# Data Skills Bootcamp – Final Project

Financial Analysis Project Report

# Introduction

The aim of the project was to conduct an analysis of a global organisation’s financial position to give the Chief Executive a better understanding of the company’s outgoings.

The organisation has seen a sustained period of growth over the previous 10 years and because of this the greater number of employees has resulted in an increase in salary and bonus payments.

With this in mind, the report focused on these particular outgoings, and as well as informing the Chief Executive of the findings, this project attempted to make some recommendations for improving the financial aspects of the company.

# Determining Requirements

To achieve these results the projected followed the Data Analysis Lifecycle. The raw data supplied by the company was prepared so that it was ready for analysis. The data was then analysed using the relevant methods to provide the information that the Chief Executive had requested:

• How much does the company need to make overall to cover the current salaries of its employees?

• Which Country has the larger cost to run?

• How much could the bonuses add to the salary cost?

• How many employees are based in each country?

• What is the average age and salary for each country?

• How can you compare these to each country/cost of living?

• What is the average amount a bonus brings to people who earn it?

Furthermore, analysis was conducted to give guidance regarding the following:

• What recommendations would you suggest for improving the financial aspects of the company?

• Are there any other key areas you feel need looking into?

Once the analysis was completed a series of visuals were created to give a clear picture of the data using relevant charts and graphs. As this project was to be reported at executive level, an ‘intuitive’ style report and presentation was selected to give a clear overall picture without getting lost in too much detail.

Finally, a conclusion was given including thoughts and recommendations on how the company could act to improve their financial performance.

# Preparing Data

The raw data was received as a .csv file. Excel was used for the cleaning of the data as it can do this intuitively and efficiently. Before any editing of the data was made, a new version was saved as a .csv file and was used for the cleaning stage. The original data file was left untouched just in case any mistakes were made, and the original data was needed. The steps followed to prepare the data were:

## Filter for Relevant Data

The spreadsheet was filtered on the ‘Exit Date’ column to show only blanks. This eliminated any employees who had already left the company as their information was irrelevant to this project.

*(See appendix A, screenshot 1)*

## Remove Duplicates

The duplicate rows were removed using the ‘Remove Duplicates’ tool based on the ‘Employee ID’ (EEID) and ‘Full Name’ columns to ensure that only duplicate entries were deleted and not any other data e.g. two salaries the same.

*(See appendix A, screenshot 2)*

## Format Data

The data was formatted to make it consistent and fit for purpose. The ‘$’ sign was removed from the ‘Annual Salary’ column, making it available for calculations further in the report. The data was checked for the correct data type i.e. Text, Number, Percentage, etc. It was decided to leave the date in the original format (US – mm/dd/yyyy) to stay consistent with any other company reports or data which was assumed would be in the same date format.

*(See appendix A, screenshot 3)*

## Standardise Text & Trimming

A =TRIM(PROPER()) function was used to remove any erroneous spaces and correctly capitalise the text data.

*(See appendix A, screenshot 4)*

## Outlier Errors

One piece of outlier data was found in the raw data, an annual salary of $14100000000,604, however, this employee had already left the company and so the data was removed during the filtering process.

## Overall Formatting

For ease of use and visual appeal the cell contents were all left aligned, and columns extended using the top-left arrow and clicking in between column headers.

*(See appendix A, screenshot 5)*

# Analysing Data

Now that the data had been cleaned it was analysed, concentrating on the objectives laid out at the start of the project. All calculated figures were rounded to 0 decimal places to stay in line with ‘intuitive’ style of communicating the results. These were the main areas of analysis, the method used and why those methods were chosen:

## Total Salary

To find the overall cost of salaries worldwide the =SUM(J2:J916) function was used to add all the numbers in the ‘Annual Salary’ column. This was used as it is a quick way of adding a large set of numbers to find a total.

The total salary cost was found to be $104,340,260.

*(See appendix B, screenshot 1)*

## Country with Largest Salary Cost

To find the country with the largest salary a simple pivot table was created by adding the ‘Country’ field into the Rows box and ‘Annual Salary’, as a Sum, into the Values box.

This gives a quick clear way of seeing totals for individual categories.

The country with the highest salary cost was found to be the United States, with a total salary cost of $67,185,519.

*(See appendix B, screenshot 2)*

## Total Bonus Cost

The same pivot table was used to find how much the bonuses could potentially add to the salary cost worldwide, the only difference being the addition of the Bonus Amount’ field being added to the Values as a Sum value. Again, a pivot table it an efficient way of finding a total value for a large set of numbers.

The overall bonus cost was found to be $14,798,522.

*(See appendix B, screenshot 3)*

## Number of Employees by Country

A COUNTIF statement was used to find the total number of employees for each country, as this can find specific data from a large set easily based on a condition. The formula looked like this =COUNTIF(Table13[Country],L19), where ‘Country’ is the range/column and ‘L19’ is the cell that contains the condition e.g. ‘Brazil’. This was executed for each country.

The overall employee numbers for each country were found to be:

* Brazil – 128
* China – 197
* USA – 590

*(See appendix B, screenshot 4)*

## Average Age and Salary by Country

Another simple pivot table was used to find the average salary and age for each country. Pivot tables are excellent for clearly displaying data and splitting it out between individual categories. The ‘Country’ field was set as Rows and both ‘Age’ and ‘Annual Salary’ fields, as averages, were set to Values.

The average age and salary for each country was found to be:

* Brazil – age: 44, salary: $11,2838
* China – age: 46, salary: $11,5287
* USA – age: 44, salary: $11,3874

*(See appendix B, screenshot 5)*

## Average Overall Bonus

An =AVERAGEIF(N2:N916,"<>0") function was used to calculate the average for the employees who had received a bonus. The IF condition was added to only use figures that were NOT ‘0’. If not these $0 figures, the people who didn’t receive a bonus, would pull the overall average down and ‘skew’ the results.

This function is a simple way of finding an average of a large set of numbers.

The overall bonus average for employees worldwide was found to be $33,710.

if not these ‘$0’ figures would pull the overall average down and ‘skew’ the results.

# Further Analysis

Once the initial analysis had been completed and the information stated in the original brief found, some further analysis was performed looking at some points that had been raised earlier.

## Comparison with Cost of Living

The average salary from each country was compared with the Cost-of-Living figure of that nation.

What is the Cost-of-Living?

“The cost of living is the amount of money needed to sustain a reasonable standard of living and afford basic expenses such as housing, food, taxes, and healthcare. Cost of living data is used to track and compare variations in the price of goods and services over time or between multiple locations (usually cities or countries)."

*\*https://worldpopulationreview.com/country-rankings/cost-of-living-by-country*

For this report, a Cost-of-Living figure was found for a month in each country. The figures used were in US Dollars (USD), making it easy to compare with our given data.

The figures found were as follows:

* Brazil - $754 per month
* China - $679 per month
* USA - $2433 per month

*\*Monthly Cost-of-Living figures taken form* [*https://livingcost.org/*](https://livingcost.org/)

*(See appendix B, screenshot 6)*

The results were added to a new field, ‘CoL Month’ and a simple multiplication formula used, =(O2)\*12, to create the field ‘CoL Year’. A final field was added to find the difference in ‘Employee Salary’ and ‘Annual CoL’ by taking the latter away from the former, i.e. =(J2)-(P2). From this it was found that:

* Brazil – Annual CoL: $9048.

On average they are earning $103,789 over the CoL

* China – Annual CoL: $8148.

On average they are earning $107,216 over the CoL

* USA – Annual CoL: $29,196.

On average they are earning $84,702over the CoL

This shows that in all countries, employees are earning well above the local Cost-of-Living figure, and in Brazil and China, they are earning around 25% more over the Cost-of-Living than in USA.

As these salaries appeared very high in comparison to the CoL, especially in Brazil and China, a further column of data was added giving the national average annual salary for each country:

* Brazil – Average national salary: $8,140
* China - Average national salary: $12,850
* USA - Average national salary: $77,464

# Data Visuals

In keeping with the theme of ‘Intuitive’ communication it was decided to use a single Power BI dashboard to relay the information clearly and concisely back to the Chief Executive.

All the information needed to answer the original objectives is displayed and can also easily be printed as a hard format document if preferred. The advantage of using a dashboard is that there is an element of interactivity that if further information, like more exact figures or results by region, is required, the reader can drill-down into the data.

Along with the main dashboard are three further graphs used as part of the further analysis and recommendations.

*\*A link to the main dashboard has been included at the end of the report.*

## Main Dashboard

A screenshot of a computer

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To add to the Intuitive theme, the main dashboard was divided up into separate boxes or areas relating to the original objectives laid out in the report.

## Salary Box

Used to show the overall salary costs and individual country salary amounts in an easily readable way, a Flash Card and a simple Bar Chart have been used. As with all the boxes, the values have been rounded to 0 decimal places to avoid too much detail. Where possible, axis value types have been added in the title to avoid clutter and making things easier on the eye.

## Employee Box

A Doughnut Chart is a good way of representing parts of a whole and has been used for the number of employees by country. This was chosen over a Pie Chart as less ink on the page keeps the design a lot cleaner. Each segment is clearly marked with the relevant figure to avoid any clicking on the parts and a Flash Card in the centre gives a quick summary of the total.

## Bonus Box

A Stacked Bar Chart was used as this was a great way of showing individual figures and a total. It clearly shows the extra cost of overall bonus payments in relation to the overall salary as well as conveying the total cost for both. A simple Flash Card displayed the average bonus payment for all colleagues that received one in a straightforward way with without overdoing the number of visuals on the screen/document.

## Average Age and Salary Box

To show the average age and salary together, they have been plotted on a scatter graph. This choice was made as they are good at displaying two sets of numerical data in a way where any correlations can be seen. Differences between each country can clearly been seen immediately, and it appears that the older you are the higher your salary, albeit by a few years.

## Salary/Cost of Living Comparison

This box was used to visualise part of the further analysis along with two further charts but was added to the main dashboard as it tied in with the original main objectives. The average salary and annual Cost-of-Living data has been added to an Area Chart. This was used as it allows the use of two Y-axis and therefore the related data can be shown simultaneously in one chart helping with making comparisons between the two.

## Slicer Box

Added at the end, the Slicer was added to give access to more in-depth information by region if necessary. Selecting any of the countries will update each of the boxes with the relevant information for that region

## Further Visualisations

Two further pages of charts were added. The first was an extension from the Cost-of-Living analysis in on the main dashboard and was used to show the amounts the salaries were above the Cost-of-Living figures in each country and how the average salary compared to the national average salary of that nation.

A similar theme was kept throughout the report to give consistency to the reader and Are Charts were again used.

A graph of different colored lines

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* *Graphs showing further analysis and comparisons of Annual Salary and Cost-of-Living*

The second page contained a Scatter Graph representing the distribution of Bonus Payment tiers. This was thought to be relevant as there were around 40 different percentage levels of bonus amounts.

A graph showing a number of points

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# Conclusion

Several key insights were made from the report. Not only from the data but also from the process of carrying out the report itself.

## Summary of Findings

It was found that the company has a total salary cost of $104M for employees in 3 countries, with the staff based in the USA accounting for just over $67M of those costs.

The USA had the largest number of employees, at 590 people, followed by China with 197 workers and Brazil employed the least number of people at 128.

The average employee in USA was 44 years old and earnt $113,874, whereas in China the averages were 46 years old and $115,287. In Brazil the average worker was 44 years old and earnt an annual salary of $112,838.

Of the employees worldwide who earnt a bonus, they received on average $33,710, and this could cost close to $15M in overall bonus payments. Added to the overall annual salary cost, this made a total salary and bonus cost of $119M worldwide.

## Final Recommendations

### Salary Compared to Cost-of-Living and National Average

Regarding further recommendations, one area that could be looked at is the level of salary in each country, but especially focusing on China and Brazil.

Across all three countries the average salary cost was similar, ranging from $113K in Brazil, to $115K in China. However, looking at the respective Cost-of-Living and National Average Salaries there was a huge disparity between the USA and the other two countries.

Whereas in the USA the average salary was around 55% higher than the average national salary, in China and Brazil, these figures were a lot higher at around a 500% and 700% increase respectively.

Considering the same compared to the local Cost-of-Living figures for the year it was found that the USA was close to 300% higher, Brazil at 1150% and China the largest increase of 1337% on the Cost-of Living.

Based on these figures, and the possibility of further growth of the company, it may be beneficial to review these salaries regularly to see to see if they are in-line with their location and explore the salaries being offered to potential new employees. Focusing on Brazil and China would also be advised where salaries appear a lot higher relatively in comparison to USA.

### Bonus Amount Structure

From the further analysis it was shown that there was a large variety of bonus payment amounts as a percentage of the employee’s salary.

The analysis revealed over 30 different bonus amounts ranging from 5% up to 40%. The lack of structure could lead to mistakes when processing employee’s bonus payments, but this could also lead individuals confused over the amount of their bonus in relation to their peers.

A structured bonus scheme may improve on the current system. For example, a simple 3 tier scheme of 5%, 10% and 20% of salary bonus payments could be introduced, where an employee’s performance, based on pre-defined KPIs, would dictate which level of bonus they receive.

This would allow for easier management and processing of bonuses as well as giving the employee a structure to follow and eliminate any ambiguity regarding bonus amounts.

## Reflection

On reflection, the project achieved the objectives laid out at the start of the report. The Data Analysis Lifecycle was followed as intended and the information required by the Chief Executive was extracted from the data, along with some further analysis. These results were visualised and some decisions and recommendations for the future were stated.

Points to take from this for future products would include not underestimating how long each of the parts of the project would take (time management) and try to consolidate the final report (report writing). Also, some further investigation into more complex analysis methods, especially in the visualisation area, would help convey more in-depth observations within the data.

# References

## Online

<https://worldpopulationreview.com/>

<https://livingcost.org/>

# Appendix A

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*Screenshot 1: Filter for relevant data*

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*Screenshot 2: Remove Duplicates*

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*Screenshot 3: Format Data*

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*Screenshot 4: Standardise Text and Trimming*

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*Screenshot 4: Overall Formatting/Clean Data*

# *Appendix B*

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*Screenshot 1: Total Salary*

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*Screenshot 2: Country with Largest Salary Cost*

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*Screenshot 3: Total Bonus Cost*

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*Screenshot 4: Number of Employees by Country*

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*Screenshot 5: Average Age and Salary of Employees*

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*Screenshot 6: Comparison of Salary with Cost-of-Living*

# Links

Link to Power BI file:

