**Inventory Management Review**

**Group 7 (Akash Valathappan, Tarunya Daga, Riha Sindhe)**

**Final Report:**

**Introduction:**

Inventory Management is crucial to the retail industry. Adidas is a multinational firm that designs and makes footwear, accessories, and apparel for sports and everyday use. This Adidas' information product is based on the Sales data in the US for the year 2020-2021 for inventory management aimed at increasing their overall efficiency and profitability. Effective inventory management Information Product can assist Adidas' supply chain to be optimized while also reducing waste and increasing revenues. With the use of an inventory management Information Product, Adidas may choose what products to stock and how much inventory to move, which can save expenses, increase productivity, improve customer satisfaction, and even raise profits. The ultimate objective is to assist Adidas in maintaining their position as a market leader and expanding their clientele.

One of Porter's Five Forces is the threat of new entrants. By lowering their expenses and boosting their productivity, Adidas can counteract this force by developing a strategic information Product, which will also help them become more efficient. Adidas may lower their expenses of inventory holding, transportation etc. with a better inventory management system. Additionally, a better inventory management system can help Adidas identify which products are selling the most and which are not, allowing them to focus their efforts on their best-selling products and which allow them to have competitive advantage in the market by making it more difficult for new competitors to compete with it on quality and brand awareness. Adidas may invest more in marketing, R&D, and other areas that can help them keep their competitive advantage thanks to the lower expenses. Additionally, Adidas may be able to outperform new rivals who might lack established supply chains or distribution networks if they have a more effective inventory management system that enables them to react more swiftly to changes in demand. Another force that the information product can combat against is the bargaining power of buyers. The buyers' negotiating power is another element that the information product can counteract. Adidas may improve their pricing plans and product offers to better serve their consumers by having a more thorough understanding of their inventory levels and sales statistics. Customers are more likely to stay with Adidas if they are happy with the goods and pricing given, which can improve customer loyalty and minimize buyer negotiating power. This can help identify any patterns or trends in sales, which can then be used to optimize pricing strategies and product offerings. Overall, a strategic inventory management system may assist Adidas in minimizing the effects of both the risk of new competitors and the bargaining power of buyers, allowing them to retain their position more easily in the market.

**Data and Methodology:**

The dataset was picked from Kaggle because it offers a thorough account of Adidas sales, including details on the goods sold, their costs, and the volume of their sales. The data set is moreover openly accessible, allowing study of it simpler. Since it is crucial to confirm the data set's legitimacy and source to guarantee its quality. The source for the Kaggle Adidas sales data is a recognized data science platform that offers authenticated and trustworthy data sets. The data set's relevance to the issue being handled i.e., the inventory management is also considered. The purpose of this situation is to enhance Adidas' inventory management strategy. Therefore, the sales data for Adidas is significant. The dataset consists of Columns such as Retailer, Retailer ID, Invoice Date, Region, State, City, Product, Price Per Unit, Units Sold, Total Sales, Operating Profit, Operating Margin, Sales Method. Our dataset initially had 9648 rows and 13 columns.

**Source Link:** <https://www.kaggle.com/code/mudassarshaheen/adidas-sales-eda-and-ml-project/input>

Data Sample:

**Graphical user interface, application, table, Excel

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Data Collection:We gathered data from sources such as Kaggle. This dataset gives us information about the sales in the USA for the year 2020-2021. Our dataset initially had 9648 rows and 13 columns. We deleted the Retailer ID column, as it was irrelevant to the Information Product and after that the dataset had 9648 rows and 12 columns.

Data Cleaning: We checked if the data had any outliers, Duplicates, Inconsistencies, Null Values. It had none.

Data Transformation: The next step was transforming the data into meaningful insights such as **Sales Growth** over months.

**Data Visualization :**

We performed various exploratory visualizations in a user-friendly format that allows for easy understanding and decision-making processes. The visualizations provide key insights into the top performing products, Top retailers with highest sales, Units Sold by Retailer and Product. The Total Operating Profits, Margins, Sales, Units Sold by all three Sales Method. Correlation Matrix to see if there was any Correlation between Total Sales and other variables, Identifying Products with Zero Sales.

**Figure 1: TOP SELLING PRODUCTS**

Chart, bar chart

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**Figure 1** tells us about the top selling products of Adidas. As seen in the graph, Men’s Street Footwear is the highest selling product of adidas followed by Women’s Apparel and the underperforming products would beWomen’s Athletic Footwear and Men’s Apparel with the least contribution of sales to Adidas.

**Figure 2: Highest Performing Retailers**

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The pie chart provides a visual representation of the percentage of sales contributed by each retailer to Adidas. The pie chart displays the total sales of each retailer as a proportion of the total sales of all retailers. As seen in the chart, West Gear contributes highest (27%) of the sales to Adidas and Walmart and Amazon contribute the lowest sales. (8% and 9% respectively). It is surprising to know that (Amazon) Online Sales Methods make the least revenue to adidas, however, when the sales are grouped by retailers, Walmart which is an instore sales method makes the least out of all the retailers. One possibility is that Walmart stocks fewer Adidas items than other merchants, which would logically lead to lower sales. Another reason could be that Walmart's pricing policy for Adidas items is not aggressive enough to attract people to make purchases there. Additionally, it's possible that Adidas items are not being promoted or efficiently marketed by Walmart, which might lead to fewer sales.

**Figure 3: Product Units Sold by Retailers**

**Chart, bar chart

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**Figure 3** shows the Products in X axis and Units Sold in Y axis and the colors in the bars represent the various retailers. As seen in the graph, Men’s Street Footwear has sold the greatest number of units. West Gear and Footlocker retailers have sold more quantity of Men’s Street footwear compared to Walmart, Amazon, and Kohl’s. Men’s Apparel has sold the lowest number of units. Particularly, Amazon and Walmart have sold the lowest units whereas footlocker and West Gear have sold some units. Overall, Men’s Apparel has sold the lowest units in the adidas portfolio. Men's Apparel may have sold the fewest units overall in the Adidas portfolio for a variety of reasons. One potential explanation is that men's clothing from Adidas is less popular than other goods like footwear. This could be driven by a lack of product innovation, shifting fashion trends, competition from other brands. Another factor that could prevent shoppers from buying men's clothing is that its cost is too high when compared to that of comparable goods from other companies.

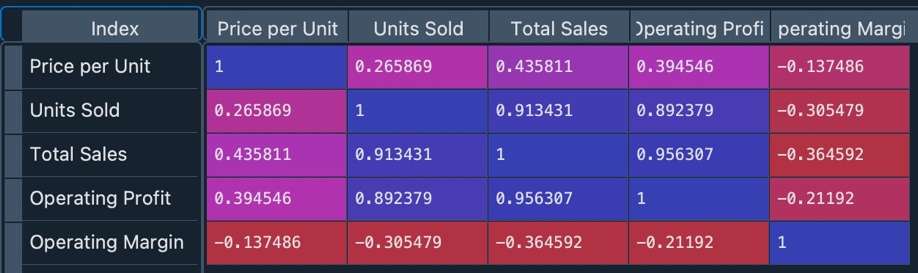
**Figure 4: Zero Sales**

**Graphical user interface, text

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It's likely that Foot Locker was out of stock of Women's Athletic Footwear on June 5 and June 11, 2021, in Omaha, the Midwest area, if these goods did not sell at that location on those dates. This may be the result of several things, such an unanticipated rise in demand or a delay in the supply chain. To guarantee that consumers can purchase the items they want and to prevent missed sales, it is crucial for the sales staff at Adidas to maintain product availability in every physical and online shop. Adidas can make sure that their products are always accessible to clients by keeping an eye on inventory levels and putting in place efficient supply chain management, which may eventually result in higher sales and client happiness.

**Figure 5: Correlation of Total Sales**

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As seen in this figure, **Units Sold and Operating Profit** have a positive Correlation with Total Sales. As the number of units sold and the total sales increase, it is likely that the operating profit will also increase. This means that the profitability of Adidas is largely dependent on the number of products they sell, and the revenue generated from those sales. By focusing on increasing their sales and revenue, Adidas can potentially increase their profitability. Adidas can make sure that appropriate products are available at the right times and places, which will enhance sales and profitability. Adidas can make data-driven decisions to optimize their inventory management and increase their revenues by using our information product to detect which goods are doing well and which need to be refilled. However, it is important to note that correlation does not necessarily imply causation, and there may be other factors that also contribute to the operating profit, such as production costs and marketing expenses etc.

**Figure 6: Total Sales by Sales Method**

**Chart, bar chart

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As Seen in Figure 6, In Store Sales Method Accounts for Most of The Sales of Adidas and the least is Online.

**Figure 7: Total Operating Profits**

**Chart, bar chart

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As Seen in Figure 7, In Store Sales Method Accounts for Most of the Operating Profits of Adidas and the Least Is Online.

**Figure 8: Total Units Sold by Sales Method**

**Chart, bar chart

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As Seen In The Figure 8, In Store Sales Method Accounts For least units sold by Adidas and the highest is sold by Online Sales Method.

**Figure 9: Total Operating Margin**

Chart, bar chart

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As Seen in Figure 9, In Store Sales Method Accounts for Least Operating Margin and the highest Operating Margin is contributed by Online Sales Method.

Adidas needs to create a more balanced inventory management strategy that considers both in-store and online sales channels considering this information. To enhance the number of units sold and operating margin for in-store sales while maintaining high overall sales and operational profitability, the firm might consider increasing inventory levels and assortment. By providing more aggressive pricing and promotions for online sales while retaining the high number of units sold and operating margin, the firm can concentrate on boosting overall sales and operational profitability.

One factor contributing to the higher operating margin of the In-Store Method would be the expense of operating physical storefronts, which might reduce the profit margin. These expenses include rent, utilities, and employees. because there are no shipping and handling fees involved, which can drive up the price of a product sold online, in-store sales may have larger profit margins than online sales. Additionally, compared to internet sales, in-store sales may entail less discounts or promotions, which can also result in better profit margins. Second, there could not be as many units available in-store, which would explain the reduced number of units sold there. The amount of inventory that can be sold might be constrained by the need for physical space for product storage and display during in-store sales. Additionally, clients' access to the actual store may be restricted for other or geographical reasons, which may reduce the quantity of items sold.

On the other hand, the greater reach and convenience of online shopping, which lets customers quickly explore and purchase items from anywhere, which results in low overhead costs and may be the reason for the larger number of units sold and operating margin for online Methods. Online Sales Method may also draw a diverse consumer allowing Adidas to reach clients in regions without physical storefronts. base that is more inclined to make repeat purchases or higher-priced transactions, which might result in greater operating margins overall. Although online sales may have better margins and unit sales, it's vital to remember that some online items may have lower selling prices, which might result in fewer overall sales and profits. It's also important to keep in mind that outside influences like shifting customer behavior and rivalry between businesses might have an impact on these trends. Adidas must thus constantly monitor and analyze sales data and inventory levels to make wise decisions and maintain its position as a market leader.

The new information product of inventory management review is strategic for Adidas for several reasons. First, Adidas can make sure that they always have the right amount of product on hand by optimizing their inventory levels, which may help them fulfill customer demand and lower the risk of stockouts. Consumer loyalty and satisfaction can increase because of that. Second, by lowering the cost of maintaining goods, a better inventory management system may aid Adidas in saving money and boosting profitability. Adidas may free up money that can be used to spend in other parts of the business, like marketing or R&D, by minimizing the quantity of surplus inventory they maintain. Thirdly, Adidas can spot trends and patterns by examining their sales data and inventory levels. There are existing information products in the market that provide insights into sales data and product performance data. However, our information product is unique in a way that it combines multiple data elements to provide a comprehensive view of product performance based on inventory helping the supply chain managers of Adidas to optimize inventory based on various factors such as location, highest selling products, etc. The new information product uses advanced statistical and machine learning techniques to identify patterns and correlations that are not visible in other information products. Additionally, our Information Product is user-friendly and adaptable, making it simple for supply chain managers to acquire and examine data that is relevant to their requirements. By doing so, they can lessen the chance of stockouts or overstocking and make more informed judgments about inventory management which can result in increased sales, improved customer satisfaction and increase overall operational efficiency.

Adidas may gain from improved inventory visibility, higher inventory monitoring accuracy, better inventory cost control, and the capacity to make data-driven decisions to optimize inventory levels. The operations and supply chain management teams of Adidas, as well as other pertinent stakeholders like the finance and sales teams, would be the primary users of the information product of inventory management. Adidas' operations and supply chain management teams are likely to use the information product of inventory management the most. These teams oversee inventory levels and make sure that the right items are accessible at the right times and places. These teams may use the information product to aid in data-driven inventory management choices, such as optimizing inventory levels and determining which goods are selling well and which are not. The product was created to support these teams in lowering costs, increasing supply chain efficiency, and optimizing inventory levels. Senior management may also utilize the product to make tactical choices on supply chain and inventory management. The IP may assist sales teams by ensuring that in-demand goods are always available, lowering the possibility of stockouts and lost sales chances. Additionally, it may benefit supply chain managers by giving them insights into demand trends and enabling them to modify inventory levels appropriately. Marketing: The IP may assist marketing teams in optimizing product promotions and campaigns by offering inventory data. They may use the data to determine which goods are doing well and make sure that there is enough inventory of these things in physical stores and online. Consumers: The IP can help consumers find the items they want in stock at the time they need them by increasing inventory accuracy and lowering the risk of stockouts. This might promote client loyalty and consumer happiness. Overall, our strategic inventory management product has the potential to benefit a wide range of stakeholders within Adidas, from inventory managers to sales teams to supply chain managers, and can help the company achieve its goals of improving efficiency, reducing costs, and increasing sales.

The information product on inventory management for Adidas is a quality information product because it addresses a critical business need - efficient inventory management. The information product may assist Adidas in cutting costs, improving productivity, and gaining a competitive edge in the market by utilizing sales data and developing an optimal inventory management system. The information product also considers important elements like seasonality, product popularity, etc. That have an impact on inventory management. The information product may assist Adidas in making decisions that increase their performance by offering practical insights and suggestions based on these elements. The information product is also created to be user-friendly and available to a variety of stakeholders, including executives and inventory managers., The information product may encourage collaboration and well-informed decision-making within the business by providing the data in a way that is simple to understand.

Adidas can do a regular check to make sure the data gathered is accurate, full, consistent, and up to date. Data profiling, cleaning, and standardization procedures can be used to accomplish this. Adidas may keep a close eye on the accuracy of the data used to manage its inventory. Manual reviews or automated data quality checks can be used to accomplish this. The integrity of the data may be ensured by rapidly fixing any mistakes or discrepancies. Steps may be taken to guarantee the privacy and security of the data. Implementing access restrictions, encryption, and data backup and recovery processes are all part of this to ensure confidentiality and integrity of data. By receiving stakeholder input and implementing it into their data governance system, Adidas can continuously enhance the quality of the data elements. To keep up with the most recent standards and developments in the business, they might also embrace best practices in data management. The information product for inventory management should be in line with Adidas' overall business plan. This can guarantee that the product is created to satisfy the unique demands and objectives of the firm. To determine areas for development and make sure the product is fulfilling users' demands, Adidas can collect feedback from users such as supply chain operations team, stakeholders, sales team etc. of the inventory management information product. The development and improvement of the product can be influenced by this input. Constant innovation: Adidas can constantly improve the inventory management information product to keep one step ahead of the competition and give the business fresh, insightful information. Utilizing new technology, including new data sources and analytical methods, can help with this.

**The Information Product:**

**Timeline

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As seen in **Figure1**, the high purchase rates on October 17, November 17, and December 16 may be connected to individuals getting their wages at the beginning of the month, according to the trend plot of the inventory data. The business may think about doing promotions or providing discounts to retain or boost sales during these times. On the other hand, it's possible that customers were more restrained in their spending at the end of the month, which would explain the relatively low end-of-month sales. To remedy this, the business could run sales or promotions at the end of the month, such as a month-end sale or a clearance sale, to entice customers to buy things. From an inventory management perspective, the insights drawn from the trend plot can help the company optimize its inventory levels. Since there is a clear pattern of high purchase rates on certain dates, the company can plan its inventory, accordingly, ensuring that it has enough stock to meet the demand during these peak periods. Additionally, the suggestion of a pay day promo and month-end promo can also be incorporated into the inventory management strategy. By forecasting demand during these periods and stocking up accordingly, the company can ensure that it is able to meet the increased demand and prevent stockouts. This can help the company to maintain or increase sales, as well as reduce the risk of overstocking and unnecessary inventory holding costs.

As seen in **Figure 2**, The stacked bar graph represents, the total sales of all the products by the sales methods. As, we observe In-Store sales makes more than half of the total sales of Adidas. Products such as Women’s Athletic footwear whose sales in the In-Store and Online are close to each other roughly around 36-40M. Adidas can move the sales almost completely towards Outlet to reduce the operating margins of the Store and can focus more on other products who are making more sales and work on optimizing their stocks so that they don’t run out and they are always available. Similarly, Women’s Streetwear in the store is also making sales close to the outlet price, this product can also be shifted towards outlet sales method to increase the operating margin of the store. However, as seen in our initial analysis Women’s Athletic Footwear and Women’s Streetwear Footwear are the underperforming products of Adidas, they can be moved towards outlet sales by giving discounts and emptying out the stocks.

As seen in **Figure 3**, The Map view gives us insight about the operating margins of the various sales method in Cities. As seen in New Orleans City, the Online Sales Method generates more Operating Margin than the In-store Method. A good suggestion to the Supply Chain managers would be to allocate more inventory for the online methods in cities that generate higher operating margins than In-Store Methods which would be helpful to optimize inventory and increase profits. The managers can see trends in seasons, customer preferences in the area and make changes accordingly. An alternate method would be to either move the Entire stock to the Outlet Method, even though New Orleans doesn’t have an Outlet, it would be feasible to open an outlet, which is away from the city and lesser rent and sell the products there which would reduce the operating margins. New York has Higher Operating Margin in outlet than In-Store One cause may be that the store is managing its inventory well and selling goods with larger profit margins as a result. They could have also put into place efficient cost-cutting strategies to lower costs and boost profitability. Another explanation is that the retailer could be strategically pricing its goods to generate the most revenue. Due to their popularity or the limited availability of their items, they could be able to charge greater rates for their goods while still drawing in clients. There might be several explanations for why Honolulu's operating margins in stores are higher than those online. The market demand for Adidas goods may be greater in Honolulu's physical stores than it is in its online site, which is one explanation. This could be the result of elements like tourism, local fashion trends, and the city's general shopping culture. Additionally, operating margins for online sales may be lower in Honolulu than in other locations due to expenditures involved with running an online business, such as shipping, handling, and marketing charges. It's also conceivable that the corporation has improved its inventory management techniques in Honolulu, which has led to lower expenses and increased profitability. Increased inventory levels for outlet stores, which have larger operating margins than online sales, can be one possible inventory management approach for Honolulu. The business can carry out market research to determine local product demands and preferences, and then modify inventory levels accordingly. By installing an automated inventory management system or a just-in-time inventory system, they may also optimize their supply chain to save costs and boost efficiency.

**Conclusion:**

The analysis of Adidas sales data and inventory management practices revealed several insights that can help the company improve its profitability and optimize its inventory levels. By analyzing the sales trends, the business can plan promotions and sales to boost sales during peak periods, such as paydays and month-ends. Additionally, by identifying underperforming products, the company can move them to outlet sales methods and offer discounts to reduce inventory holding costs. The map view provided insights into the operating margins of various sales methods in different cities, which can help the company allocate inventory to maximize profits. The company can also improve its inventory management techniques by using automated inventory systems or just-in-time inventory systems to save costs and increase efficiency. By implementing these strategies, Adidas can maintain or increase sales, reduce inventory holding costs, and improve profitability.