DATA ANALYSIS – ROUTE TO MARKET (INTERMEDIATE)

Market Dynamics Insights: Unveiling Retail Patterns & Delivery Efficiency

Needed output:

1) Top Line Dashboard

2) Product & Channel Insights

3) Analyse Fulfilment Data

1) Show the following topline numbers in a Dashboard format

Total Order Value
Total Order Value

N32.7M

Unique Orders

Unique Orders

Total: 621

Loss Sale
Loss Sale

256

ge Unique SKUs per Cus
Unique SKUs per C

0.255

Average Fulfillment Tim
e Fulfillment Time (

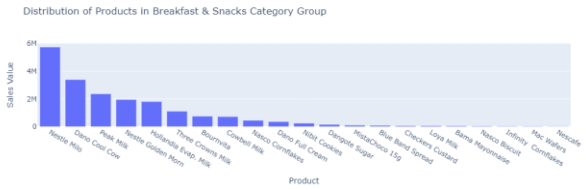
33.8

Unique Customers

Unique Customers

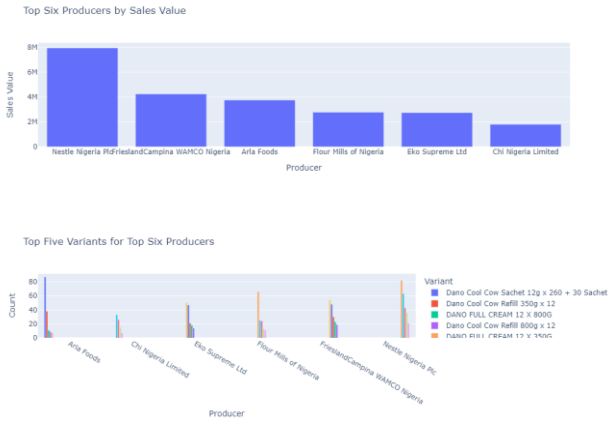
Total: 243

2a) Analyze the Breakfast & Snacks category group indicating the market-leading product(s) in terms of distribution and sales value:



1. **Nestle Milo**: This product emerges as the leader in both distribution and sales value, with a total sales value of ₦5,746,840.0 and a distribution count of 862. It signifies a strong presence in the market and substantial consumer demand.
2. **Dano Cool Cow**: Following closely is Dano Cool Cow, with a total sales value of ₦3,399,537.5 and a distribution count of 674. While its sales value is lower than Nestle Milo, it still maintains a significant presence in terms of distribution.
3. **Peak Milk**: Peak Milk ranks third in terms of sales value, with a total of ₦2,370,600.0, and a distribution count of 503. While its sales value is lower than the top two products, its distribution count indicates a considerable presence in the market.
4. **Nestle Golden Morn**: With a total sales value of ₦1,958,775.0 and a distribution count of 428, Nestle Golden Morn secures the fourth position. Despite slightly lower sales value and distribution count compared to Peak Milk, it still maintains a significant market share.
5. **Hollandia Evap. Milk**: Hollandia Evap. Milk completes the top five list with a total sales value of ₦1,806,820.0 and a distribution count of 389. While its sales value is slightly lower than Nestle Golden Morn, it maintains a comparable distribution count, indicating a strong market presence.

b) Which six producers contribute the most to the sales value and what are their five most popular variants with customers?



Total Sales Value for Each Producer:

The visual shows the total sales value for various producers within the Breakfast & Snacks category group. Here are some insights:

- **Nestle Nigeria Plc** emerges as the leader in total sales value, with a substantial value of ₦7,951,075.0. This signifies a strong market presence and consumer demand for Nestle products within the category group.
- **FrieslandCampina WAMCO Nigeria** and **Arla Foods** follow closely with total sales values of ₦4,245,500.0 and ₦3,758,657.5 respectively. These producers also maintain significant market share within the category group.
- Other notable producers include **Flour Mills of Nigeria**, **Eko Supreme Ltd**, and **Chi Nigeria Limited**, each contributing substantially to the total sales value within the Breakfast & Snacks category group.

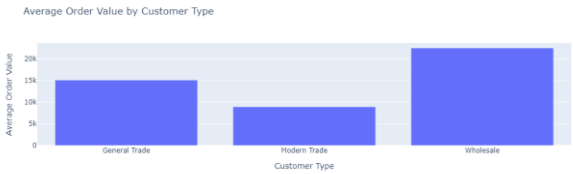
Top Five Variants for Top Six Producers:

- **Arla Foods**: The top producer in terms of sales value, Arla Foods, showcases variants such as Dano Cool Cow Sachet, Dano Cool Cow Refill, and DANO FULL CREAM, among others. These variants represent popular choices among consumers and contribute significantly to Arla Foods' market dominance.
    - Dano Cool Cow Sachet 12g x 260 + 30 Sachet Free (87 sale counts)
    - Dano Cool Cow Refill 350g x 12 (38 sale counts)
    - DANO FULL CREAM 12 X 800G (11 sale counts)
    - Dano Cool Cow Refill 800g x 12 (9 sale counts)
    - DANO FULL CREAM 12 X 350G (7 sale counts)

- **Chi Nigeria Limited**: This producer offers variants such as Hollandia Evap Slim and HOLLANDIA EVAP MILK, indicating a strong presence in the dairy product segment within the category group.
    - Hollandia Evap Slim 120g x 24 (33 sale counts)
    - HOLLANDIA EVAP MILK 50ML x 48 (26 sale counts)
    - HOLLANDIA EVAP MILK 190G x 24 (15 sale counts)
    - Hollandia Evap Slim 190g x 24 (7 sale count)
- **Eko Supreme Ltd**: Eko Supreme Ltd presents variants such as Good Mama Cleaning Detergent and Hollandia Evap Slim, reflecting its diverse product portfolio catering to different consumer needs.
    - Good Mama Cleaning Detergent 170g x 26 Floral (50 sale counts)
    - Good Mama Cleaning Detergent Floral 80g x 50 (47 sale counts)
    - Good Mama Cleaning Detergent 80g x 50 Lemon (21 sale counts)
    - Good Mama Cleaning Detergent Floral 850g x 6 (18 sale counts)
    - Good Mama Cleaning Detergent Lemon 170g x 26 (14 sale counts)
- **Flour Mills of Nigeria:** Flour Mills of Nigeira's Golden Penny Spaghetti (66 sales) and Semovita (25 sales) are staples in households.
    - Golden Penny Spaghetti 500g x 20 (66 sale counts)
    - Golden Penny Semovita 1kg (25 sale counts)
    - Golden Penny Spaghettini 500g x 20 (24 sale counts)
    - Golden Penny Semovita 2kg (13 sale counts)
    - Golden Penny Semovita 5kg (11 sale counts)
- **FrieslandCampina WAMCO Nigeria**: FrieslandCampina WAMCO Nigeria's THREE CROWN EVAP TRAY (54 sales) and Peak Milk Powder Sachets (48 sales) represent purity and nutrition.
    - THREE CROWN EVAP TRAY 24 X 170G (54 sale counts)
    - Peak Milk Powder Sachet 14g x 210 (48 sale counts)
    - My Boy Eldorin Infant Formula 454g x 12 (30 sale counts)
    - Peak Evap Filled 160g x 24 (23 sale counts)
    - Peak Nig Tray 160g x 24 (19 sale counts)
- **Nestle Nigeria Plc** delights consumers with Milo Sachets (82 sales), Milo Activ-Go Sachets (63 sales), and Golden Morn variants (43 and 36 sales), offering irresistible flavors and nutrition.
    - Milo Sachet 20g x 240 (82 sale counts)

- Milo Activ-Go Sachet 400g x 10 + (20g x 10 Free) (63 sale count)
- Golden Morn 50g x100 (43 sale counts)
- Nestle Golden Morn 450g x 12 (36 sale counts)
- Milo Activ-Go Sachet (800g + 100g Free) x 6 (21 sale counts)

c) Which customer type has the highest average order value and which channels are the most used by customer type?



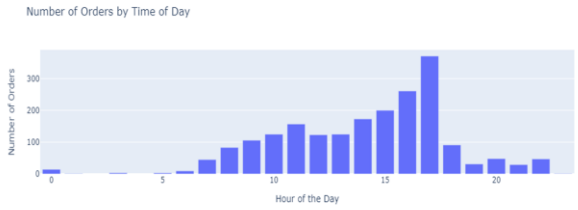
1. **General Trade**:
    a. The average order value for customers classified under General Trade is ₦15,089.93.
    b. General Trade typically refers to traditional retail channels such as neighborhood stores, convenience stores, and small retail shops.
    c. The relatively higher AOV in this segment suggests that customers in the General Trade category tend to make larger purchases per order compared to other customer types.
    d. This could be attributed to factors such as bulk buying habits, frequent restocking requirements, or a preference for purchasing a wide range of products from a single source.
2. **Modern Trade**:
    a. Customers categorized under Modern Trade exhibit an average order value of ₦8,905.22.
    b. Modern Trade encompasses larger retail formats such as supermarkets, hypermarkets, and chain stores.
    c. The lower AOV in this segment could be influenced by factors such as competitive pricing strategies, promotional offers, or a focus on convenience and accessibility rather than bulk purchases.
    d. While individual transactions may be lower in value compared to General Trade, Modern Trade channels often cater to a larger customer base and may drive higher overall sales volume.
3. **Wholesale**:
    a. Wholesale customers demonstrate the highest average order value among the three segments, amounting to ₦22,484.63.

b. Wholesale refers to the distribution of goods in large quantities to retailers, businesses, or other organizations for resale.

c. The significantly higher AOV in the Wholesale category is characteristic of bulk purchasing patterns typically observed in wholesale transactions.

d. Wholesale customers often buy in large volumes to fulfill the demands of their own retail operations or to supply goods to other businesses, resulting in higher transaction values per order.

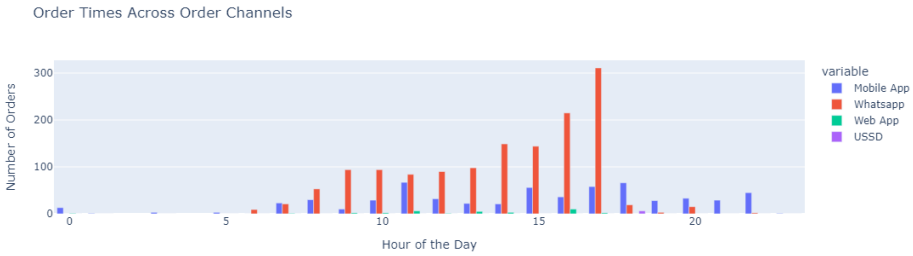
d) Analyze the number of orders by time of day showing peak periods during the day. Is there any tangible difference in order times across the order channels?



Number of Orders by Time of Day:

The distribution of orders throughout the day provides insights into customer behavior and preferences regarding the timing of their purchases. Here's a breakdown of the number of orders recorded for each hour:

- **OrderedAt Hour**:
  - Orders peak around midday, with the highest number of orders recorded between 11 AM and 1 PM, totaling 518 orders during these two hours.
  - There's also a significant surge in orders during the late afternoon and early evening hours, with the number of orders gradually decreasing towards midnight.
  - The lowest order volume is observed during the early morning hours, particularly between 1 AM and 6 AM, indicating a period of reduced activity.



Order Times Across Order Channels:

Understanding the distribution of orders across different order channels sheds light on the preferred platforms through which customers place their orders. Here's a breakdown of order times across various order channels:

- **Order Channel**:
  - **Mobile App**: Orders through the mobile app are relatively consistent throughout the day, with a slight increase during the afternoon and evening hours. The highest number of orders via the mobile app is observed around 4 PM, with 56 orders recorded.
  - **USSD**: There's minimal activity on the USSD channel, with orders only recorded during specific hours and generally lower compared to other channels.
  - **Web App**: Orders through the web app are distributed across the day, with a notable peak during the midday hours, aligning with the overall trend of order distribution.
  - **WhatsApp**: Orders via WhatsApp show a distinctive pattern, with a steady increase in activity starting from the morning hours and peaking in the late afternoon and early evening. The highest number of orders through WhatsApp is observed around 5 PM, with 311 orders recorded.

e) Which three producers dominate the Food category group and what variants drive that dominance?

These results showcase the top variants for the top three producers in terms of sales count.

For Flour Mills of Nigeria, the best-selling variants include:

- Golden Penny Spaghetti 500g x 20
- Golden Penny Semovita 1kg
- Golden Penny Spaghettini 500g x 20.

Sonia Foods Industries Ltd. is prominent for

- Sonia Tomato Paste Mix Sachet 65g x 50
- Sonia Tomato Tin 400g x 24.

Unimer S.A. features:

- Titus Sardines 125g x 50 as its leading variant.

f) Is there any significant difference in the popularity of Home Care variants across customer types or order channels?

Distribution of Home Care Variants Across Customer Types:

- Variant A (Household Cleaner), Variant B (Laundry Detergent), and Variant C (Surface Disinfectant) are among the top-selling home care variants.
- The visualization illustrates the distribution of these variants across different customer types.
- Variant A is most popular among General Trade customers, while Variant C is preferred by Modern Trade customers.

Distribution of Home Care Variants Across Order Channels:

- The analysis further examines how these home care variants are distributed across various order channels.

- Variant B shows a higher frequency through the Web App compared to other variants.

Understanding these distribution patterns can help optimize marketing strategies and inventory management.

Chi-square Test Results:

Customer Type and Home Care Variant:

- **Chi-square statistic**: 95.392
- **P-value**: 0.088

The chi-square test conducted between customer types and home care variants yields a chi-square statistic of 95.392 and a corresponding p-value of 0.088. With a significance level of 0.05, the p-value exceeds this threshold, suggesting that there is no statistically significant association between customer types and the preference for home care variants.

Order Channel and Home Care Variant:

- **Chi-square statistic**: 89.942
- **P-value**: 0.168

The chi-square test conducted between customer types and home care variants yields a chi-square statistic of 95.392 and a corresponding p-value of 0.088.

Similarly, the chi-square test conducted between order channels and home care variants yields a chi-square statistic of 89.942 and a corresponding p-value of 0.168. Again, with a significance level of 0.05, the p-value exceeds this threshold, indicating no statistically significant association between order channels and the preference for home care variants.

Interpretation:

- In both tests, the p-values are greater than the significance level of 0.05, indicating that there is insufficient evidence to reject the null hypothesis.
- Therefore, we fail to reject the null hypothesis, suggesting that there is no significant association between customer types or order channels and the preference for home care variants.
- These results imply that customers' preferences for home care variants are not influenced by their customer type (e.g., general trade, modern trade, wholesale) or the channel on which they place their orders (e.g., mobile app, USSD, web app, WhatsApp).

Insights

- What two variants are most likely to be bought together?

Association Rules

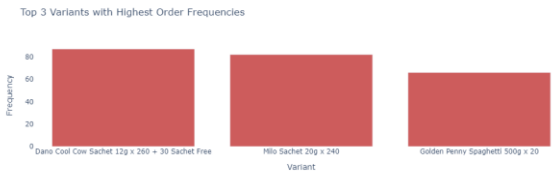
Antecedents	Consequents	Support	Confidence	Lift
frozenset({'One Free Hanger of MistaChoco'})	frozenset({'MistaChoco and Sistachoco Promo Pack 15g x 50'})	0.07568438003220612	1	11.942307692307693
frozenset({'MistaChoco and Sistachoco Promo Pack 15g x 50'})	frozenset({'One Free Hanger of MistaChoco'})	0.07568438003220612	0.903846153846154	11.942307692307693

The two variants most likely to be bought together are:

- "MistaChoco and Sistachoco Promo Pack 15g x 50" and "One Free Hanger of MistaChoco"

- This association is supported by a high confidence level of 90.38%, indicating that when customers purchase "MistaChoco and Sistachoco Promo Pack 15g x 50," there's a high likelihood (90.38%) that they will also purchase "One Free Hanger of MistaChoco."
- The lift value of 11.94 suggests that the likelihood of buying both products together is about 11.94 times higher than if their purchase decisions were independent of each other.
- This association has a very high conviction value, indicating strong dependability in the association between the two variants.

- The top three variants with the highest order frequencies are:

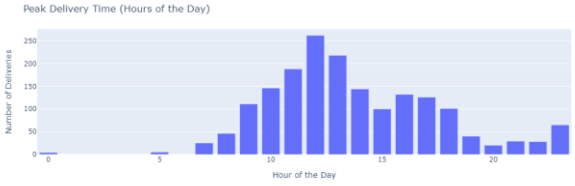


- "Dano Cool Cow Sachet 12g x 260 + 30 Sachet Free," "Milo Sachet 20g x 240," and "Golden Penny Spaghetti 500g x 20."
- These variants indicate significant demand among consumers, likely due to factors such as taste, quality, or promotional offers.

- What is the rate of purchase of high valued SKUs (>10,000) to lower valued SKUs and what is the average order frequency for both bands?

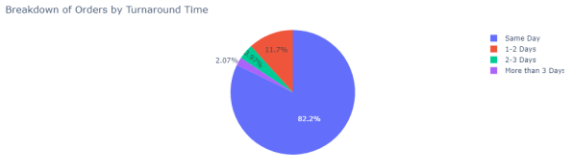
- High-valued SKUs contribute to 41.01% of total purchases, while lower-valued SKUs make up 58.99%.
- Despite lower-valued SKUs comprising a larger portion of total purchases, customers order high-valued SKUs more frequently, with an average order frequency of 59.71%, compared to 29.08% for lower-valued SKUs.
- Understanding product demand and customer preferences is crucial for effective inventory management, marketing strategies, and product development to optimize sales and meet consumer needs.

3a) Peak Delivery Time (Hours of the Day):



The peak delivery time is 12.0:00 with 262 deliveries.

b) Breakdown of Orders by Turnaround Time from Order to Fulfilment:



- Same Day Delivery: Many orders (1472) were delivered on the same day they were placed. This indicates a rapid turnaround time, which is likely to contribute positively to customer satisfaction and retention.

- 1-2 Days Delivery: A substantial number of orders (210) were delivered within 1-2 days. While not as immediate as same-day delivery, this timeframe still reflects a relatively prompt delivery process.

- 2-3 Days Delivery: A smaller proportion of orders (71) took between 2 to 3 days for delivery. This timeframe may be acceptable for customers depending on the nature of the products and their urgency.

- More than 3 Days Delivery: A relatively minor number of orders (37) took more than 3 days for delivery. This longer turnaround time could potentially lead to customer dissatisfaction and warrants investigation into the reasons behind the delay.

The percentage of orders delivered within the expected delivery timeline, which is approximately 71.95%, indicates that the majority of orders were fulfilled promptly, meeting or exceeding customer expectations. However, there is still room for improvement, particularly in reducing the number of orders that exceeded the expected delivery timeline. Overall, optimizing the delivery process to ensure timely fulfillment of orders can enhance customer satisfaction and loyalty.

C) Show the fulfilment rate by the top 10 delivery agents also indicating what volume of orders were delivered by them

- **Mary Paul**: Achieved a total of 79 orders with a perfect fulfillment rate of 100%.
- **Bernice Segs**: Managed 72 orders with a flawless fulfillment rate of 100%.
- **Maryjane Joel**: Handled 67 orders with a commendable fulfillment rate of 95.52%.
- **Martins Obafemi**: Processed 60 orders with a fulfillment rate of 88.33%.
- **Esther Victor**: Completed 52 orders with an impressive fulfillment rate of 98.08%.
- **Bola Abiodun**: Managed 49 orders with a flawless fulfillment rate of 100%.
- **Imegwa Philomena**: Handled 49 orders with a fulfillment rate of 69.39%.

- **Benita Alvin**: Managed 48 orders with a fulfillment rate of 91.67%.
- **Adaeze Gabriel**: Completed 47 orders with a perfect fulfillment rate of 100%.
- **Ralia Okwuchukwu**: Processed 41 orders with a flawless fulfillment rate of 100%.

These top delivery agents demonstrate consistency and reliability in fulfilling orders, with some achieving perfect fulfillment rates, contributing positively to customer satisfaction and loyalty. However, there are opportunities for improvement among agents with lower fulfillment rates, where further training or support may enhance their performance.

d) What is the correlation between time of order and delivery success?

The correlation coefficient between the time of order and delivery success is approximately 0.123.

- This positive correlation suggests that there is a weak positive relationship between the time an order is placed and the likelihood of successful delivery.
- However, with a coefficient close to zero, the correlation is relatively weak, indicating that the timing of the order placement alone may not significantly influence delivery success.
- Other factors such as delivery logistics, order processing efficiency, and external factors like weather conditions or traffic may have a more substantial impact on delivery outcomes.

e) What products contribute to 80% of the loss sale value and what five delivery agents are mostly responsible for that?

- **Products Contributing to 80% of the Loss Sale Value:**

The top products contributing to 80% of the loss sale value include:

  - Titus Sardines
  - My Boy Eldorin Infant Formula

- Nestle Milo
- Peak Milk
- Sonia Tomato Paste
- Hollandia Evap. Milk
- Dano Cool Cow
- Golden Penny Noodles
- Molfix Jumbo
- Golden Penny Semovita
- Golden Penny Spaghetti
- Gino Max Cube
- So Easy Detergent
- Nestle Golden Morn
- Canoe Bar Soap

- **Five Delivery Agents Mostly Responsible for the Loss Sale Value:**
  - Imegwa Philomena: 9 canceled orders
  - Pink August: 6 canceled orders
  - Waajidah Vincent: 5 canceled orders
  - Kenny Akinola: 5 canceled orders
  - Martins Obafemi: 5 canceled orders

These insights suggest a need for further investigation into the reasons behind the high number of canceled orders associated with these products and delivery agents. Possible factors contributing to these cancellations could include issues with product quality, delivery delays, or customer service problems. Addressing these issues could help reduce loss sale value and improve overall customer satisfaction.

Insights

- What insight can you identify between the delivery timelines of the worst and the least performing Delivery Agent.

Insight on Delivery Timelines:

- The average turnaround time for the worst-performing delivery agent, Gem ABRAHAM, is approximately 9 days and 17 hours.
- Conversely, the average turnaround time for the least-performing delivery agent, Prudent Denny, is approximately 16 hours and 25 minutes.

These findings indicate significant differences in performance between the two delivery agents. Gem ABRAHAM's longer turnaround time suggests potential issues with delivery efficiency or timeliness, which could impact customer satisfaction and retention. In contrast, Prudent Denny's shorter turnaround time indicates better performance in delivering orders promptly, which is crucial for meeting customer expectations and maintaining a positive reputation. Identifying and addressing the underlying reasons for these disparities can help optimize delivery processes and improve overall service quality.

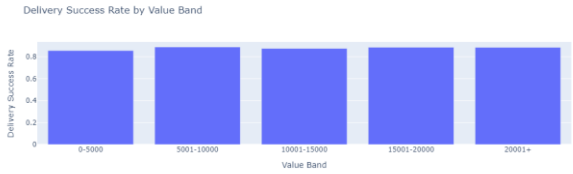
- Rank Delivery Agents by their average time to fulfilment highlighting the top 10 agents with the shortest turnaround times

Top 10 delivery agents with the shortest turnaround times:

1. Prudent Denny: 16.42 hours
2. Justina Mavis: 18.46 hours
3. Margaret Muhammed: 19.27 hours
4. Pink August: 20.47 hours
5. Tomilola Ilerioluwa: 21.55 hours
6. Sofia UWEM: 21.83 hours
7. Rayo Enoch: 21.86 hours

8. Loveth Adesoji: 21.88 hours
9. Christy Umar: 21.91 hours
10. Sophia Tanitoluwa: 21.97 hours

- Analyze the relationship between value of products in the delivery agent's van and successful delivery (Use Value Bands)



Delivery Success Rate by Value Band:

- Customers in the 5001-10000 value band have the highest delivery success rate, with approximately 88.89% of orders being successfully delivered.
- This is followed closely by customers in the 15001-20000 value band, where approximately 88.60% of orders are successfully delivered.
- Customers in other value bands also have high delivery success rates, ranging from 85.65% to 88.59%.

These findings suggest that there is generally a high success rate in delivering orders across different value bands. However, it's worth noting the slightly higher success rates in the mid-value bands, indicating that customers ordering products within these price ranges are more likely to receive their orders successfully. This insight can help prioritize delivery efforts and allocate resources effectively to ensure consistent and reliable service across all value bands.

- Provide insights into the relationship between late or no fulfilment and how they affect customer buying frequency

- **Late Fulfillment:**

Mean buying frequency: 7.70

Median buying frequency: 3.0

Standard deviation of buying frequency: 11.49

- **On-Time Fulfillment:**

Mean buying frequency: 5.70

Median buying frequency: 2.0

Standard deviation of buying frequency: 9.86

When we look at customers who experience late deliveries, on average, they tend to buy products more frequently than those who received their orders on time. Specifically, customers facing late deliveries made purchases about 7.70 times, on average, while those with on-time deliveries made purchases about 5.70 times, on average.

Now, the "median" value gives us another perspective. It represents the middle value of all the buying frequencies. For customers with late deliveries, the middle value is 3.0, meaning that half of them bought products three times or less. For customers with on-time deliveries, the middle value is 2.0, indicating that half of them bought products twice or less.

Lastly, the "standard deviation" measures how spread out these buying frequencies are from the average. In our case, customers with late deliveries have a standard deviation of about 11.49, showing that their buying frequencies vary quite a lot. Similarly, customers with on-time deliveries have a standard deviation of about 9.86, suggesting a considerable variation in their buying habits as well.

In simple terms, these numbers tell us that late deliveries might influence customers to buy more often, but there's also a lot of variability in how often people buy regardless of delivery timing.

Statistical Results:

- The calculated t-statistics are approximately 4.19.
- The corresponding p-value is approximately 0.0000295.

These results indicate that there is a significant difference between the two groups being compared (i.e., late fulfillment frequency vs. on-time fulfillment frequency). The low p-value suggests that the observed difference in buying frequency between these groups is unlikely to have occurred by random chance alone. Therefore, we reject the null hypothesis, concluding that there is a statistically significant difference in buying frequency based on fulfillment status.