

AISC2004 -1 – Data Storytelling – ICAE #5 – Group D

Names	Roles	Description
Robandeep Kaur	Did proofreading in PPT and report.	from 3:38 to 4:00 pm- started working on the assigned task and explain the problem. 29/7/2023 10:45 to 11:00 pm explained about the given data and 30/07/2023 did visualization graphs and proofreading.
Eduardo Lovo Torres	Did graphs using tableau, data analysis and used excel for forecasting.	07/27/2023: 3:35 pm to 4:00 pm Worked with the currency conversion of the values using Excel. Additionally calculated Profit/month (USD), Sales, Total cars produced/year, Total Cost, Revenue, and Profit. 07/30/2023: 10:30 am to 01 pm worked plotting graphs using Tableau (profit by month and Cars average price). 3 pm to 6 pm worked on forecasting the profits using Excel (exponential triple smoothing algorithm)
Girish Sai Thiruvudhula	Did powerBI, forecasting and data analysis.	From 3:45 pm to 4: 05 PM,Got the modified data file from Eduardo, as there are some mismatches for Canada data converted to USD and caluclated the profit , average monthly profit. 29/07/2023 - Tried to perform TSA and applied Forecasting in Python on the given data. Created tables in PowerBI and made some visualizaion and sent the same to team to have a look. Performed the Explotratory Data Analysis on the generated data in Python
Marcus Vinicius Da Silva Fernandes	Did the report writing and data analysis.	07/27: From 3:30 to 3:45 pm, splited the roles of the team members and suggested the basic steps to do the task. From 3:50 to 4:20, worked on the methodology section in the report. 07/30: Worked on the data analysis section in the report during 1 hour, starting at 10:30 am. Had a team discussion at 3pm during 1 hour and suggested changes in the graphs that people were creating (change colors, font size, type of graph, etc). After that, finished writing the report (profit prediction and conclusion) during 2 hours. Also created the graph "Forecasted Profits and Minimum Debt Payment Date".
Kumar Dahal	Time Series Analysis using Python	Using the given details tried to perform the TSA to get frocasting details for next 2 years. USed various approaches like ARIMA, SARIMA and Xgboost.
Muhammad Salman	Did graphs using tableau.	From 3: 30 pm to 4 : pm understand the given data and get converted data from Eduardo and start visulizations on it using tableaue. From 4:00 pm - 4:37 pm i realized we need to make changes in ecxel sheet to perform visulization like total car produce in year and profit for each month. 30-7-2023 (Sunday): from 11:00 am to 2:30 pm work on data sheet to generate graphs.
Pooja Katrodiya	Powerpoint perpartion	27/07/2023: 4:00 pm to 4:20 pm I made a PowerPoint (PPT) with basic slides, finalized the title, and added everyone's name. 30/07/2023 : After receiving content from everyone, I cropped all the charts to remove the headers with small fonts and then added the conclusion and reference slides to the PPT and lastly I did formatting.

Names	Roles	Description
Saranya Khanna Rajinder	Used tableau for bubble chart and dashboard.	<p>27th July (3:30- 4:00 pm) -> Data visualization in Tableau comparing car sales price for Alabama , Brampton and Paris with the given dataset.</p> <p>30th July (6:15a.m. -7:40 a.m.) -> Once the data is converted to USD I did visualization using stacked bars for cars price comparison in different currencies and car sales for three countries. Also created dashboard for those charts.</p> <p>30th July (5:10 p.m. -6:30 p.m.)-> The updated dataset with production and sales, I created horizontal barchart for cars produced in three countries, treemap for production cost, bubblechart for average price of cars, maps for Total cost and Revenue countrywise. Finally created a dashboard for all charts .</p>

Problem Definition

LCiT automotive produces cars in Alabama, USA, but they are planning to move in Paris, France or Brampton, Canada, to seek for more profit opportunities. The Corporate HQ will pay the moving costs if the debt payment occurs in no more than 2 years.

LCiT has recorded data for its existing plant for the past year, and accurate numbers for the other markets according to their opinions. The objective is to assist them in the strategic decision making about whether it is worth moving or not.

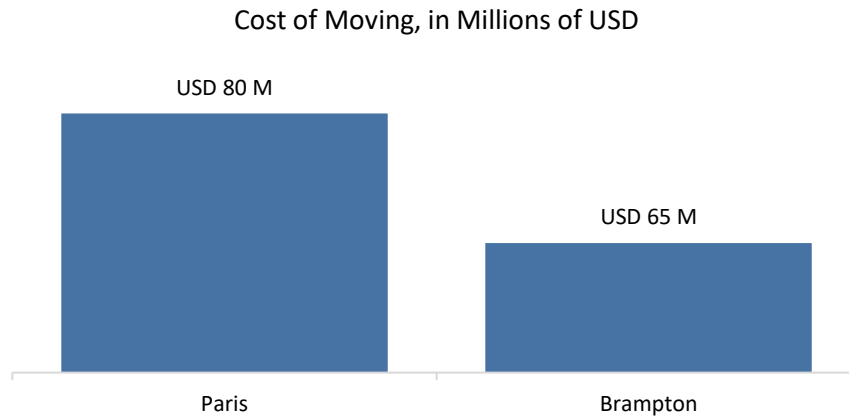
Methodology

The first step is to make sure that all the prices have the same currency. Then we will analyze the given data, calculate the predictions for the next years in all the cities, calculate the Corporate HQ's debt payment, and then make the final decision.

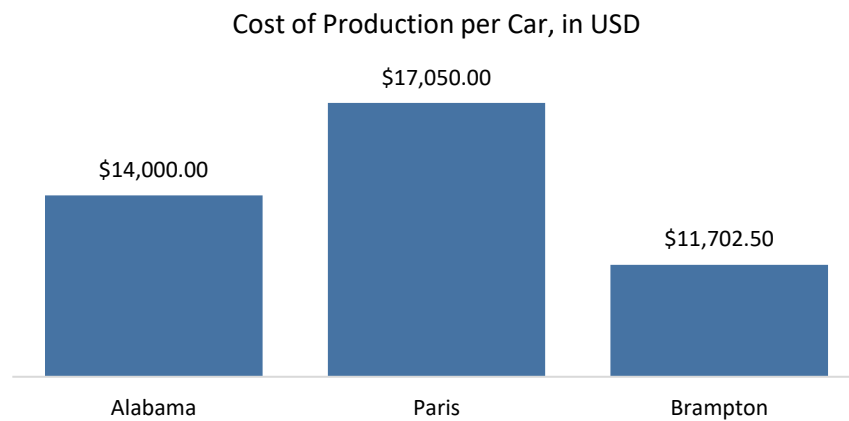
Analysis

The given data is composed of costs and prices for the current location, Alabama, and for the possible new ones, Paris, and Brampton.

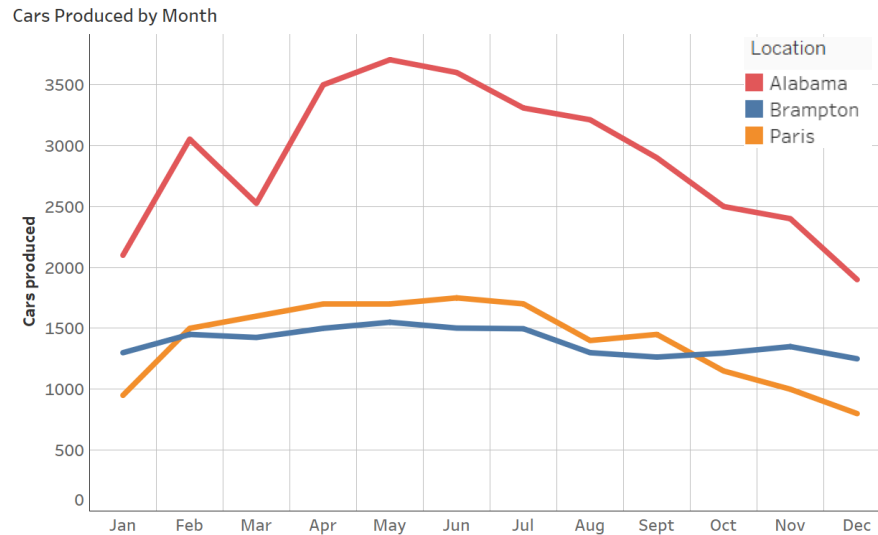
The cost of moving was given to Paris and Brampton, in \$. As the company is in Alabama, USA, we can consider that the currency is USD. The graph below shows the cost in millions of dollars. The cost of moving to Paris is higher than to Brampton, probably due to the higher costs of shipment of the equipment to a farther location.



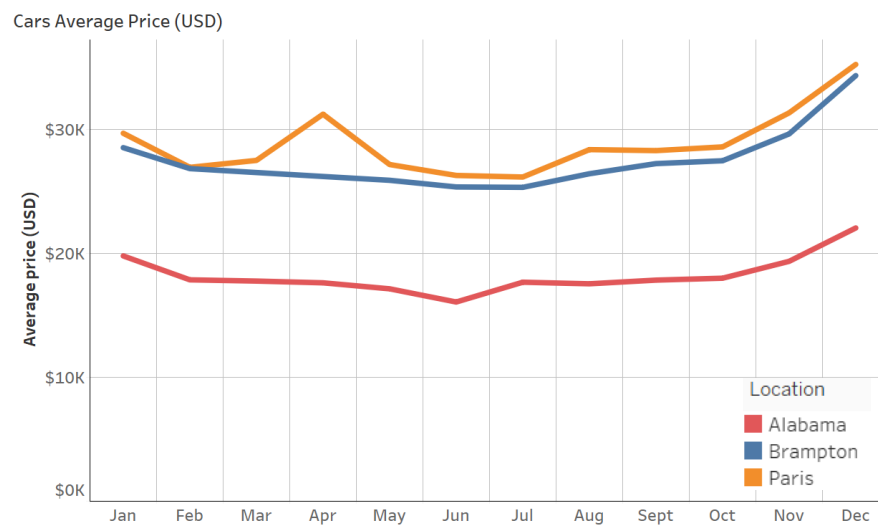
Next, further information of data shows the cost of production per car: \$14,000.00 for Alabama, 15,500.00 € for Paris, and \$15,500.00 for Brampton. Now, we can consider that there are different currencies: USD, Euro, and CAD, respectively. Therefore, we need to convert them to a common one, USD. The image below illustrates the costs of production per car for the three locations. Moving to Paris or Brampton will result in higher and lower costs compared to Alabama, respectively.



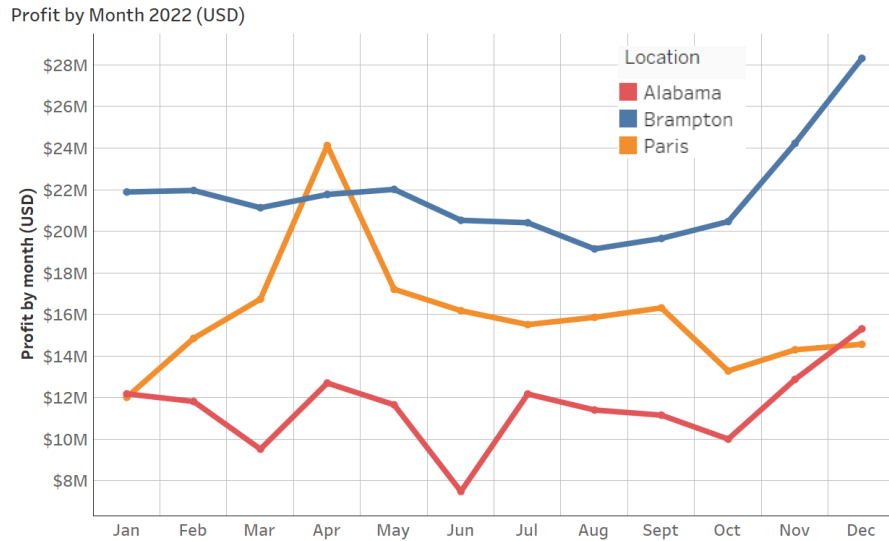
We also have the number of cars produced per month in Alabama in the past year and the predictions for the other two markets. The graph below depicts that production in Alabama is higher than predicted than others I.e., Paris, and Brampton, and it peaked in May. For the other two cities, production was similar, and both had a peak between the months of May and June.



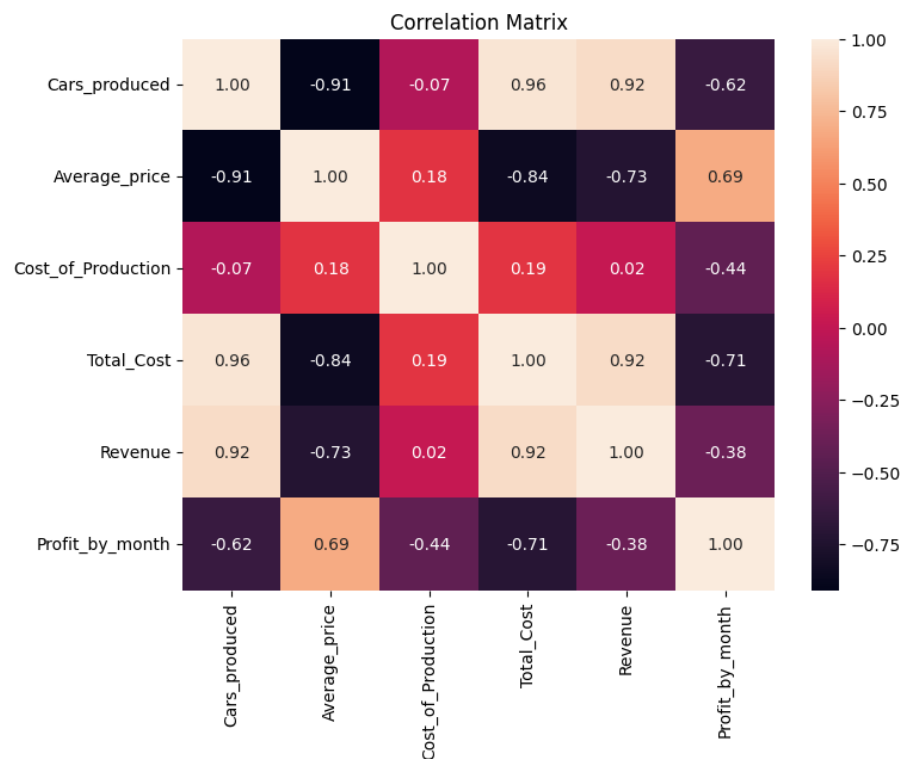
Finally, the information presented at the end is about the average price of car produced per city. Its currencies are also different, just like the cost of production per car. After converting them into USD, we plotted the following graph that shows that Paris would have the most expensive cars followed closely by Brampton, while Alabama would have the least ones.



Since the car's production cost and selling price were given, we can calculate the monthly profit. As shown in the graph below, for the first year, Brampton had a higher profit than the other locations with a steep increase for the last 3 months.



The image below is the correlation matrix between the variables considered in the analysis. The total cost is highly correlated with revenue and produced cars, and negatively correlated with profit by month, and average price. The average price and profit by month are moderately correlated, and with revenue, total cost and produced cars is negatively correlated.

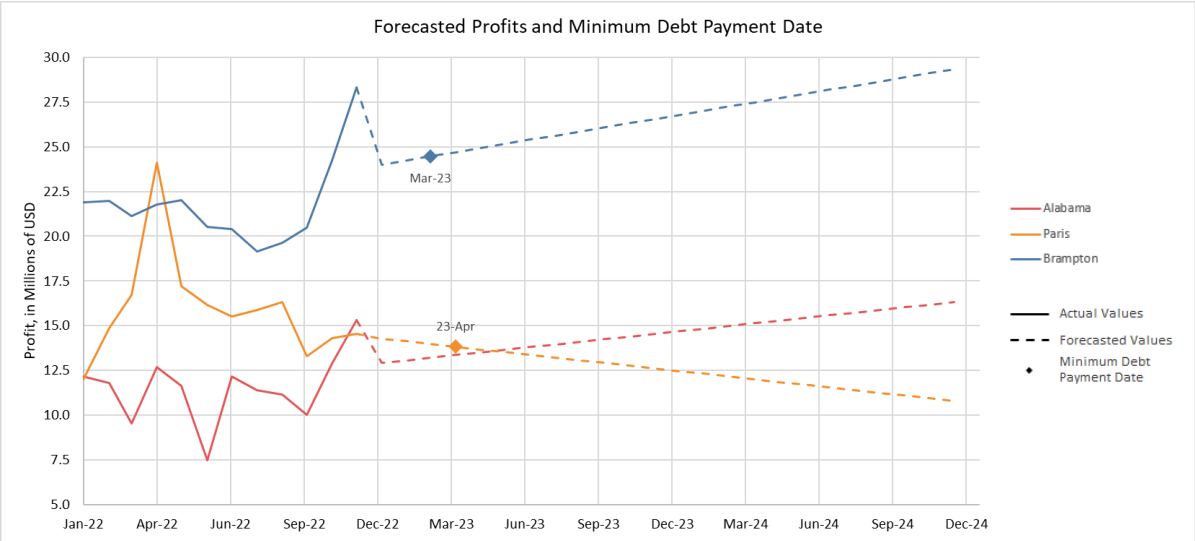


Profit prediction

To conclude whether the company should change locations or not, we need to forecast its profitability after 2 years, which is the moving payment deadline. To accomplish that, we used Exponential Triple

Smoothing algorithm. We have used ARIMA, SIRIMA and XGBoost in Python, but we didn't get a good output.

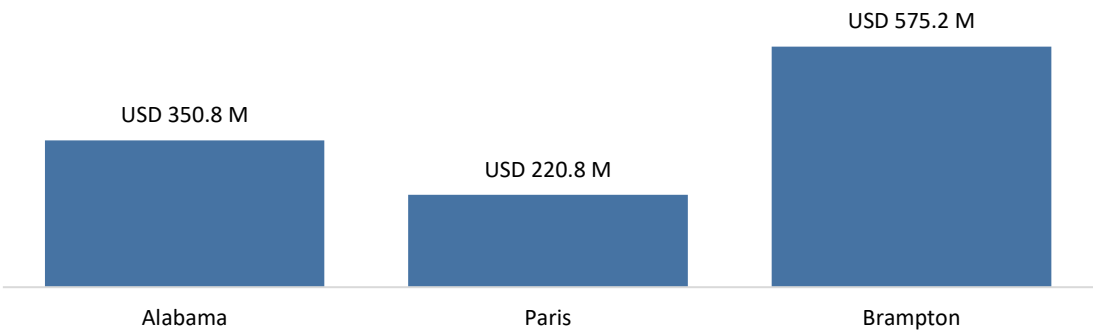
The graph below shows the forecasted profits for the three locations for each month. We can see that, after 2 years, Brampton has the highest predicted profit, while Paris has the lowest one. We didn't consider the time for moving for this comparison.



Considering that the profit for each month in Paris and Brampton will be used to pay the cost of moving, we can check the least amount of time for the debt to be paid to Corporate HQ. There are two diamond markers in the graph above for these locations. The debt will be paid earlier in Brampton, in March 2023, compared to April 2023 for Paris.

Finally, we can check what is the cumulative profit in 2 years after paying the cost of moving. The graph below illustrates that Brampton has the highest one. Therefore, moving to this city in Canada will make the company LCiT get a bigger profit.

Cumulative Profit in 2 Years After Paying Cost of Moving



Conclusion

LCIT Automotive should move to Brampton, Canada, to pursue a higher profit potential, instead of remaining in Alabama or going to Paris, France. This conclusion is based on the analysis of production costs, car pricing, and profit projections for the following two years.

According to the forecast, Brampton will be the most profitable city and the debt to Corporate HQ could be paid earlier (by March 2023 if all the profit is relocated to the payment, which is an unrealistic scenario). Therefore, the relocation to Canada is suggested as LCIT Automotive's best strategic option.

Appendix

Univariate, BiVariate and Trivariate Analysis:



Univariate, BiVariate
and Trivariate Analy:

- Led Automotive's strategic relocation analysis, assessing which city is best to move the manufacturing unit to.
- Ensured currency consistency, analyzed data, and forecasted profitability within two years.
- Employed Exponential Triple Smoothing for profit forecasting. Recommended the relocation based on robust cost analysis, profit projections, and early debt repayment to Corporate HQ, promising increased
- profitability.