

Challenge 1: Are Sales Decreasing?

Assignment 1 for Intro to AI

1. Introduction

This analysis was done for a travel company in Barcelona that works on a yearly subscription basis. Management was worried that the number of customers might be going down, so they asked for an outside, data-driven review of recent performance.

We got the following sets of data:

- **Transactions (funnel.csv):** The status of customer funnels from 2019 to 2023
- **Scores (scores_20 – scores_23.csv):** Ratings of trip satisfaction by year
- **Budget Units (budget_units.xlsx):** Categories of trip costs (A–D) by year
- **Analytics Data (analytics_data.csv):** Statistics on how well the website works

We used **pandas**, **matplotlib**, **seaborn**, and **scikit-learn** in Python to do all the analyses.

2. Preparing the Data and the Methodology

- Dates were made the same and turned into yearly variables.
- The four yearly satisfaction files were combined into one dataset that had a “Year” column.
- The budget data was changed from a wide format (period_20–23) to a long format to fit trips × years.
- The “percent” signs were taken out of the web analytics columns and the numbers were changed.

The study looked at:

1. **Sales Trend:** The number of final “Sales” records each year and the trend line for linear regression.
 2. **Customer Satisfaction:** Average ratings by year and by budget class.
 3. **Budget Effect:** How the cost of a trip affects how happy you are.
 4. **Web Analytics:** The relationship between page views, bounce rate, and conversion rate.
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3. Results

3.1 Sales Trend

Year Sales Count

2019	122
2020	384
2021	373
2022	369
2023	278

Sales went up a lot from 2019 to 2020, but then they started to go down slowly.
The regression slope (+29.7) shows that things are generally getting better over time, but the recent drop (2021–2023) suggests that things are slowing down.

Meaning:

Overall, sales went up, but the company has been slowing down since 2021.

3.2 Customer Satisfaction

Year	Organisation	Global Satisfaction
2020	7.87	7.42
2021	8.05	7.70
2022	7.72	7.25
2023	7.89	7.59

Scores stayed high, around 7.5 to 8.0 out of 10.
There was a small drop in 2022, but things got better in 2023.

Meaning:

The quality of the trips is high and steady; sales are unlikely to drop because customers are unhappy.

3.3 Analysing the Budget and Costs

Budget Class	Organisation	Global Satisfaction
A	8.00	7.52
B	8.01	7.61
C	7.83	7.55
D	6.00	6.03

People were happiest with trips that cost more (A/B), while trips that cost less (D) didn't do as well.

Meaning:

Premium offerings make people think they are worth more; budget trips may hurt the overall reputation.

3.4 Website Analytics

Metric 1	Metric 2 Correlation
Page Views and Bounce Rate	−0.90
Page Views and Conversion Rate	+0.82
Bounce Rate and Conversion Rate	−0.79

It was found that there were strong relationships:

- More page views means more conversions.
- More people leaving the site means fewer conversions.

Meaning:

Getting people to interact with you online is very important for sales.

Making the design and content of your pages better could greatly increase conversions.

4. Suggestions

1. **Look into the drop from 2021 to 2023.**
Look at prices, sales, and the different stages of the funnel to find places where conversions are stuck.
 2. **Make the website work better.**
Lower the bounce rate, refresh the trip pages, and make the calls to action clear.
 3. **Advertise trips in the middle and high price ranges.**
Classes A and B are both profitable and have very happy customers.
 4. **Look at cheap trips again.**
To protect brand value, either make them better or get rid of them.
 5. **Set up ongoing monitoring.**
Make dashboards that show sales, satisfaction, and web metrics in real time for the whole year.
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5. Conclusion

Sales have gone up since 2019, but they have been going down lately.

Customer satisfaction stays high over the years, especially for premium trips.

Web analytics show that user engagement has a big effect on conversions.

The company can stop the short-term drop and keep long-term growth by focusing on improving its digital marketing and optimising its trip portfolio.