

INTERNSHIP: PROJECT REPORT

Internship Project Title	TCS iON RIO-45: EMPLOYEE ATTRITION RATE ANALYSIS
Name of the Company	TCS iON
Name of the Industry Mentor	Debashis Roy
Name of the Institute	ICT ACADEMY OF KERALA

Start Date	End Date	Total Effort (hrs.)	Project Environment	Tools used
15-09-2021	04-10-2021	45	Chrome, Windows 10	MS Office, PowerBI

Acknowledgements

I am highly indebted to TCS iON for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

I would like to express my gratitude towards my parents and my academic mentor, for their kind co-operation and encouragement which help me in completion of this project.

I would like to express my special gratitude and thanks to my industry mentor for giving me such attention and time.

Objective

This HR data is a fictional data set created by IBM data scientists. The topic of this data is to identify the factors that cause employee attrition and to look at important questions such as analysis of distance from home by job role and attrition or compare average monthly income by education and attrition. Finally, I want to predict attrition of valuable employees through HR data analysis.

In this analysis process, I will try to understand the most influential causes of attrition and to suggest Employee Retention Strategies.

Introduction

IBM created this dataset to allow analysts to uncover the reason for employee attrition.

We will investigate the attrition rate, as the average company's employee attrition rate is below 20%. For any company with a higher than 20% attrition rate, there is a concern for the company's turnover rate. A company that wants to have a "good" attrition rate should be aiming at 10% attrition rate. As employees requires time, energy, and money to train, the lower the attrition rate, the better it is to have a sustainable company culture.

Before diving into the dataset and start analysing, I have listed out three questions that I will try to find in my analysis and based on the finding to generate recommendations to the management.

Business Question

1. What is the attrition rate? Is it high or low?
2. What are the factors affecting the attrition rate?

Problem Statement:

Human Resources are critical resources of any organization. Organizations spend huge amount of time and money to hire and nurture their employees. It is a huge loss for companies if employees leave, especially the key resources. Reasons for attrition can be plenty and range from dissatisfaction due to low salaries, less or no career growth opportunities, inferior employee supervision, eagerness to get into companies with global presence, lack of recognition, lack of freedom of expression in the organization and underutilization of talents and skills of the individuals. Thus in a situation when more and more employees are quitting the organization, the attrition rate is on a rise. So if HR can predict weather employees are at risk for leaving the company, it will allow them to identify the attrition risks and help understand and provide necessary support to retain those employees or do preventive hiring to minimize the impact to the organization.

Overview

Summary of Insights / Order / Values of features w.r.t target variable (Attrition) :

General Employee Information :

- Age : 20 - 44
- Gender: Male > Female
- MaritalStatus : Single > Married > Divorced
- Education : Below College > Bachelor > College > Master > Doctor
- DistanceFromHome : 20 - 24 > 15 - 19 > 25 - 29 > 10 - 14 > 5 - 9
- TotalWorkingYears : Very high chances during the 1st 10 working years
- NumCompaniesWorked : High chances during 1st - 2nd job. Chances increase by a huge margin after working in 4th company.

Employee Job Information :

- EducationField : Human Resources > Technical Degree > Marketing > Life Sciences > Medical > Other
- Department : Sales > Human Resources > Research & Development
- JobLevel : JobLevel 1 > JobLevel 3 > JobLevel 2 > JobLevel 5 > JobLevel 4. We can see that the JobRoles with high attrition rate are present in the JobLevel with high attrition rate.
- JobRole : Sales Representative > Laboratory Technician > Human Resources > Sales Executive > Research Scientist > Healthcare Representative = Manufacturing Director > Manager > Research Director
- JobInvolvement : Low > Medium > High > Very High

- OverTime : Yes > No
- Job Satisfaction : : Low > Medium > High > Very High

Employee Company Information :

- Years At Company : 0 - 4 > 5 - 9 > 10 - 14 >
- Years In CurrentRole : Some peaks of high attrition values without any pattern is found.
- Years With Curr Manager : Some peaks of high attrition values without any pattern is found.
- Years Since Last Promotion : 0 > 1 > 2. Some other peaks are also found with significant values.
- Training Times Last Year : 0 > 4 > 2 > 3 > 1 > 5 > 6
- Work Life balance : Bad > Best > Good > Better

Company Features :

- Percent Salary Hike : 11 - 14 has the highest attrition rate. As the value increases, number of attired employees decrease.
- Stock Option Level : Number of employees reduces as the StockOptionLevel increases.
- Business Travel : Travel Frequently > Travel_Rarely > Non-Travel
- Performance Rating: Excellent = Outstanding. No values of Low & Good recorded.
- Environment Satisfaction: Low > Medium > High > Very High
- Relationship Satisfaction: Low > High > Medium > Very High

Finances:

Monthly Income : 2000 - 3000

Hourly Rate : 50 - 60. Values are very close to each other.

Daily Rate : 300 - 400. Values are very close to each other.

Monthly Rate : Very close and small peaks are present.

Summary:

- Dataset Structure: 1470 observations (rows), 35 features (variables)
- Missing Data: There is no missing data. It will make it easier to work with the dataset.
- Data Type: We only have two datatypes in this dataset: factors and integers

Methodology

Uncover the factors that lead to employee attrition and explore important questions such as ‘show me a breakdown of distance from home by job role and attrition’ or ‘compare average monthly income by education and attrition’. This is a fictional data set created by IBM data scientists.

What is Employee attrition ?

Employee attrition is defined as the natural process by which employees leave the workforce .

2. Introduction

IBM created this dataset to allow analysts to uncover the reason for employee attrition.

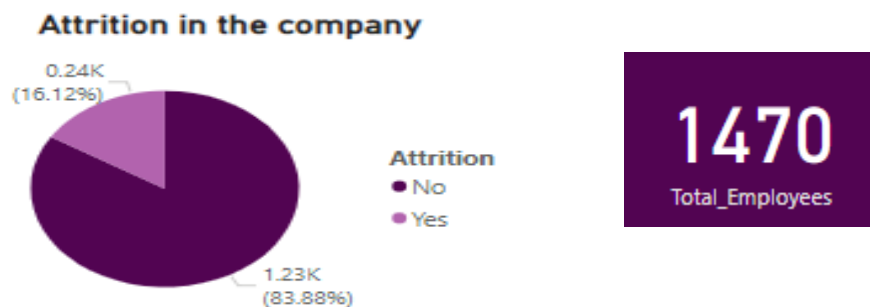
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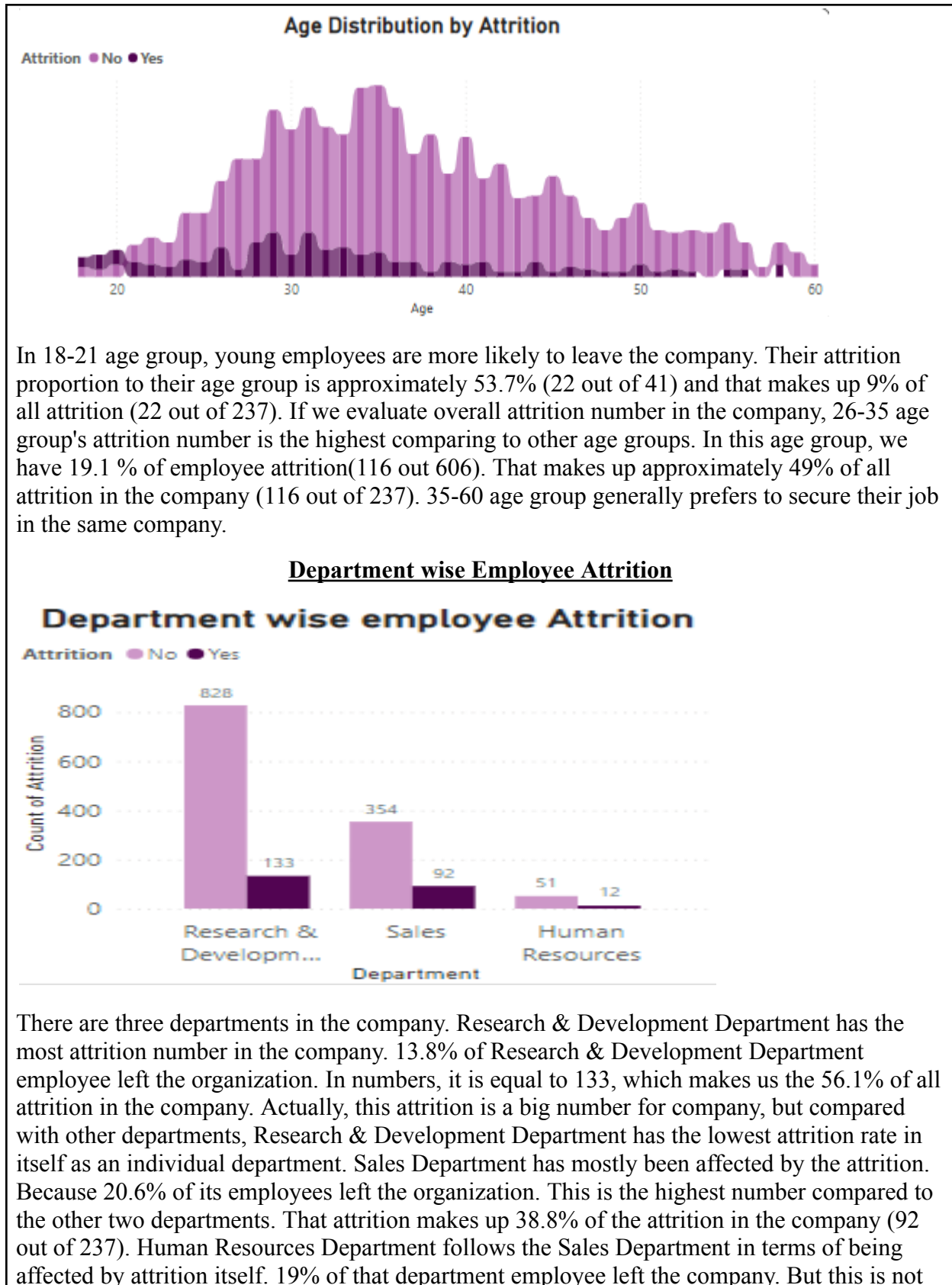
Target Variable ('Attrition'):



In the company, there are 1470 employees 0.24K employees who compose 16% of the total number of employees left the company for some reasons. Besides that, 1.23K employee is currently continuing to work in the same company.

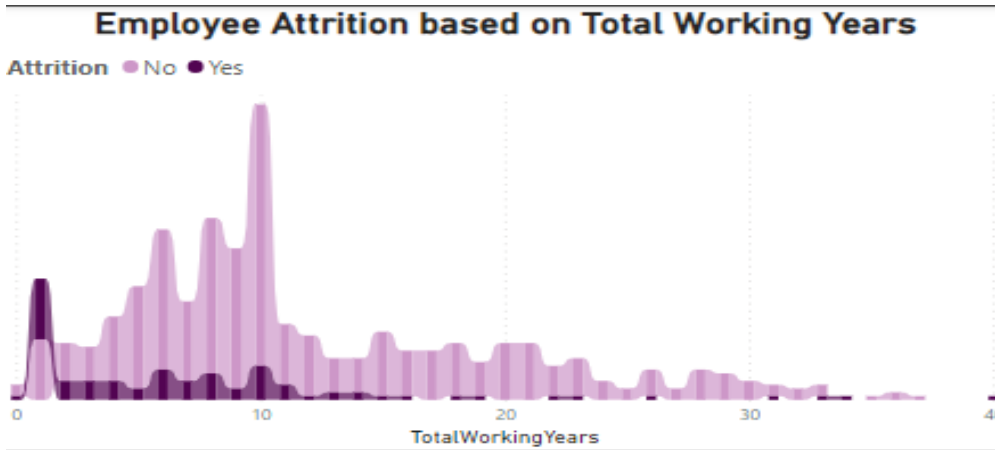
Attrition Analysis

Employee Attrition based on Age



that huge number in terms of whole attrition in company. Human Resources Department employee attrition makes up 5% of all attrition in the company (12 out of 237).

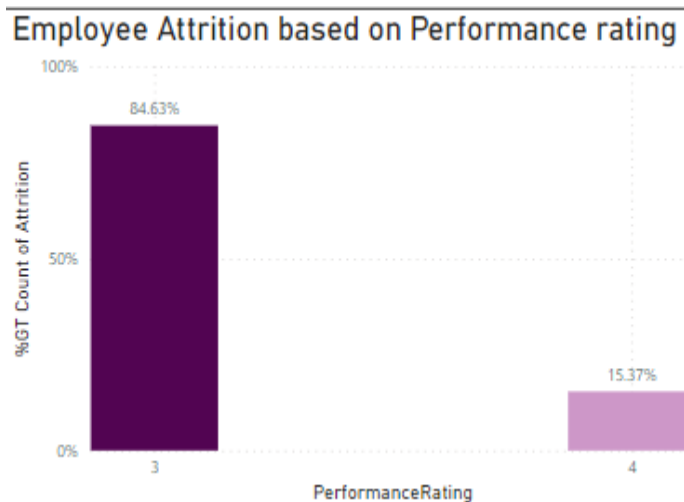
Employee Attrition based on Total Working Years



It seems to a large majority of those who left had a relatively shorter working year. In addition to that, employees who have 6-10 years' experience have also second highest attrition rates throughout the company.

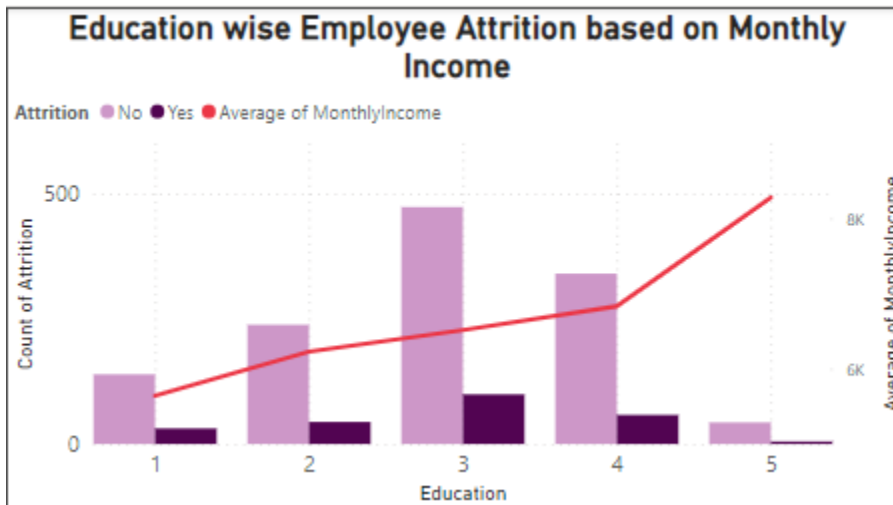
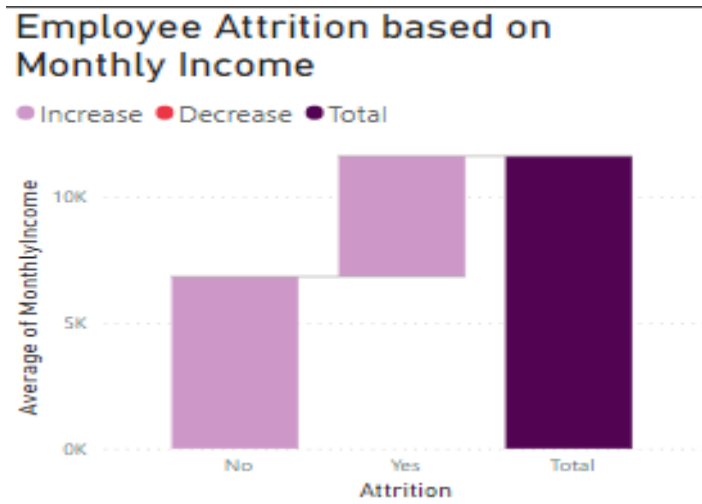
Attrition based on Performance rating:

Performance rating has two category such as 3 and 4. Not surprisingly, performance rating 3 group has the highest attrition number and compose 84.4% of all attrition in the company (200 out of 237 employees)



Education wise Employee attrition Based on monthly income

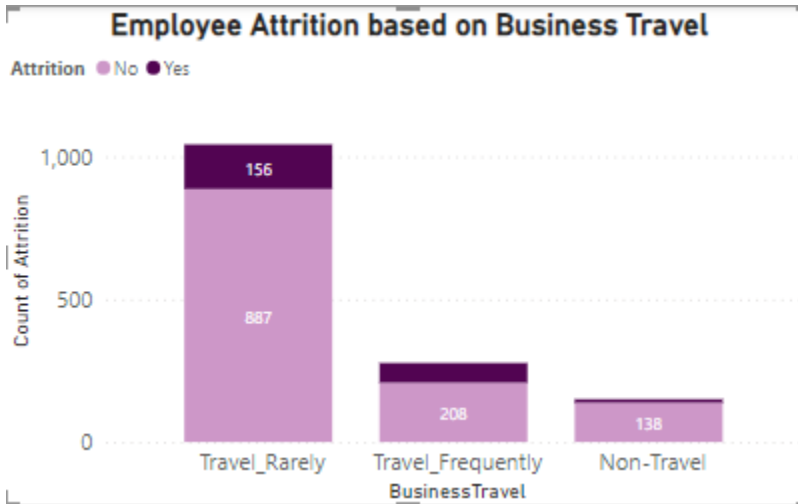
The group with most monthly income , has the lowest attrition. Hence increase in monthly income can reduce attrition.



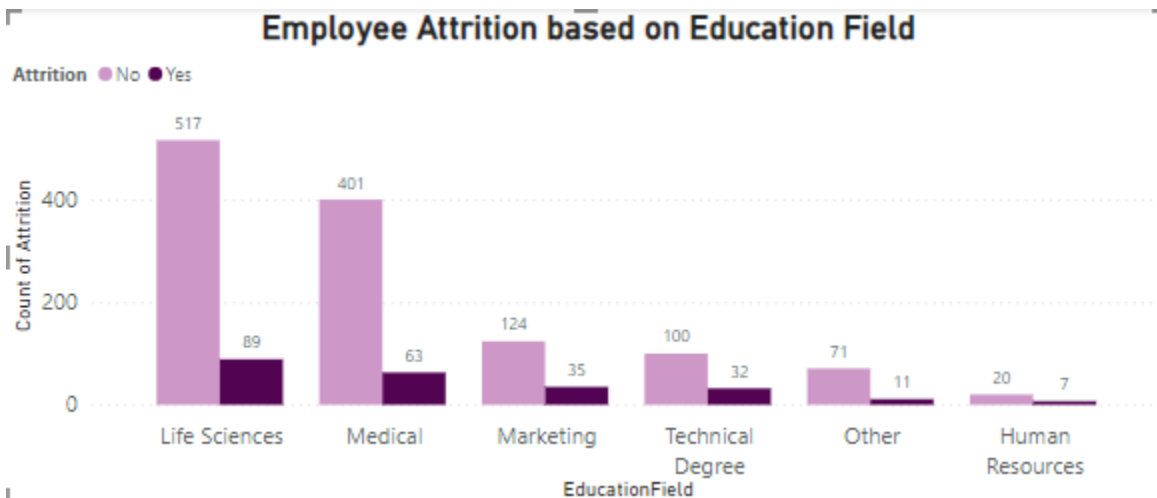
Employee Attrition based on Business Travel:

In the company, most of the employee travel rarely or don't travel according to their job description. That group compose the 1193 employees of entire company. The rest of the company employees which is 277 out of 1470 of them must travel frequently. The highest attrition number with 156 belongs to the employees who travels rarely. That is approximately 156 out of 1043 of employees in that group. But when you put this number overall attrition, it

makes up 65.8% of all attrition in the company (156 out of 237). if we look at the attrition percentage of relevant travel group, the employees who are traveling frequently are in the danger zone. Because they have the highest attrition proportion, which is 69 out of 277, in their individual travel group. That group's attrition rate composes of the 29.1% of overall attrition in the company (69 out of 237). Employees who don't travel in their current role have the lowest attrition.



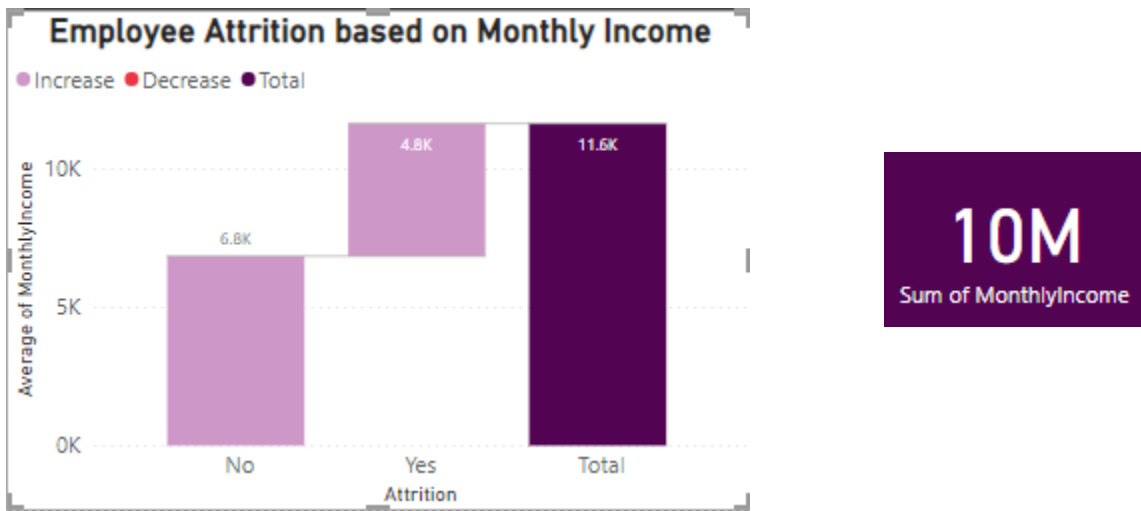
Employee Attrition based on Education field



Employees who have Life Science education level have the most attrition number which makes up 89 out of 237. But that composes only 14.7% of attrition within Life Sciences field. Medical education level has the second highest attrition number which makes up 63 out of 237 of all attrition. But that composes only 14.7% of attrition within Life Sciences field. Besides that, Human Resources, Technical Degree, and Marketing fields are mostly affected by the attrition respectively. Their approximately 22-26% employees left the company.

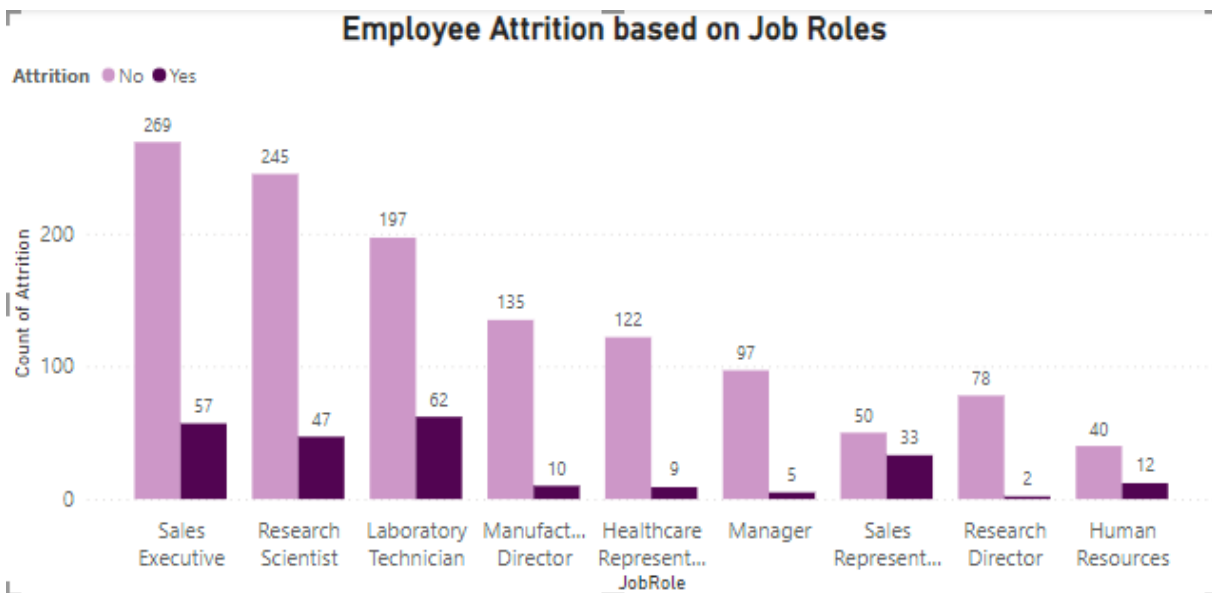
Employee Attrition based on Monthly Income

It seems to a large majority of those who left had a relatively lower monthly income.



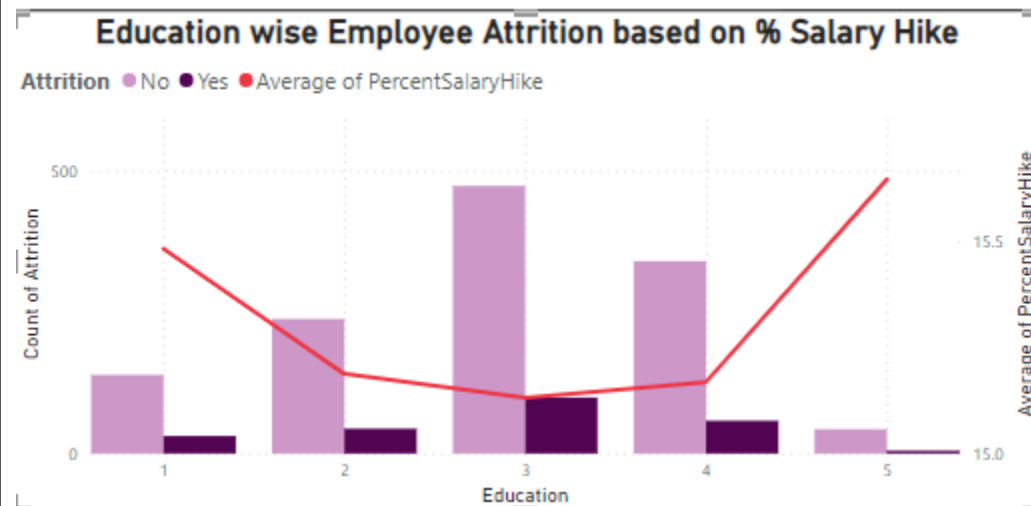
Employee Attrition based on Job Roles

Laboratory Technician has the most attrition number with the 62 out of 237 employees of all attrition in the company. Sales Executive and Research Scientist are following the Laboratory Technician in attrition throughout the company with the 57 and 47 employees respectively. Those both job roles' attrition composes 44% of whole company's attrition. Sales Representative role has been affected mostly by the attrition. Sales Representative has lost approximately 40% of its' employee. Laboratory Technician and Human Resources followed it in terms of losing employee as a job role. On the other hand, Research Director job role has the lowest attrition number not only in the company (2.5%) but only within its own job role (0.8%).



Education wise Employee Attrition based on % Salary Hike

Group 3 has the most attrition and salary hike % average is 15.15 which is the lowest compared to other groups. Hence attrition has increased due to low salary hike %.



Gender Analysis

In this section, we will try to see if there are any discrepancies between male and females in the organization. Also, we will look at other basic information such as the age, level of job satisfaction and average salary by gender.

Questions to ask Ourselves:

- What is the age distribution between males and females? Are there any significant **discrepancies**?
- What is the average job satisfaction by **attrition status**? Is any type of gender more dissatisfied than the other?
- What is the average salary by gender? What are the number of employees by Gender in each department?

Gender V/S Attrition

The attrition is more for male compared to female.

Employee Attrition by Gender

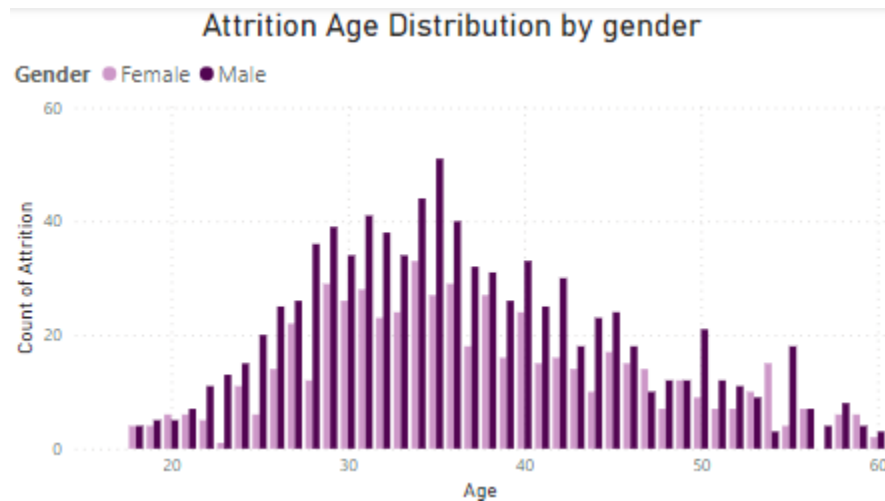


Female
588
Count of Gender

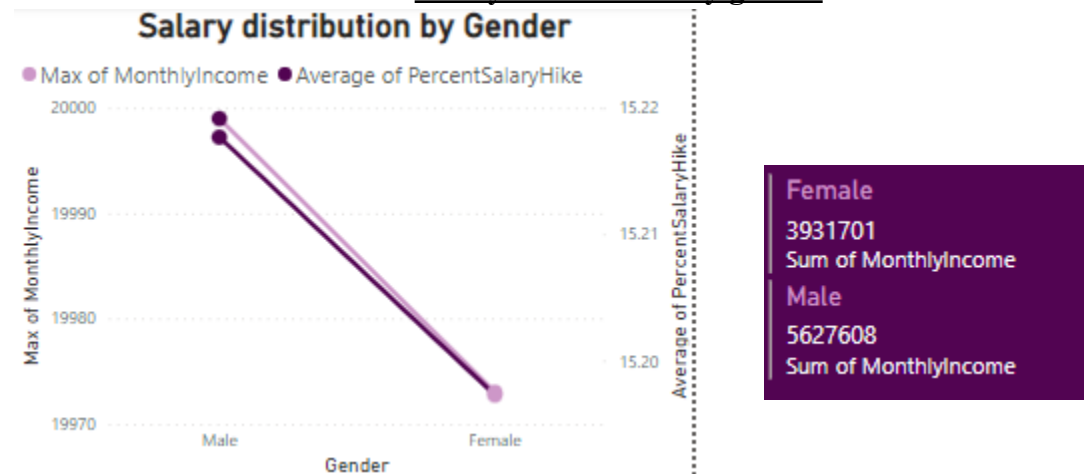
Male
882
Count of Gender

Attrition age Distribution by Gender

Young employees are more likely to leave the company. The attrition is similar to attrition age distribution. Male have higher attrition rates compared to females and 30-40 years has the most attrition values.



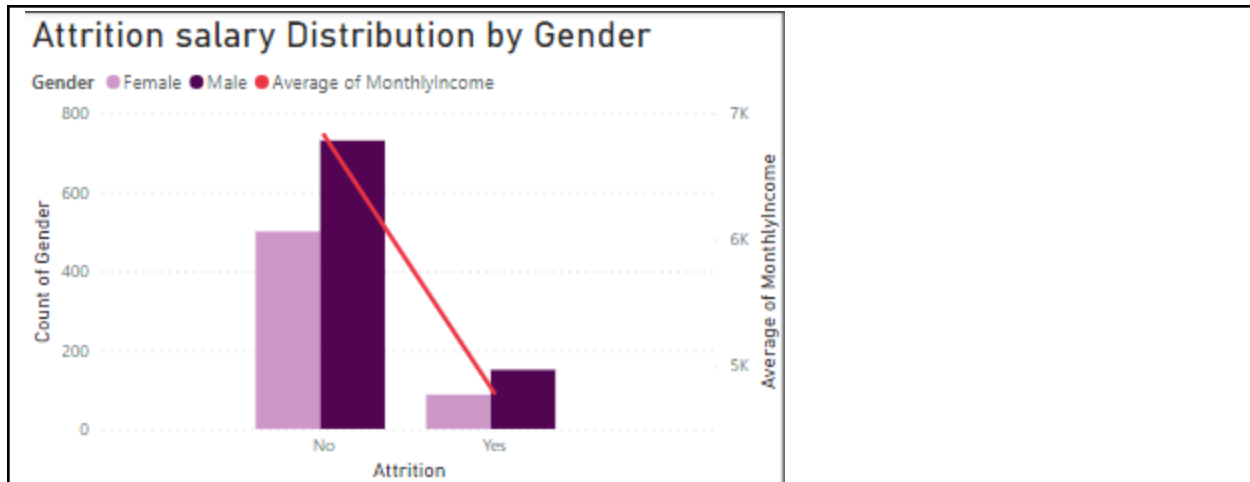
Salary Distribution by gender



There is a difference of salary for both genders the salary hike also defers. this is because there are more males 882 out of 1470 and females 588 out of 1470.

Attrition Salary distribution by Gender

Salary distribution of different gender has no influence in attrition.

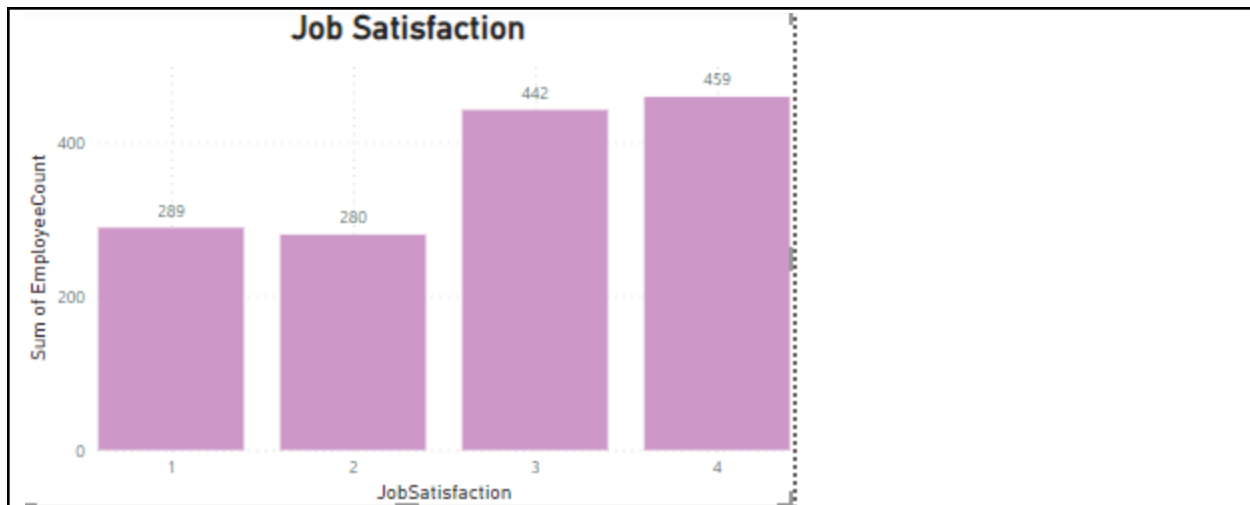


Employee Attrition based on Gender and Distance from Home

Employees whose homes are 1-3 miles far away from the company compose approximately 1/3 of the whole company employee and their attrition rate is 28.7% of all company (68 out of 237). Also, employees whose homes are 10+ miles far away from the company compose approximately the other 1/3 of the whole company employee and their attrition rate is 39.2% of all company (93 out of 237). Attrition rate within its own distance group seems to increase as the distance from home increases. The male gender group have more attrition rates than female as the distance increases. This shows people prefer to work near the office.



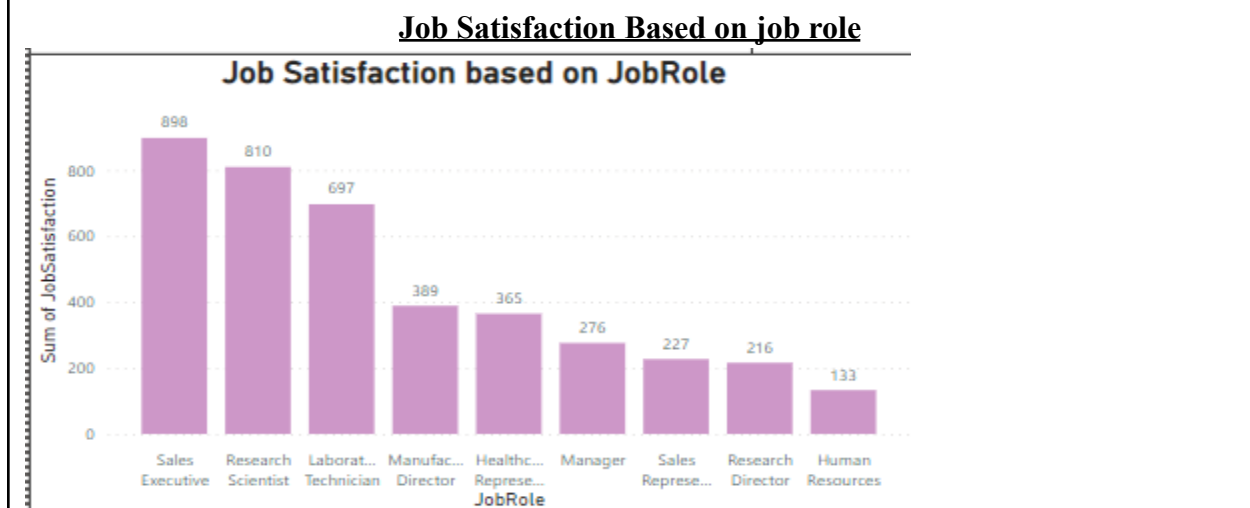
Employee Satisfaction Analysis Job satisfaction



Most of the employees are given rating 4 indicating very high job satisfaction.



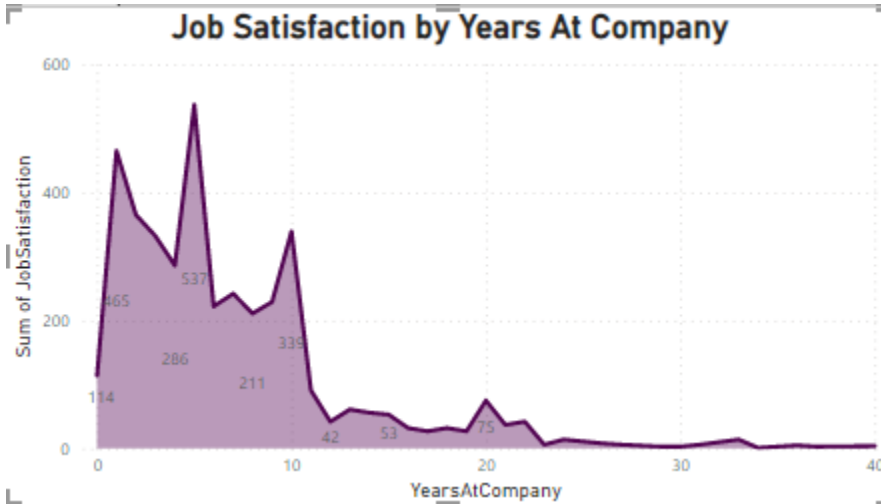
Most of the employees are given rating 3 indicating High job satisfaction.



Sales executive are the mostly satisfied Job role and human resource as least satisfied.

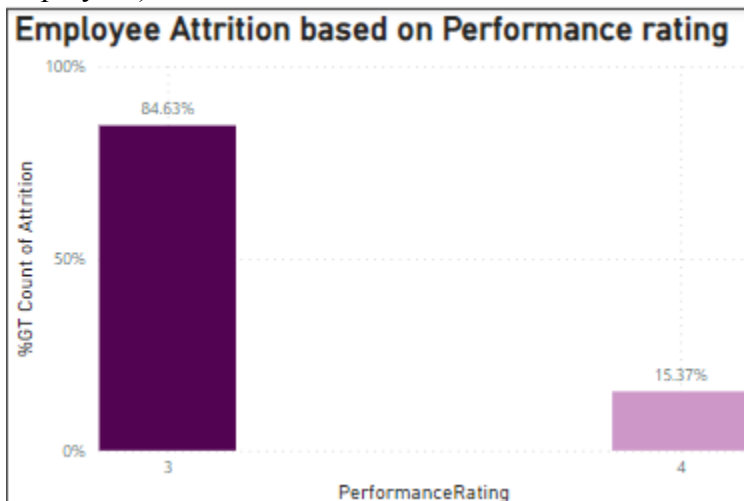
Job satisfaction by years at company

From the image below we can see as the years working in company increases job satisfaction also decreases.



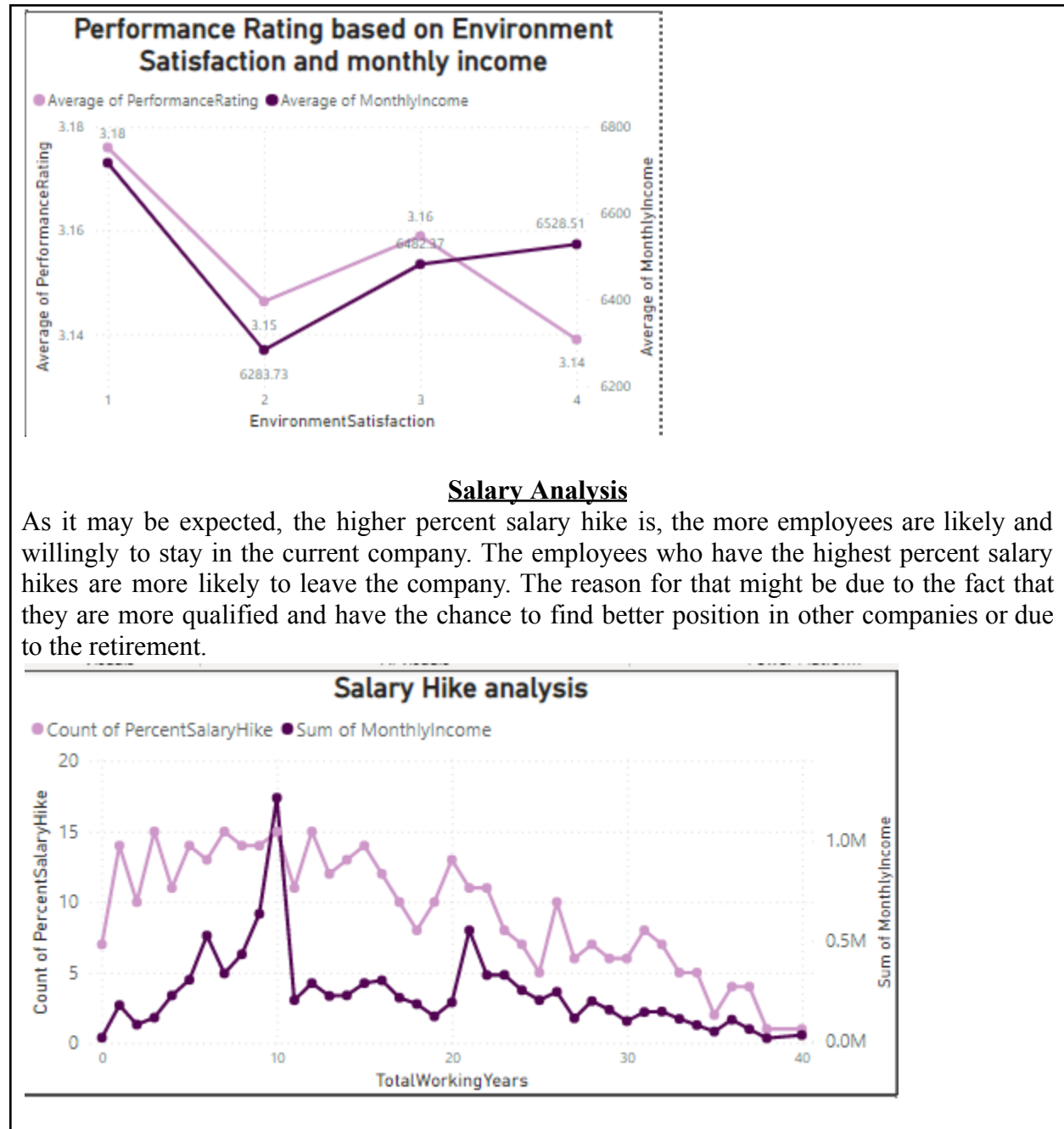
Employee attrition Based on performance rating

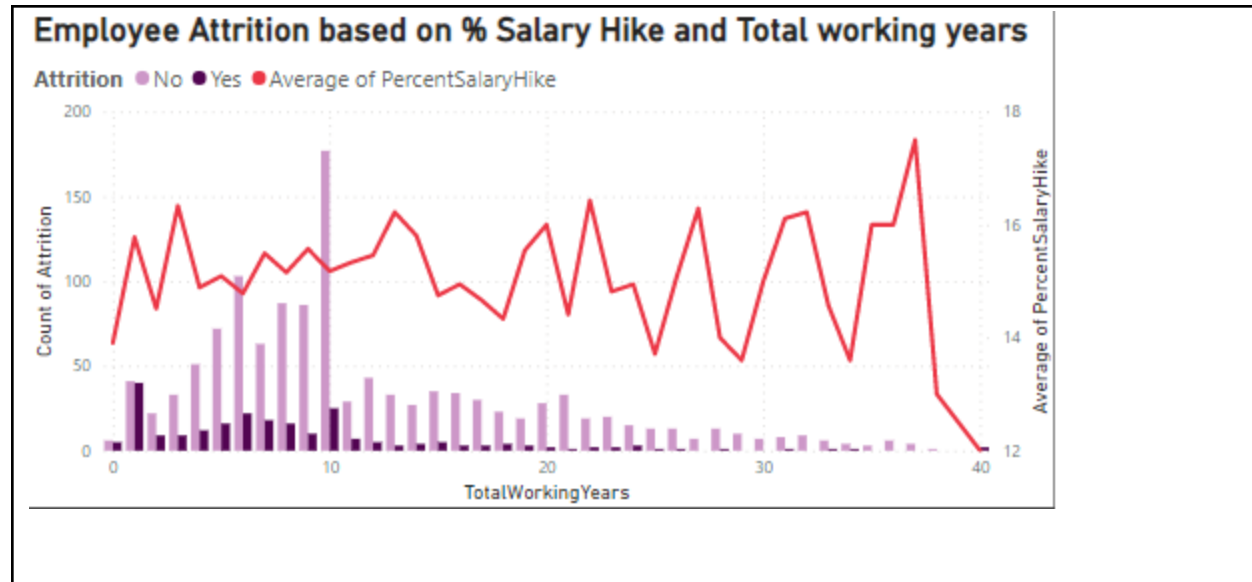
Performance rating has two category such as 3 and 4. Performance rating 3 group has the highest attrition number and compose 84.4% of all attrition in the company (200 out of 237 employees)



Performance rating based on Environment Satisfaction and monthly income

Environment satisfaction group 3 has second largest average monthly income. This shows high monthly income and Environment satisfaction increase performance.





Scope of the Study

- i. Identifying the root causes of attrition can help the organization from future damage in terms of talented employee pool.
- ii. The study lets us know the employee's preference for a job change and the dissatisfaction areas.
- iv. The study provides suggestions and strategies to improve employee retention.

RECOMENDATIONS

Suggested Actions: It's not sensible to focus on every employee who wants to leave because it costs time and energy for human resources management department. HR department need to focus on:

- Improving the work conditions Provide an option for the employee's to work from home, on a flexible schedule, or in an office with an ergonomic workspace, they will be more satisfied with their work and more likely to achieve a healthy work-life balance.
- Offer modest salaries and perks To maintain the critical employee's company need's to offer equitable and modest salaries. You can also give added perks like flexible schedules, travel discounts etc.
- Employee Engagement When you have talented employee's we need to find ways that you can help expand the employee's skill set, so that their involvement in the job increases. If their involvement is low, they will get bored and think that they are not growing within the organization

Link to code and executable file

Drive Link:

https://drive.google.com/drive/folders/19JdrxP8CXuzGQAe38tmcxY5vdKhNfoCf?usp=share_link

CONCLUSION

- 18.8% of the employees travels frequently, and they have the highest attrition percentage(25%). The company should question what makes traveling a burden on their employees. The company should balance the travel status and if necessary, there might be some adjustments on the job description in terms of traveling. The company may use some extra incentives to motivate their employees who are supposed to travel.

- 5.6% of employees works as Sales Representative and 17.6% of employees works as Laboratory Technician. They have 39.8% and 17.6% attrition percentage respectively. These two job roles should be questioned, and the company should find the reason(s) why these job roles face more attrition rate than all others and take necessary actions.
- Beside those factors above, there are some other indicators which keep employees in the company. These factors are stated below. - Total working years in the company, - Years in current role, - Environment satisfaction, - Medical education field, - job satisfaction, - Job involvement, - Years with current manager, - Work life balance, - Age. The company should primarily try to increase the effectiveness of those factors. As a result, it will yield to the decrease in the attrition rate.