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Introduction

This report will analyze the question: What makes employees stay or leave our company? The goal of this report is to give our HR department insight into what employees want from their employers. We are interested in providing this information to the HR department in order to foster a healthy work environment where employees feel supported and productive. To gather useful statistics and information we analyzed the dataset [“HR Employee Analytics”](#) published on the website Kaggle.

This dataset contains 11 columns and 15,000 rows, with the target column being whether or not an individual stayed or left a company. We conducted an exploratory data analysis on this dataset and found that an individual's overall satisfaction level, weekly hours, number of projects, work department, and salary have a strong influence on if they left the company. This report will provide information on each of these variables as well as supporting visualizations to emphasize the impact the variables have on attrition rate.

Results and Discussion

Overall Satisfaction Level

The dataset includes a column that provides an employee's overall satisfaction on a scale of 0-100%, with 100% being extremely satisfied. When analyzing this column, we separated the column into two parts: those who stayed at their job and those who left their job. Within each section we calculated the average overall satisfaction level for each group. Here were the results:

The Average Employee Satisfaction Level Per Employment Status at a Company

Satisfaction is evaluated on a scale of 0%-100%, with 100% being extremely satisfied

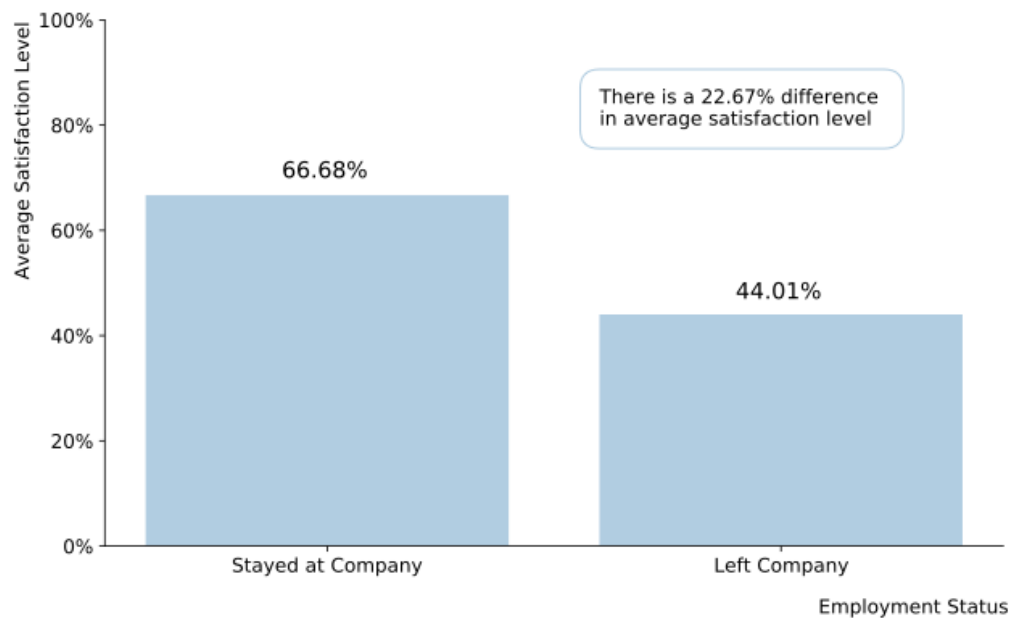


Figure 1.1

From **Figure 1.1** we can see that those individuals who stayed at a company had an average satisfaction level of 66.68%, whereas those who left a company had an average satisfaction level of 44.01%, a 22.67% difference. This emphasizes that those who have a higher overall satisfaction level are more likely to stay at a company, and the inverse also holds true: those who have a lower overall satisfaction level are more likely to leave a company. In summary, to keep attrition rates low, our company must keep their employees' overall satisfaction levels high.

Weekly Hours

An important factor that determines employee retention/attrition rate is a work-life balance. We analyzed the effect of work-life balance by plotting weekly hours worked per employee versus the difference from the average attrition rate. Weekly hours worked was obtained by simply dividing the average monthly hours per employee by four.

Overworked employees left the company 50% more than the average

Since the mean attrition rate was 27%, this implies 80% of overworked employees left!

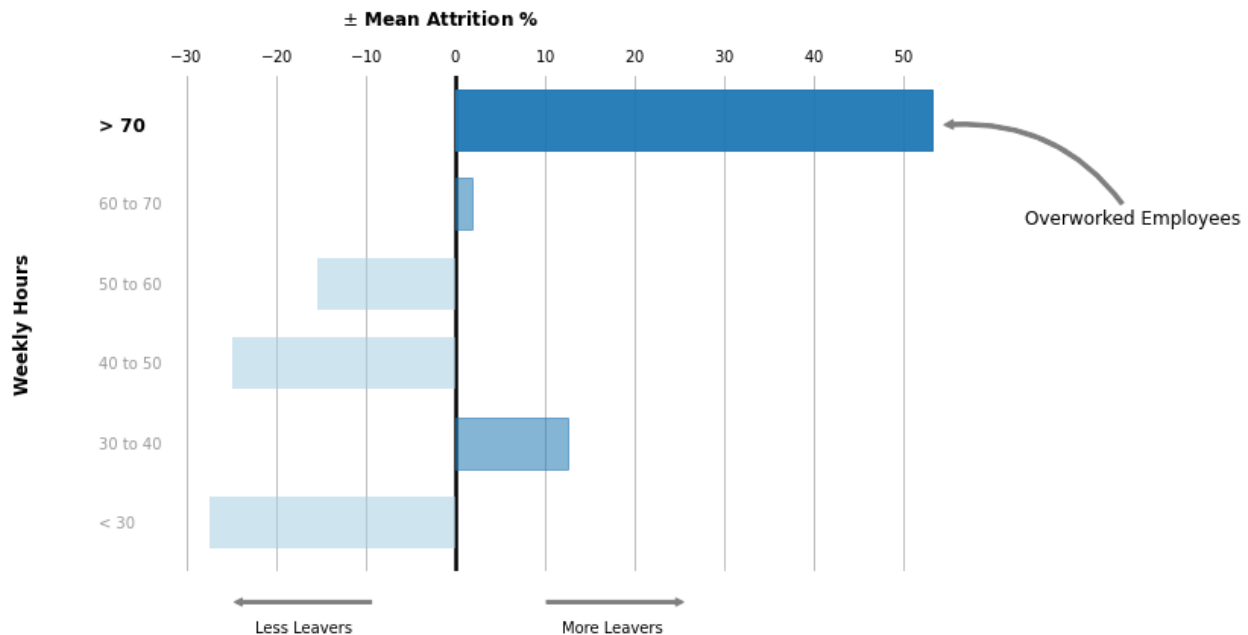


Figure 2.1

We observed in **Figure 2.1** a trend between weekly hours and difference in mean attrition rate. We labeled employees who worked more than 70 hours a week as overworked employees. Overworked employees' attrition rate was 50% higher than the average employee. Since the average attrition rate is 27%, this means their overall attrition rate was about 80%! In contrast, the attrition rate of employees who worked less than 30 hours was 0%. In fact, the mean attrition rate almost increases hand-in-hand with weekly hours with the exception of employees who work 30 to 40 hours per week. A possible explanation for this could be that the employees who work 30 to 40 hours per week are not working enough to feel engaged, but still are working enough to experience work stress.

Some limitations of this analysis could be that the bin size for weekly hours worked could be too big and lead to misleading visuals and conclusions. However, when we used 5 hours intervals for each bin, the same relationship was observed.

In conclusion, there appears to be a relationship between weekly hours worked and difference from mean attrition rate. There is a steep dropoff in mean

attrition rate below 70 hours worked, and the optimal range is 40 to 60 hours per week.

Number of Projects

An important question we wanted to address was “does the number of projects given to an employee have an effect on whether or not they leave the company?” To answer this question, we must look at the number of projects each employee worked on and if they are still with the company or not.

Looking at the data, we see that all employees work on two to seven projects at a time. 3,571 out of 14,999 employees in the data set have left the company, which is about a 24% attrition rate. Most employees are working on three to five projects with the median being four projects. **Figure 3.1** shows the count of people working a specific number of projects and **Figure 3.2** displays that distribution.

Number Projects	Counts
2	2388
3	4055
4	4365
5	2761
6	1174
7	256

Figure 3.1

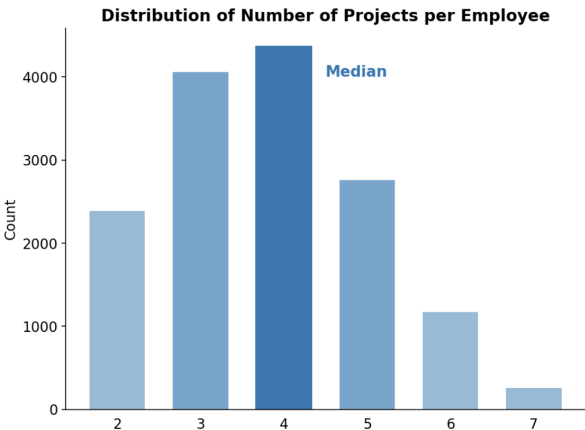


Figure 3.2

To dive deeper, we separated the employees by the number of projects they were assigned and if they left the company or not. When grouping by employees who left, we found that the highest proportion of people leaving by project number was at seven, with a 100% turnover rate. However, in total, there are only 256 who have seven projects, which is about 1.7% of all employees.

Employees assigned exactly two projects had the highest number of people leaving with 1567 out of 2388 quitting. This is the second highest turnover rate at

65%. The third highest turnover rate is six projects at 55%. Of all employees who left the company, 69% were working on either two, six or seven projects at a time.

On the contrary, only 13% of employees who left were working on three or four projects at a time, with three projects having the lowest turnover rate at 1.7%.

Proportion and Count of Employees Who Left vs Stayed by Number of Current Projects

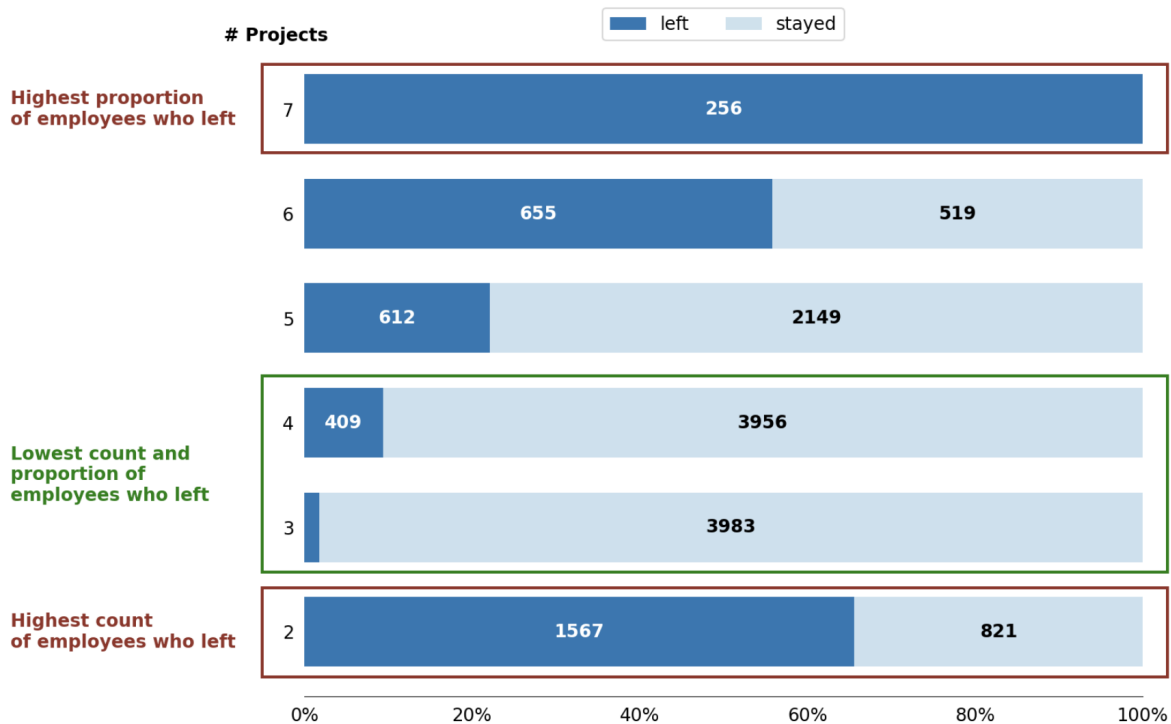


Figure 3.3

From this analysis, we have evidence that the number of projects an employee works on at any given time does have an influence on whether or not that employee leaves the company. Based on the data, the optimal number of projects to assign an employee is between three to four. Since the median number of projects is four, the majority of employees are assigned the right number of projects, but this can always be improved.

On the upper bound, we would recommend avoiding assigning someone six and seven projects. Although only 256 people were given seven projects, 100% of them left. This is major evidence that any worker given this number of projects in the future will leave. Six projects also have the majority of the workers leaving and should be lowered as well.

To improve the retention rate the most, we suggest that you increase the project count on employees working two projects by one, two at most, to place them in the lowest attrition project group. This will have the greatest overall increase to the employee retention rate.

Overall, the data shows that employees working on too many projects or too little projects have the highest turnover rate. The best number of projects to work on are between three and five. This area seems to have the optimal work-life balance contributing to a higher retention rate.

Salary

Another important factor that determines the employee retention rate is salary. The salary in the data set is divided into three categories of low, medium and high. We analyzed the effect of salary on leaving rate and found a high positive correlation between the two. An employee with a low and medium salary structure is seen to be from **Figure 3.1** generally more dissatisfied with their job and more likely to leave. We can see the percentage of the people from different salary categories leaving the company. Notice the low percentage of high salaried people leaving.

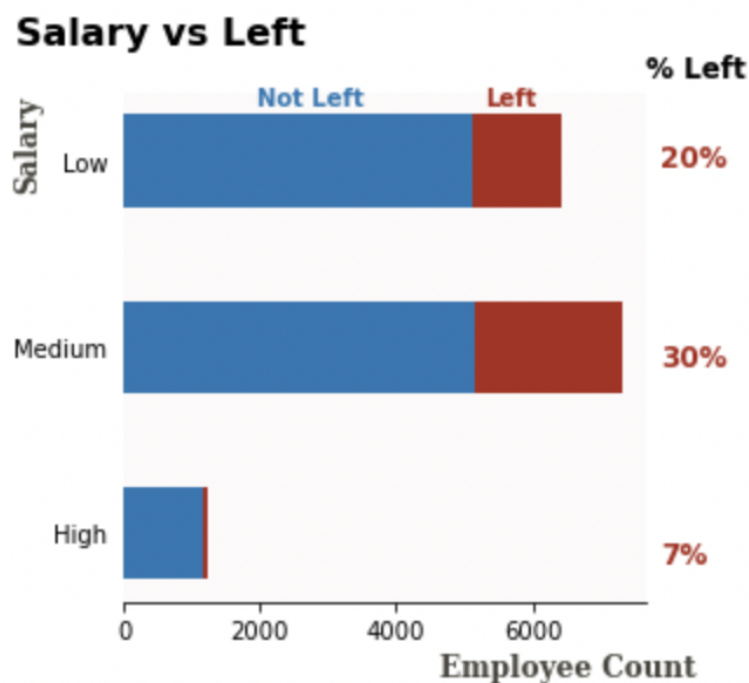


Figure 3.1

Work Department

On analyzing the relation of departments of the employee and leaving we don't find any direct correlation. It seems at first that departments are not directly impacting the leaving decision of the employee. In a further analysis of the department we try to segregate the number of employees in each department into low, medium and high salary categories and see if a department has an influence on an employee's salary which in turn is impacting their leaving decision.

Department Wise People(On Varying salary range) Leaving

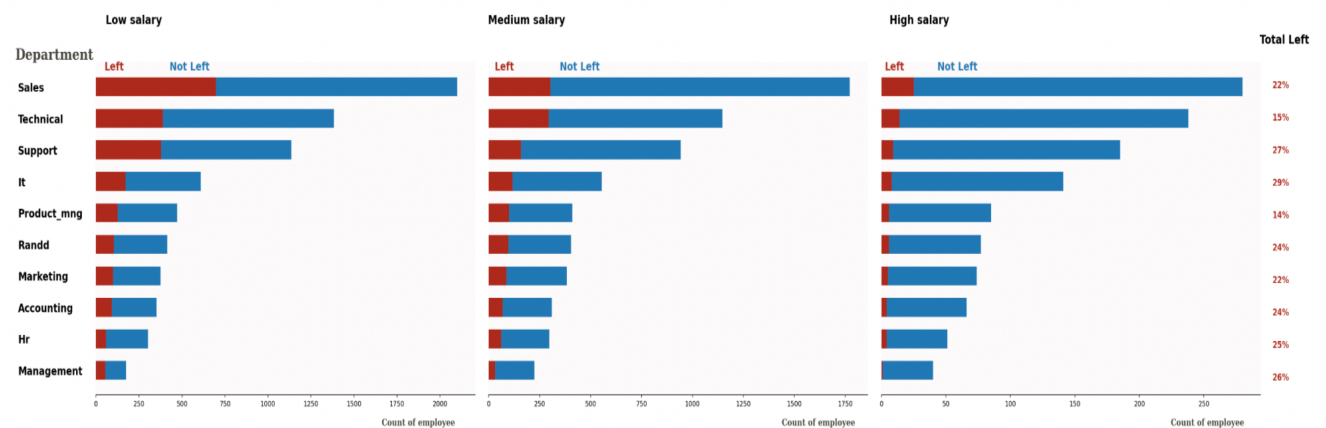


Figure 4.2

We observed in **Figure 4.2** the leaving trend from departments for employees with low, medium and high salary range. We can clearly see that there are more employees leaving from each department on a low salary than those on a high salary range. Also, in general we see that people leaving the IT department is the highest even though the number of people in each of its salary categories are moderately distributed. There may be other factors in this department that are causing employees to leave apart from the salary and we need more data to take a deeper look at this to analyze the actual factor in the department that is influencing this decision.

Conclusion

In general, we can see that there are several variables that influence whether a person stays with the company. If our company wants to increase the number of

employees who stay they need to keep their employees' overall satisfaction level high. Our company can keep their employees' satisfaction level high by looking into the other variables mentioned: weekly hours, number of projects, work department, and salary.

The data tells us that there is a relationship between weekly hours and attrition rate. To maximize employee retention, we should aim to give employees less than 30 hours or 40-60 hours per week.

The number of projects given to an employee plays an important role in keeping retention rates high. Employees with three or four projects tend to stay with the company, while those with two, six, or seven projects are much more likely to quit. Due to this, we highly recommend that you try to keep the project count of employees between three and four.

The salary given to an employee plays a crucial role in employee retention rates. Employees with high salaries have a very low leaving ratio. Based on the department wise salary and retention analysis we can see more the number of employees in each department with low and medium salary range more is the leaving percentage. To get more specific department attributes contributing to retention, more data will be required.