E-Commerce Data Analytics Case Study (Skill Test Simulation)

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Introduction

This project is a skill test completed as part of the Data Analyst recruitment process on Aug 2025. It includes data cleaning, profitability analysis, and business insights with actionable recommendations.

Tools to perform analysis is spreadsheet (Excel) with following details:

- I use conditional formatting to label loss and profit
- I use excel statistical function (SUMIF) and formulas to calculate overall profit & net profit.
- Logical function to label stock item status (need restock, stock avail, almost run out of stock).
- Lookup function (index-match) to fill necessary data
- Ranking the sales perfomance using sort/sortby function
- I use pivot table to obtain summary of the dataset
- Generate chart to visualize sales performance and total orders accross the month
- Extracting insight and suggest actionable recommendation based on analysis performed

Link to spreadsheet that I worked on: Data Analytics

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Executive Summary

1. Around 93% of order are from Whatsapp chat -> Prioritize as main sales channel
2. Q4 (especially December) are sales generator engine -> Build holiday playbook for another similar peaked season
3. Bank Transfer dominates but is relatively slow -> introduce QRIS & push Multifinance to shorten customer purchase journey.

Exercise 1 - Spreadsheet Orders

Task

1. Fill the Purchase Price and Selling Price Columns based on "Data Sheet"
2. Calculate Profit Column

Screenshot of works

ORDER TABLE

Order ID	What customer bought	Purchase price	Selling price	Pieces	Profit
1	Banana	Rp 500.00	Rp 780.00	3	Rp 840.00
2	Bilberry	Rp 1,000.00	Rp 1,550.00	4	Rp 2,200.00
3	Blackberry	Rp 1,800.00	Rp 2,790.00	10	Rp 9,900.00
4	Blackcurrant	Rp 800.00	Rp 1,240.00	3	Rp 1,320.00
5	Boysenberry	Rp 1,200.00	Rp 1,090.00	4	-Rp 440.00
6	Currant	Rp 1,000.00	Rp 1,550.00	20	Rp 11,000.00
7	Cherry	Rp 1,100.00	Rp 1,710.00	40	Rp 24,400.00
8	Cherimoya	Rp 2,800.00	Rp 2,790.00	30	-Rp 300.00
9	Cloudberry	Rp 1,900.00	Rp 2,950.00	24	Rp 25,200.00
10	Coconut	Rp 1,600.00	Rp 1,550.00	3	-Rp 150.00
11	Cranberry	Rp 1,820.00	Rp 2,110.00	4	Rp 1,160.00
12	Cucumber	Rp 1,890.00	Rp 2,170.00	10	Rp 2,800.00
13	Custard apple	Rp 1,970.00	Rp 2,230.00	3	Rp 780.00
14	Damson	Rp 2,050.00	Rp 2,290.00	4	Rp 960.00
15	Date	Rp 2,130.00	Rp 2,350.00	20	Rp 4,400.00

Result Summary

Total Loss (Profit < = 0)	-438490
Total Gain (Profit > 0)	248200
Net Deficit	-190290

Insights

Although the orders generated 248K in gains, but these were outweighed by 438K in losses, leading to a net deficit of 190K.

Recommended action plan:

1. Re-evaluate the selling price of products that generate losses.

- Cherimoya sold in total 70 items from 2 transactions. But both transactions resulted loss eventhough cherimoya is relatively high selling items. I suggest to rise the price for Cherimoya and other loss generated product that sells high quantity (e.g. coconut, huckleberry, mulberry, pear).
- Since these items are relatively high demand, thus drives better profit if the sellling price is adjusted higher.

2. Discontinue product that generate loss and sold in low demand

Boysenberry sold in relatively low demand (7 quantities from 2 transactions) and resulted loss. I suggest to discontinue the product and focus more on other products that generate profit and in high demand.

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Exercise 2 - Spreadsheet Data

Task

1. Fill the Selling Pieces, Last Stock, Overall Profit, and Need Restock Column based on "Orders Sheet"
2. Provide a TOP 10 Fruits on "TOP 10" Table based on Overall Profit

Screenshot of works

Fruits	Purchase	Selling pri	Pieces in	Selling Pieces	Last Stock	Overall Profit
Apple	Rp 1,000	Rp 1,550	100	4	96	Rp 2,200.00
Apricot	Rp 1,200	Rp 1,860	130	20	110	Rp 13,200.00
Avocado	Rp 800	Rp 1,240	150	40	110	Rp 17,600.00
Banana	Rp 500	Rp 780	70	33	37	Rp 9,240.00
Bilberry	Rp 1,000	Rp 1,550	80	28	52	Rp 15,400.00
Blackberry	Rp 1,800	Rp 2,790	200	13	187	Rp 12,870.00
Blackcurrant	Rp 800	Rp 1,240	100	7	93	Rp 3,080.00
Blueberry	Rp 500	Rp 780	130	10	120	Rp 2,800.00
Boysenberry	Rp 1,200	Rp 1,090	150	7	143	-Rp 770.00
Currant	Rp 1,000	Rp 1,550	70	24	46	Rp 13,200.00

Need Restock	Rank	Rank	Fruits	Overall Pro
Stock is available	19	1	Cloudberry	Rp 56,700
Stock is available	6	2	Cherry	Rp 36,600
Stock is available	3	3	Avocado	Rp 17,600
Nearly Running Out Stock	10	4	Bilberry	Rp 15,400
Nearly Running Out Stock	4	5	Durian	Rp 13,300
Stock is available	8	6	Apricot	Rp 13,200
Stock is available	16	7	Currant	Rp 13,200
Stock is available	18	8	Blackberry	Rp 12,870
Stock is available	31	9	Dragonfruit	Rp 12,000
Nearly Running Out Stock	7	10	Banana	Rp 9,240

Recommended action plan:

<u>1. Re-evaluate the selling price of products that generate losses.</u>

- Physalis (rank 64), Pomegranate (rank 60), Pomelo (rank 63) are example of product that generate significant loss but the stock available is more than pieces sold, suggesting this is slow moving product.
- Bundle this product with high moving product to reduce over-stock and reduce their loss

<u>2. Top 10 product that nearly running out stock and need restock</u>

A. For product that nearly running out stock (Banana, Bilberry, Currant):

- Ensure the stock ready before next order. I suggest minimum stock available 1,5 - 2x the selling piece.
- Adjust the price higher to maximize the generated profit. Invest more resource on this product
- Better strategy in production planning and item supply to ensure the stock always available to purchase

B. For product that need restock (Cherry, Cloudberry, Durian):

- Audit the product stock supply and purchase pattern to investigate why these product running out stock. Probably high demand but low supply capacity.
- Build strategy to ensure stock always ready before next order, I suggest minimum stock available 1,5x - 2x the selling piece.
- Adjust the price higher to maximize the generated profit. Invest more resource on this product.

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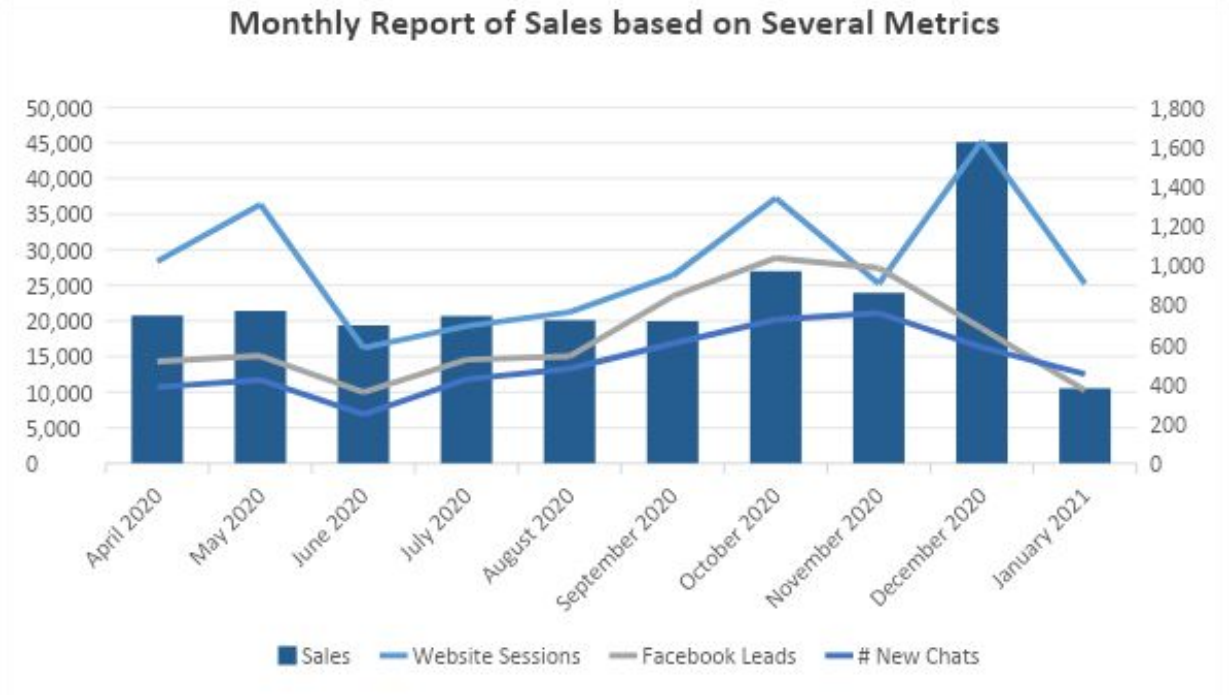
Case 1 - Chat Performance

Task: Please give minimum of 3 insights from the data and action plans for each.

Month	Website Sessions	Facebook Leads	# New Chats	Sales
April 2020	28,372	14,333	10,728	749
May 2020	36,378	15,107	11,723	771
June 2020	16,252	9,981	6,867	698
July 2020	19,282	14,568	11,826	744
August 2020	21,242	15,024	13,301	725
September 2020	26,353	23,461	16,853	718
October 2020	37,252	28,834	20,181	973
November 2020	25,253	27,459	21,117	862
December 2020	45,262	18,944	16,320	1,624
January 2021	25,241	10,256	12,544	379
Average of metrics	28,089	17,797	14,146	824



Summary:

1. Facebook and New Chats are not independent metrics.
Insight: Trends show that increases in Facebook Leads consistently align with increases in New Chats.
Action Plan: Choose one of the metrics as the primary driver metric. Instead of splitting resources on both, double down on optimizing on one of the metrics

2. December 2020 is the highest sales and website session peak
Insight: December had the highest website sessions (45k) and the highest sales (1,624, nearly double the overall average).
Action Plan: Build a **holiday playbook**: increase ad spend, launch promos, and prepare logistics to handle spikes similar periods

3. Oct 2020 - Dec 2020 (Q4) consistently outperforms the average
Insight: Average sales across April 2020 - Jan 2021 is 824. Oct (973), Nov (862), and Dec (1,624) all sbove average. This confirms Q4 as the company's strongest quarter to boost sales.
Action Plan: Treat Q4 as a profit generator, plan ahead by concentrating marketing spend, promos, and sales campaigns in this period. Build Q4-focused offers and build stock planning early to maximize returns.

4. May 2020: High traffic, weak conversions
Insight: May brought in 36k website sessions nearly matching October's traffic, but sales (771) underperformed. This suggests a funnel leak: high traffic but low conversion.
Action Plan: Audit May's campaigns to see if traffic came from low-quality sources. I suggest to check any barrier to acquire converted users, for example checkout process issues or maybe website loading or UI/UX issues.

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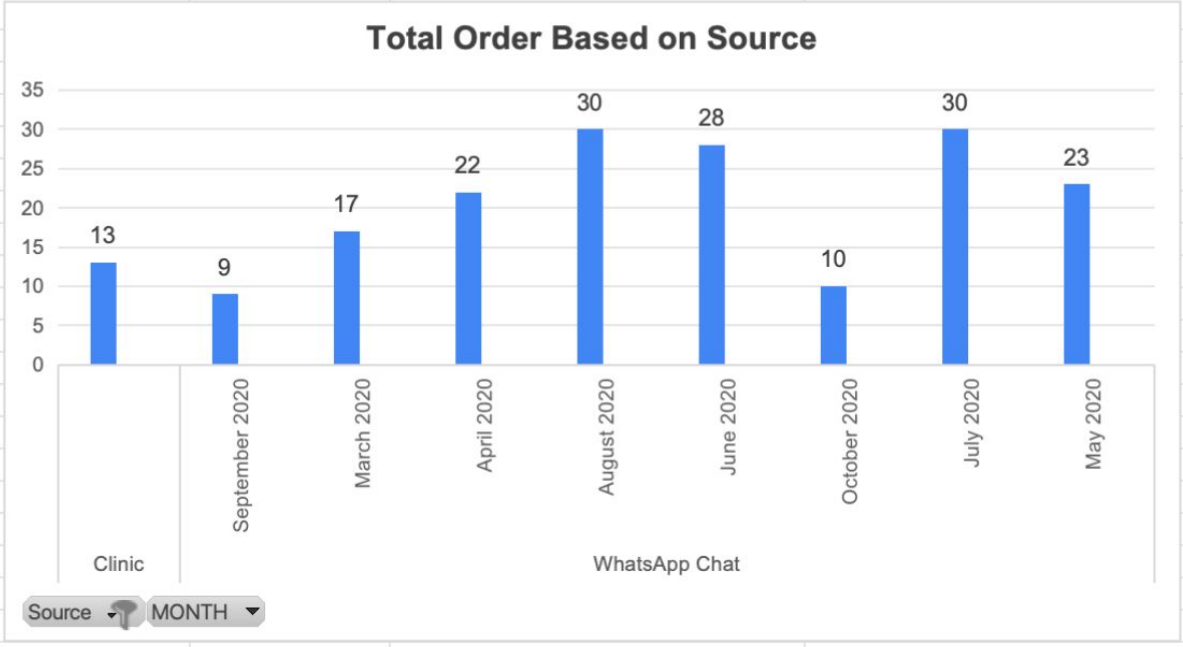
Case 2 - Sales

Task: Please generate at least 3 insights from the data besides with at least one chart and action plans for each insights.

Source	MONTH	Total Orders	Avg of Gap Since First Chat (Days)
Clinic		13	0.00
WhatsApp Chat		169	7.99
	September 2020	9	17.22
	March 2020	17	12.59
	April 2020	22	9.32
	August 2020	30	8.47
	June 2020	28	7.89
	October 2020	10	7.70
	July 2020	30	4.43
	May 2020	23	4.00
Grand Total		**182**	**7.42**



Summary:

1. Orders booked based on Source
Insight: 169 out of 182 orders (93%) came from WhatsApp Chat, versus only 13 from Clinic.

Action Plan: Use WhatsApp as the primary sales channel.
- Invest in scaling WhatsApp service (trained agents, chatbots for FAQs, faster response times).
- Reduce clinic dependency by redirecting resources (on-site CS staff → WhatsApp handling).
- Run WhatsApp-first campaigns with direct booking links, reminders, and upsells.

2. July & August are order peaks
Insight: July (30 orders) and August (30 orders) are the highest order months, well above the average of ~21 orders/month. Interestingly, Jul 2020 also had relatively short booking gaps, shorter than average of booking (7,42 days), suggesting customers were more decisive to purchase service/product in this period.

Action Plan:
- Treat July–Aug as seasonal high-demand months: allocate more staff, promo budgets, and targeted campaigns.
- Launch seasonal packages, leveraging the shorter decision gap with flash deals to maximize conversions.
- Use insights from Jul–Aug campaigns as a blueprint to replicate peak demand in weaker months.

3. September & October are low performance month
Insight: September (9 orders) and October (10 orders) are the lowest months. September also had the longest booking delay (17 days), suggesting customers are indecisive to purchase.

Action Plan:
For September: Introduce time-limited urgency offers (discount countdowns, “book by X date” bundles) to shorten decision time.
For October: Focus on engagement (personalized follow-ups, loyalty rewards, membership, first time member offers)

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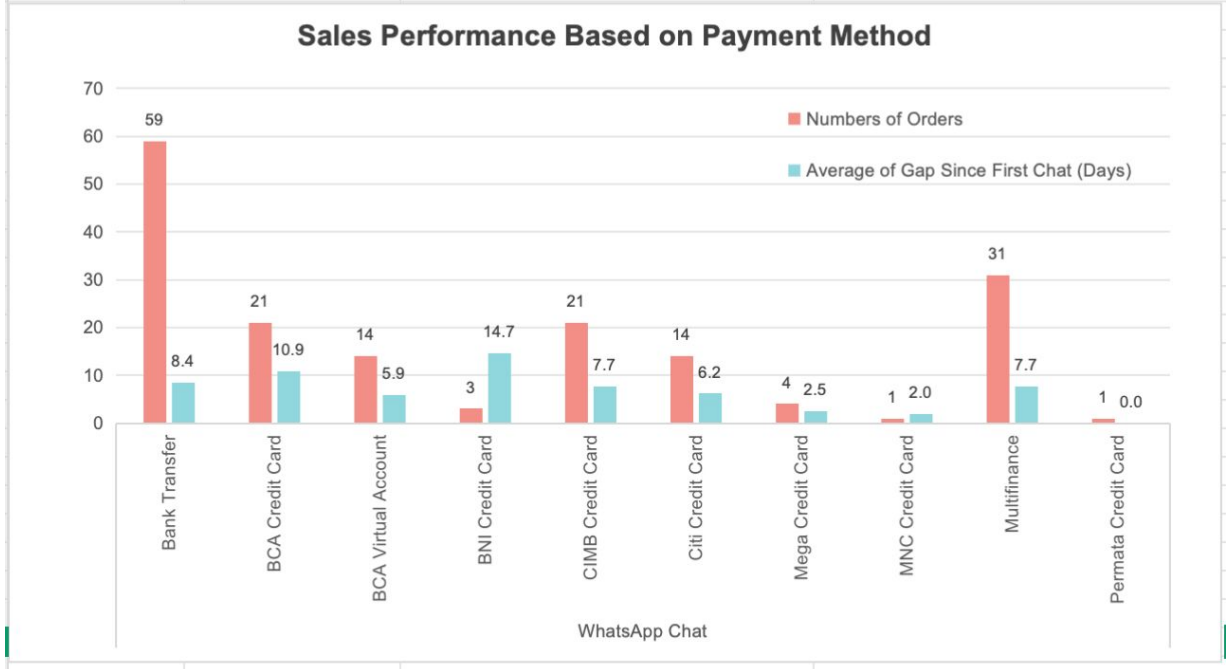
Case 2 - Sales

Task: Please generate at least 3 insights from the data besides with at least one chart and action plans for each insights.

Source	Payment Method	Numbers of Orders	Average of Gap Since First Chat (Days)
WhatsApp Chat		169	8.0
	Bank Transfer	59	8.4
	BCA Credit Card	21	10.9
	BCA Virtual Account	14	5.9
	BNI Credit Card	3	14.7
	CIMB Credit Card	21	7.7
	Citi Credit Card	14	6.2
	Mega Credit Card	4	2.5
	MNC Credit Card	1	2.0
	Multifinance	31	7.7
	Permata Credit Card	1	0.0
Grand Total		**169**	**8.0**



Summary:

1. Bank Transfers is the most popular payment method. Multifinance is the second most popular.

Insight: Although most orders are purchased via bank transfers, the order delay is higher than average order (8 days).

Action Plan:

- Provide more seamless purchase journey for customer, for example: QRIS payment system.
- Put Multifinance at the top option when user want to complete payment (shortened the user purchase journey)
- Launch co-branded discounts or loyalty perks with Multifinance providers to encourage migration from slower Bank Transfers to faster credit alternatives.

2. Customer who purchase with BNI Credit Card has the longest booking delay

Insight: Only 3 order purchased with BNI Credit Card and has the longest booking delay, showing the customer with this payment method hesitate to purchase and not familiar with the service (low order)

Action Plan:

- Investigate BNI CC flow, what cause the customer to delay the purchase
- Partner with BNI to run exclusive promotions (e.g., 0% installment, cashback) to test whether low adoption is due to lack of incentives.
- If the issues are structural, consider de-prioritizing this payment option in the UI

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Thank you!

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