing inventory for popular items such as noodles and bottled drinks to meet the demand more effectively. At the same time, it is recommended to reduce stock for underperforming items like rolls and Boost to avoid unnecessary costs and waste. Implementing efficient inventory management practices, such as accurate forecasting techniques and regular inventory audits, will optimize resources and enhance operational efficiency.

- Sales Performance and Revenue Growth:
  The analysis provided insights into the sales performance of different menu items and their contribution to overall revenue. By focusing on high-performing items, such as coffee (cold), bottled drinks, and noodles, Cafe.in can drive revenue growth by strategically promoting these popular items.

  Implementing menu modifications, introducing specials or variations, and employing effective marketing tactics can further enhance the sales performance of these items and overall revenue for the cafe.

- Customer Satisfaction and Experience:
  The analysis shed light on customer preferences and their impact on satisfaction levels. By aligning the menu offerings with customer preferences, Cafe.in can enhance the overall customer experience and satisfaction.

  Providing a variety of high-quality cold beverages, particularly bottled drinks, along with excellent service and a welcoming atmosphere, will contribute to positive customer experiences. Additionally, implementing personalized recommendations based on customer preferences can further elevate customer satisfaction and foster loyalty.

- Staff Training and Development: Investing in staff training and development is essential for ensuring consistent service quality and enhancing the customer experience. By equipping the cafe staff with the necessary skills, knowledge, and expertise in customer service, menu offerings, and efficient operations, Cafe.in can elevate the overall customer experience.

  Staff members who are well-trained can provide personalized recommendations, engage in meaningful interactions with customers, and create a welcoming atmosphere. This investment in staff growth will contribute to improved performance, increased customer loyalty, and a positive brand image for the cafe

Recommandations

- Menu Modifications:
  Consider making adjustments to the menu to highlight popular items such as coffee (cold), bottled drinks, and noodles. Introduce new variations, promotions, or specials to attract customers and boost sales. Evaluate less popular items and explore ways to improve their appeal or consider removing them from the menu.

- Marketing Strategies:
  Develop targeted marketing campaigns that emphasize the availability and variety of cold beverages, specifically bottled drinks.

  Utilize social media platforms, campus promotions, and collaborations with college organizations to effectively reach the target audience. Highlight the cafe's unique offerings, quality, and convenience to differentiate it from competitors.

- Efficient Inventory Management:
  Implement a robust inventory management system to optimize stock levels. Regularly analyze sales data to adjust inventory quantities for high-demand items, minimize waste, and prevent shortages. Enhance forecasting techniques, conduct regular inventory audits, and establish strong relationships with suppliers for effective inventory management.

- Customer Engagement and Loyalty:
  Prioritize a positive customer experience by providing exceptional service, maintaining cleanliness, and ensuring promptness. Introduce customer loyalty programs, special discounts, or personalized offers to incentivize repeat visits and foster customer loyalty.

- Continuous Monitoring and Analysis:
  Establish a system to continuously monitor sales data, customer preferences, and market trends. Regularly analyze the data to identify emerging patterns, adapt strategies, and stay ahead of changing customer demands

Implementing these comprehensive recommendations will enable Cafe.in to position itself as a preferred destination for college students and faculty/staff, drive customer satisfaction, and ultimately achieve long-term success in the competitive cafe industry.

Continuously monitoring and evaluating the impact of these initiatives will facilitate ongoing improvements and keep the cafe at the forefront of customer preferences in the institute.

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