

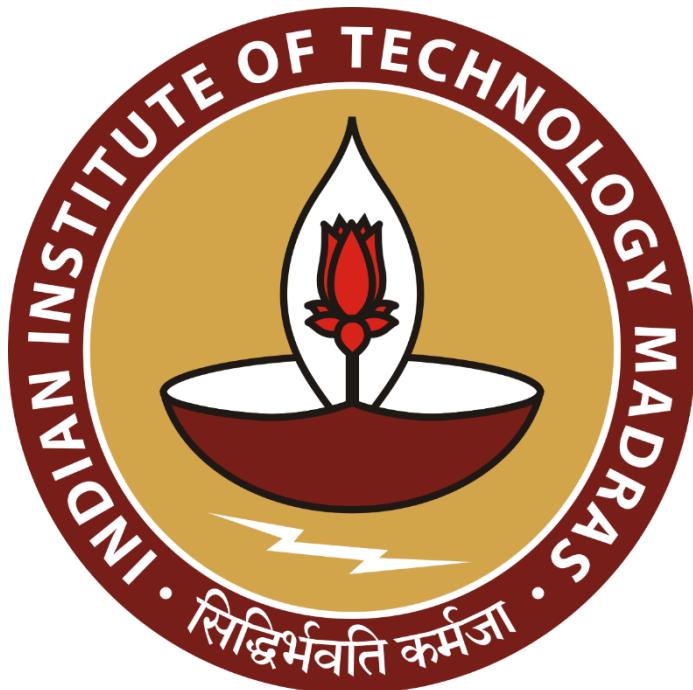
Enhancing Profitability by Combining Online Sales with Traditional Vendor Channels

A Proposal report for the BDM capstone Project

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Executive Summary

Kamalai Organics is a small scale brand of organic hair oil that is located in Yavatmal in Maharashtra. The company deals with making hand-made chemical-free hair oil that is sold mainly to sellers and to individual customers. The fact that the quality of the products and the satisfaction of their customers has been consistent has been the main strength of the business, but it has some challenges including seasonal demand variability, the inability of the vendors to order continuously, and overdependence on third-party services such as Amazon. All these have affected the overall profitability and hindered the demand forecasting.

The data to be used in this study was gathered within a period of eight months between July 2024 and February 2025 which will include sales transactions of various channels: vendor, direct and Amazon. The most important variables were Date, Sales channel, quantity sold, selling price, cost price, Revenue, Profit, Region and Return Flag. The descriptive statistics created summarized the important trends, whereas the analysis of seasonal changes, the behavior of the vendors, and platform dependency were examined with the help of analytical methods, i.e., time-series trend analysis, box plots, and heatmaps.

The initial forecasts were that sales are less in rainy months and show a significant increase in sales during winter, which is consistent with the trends of hair care according to seasons. The orders of the vendors were irregular and led to uneven cash flow, and the share of their sales in the total sale of the goods decreased because of the little advertising provided by Amazon.

According to the results, recommendations were made on how to enhance direct sales channels, implement vendor scheduling based on inventory and consider the local digital marketing that have already demonstrated indications of improved sales predictability and improved coordination of the vendor.

Detailed Explanation of Analysis Process / Method

1. Time Series Analysis

The trends, patterns, and fluctuations of the performance of Kamalai Organics in terms of sales each month were identified using time-series analysis. As the business has fluctuating demand for its hair oil, this analysis is used to realize how customer purchases are affected by the passage of time based on seasonality, marketing campaigns, or platform promotion. The observation of such trends will enable Kamalai Organics to forecast high demand periods to optimize on production and stock quantities.

Steps to Perform:

- **Data Preprocessing:**
 - Transform the Date column in the correct format of a datetime.
 - Separate and summarize the data based on Month-Year to sum up Total QuantitySold and Revenue.
- **Visualization:**
 - Monthly sales and profit plot line to identify trends and seasonal changes.
 - Pivot tables in Google sheets will summarize data on a channel by month.
- **Patterns:**
 - Point out times of good and bad sales (e.g. festival months or seasonal declines).
 - Determine the demand peaks in relation to the promotions or seasonal purchases.

Expected Outcome:

It has been found that the sales demand varies within the months with some months exhibiting peaks that could be related to festive sales or online promotions. These patterns also help Kamalai Organics in controlling the production process, preventing stock shortages, and designing specific marketing strategies with ease.

2. Quantitative and Statistical Analysis

Quantitative analysis helped summarize the dataset and uncover underlying sales dynamics. Descriptive statistics, mean, median, mode, standard deviation, were calculated for Quantity_Sold, Revenue, and Profit. This process quantified central tendencies and variability, showing how consistent or inconsistent sales performance has been.

Steps to Perform:

- **Data Preprocessing:**

- Make sure that there is some numerical discipline in the essential fields: QuantitySold, Revenue, Profit and DeliveryDistance.

- **Descriptive Statistics Calculation:**

- Calculate mean, median and standard deviation by use of spreadsheet functions or by Python.
 - Formula examples:
 - Mean:

$$\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$$

- Standard deviation:

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2}$$

- **Visualization:**

- Presentation of monthly averages and totals should be in the form of bar charts and summary tables.
 - Box plots were plotted to see the spread and identify the irregularity in the quantity of the vendor orders..

- **Interpretation:**

- QuantitySold had a high standard deviation which affirms changing demand.
 - The channel-wise averages showed that Kamalai Organics was excessively dependent on Amazon on the high selling months..

Expected Outcome:

The discrepancy in the sales and vendors ordering habits was also measured through this analysis. It also found that Amazon is generating a disproportionate amount of total revenue, which implies platform dependency. The numeric summaries provided a factual underpinning of the subsequent level of visual and correlation-based analysis.

3. Channel-Wise and Vendor Analysis

The channel and vendor performance analysis was going to determine dependency patterns and supply chain inefficiencies. Kamalai Organics depends on numerous sales channels (Amazon, Direct and Vendor). Through evaluation of performance metrics between these channels, aspects of overdependence and erratic vendor behaviour were determined.

Steps to Perform:

- **Channel Aggregation:**
 - Calculate the monthly revenue and orders per SalesChannel using pivot tables
- **Visualization:**
 - Establish a heatmap to conduct a comparison between performance across months and channels.
 - Employ box plots to indicate differences in orders of the vendors.
- **Comparative Evaluation:**
 - Determine the channels that are always the biggest contributors of revenue.
 - Identifies anomalous vendor behaviors by abrupt decreases or increases in the quantity of orders.

Expected Outcome:

The review showed that Kamalai Organics is excessively relying on Amazon to make sales when the demand is high. There was inconsistency in the vendor orders leading to disruption in supplies. These results justify the suggestion of diversification of the sales with the help of direct-to-customer site and automation of scheduling of the orders with the vendors.

4. Correlation and Profitability Analysis

Correlation analysis was also carried out to establish a relationship between such factors like sales channel, distance of delivery and profit. The knowledge of these associations assists the business in maximizing delivery pathways and enhancing pricing methods.

Steps to Perform:

- **Data Preparation:**
 - Choose numerical variables: Revenue, Profit, DeliveryDistancekm and QuantitySold.

- **Correlation Computation:**

- Apply the formula of Pearson correlation coefficient:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

- Calculate the correlations in Python (df.corr()) or in Sheets

- **Visualization:**

- Visualize relationships strength by plotting a heatmap.

- **Interpretation:**

- The Correlation between DeliveryDistance and Profit is negative, which shows that the longer the delivery route the lesser the profitability is.
 - Strong correlation between Vendor and Revenue is a confirmation of inconsistent vendor contribution to order.

Expected Outcome:

In this analysis, the negative effect of logistics distance on profits was quantified and the inefficiency in terms of sales based on vendors was pointed out. These results support the necessity of the improved coordination of the vendors and increased local distribution to decrease the cost of delivery.

5. Qualitative Business Insights

In order to supplement the quantitative results, the business owner was also discussed. These discussions helped understand the working realities of the numbers, including why there are seasonal differences on demand, why the vendors are uneven, and how the platform affects requirements.

Steps to Perform:

- Informally interview the owner to get an idea on perceived demand cycles.
- Match qualitative on to quantitative results (e.g. high Amazon dependency in the months with festivities).

Expected Outcome:

Integrating owner feedback with analytical outcome made sure that the suggestions were feasible. The business realized the areas of improvement in vendor coordination and selling product diversification and initial steps were made in the development of direct sales site.

Results and Findings

1. Analysis of Channel Order Patterns by Month

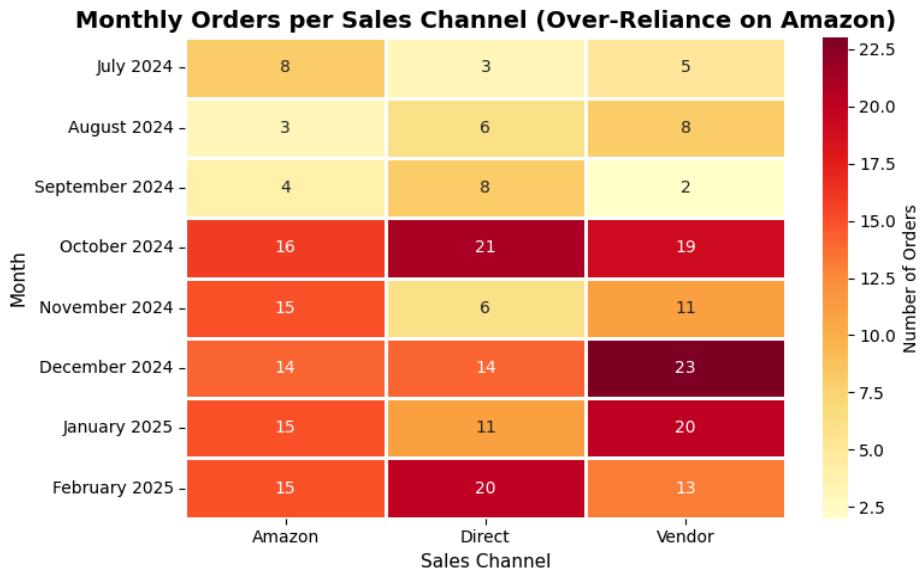


Fig 1. Heatmap for Monthly Orders per Sales Channel

- The heatmap above indicates a clear month-wise and channel-wise overview of the order distribution with all the channels having low order activity indicating the lack of demand or less promotion during these months. It is noted that all channels show a sharp rise in the number of orders starting in October 2024 with Direct (21 orders) and Vendor (19 orders) on the top and Amazon on the bottom of the list as well.
- The trend continues through February 2025 indicating a heavy festive or seasonal demand effect and indicates that the strategies of the channels have achieved diversification in their order volumes, unlike pure Amazon dependency.
- Although the order volumes remain high, with no month recording less than three orders, this would indicate that the channels have developed a diversification strategy in their operations, which would prevent a business risk of overreliance on a single channel. The strong performance of the Vendor channel in February (20 orders) could be a result of end-of-season clearance of stock or last-minute campaigns.

2. Revenue Contribution Analysis by Sales Channel

- The pie chart helps to make a view of the total revenue distribution among the Amazon, Direct, and Vendor sales channels, as well as to emphasize the proportional contribution each

channel makes to the overall income stream of the business, based on the channel-specific incentive and diversification efforts more practical.

- The close similarity in the share of each channel demonstrates the well-managed channel mix, which can lessen the risk factor and reliance on a single channel, which will help the business to stay buoyant. The channel-specific incentive and diversification strategy becomes practical, making the channel-specific incentive programs more effective at targeting unique customers.

Channel Contribution to Total Revenue

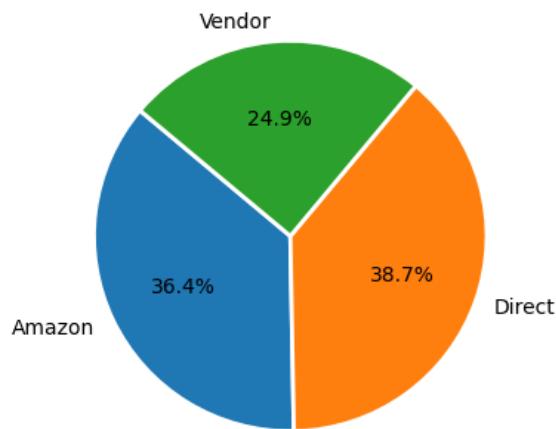


Fig 2. Pie Chart for contribution of each channel to total revenue

3. Monthly Average Revenue Performance Analysis

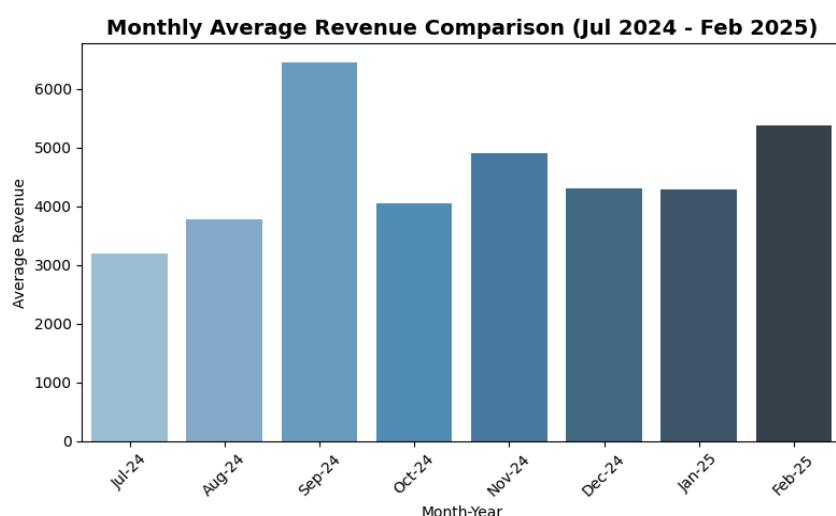


Fig 3. Bar Chart for average revenue

- The bar chart, in turn, enables the decision-makers to identify the high and low-performing months and take specific steps to ensure the growth in every month, as the high average performance of the business in 2024 is characterized by the general regularities of its monthly trends and a consistent and systematic manner of the business results.
- From the chart we can infer that September has the highest average revenue while July has the least. Undoubtedly, the corresponding highlights the overall trend of the business performance but allows taking some specific steps to boost the average monthly performance in order to increase the revenue in the particular month due to the frequency of the business outcomes and the ability to formulate the corresponding strategies of the business promotion.

4. Trend Analysis of Monthly Total Sales and Quantity

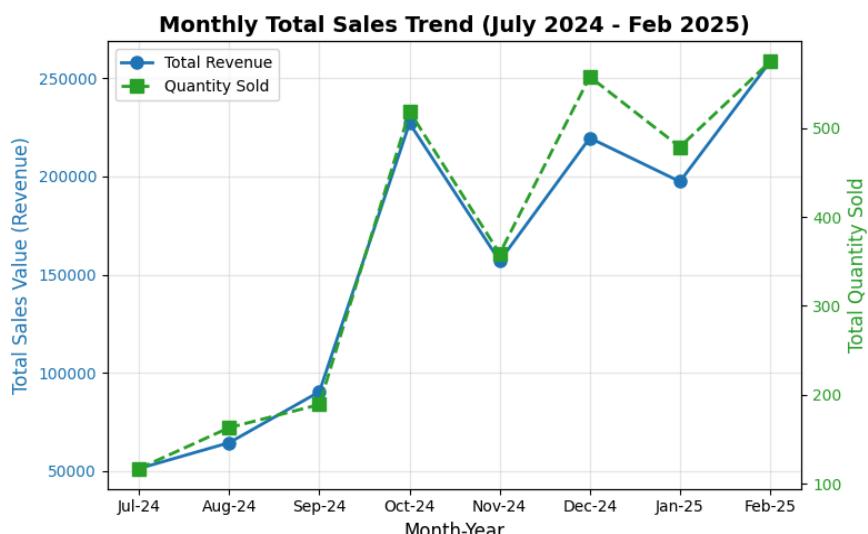


Fig 4. Line Chart of the total sales trend

- The line chart above in the dual axis mode shows that there is a general downward trend in total revenue and quantity sold in the month of July to September 2024, which was the least active sales month with minimal demand or low levels of marketing.
- A significant increase is seen beginning in October 2024, and the peak point in terms of revenue and quantity sold is observed in December and February. The almost parallel change in the movement of the two lines suggests that the revenue is highly reliant on the number of units sold, which may hint at stable pricing or product mix instead of the substantial change in the average value of its sale.
- The steep drop in November and December indicate that the growth of the business heavily depends on the activities held at specific times of the year to promote sales and encourage the

idea that the business may not have significant shifts in the average price of selling its goods to customers.

- Generally, it can be observed that these two lines show that the enterprise relies heavily on the events that take place at a particular time. Determining these cycles will help the management to synchronize the inventory, employees, and marketing to the best of its performance.

5. Distribution Analysis of Vendor Order Quantities by Month

- The summary of the visualization of this box plot shows that the quantities ordered by the vendors by month are distributed, which can be used to optimize the vendor engagement and inventory management, as the bigger the uncertainty due to seasonal variability, the better the strategy of negotiation and resources allocation can be made.
- The variability of the quantities ordered by the vendors by month and their median (the median is usually the same as the overall median of the whole dataset) indicate that a better approach involves focusing on months with a higher uncertainty level to enhance the negotiation and resources allocation strategy. December has the highest median and IQR, while months like July and September seem more stable.

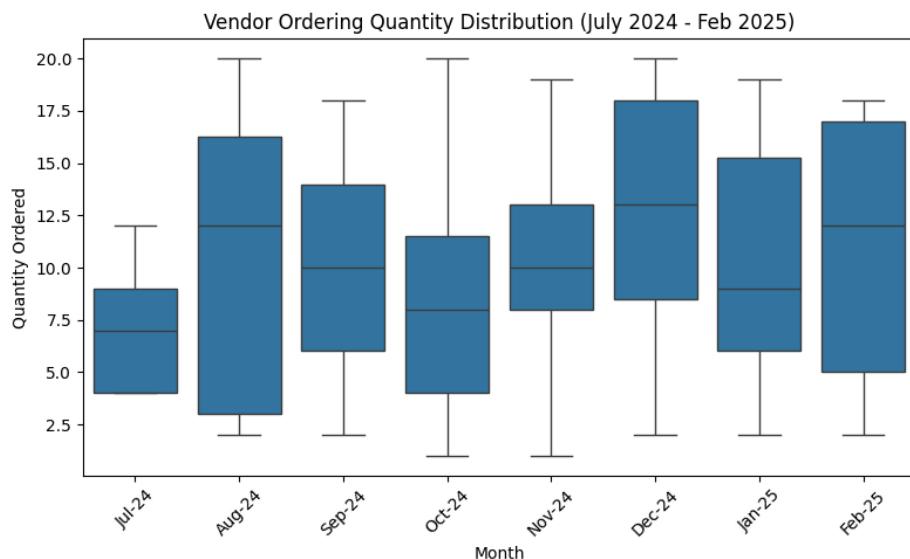


Fig 5. Box plot for vendor ordering quantity distribution

6. Trend Analysis of Vendor Orders and Quantities

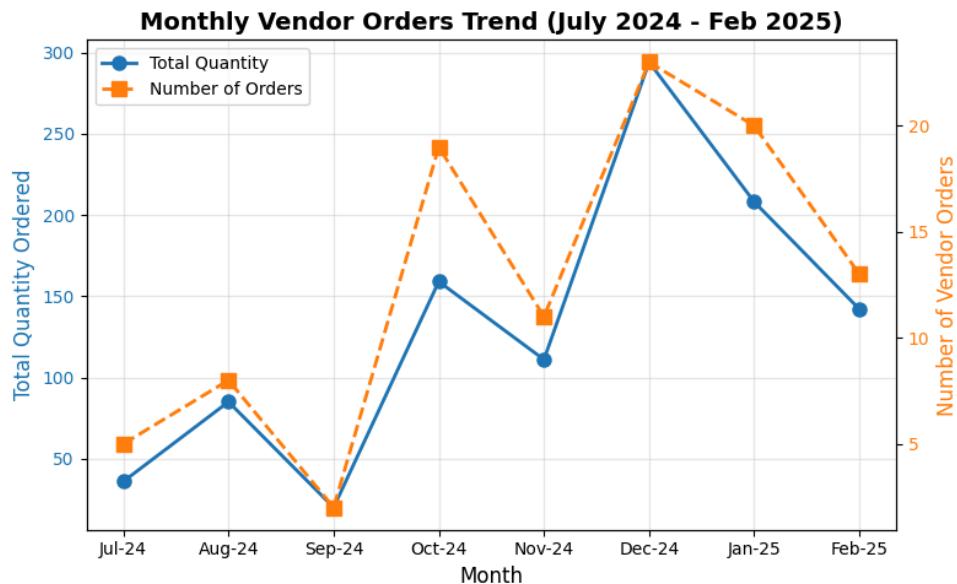


Fig 6. Line Chart for vendor order trends

- This monthly vendor order trend graph demonstrates how the total quantity ordered (blue line) and the number of vendor orders (orange dashed line) are rising in July 2024 to February 2025, showing data trends that indicate trends in demand and supply over the period.
- The high activity in the last part of the year from October to December, demonstrates that the vendor has an overall pattern of responding to seasonality, needs to maintain its relationships with suppliers when demand is low, and can use the information to make a more accurate forecast of the order and vendor orders in the future.
- The steep drops in September and November suggest low market activity. However, vendors have maintained a consistent average order size aligned with the trend of about 11 units/order.

7. Analysis of returns by channel (platform dependency)

- The above stacked column graph illustrates the orders returned to the Amazon, Direct and Vendor channel as compared to those which were successfully fulfilled.
- Although Vendor manages the largest absolute number of orders, the ratio of returns is considerably higher in Amazon than in Direct or Vendor.
- Direct channel is characterized by high order fulfillment achievement and the share of returns is low and this implies an increased reliability or post-sale processes.
- Vendor, although with a slightly higher volume, has a low number of returns- a good sign of a better pre-sale check or a customer specific channel trust.

- The return concentration in Amazon is a business perspective of extreme concern: it can indicate the problems that are peculiar to this channel, i.e., failure to meet the expectations of customers, lack of product consistency, or operational tensions peculiar to the policies of the marketplace.
- Over dependence on Amazon, given the amount of its turnover, is a risk to both revenues and reputation in case the discontented customers intensify or drop.
- Business enterprises must promptly respond to the root causes that contribute to Amazon returns by checking product pages, returns, and after sales services.
- Distributing sales channels and easing returns process can minimize overexposure to one channel that has a high risk factor and eventual safeguard profit margins and customer base.

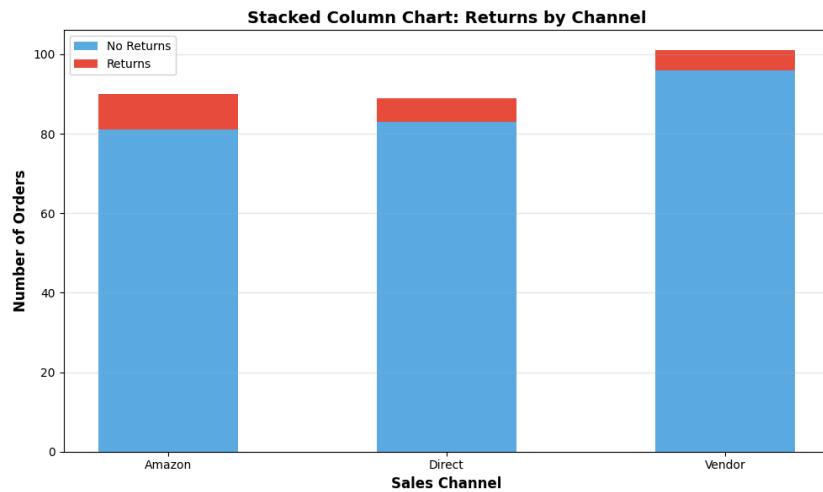


Fig 7. Stacked Column Chart for returns by channel

Interpretation of Results and Recommendations

1. Financial Metrics Interpretation:

Financial Metric	Value
Total Revenue	1,265,541
Total Turnover	1,175,339
Total Cost	640,077
Avg Daily Profit	3,884.87
Min Daily Profit	183.0
Max Daily Profit	15,469.0

Total Revenue: This is the gross sales revenue of selling goods at the period. A good overall revenue amount is an indicator of a good sales volume and market share. Nevertheless, profitability or efficiency of operations cannot be quantified by revenue.

Total Turnover: Turnover corrects the revenue by including returns and discounts. The fact that the total revenue reduced slightly implies that there were some returns/refunds and yet good sales quality. It is important to maintain low returns in order to safeguard revenue streams.

Total Cost: The total buying or manufacturing cost of goods sold (COGS). The gross margin and cost management efficiency can be checked by comparing the total cost and the revenue with the turnover.

Average Daily Profit: Average profit generated per day, shows profitability of operations in the period. To continue doing business, this average should be maintained or increased.

Minimum Daily Profit: The poor daily profit indicates the possible days of bad performance or high cost. The recognition and exploration of these days help in reducing risks and better handling of cash flow.

Maximum Daily Profit: Peak daily profit displays successful selling days, or successful cost management and promotion influences. Global knowledge on drivers of peak days can be used to guide replication strategies.

Recommendations:

- Urgent: Perform detailed studying of returns in order to reduce post sale losses and enhance satisfaction of customers. Days with lowest profit also reveal inefficiencies, which should be improved in real-time to expose current weaknesses.
- Long-term: Improve the effectiveness and cost management of supply chains and increase gross margins. Invest in high-profit period marketing techniques to earn peak performance and average the daily profit constant with time.

Impact:

The application of these recommendations will help to increase net profitability, stabilize revenue flows, mitigate financial risks on low-profit days, and improve the competitiveness of the firm. Better cost management and strategic sales growth will lead to the increase of shareholder values and the sustainable growth of business.

2. Channel Performance Interpretation

Sales Channel	Orders	Total Units Sold	Total Revenue	Total Cost	Total Profit	Avg Revenue Per Order	Avg Profit per Order
Amazon	90	923	460,577	199,539	261,038	5,118	2,900
Direct	89	981	489,519	210,197	279,322	5,500	3,138
Vendor	101	1,055	315,445	230,341	85,104	3,123	843

This table of channel-wise financial analysis will present a finer perspective to the sales, profitability, and operational efficiency of Amazon, Direct, and Vendor channels. Although the Vendor channel has the largest order volume (101) and units sold (1,055) the overall and average profit per order are significantly lower than Amazon and Direct. Direct channel has the greatest revenue (489,519) and profit (279,322) with high value extraction per order (avg. profit: 3,138) even though it handles a little fewer orders. Amazon follows close by both in terms of revenue and profit per order. The Vendor channel is a volume channel with low profit margins (mean profit: 843), presumably because of a higher cost or a reduced power of prices.

These differences indicate that not every channel will result in the same degree of profitability and high order volume does not mean high margins. The channels cannot be evaluated based on the number of transactions or gross sales only- the focus needs to be on the bottom-line contributions.

Recommendations:

Urgent:

- Bring out the review of costs and pricing of Vendor channels with the aim of establishing factors contributing to low profit margins. Make instant changes to the price, discounts, or the cost of procurements.
- Concentrate on imitating profit maximizing tactics in the Direct and Amazon channels (e.g. marketing, targeting or bundling approaches) in the Vendor segment to elevate average profit per order.

Long-Term:

- Move strategic focus to grow the order and revenue split with Direct and Amazon where the profitability is much stronger and manage the vendor terms and supply chain contracts optimally to be cost effective.
- Establish SMART targets: For example in next two quarters, aim to increase Vendor average profit per order by a price of 1500 and re-evaluating order incentives.

Impact:

These recommendations will be the best way to make the company as profitable as possible without losing out on the sales momentum. The alignment of channel strategies to profitability will enable the business to restore the balance on focus to value rather than volume and guarantee more sustainable growth, as well as aid in making better investment decisions. Better vendor margins and intelligent

channel prioritization can help the business to resist the competitive forces and economic cycles and meet stakeholder expectations.

3. Increase Product Line and Channel Diversification

Short-term Recommendations:

- Bring in new organic personal care items like shampoo, conditioner, or serum which are on the same herbal oil foundation to capitalize on the brand acquaintance.
- Conduct monthly promotion campaigns on busy months (Oct-Feb) through Amazon and social media to take advantage of consumer peaks.

Long-term Recommendations:

- Enhance the relationship with the vendors, providing stability in supplies and volume-based incentives.
- Consider offline physical store distribution by small organic product shops or local events in order to have different sources of revenues than being over-reliant on e-commerce.

Impact:

The channel and product diversification will reduce the volatility of revenues and enhance brand memories. The diversified product offering with a variety of sales channels will increase the seasonal resistance.

4. Improve Inventory and Demand Forecasting

Recommendations:

- Introduce demand forecasting (e.g. 3-month moving average) based on the previous order information to organize stock replenishment cycles.
- Establish inventory levels depending on average sales and lead time in order to avoid stock out or over holding.

Impact:

This will help in the smoother operations, low holding cost and on time delivery of orders during the busiest periods.

5. Optimization of Vendor Relationship

Recommendations:

- Measure reliability of the vendors by using order consistency measures and remove bad performers.
- Implement quarterly vendor performance appraisal by timeliness of delivery and stability of number of orders.
- Offer incentives such as early-payment or volume discounts to good performing vendors.

Impact:

This will decrease supply upheavals, enhance fulfilment performance, and have a consistent flow of orders across the year.

6. Marketing and Customer Retention

Recommendations:

- Introduce customer loyalty promotions on repeat purchases in an attempt to boost Direct channel retention.
- Performance analysis Use social media analytics to determine the most successful campaigns and optimize advertisement costs.
- Emphasize on sustainability and authenticity in the packaging and storytelling to reinforce brand positioning.

Impact:

Customer retention and repeat purchases can boost profit margins without increasing marketing expenditure significantly, supporting sustainable growth.

Additional

BDM Folder - [Link](#)