Employee Attrition & Factors

BCE483 | Business Intelligence and Analytics

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Introduction

The dataset analyzes an organization's employees, covering topics such as employee attrition, personal and job-related factors, and financials. Numerous parameters are included, such as the employee's age, gender, marital status, business travel frequency, daily rate of pay, and departmental information such as distance from home to office or education level. Additionally, a variety of job-related parameters are included, such as Job Involvement (level), Job Level (relative to similar roles within the same organization), Job Role specific to that individual (function/task), as well as total working hours in a week/month/year, whether overtime or standard hours for that particular job. Furthermore, specifics include % Salary Increase during their tenure with the company from Promotion or otherwise, and Performance Rating based on specific criteria established by leadership. An employee's monthly income is determined when they are hired, followed by their monthly pay rate, including overtime hours, as applicable, and the number of companies for which they have previously worked. Finally, the Retirement Status, also known as Attrition, is highlighted, which covers whether there was an intention to stay with one employer until retirement age or if attrition occurred earlier than expected for reasons beyond one's control. Using this dataset, you will be able to gain a better understanding and visualization of the various major aspects of today's workforce management practices, which have changed dramatically over time due to technological advances.

Dataset

We used the data from Kaggle to understand and work on our topic. In the dataset, there are 1471 rows and 35 columns. There are 3 departments Sales, Research & Development, and Human Resources. Out of the 1471 entries, the total number of attritions is **232.**

Attribute	Description	Type	Value
Age	The age of the employee	Numerical	From 18 to 60
Attrition	Whether the employee left or not	Categorical	True/False
BusinessTravel	How often do they travel	Categorical	One of the listed categories
DailyRate	Daily rate of pay for employee	Numerical	From 102 to 1499
Department	The department they work in	Categorical	One of the listed categories
DistanceFromHome	The distance from the employee's home to the office.	Numerical	Distance in miles (mi)
Education	The employee's level of education	Categorical	One of the listed categories
EducationField	Employee's field of study	Categorical	One of the listed categories
EmployeeCount	Total number of employees in the organization	Numerical	Sum
EmployeeNumber	The unique identifier of the employee	Numerical	Unique incremental ID
EnvironmentSatisfaction	The employee's level of satisfaction with the work environment	Categorical	Scale from 1 to 4

Gender	Employee's gender	Categorical	Male/Female
HourlyRate	Hourly rate of pay of the employee	Numerical	From 30 to 100
JobInvolvement	Level of involvement required from the job	Categorical	Scale from 1 to 4
JobLevel	Employee's job level	Categorical	From 1 to 5
JobRole	Employee's role in the organization	Categorical	One of the listed categories
JobSatisfaction	Level of satisfaction with their job	Categorical	Scale from 1 to 4
MaritalStatus	Employee's marital status	Categorical	One of the listed categories
MonthlyIncome	The employee's monthly income	Numerical	From 1009 to 20K
MonthlyRate	Monthly rate of pay of the employee	Numerical	From 2094 to 27K
NumCompaniesWorked	The number of companies the employee has worked for	Numerical	From 1 to 9
Over18	If the employee is over the age of 18 or not	Categorical	True/False
OverTime	If the employee works overtime or not	Categorical	True/False
PercentSalaryHike	Percent of salary hike for the employee	Numerical	Percentage %
PerformanceRating	Employee performance rating	Categorical	Scale from 1 to 4
StandardHours	Employee's standard working hours	Numerical	80 hours
TotalWorkingYears	Total number of years the employee has worked	Numerical	From 0 to 40

TrainingTimesLastYear	The number of times last year the employee was taken for training	Numerical	From 0 to 6
WorkLifeBalance	The employee's perception of their work-life balance	Categorical	Scale from 1 to 4
YearsAtCompany	Total number of years the employee has been in the company	Numerical	Sum (From 0 to 40)
YearsInCurrentRole	Total number of years employee has worked in their current role	Numerical	Sum (From 0 to 18)
YearsSinceLastPromotion	Total number of years since the employee was last promoted	Numerical	Sum (From 0 to 15)
YearsWithCurrManager	Total number of years the employee has worked with their current manager	Numerical	Sum (From 0 to 17)

Data Preprocessing

We have removed two rows from the dataset that we think are not necessary:

1- **StockOptionLevel:** Stock option level of employee.

- We think it is not necessary to know this information.

2- **RelationshipSatisfaction:** Employee's satisfaction with their relationships.

- We think it's not clear and not specific the meaning of the relationship, is it between

  coworkers or the employee's relationship with his family, friends, etc?

Data Visualization

1. Attrition vs. Travel

   This joint bar chart shows the relationship between the level of attrition depends on the business travel status. We found that the research and development department attrition to no attrition rate is best in terms of low attrition based on their total count. The sales department employees who travel frequently seem to have **around a 30%** attrition rate. Finally, employees that don't travel have little to no attrition. So what we can comprehend from this graph is that employees that don't travel or rarely travel have the least attrition rate overall compared with the employees who travel frequently.
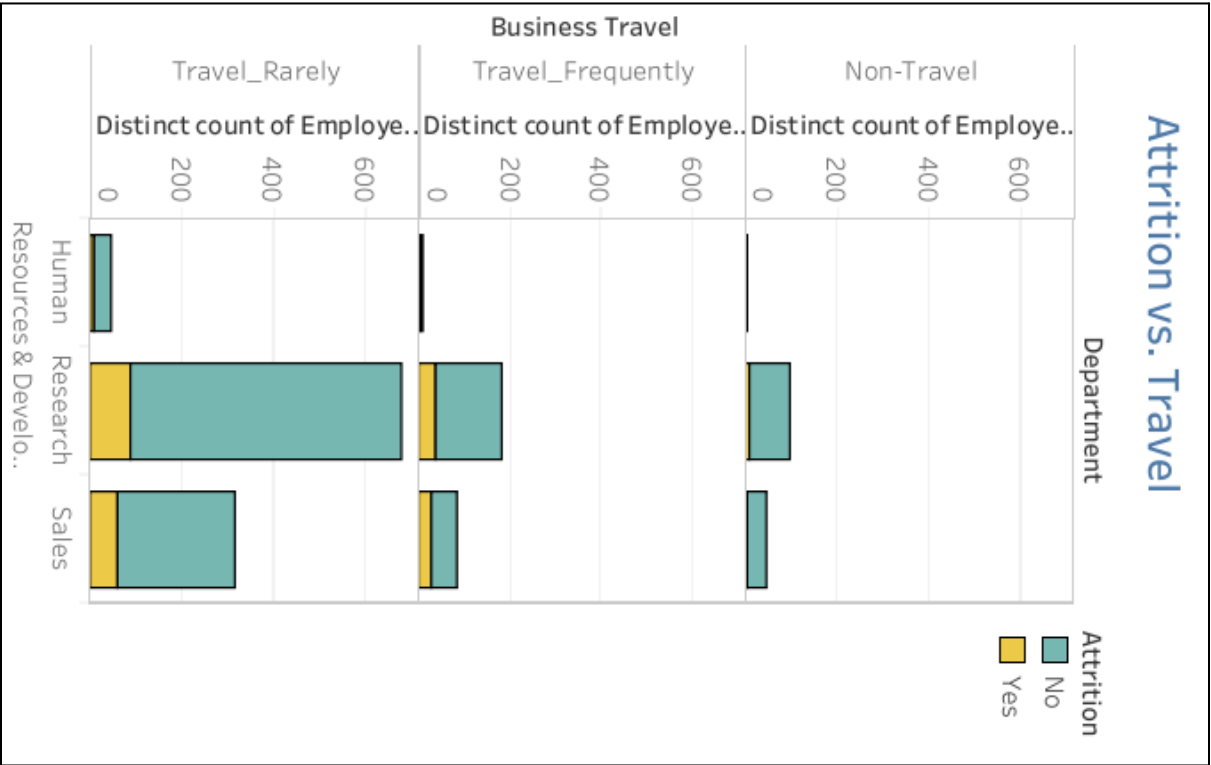
Figure 1

2. Attrition per Job Role

In the tree map below, we can see each job role and the attrition number. The highest attrition role is the "Sales Executive" role with **326** employee attrition making up **22.18%** of the attrition rate. The second-highest attrition role is a "Research Scientist" with **292** employee attritions making up **19.86%.** The job role with the lowest attrition rate is "Human Resources" with **52** employee attrition making up **3.54%** of the total attrition. The "sales executive" has the most attritions, we can relate it to the previous insights (figure 1) as they had a significant attrition rate when traveling rarely or frequently.
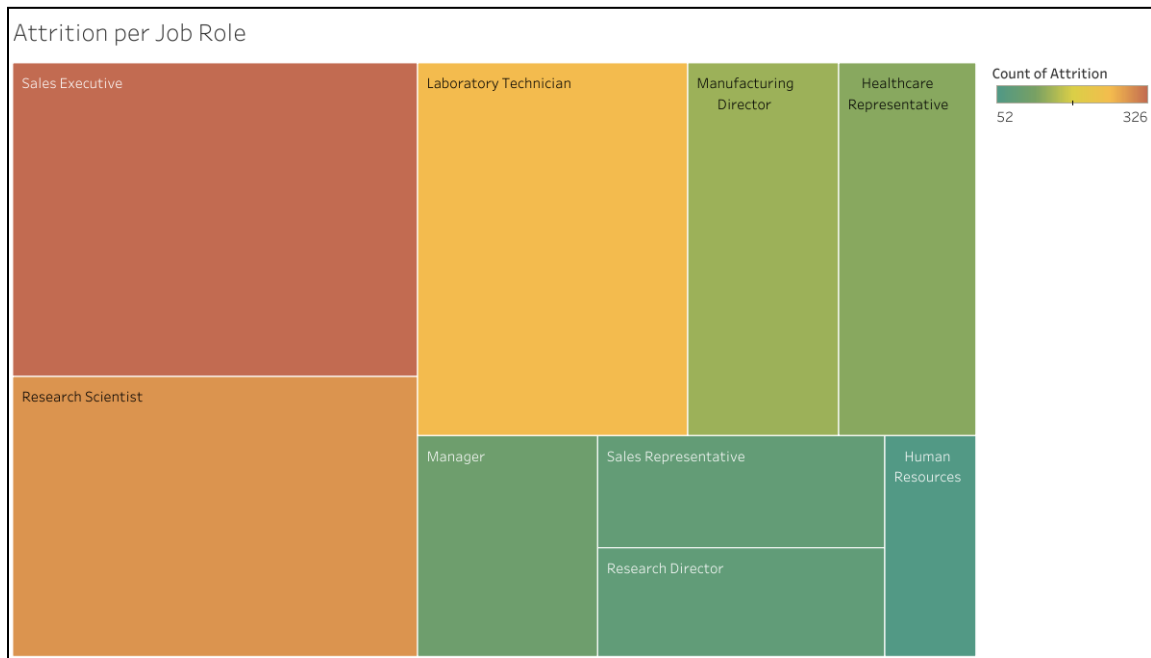
Figure 2

3. Attrition per department

In these horizontal bars, we can see the number of attrition per department. Although research and development have the highest count of attrition at **133** and a rate of **16%**, sales have the highest rate of attrition at around **26%.** The human resources department rate was **23.5%.**
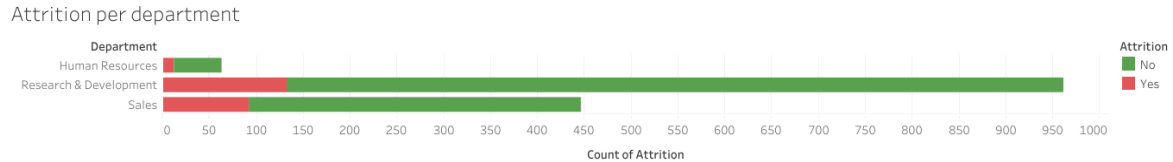

Figure 3

4. Attrition vs. Environment Satisfaction

In these stacked bars, we can see the environment satisfaction level and the attrition for each employee. **The average** environmental satisfaction with no attrition was *2.77* and **the average** environmental satisfaction with attrition was *2.46*.
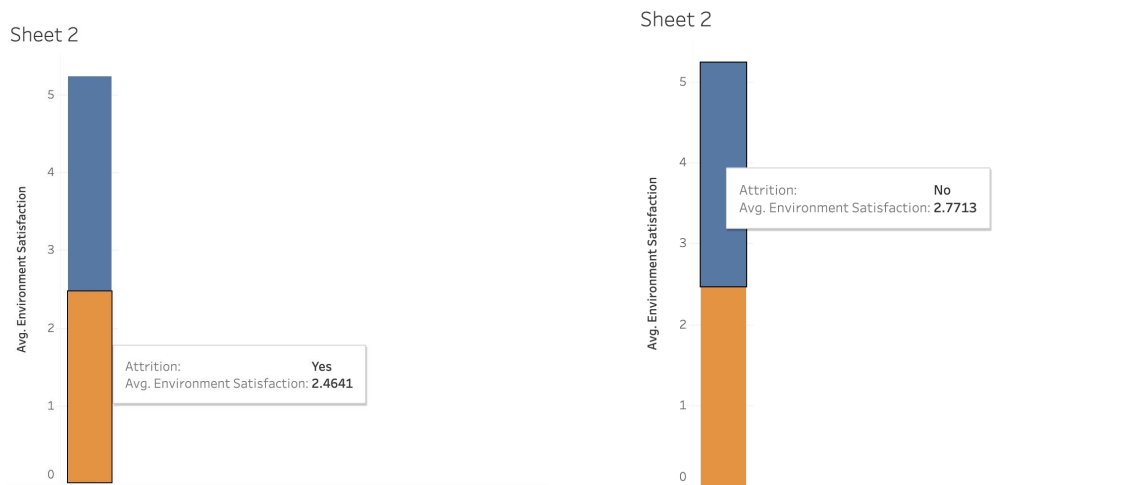
Figure 4

5. Attrition per Job Level

We used the Highlight table below to find the attrition for the job level of each employee. The working hours for all employees in all job levels are 80. We can see that most of the job levels have no attrition. **2,646 job levels have no attrition, and 388 job levels have yes attrition.**
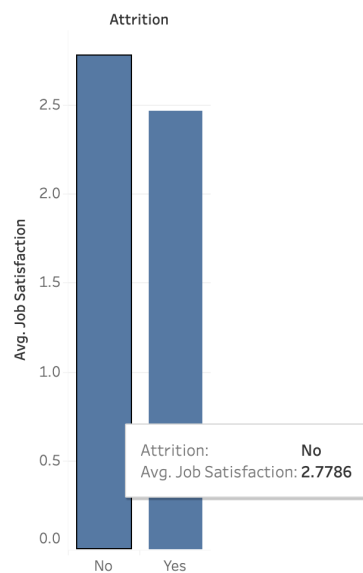

Figure 5

6. Attrition vs. AVG Job Satisfaction

We used Horizontal Bars to show the relation in employee satisfaction rates related to attrition. This can help to identify whether employees have job satisfaction with attrition or not. The average job satisfaction with no attrition is 2.7786 and the average job satisfaction with yes attrition is 2.4684. As a result, we can see that **NO attrition results in HIGH satisfaction**.

Figure 6

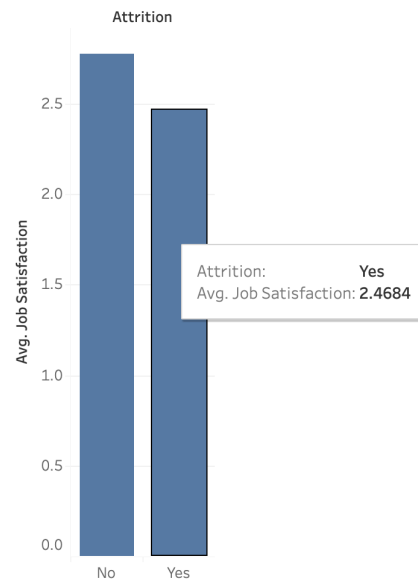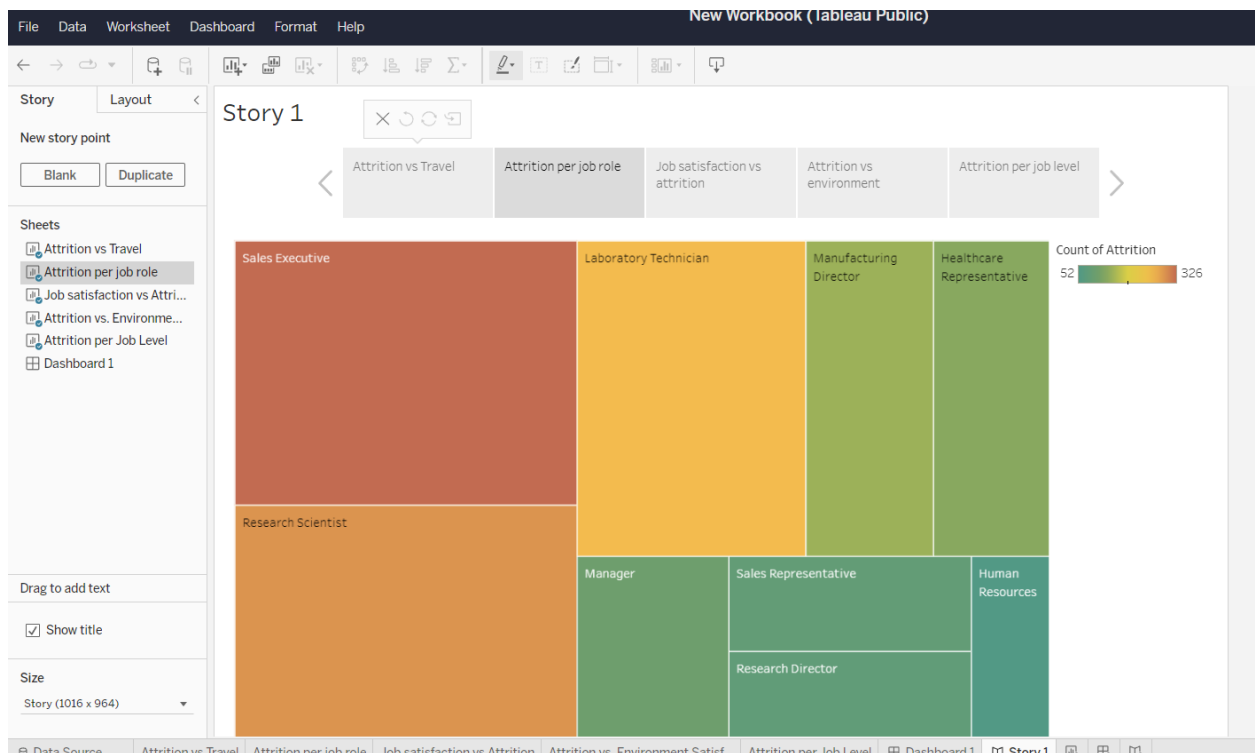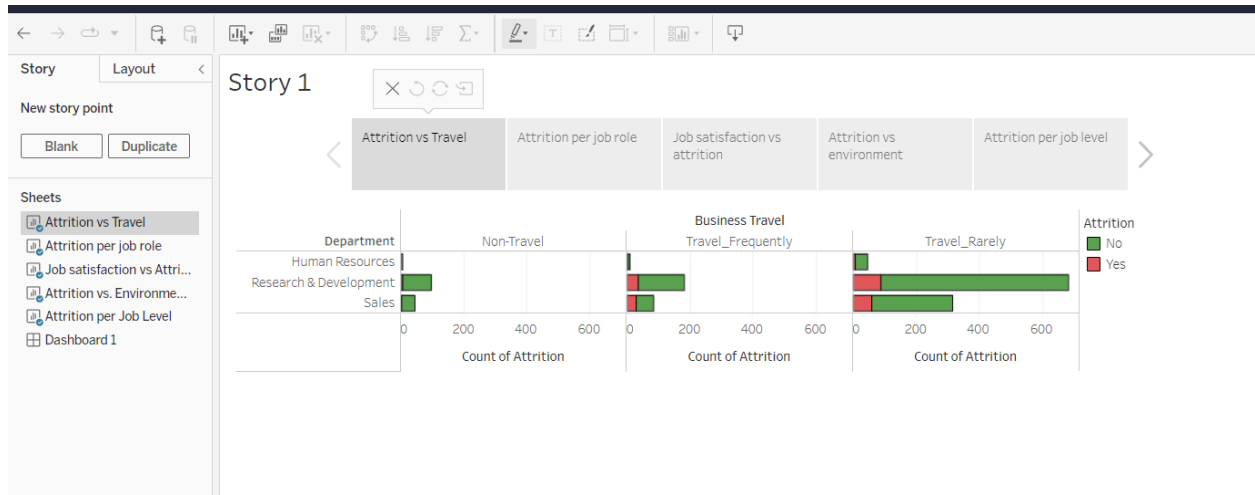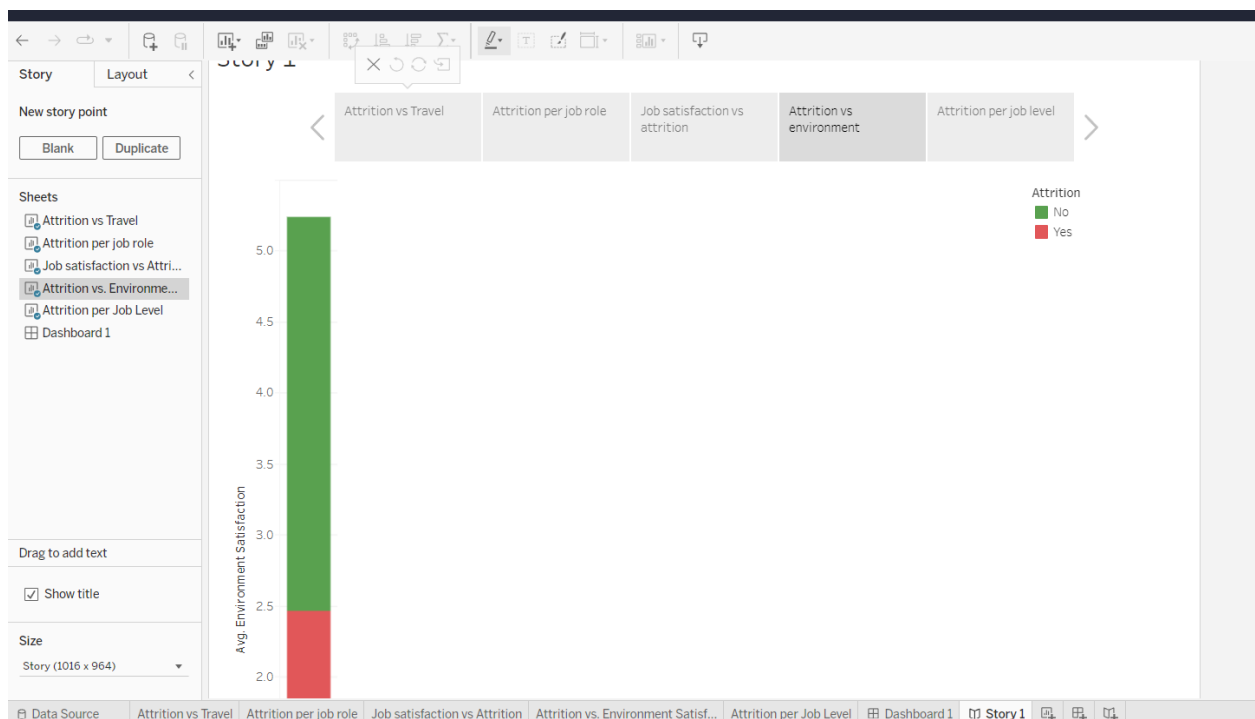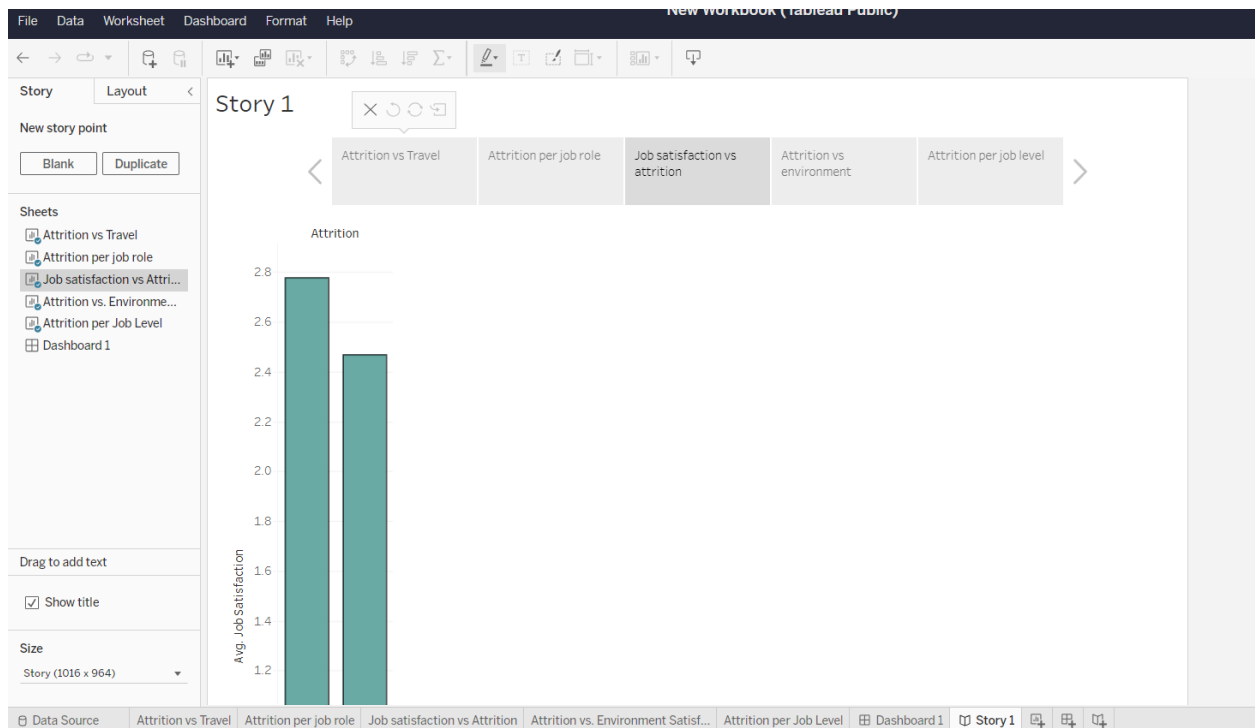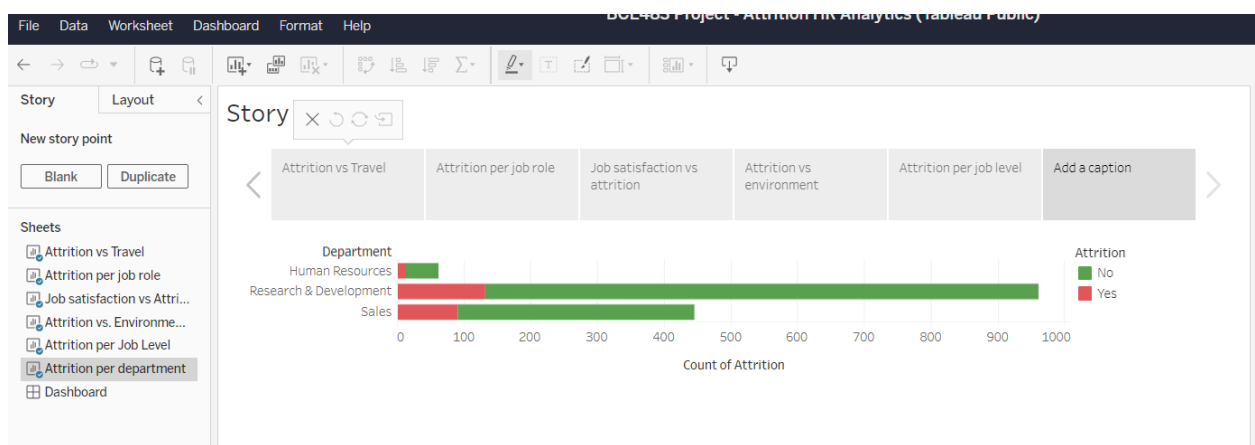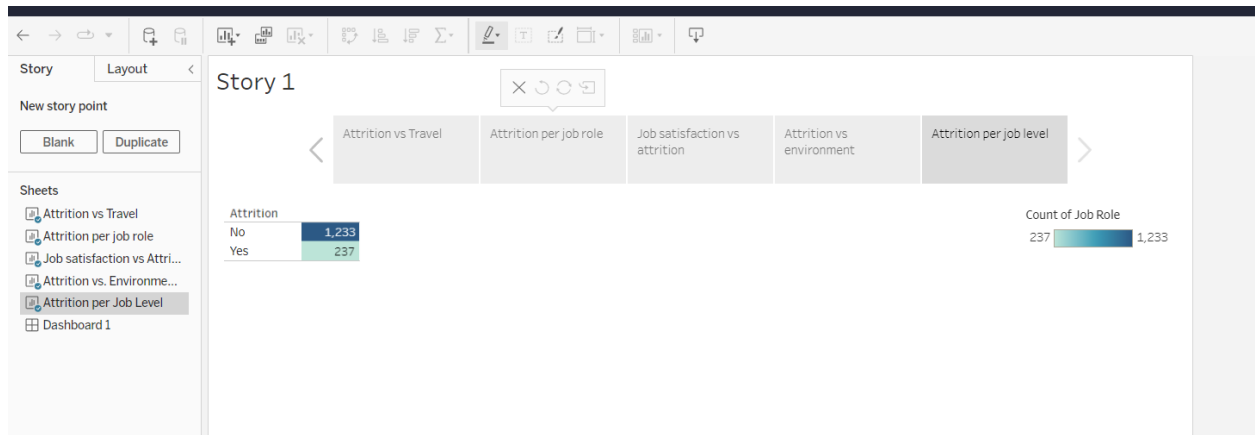**Story**

We used Tableau's guide on how to create our story. We started by gathering all the information

and graphs we made into one tableau workspace. We then named the sheets and finally created

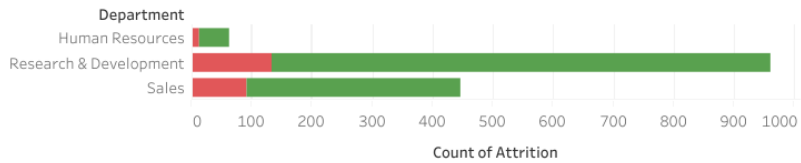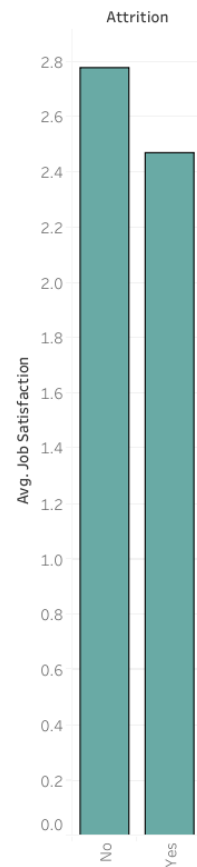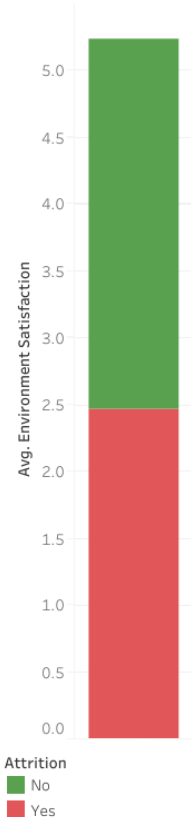the story. Below are screenshots of the story and the link to the public story. Story

File   Data   Worksheet   Dashboard   Format   Help

Story   Layout

New story point

Blank   Duplicate

Sheets
- Attrition vs Travel
- Attrition per job role
- Job satisfaction vs Attri...
- Attrition vs. Environme...
- Attrition per Job Level
- Dashboard 1

Drag to add text

☑ Show title

Size
Story (1016 x 964)

Story 1

Attrition vs Travel | Attrition per job role | Job satisfaction vs attrition | Attrition vs environment | Attrition per job level

Attrition

2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2

Avg. Job Satisfaction

Data Source | Attrition vs Travel | Attrition per job role | Job satisfaction vs Attrition | Attrition vs. Environment Satisf... | Attrition per Job Level | Dashboard 1 | Story 1

Story   Layout

New story point

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Sheets
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- Attrition vs. Environme...
- Attrition per Job Level
- Dashboard 1

Drag to add text

☑ Show title

Size
Story (1016 x 964)

Story 1

Attrition vs Travel | Attrition per job role | Job satisfaction vs attrition | Attrition vs environment | Attrition per job level

Attrition
■ No
■ Yes

5.0
4.5
4.0
3.5
3.0
2.5
2.0

Avg. Environment Satisfaction

Data Source | Attrition vs Travel | Attrition per job role | Job satisfaction vs Attrition | Attrition vs. Environment Satisf... | Attrition per Job Level | Dashboard 1 | Story 1

Dashboard

Conclusion

To conclude, we found some insightful information about the attrition rate. We found that the environment and job satisfaction play a major role in the attrition rate. The employees with an average rating of **2.4** or lower had the attrition value set to true. Also, we found that the sales department had the highest rate of attrition **26%.** Also, we found that the employees who travel frequently are more likely to have attrition, after that the employees who rarely travel, and finally the non-travel had the lowest rate.

In the project, we learned how to find insightful information with the data provided. We learned how to eliminate unnecessary attributes and make use of what we have. We also learned how to use Tableau and create dashboards and stories. We implemented what we learned in class about measures and dimensions.

References

1. https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-story.htm