Project Report

Content

1. Project Background

(Explain the Project in your own words in 15-20 lines)

The main purpose of this project is to investigate into the possible reasons for the attrition rate in the company and provide helpful insights and suggestions to the management committee. Ideally to understand how the organization can have a healthier attrition rate.

A data consisting of the employee's information within a 12-month range was provided. The dataset consists of 1470 employees with 34 attributes each will form the basis of the analysis.

In every organization, the employee plays a crucial role in attributing to the success of the company. Having a high turnover rate will demand high costs in constantly sourcing for new talents, training. On top of that, pay increment and performance bonuses allocated to employees are additional cost to the organization. Thus, when an employee chose to leave, the amount of time, effort and expense incurred are lost together by the organization which might potentially impact the organization's success as it can be used for other functions.

For purpose of analysis, Power BI Service will be used to derive the visuals to understand the attrition rate. There will be 5 reports that will cover the different aspects. And in each report, 4-6 visuals will be provided. It will also come along with a title for each report and a short narrative at the bottom of the report as well.

This report will greatly assist in gaining more insight into the attrition rate. It will be then presented to the HR manager along with the relevant directors so that they can implement and act on an appropriate intervention with better understanding.

2. Project Objective

1. **To understand the HR attrition data and analyze the factors that may/may not have contributed to the attrition rate over a period of 12 months.**
2. **Applying the knowledge we have learnt for Power BI to create different visualization to explain the attrition rate**
3. **Using the visuals and analysis, recommend ways to the Management keep attrition rate to a healthy level.**

3. Project Specifications

• Data is shared in excel spread sheet with various information under 34 headers of 1470 employees. Codes under few headers has been updated with the details given in separate spreadsheet.

The excel files uploaded are as follows:

Dataset "HR_Attrition"

• The title of the project is HR Attrition.

• The tool / software used for analysis is Power BI Services.

1. The Excel Datasheet has been downloaded to trim the data. 12 Data Attributes has been replaced using the definition in the definition file.

2. The data then has been uploaded in Power BI for the purpose of preparing reports.

3. The document contains 5 visual reports using combination of different charts with narrations, data visualizations will provide necessary information for decision making.

The report categories are:

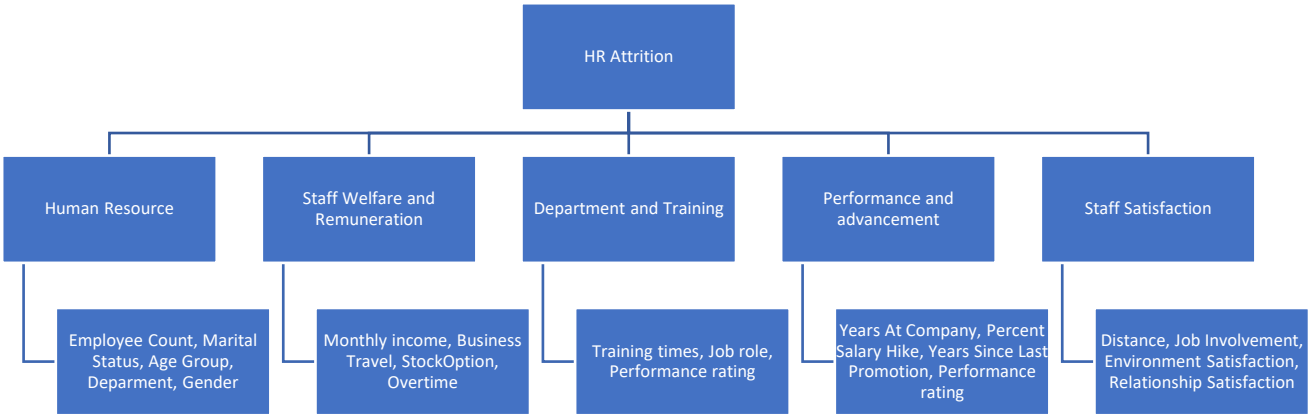
1. Human Resource
2. Staff Welfare and Remuneration
3. Department and Training
4. Performance and advancement
5. Staff Satisfaction
6. Summary page

4. The report pages will then be logged in this Microsoft word document and justifications will be provided to why it is built in this fashion.

4. Activity 1: Identify the factors influencing the Data Visualization

The staff details shared by the organisation in excel spread sheet has been classified under 5 major groups for the purpose of analysing the information on HR Attrition. The flow chart below shows the classification. The Management can focus more on these areas to mitigate the staff turnover in the organisation.

The 5 major group will also be the report that we will be building on.



Identify the audience of data visualization and their size

HR Director & HR Manager and senior management. Size of the audience 5-10 members

Identify which of the visualizations – static or interactive, is required

The objective of the project is to focus on the key factors that influence employees to leave the organisation. The visuals I am using are combination of static and interactive charts. I have used Microsoft Power BI Service application to analyse the data. Each sheet of the report contains 4 or more charts which interact with each other. The combination of information helps the decision makers to categorise employees who are more likely to live the company. This will enable the Management to address employees concerns and wellbeing.

Interactive filters such as slicers and drill down functions can enable you to focus on the groups which requires more attentions. Colours which are green are used to indicate “True” and red for “False” in attrition rate visualisations.

5. Activity 2: Review the Project Data Set

List and explain the tasks in activities along with the outcome each task

Data Volume

The HR Attrition dataset consists of 1471 rows and 34 columns. By excluding the header, we can derive a total of 1470 employees with 34 attributes each.

The Data Definition excel spreadsheet contains 55 rows and 2 columns in sheet 1 and 35 rows and 3 columns in sheet 2. The respective definition is then integrated into the HR Attrition dataset to form a dataset that holds more value. The integration is important so that more concise reports can be generated from Power BI.

Data Diversity
Age – Ranges from 18 to 60 years old in numerical value
Age Group – 5 Selection from 18-25, 26-35, 36-45, 46-55 and 56 and above
Attrition – 2 Selection of either Yes or No
Business Travel - 3 Selection of either Non-Travel, Travel-Rarely or Travel-Frequently
Department – 3 Department namely HR, R&D and Sales
Daily Rate – Ranges from $102 to $1,499 in numerical value
Distance from Home – Ranges from 1 to 29 in numerical value
Education – 4 Selection of Below College, College, Bachelors, Master and Doctor
Education Field – Human Resource, Life Sciences, Marketing, Medical, Technical Degree and Others
Environment Satisfaction – 4 Selection of either Low, Medium, High or Very High
Gender – 2 selection of Male or Female
Hourly Rate – Ranges from 30 to 100 in numerical value
Job Involvement – 4 Selection of either Low, Medium, High or Very High
Job Satisfaction – 4 Selection of either Low, Medium, High or Very High
Job Level – Ranges from 1 to5 in numerical value
Job Role – Healthcare Rep, Human Resource, Lab Technician, Manager, Manufacturing Director, Research Director, Research Scientist, Sales Executive and Sales Rep.
Marital Status – 3 Selection of either Single, Married or Divorced
Monthly Income – Ranges from $1,009 to $19.999 in numerical value
Monthly Rate - Ranges from $2,094 to $26,999 in numerical value
Number of Company Worked – Ranges from 0 to 9 in numerical value
Overtime – 2 Selection of either Yes or No
Percent Salary Hike – Ranges from 11% to 25% in numerical value

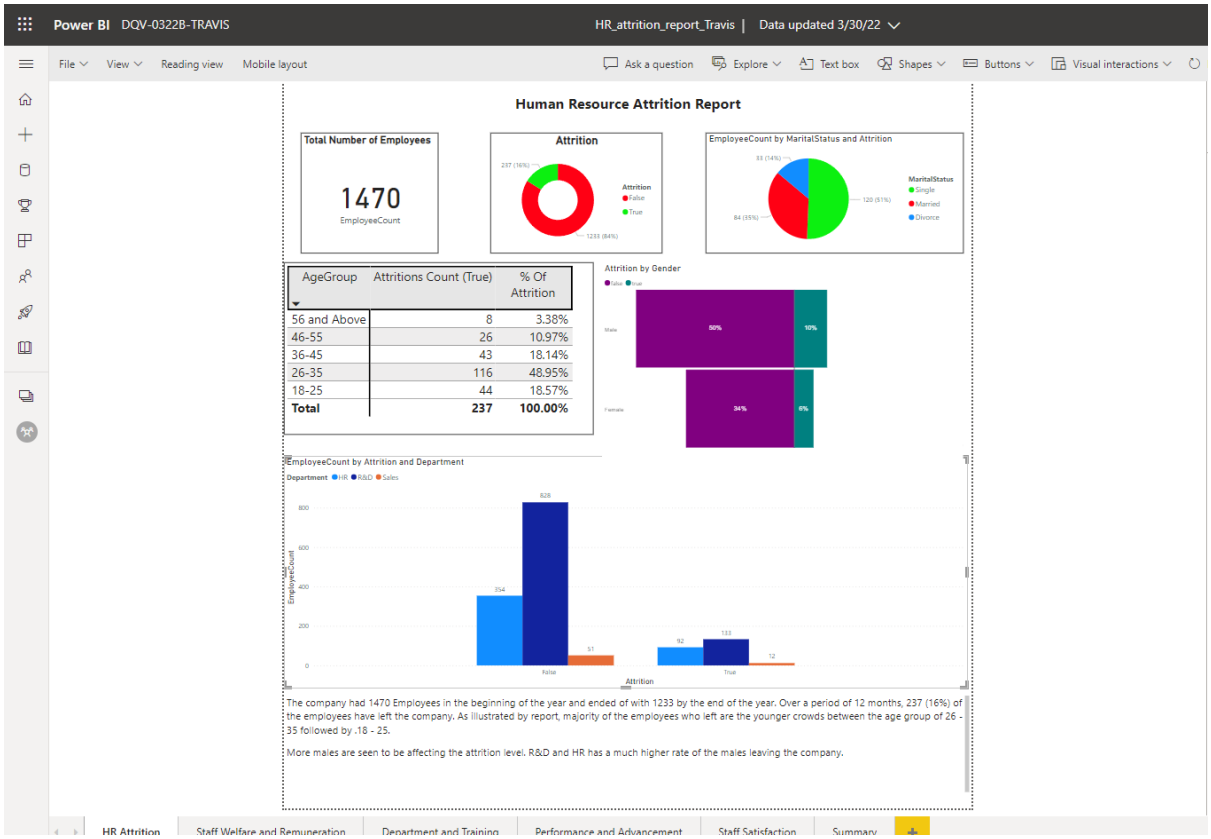
Years at Company – Ranges from 0 to 40 in numerical value
Years since last promotion – Ranges from 0 to 15 in numerical value
Years with current Manager – Ranges from 0 to 17 in numerical value
Work Life Balance – 4 Selection of either Bad, Good, Better or Best
Stock Option Level – Ranges from 0 to 3 in numerical value
Standard Hours – All Employees in dataset works the same 80 standard hours
Total Working Years – Ranges from 0 to 40 in numerical value
Training Time Last Year – Ranges from 0 to 6 in numerical value
Relationship Satisfaction – 4 Selection of either Low, Medium, High or Very High
Performance Rating – 2 Selection of either Excellent or Outstanding
Percent Salary Hike – Ranges from 11% to 25% in numerical value
Overtime – 2 Selection of either Yes or No

6. **Activity 3: Select the appropriate data visualization technique for gathering the required insights from the Project Dataset. Justify why you are using the technique and why you have ruled out the other techniques.**

Page 1 "Human Resource"	Card	Shows Total Employee count
	Pie Chart	Attrition "True" by Marital Status
	Donut Chart	Attrition "True" by Employee Count
	Tornado Chart	Attrition "True" by Gender
	Matrix	Attrition "True" by AgeGroup
	Clustered Column Chart	Department group by attrition
Page 2 "Staff Welfare & Remuneration"	Clustered Column Chart	Attrition "True" by Business Travel in different departments
	Pie Chart	Attrition "True" by Business Travel
	Clustered Bar Chart	Attrition "True" by Stockoptionlevel
	Scatter Chart	Attrition "True" in Years At Company and respective monthly income
	Key Influencers	Likelihood of attrition by Overtime, MonthlyIncome or Business Travel
Page 3 "Department and Training"	Treemap	Training Time Last year versus Performance rating in different departments
	Stacked Column Chart	Employee count by Job role
	Matrix	Percentage of employee count in Job role
	Card	Average number of Training times Last Year
	Multi-Row Card	Department Average number of Training times Last Year
Page 4 "Performance and Advancement"	Clustered Bar Chart	Attrition "True" by Stockoptionlevel
	Clustered Column Chart	Employee Count by Years since last promotion and grouped by Attrition
	Treemap	Attrition "True" by Department and Percent Salary Hike

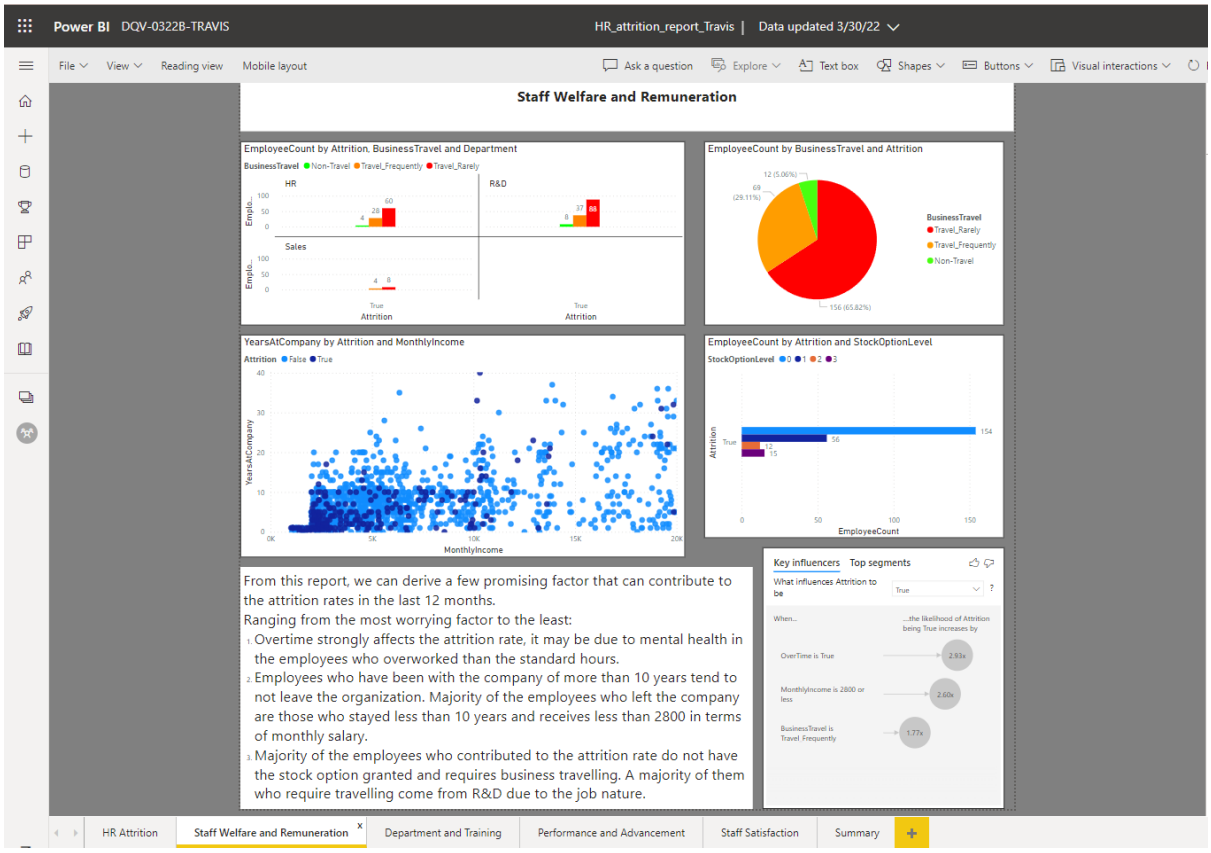
	Funnel	Compares the average Total Working Years, Years in the company and Years in current department
	Slicer	Focus on Performance Rating
Page 5 “Staff Satisfaction”	Stacked Column Chart	Attritted true due to environment satisfaction by department
	Clustered Column Chart	Employee count by Department and grouped by attrition
	Stacked Bar Chart	Employee Count by Distance from home and grouped by attrition
	Matrix	Attrition true by relationship satisfaction and age group
	Decomposition Tree	“True” Attrition breakdown by Environmental Satisfaction and Job involvement
	Chiclet Slicer	Focus on Relationship satisfaction
	Key Influencers	Likelihood of Attrition being true by Environmental, Job and Relationship Satisfaction
Page 6 “Summary”	TextBox	Summary of the findings by the visualizations

7. Activity 4: Develop the Data Visualization



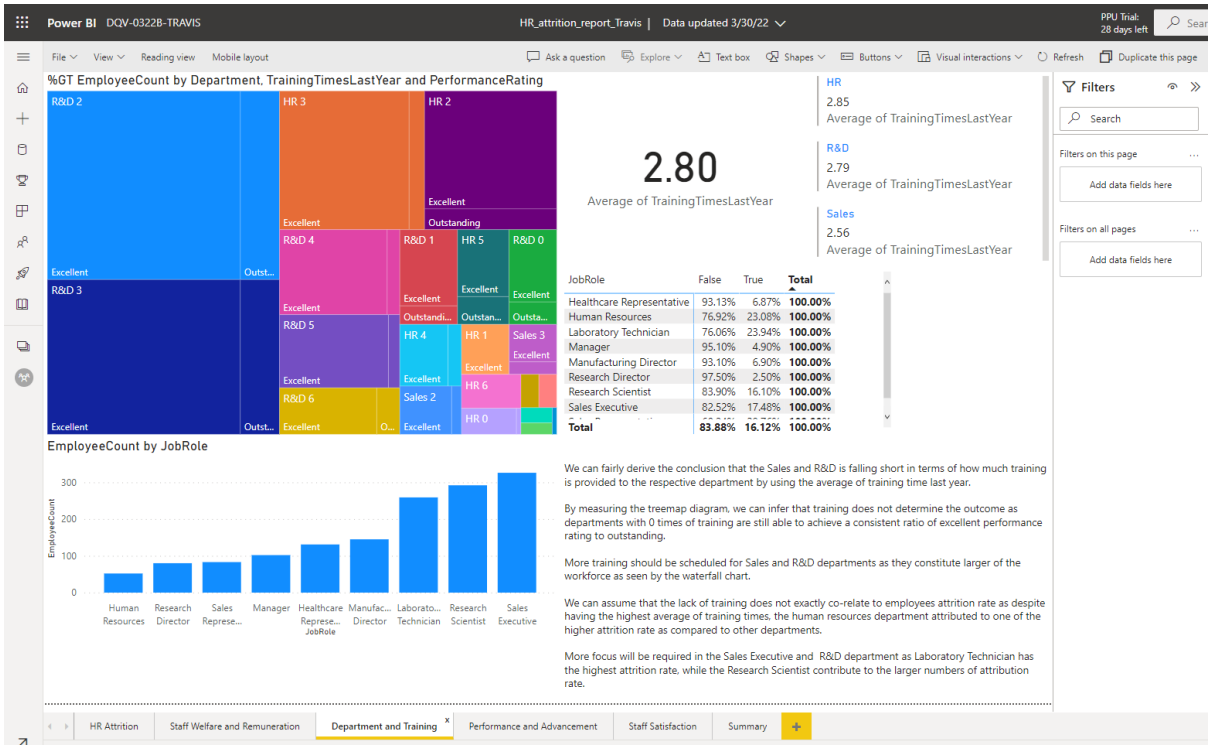
Visual	Outcome	Justification
Card	Showing Total number of employees	To show **Single** figure clearly
Pie Chart	Clear display between how many employees have left (16%) and how many are still with the company (84%)	Showing the relationship of parts to the whole when there are a small number of levels
Donut Chart	Clear comparison between the martial status of employees who have left	Donut charts are used to show the proportions of categorical data, with the size of each piece representing the proportion of each category so that it will be easier to identify
Tornado Chart	Attrition rate by Gender demonstrates that there are more male than female in the company and the ratio of attrition is slightly higher in the males	The chart is used to show the impact such as how a condition will impact the result on the outcome.
Matrix	Clear data to allow us to understand in terms of percentage which age group has a higher rate of attrition (26-35 with a 48.95%)	Analyze and understand the relationships between data sets
Clustered Column Chart	There is a higher rate of attrition in the HR department (92/354*100%)	Clustered columns allow the direct comparison of multiple series as it

	and majority of the employees come from the R&D department	displays more than one data series in clustered vertical columns



Visual	Outcome	Justification
Clustered Column Chart	A higher requirement for business travelling is observed from HR and R&D. More travelling corresponds to a higher rate of attrition.	Clustered columns allow the direct comparison of multiple series as it displays more than one data series in clustered vertical columns. We can also observe different breakdown in various departments versus the relationship with business travelling.
Pie Chart	Allow us to further understand in a nutshell how many people left the company based on the requirement of travelling. Constitution of Frequent Travelling (65.82%) and Rarely Travelling (29.11%) builds up those who left and only minimal employees left who are on a Non-Travel job in nature (5.06%).	Showing the relationship of how business travelling can affect the attrition rate as there are only 3 levels: Travel_Rarely, Frequently and Non-Travel.

Clustered Bar Chart	Employees who have no or the lowest tier stock option have a higher tendency to leave the company. Level 0 Stock option – 154 Level 1 Stock option - 56	A clear illustration of employees who left based on what stock options they are holding.
Scatter Chart	Most employees leave the company under 10 years of being in the company. Those who chose to leave the company have a monthly salary of less than 10,000 with majority of them lesser than ~6,000.	The scatter diagram graphs pairs of numerical data, with one variable on each axis, to look for a relationship between them. In this chart we can understand the relationship of how monthly income and their years at company will affect their decision of leaving. We are also able to observe for outliers as well.
Key Influencers	Overtime has a higher likelihood of why employees chose to leave. This may be due to a poorer work-life balance.	The key influencers visual helps understand the factors that drive the attrition rate. We can understand what causes a bigger factor in the reason why employees are leaving.



Visual	Outcome	Justification
Treemap	We can assume that the lack of training does not exactly co-relate to employee's attrition rate as despite having the highest average of training times, the human resources department attributed to one of the higher attrition rates as compared to other departments.	Treemap displays hierarchical data as a set of nested rectangles that allow us to understand many metrics together. We can understand how employees perform with adequate or inadequate trainings.
Stacked Column Chart	More employees in the R&D department followed by Sales and HR are observed.	Allow us to compare between different job roles and how many employees are in them.
Matrix	More attrition rate is observed in the Sales Executive and R&D department (Laboratory Technician and Research Scientist – Due to higher employee count).	The multiple matrix data set allow us to clearly identify which Job role has a higher attrition rate.
Card	An average of 2.8 is observed for trainings in last year for all departments.	To show Average Figure of Training last year.
Multi-Row Card	R&D and Sales have a lower average training count last year (Below 2.8).	To show the **3**-department average training clearly.

Visual	Outcome	Justification
Clustered Bar Chart	Employees who have no, or the lowest tier stock option have a higher tendency to leave the company. Level 0 Stock option – 154 Level 1 Stock option - 56	A clear illustration of employees who left based on what stock options they are holding.
Clustered Column Chart	Employees with higher attrition rate falls in 0-3 Years Since Last Promotion. We can infer that employee have higher attrition rate can be due to how the data is recorded as 0 will include employees who have just joined the company for less than a year. However, employees who got promoted or stayed for more than 3 years tend to not leave the company except for a few outliers.	The clustered columns between those who left and stayed in the company allow the direct comparison of multiple series as it displays more than one data series in clustered vertical columns. We can understand better between the relationship how years in company since last promotion can affect the attrition rate.
Treemap	We can observe a gradual drop in the attrition rate as the percent salary hike increases.	Treemap displays hierarchical data as a set of nested rectangles that allow us to understand many metrics together. We can understand how increase in salary hike can retain talents.

Funnel	The funnel table illustrates the average of years at the company is 7.06 or 61.89% of the average of total working years.	A funnel chart helps visualize a linear process that has sequential connected stages. It allows us to understand the average years the employee stays in the company versus total working years.
Slicer	Employees with Outstanding performance rating showcase a healthier and lower attrition value as compared to employees with Excellent performance rating.	Allow the user to compare between those performing at excellent and outstanding for the page visualizations.

Visual	Outcome	Justification
Stacked Column Chart	All department has more employee that leaves the company when they find that the environmental is “Low” on satisfaction.	The stacked columns between the departments in the company allow the direct comparison of how environment satisfaction attributed to the attrition rate.
Clustered Column Chart	HR has a higher attrition ratio and R&D holds the most employee in terms of employee count.	The clustered columns between those who left and stayed in the respective departments let us do a side-by-side comparison of how many employees chose to leave in each department.
Stacked Bar Chart	Distance does not attribute much to the attrition rate as there is a consistent attrition rate between staying near the office and far.	The stacked bar chart extends the standard bar chart from looking at numeric values across one categorical variable to two. We can compare if distance away from company can impact a higher attrition rate.
Matrix	Relationship satisfaction does not attribute much to the attrition rate as “High” relationship satisfaction in the 26-35 age group still results to a higher attrition rate.	The multiple matrix data set allow us to clearly identify which age group contributes a higher attrition rate in terms of comparing it with relationship satisfaction.

Decomposition Tree	Low Environment satisfaction does not correspond to entire correspond to a high job involvement.	Visualize data across multiple dimensions. It automatically aggregates data and enables drilling down into your dimensions in any order.
Chiclet Slicer	Relationship satisfaction does not impact much to the attrition rate.	Focus on Relationship satisfaction.
Key Influencers	Environment satisfaction is the primary reason when it comes to Staff satisfaction at a 1.82x likelihood of employees leaving.	An overall analysis of the satisfaction metrics can allow us to understand which impacts more.

Summary

Attributes that does not or may not affect the attrition rate:

- Distance
- Lack of training
- Job involvement
- Relationship Satisfaction

There are a few groups of entity that we should narrow down and focus on:

- In the age group of 26 - 35, 18 - 25
- in the R&D and sales department: to be exact it will be the Laboratory Technician, Research Scientist and Sales Executive as they constitute most of the employees in the company
- Employees with higher attrition rate falls in 0-3 Years Since Last Promotion or as observed from the funnel tables, the average of years at the company is 7.06 or 61.89% of the average of total working years (Look into more care into employees who are currently in their 6th and 7th year with the company so that the following year there can be a potentially lower attrition rate)

Possible reasons why do the employees choose to leave ranging from the most likely to least:

- Overtime - Strongly affects the attrition rate, it may be due to mental health in the employees who overworked than the standard hours.
- Monthly income - Employees with less than 2,800
- Environment satisfaction - Employees with low environment satisfaction have a higher rate of leaving
- The nature of the job which requires oversea travelling

Suggestion on how to improve a healthier attrition rate:

- Higher Salary increment as there a gradual drop in the attrition rate as the percent salary hike increases. This proves that employees who receive an average of 11-13% tend to feel that it is insufficient and may result to their decision in leaving.

Implementation to higher salary increment to the groups who require frequent travelling or in the R&D or Sales department may help.

- Provide stock option even to those who just joined with the company as majority of the employees who contributed to the attrition rate do not have the stock option granted.
- More training should be scheduled for Sales and R&D departments as they constitute larger of the workforce.
- Pay more attention to employees in their 6th and 7th year as it is the average tenure an employee is in the company.

8. Annex

https://app.powerbi.com/links/KTV09sTmcg?ctid=cbdb10cb-b644-4887-995c-8ea0e1d40752&pbi_source=linkShare