

A dark blue vertical bar runs down the left side of the page. A blue arrow points to the right from the bar, containing the date.

10/25/2020

Employee Attrition

Midterm Assignment

Several thin, dark blue curved lines originate from the bottom left corner and sweep upwards and to the right.

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Describe the kinds of information that is collected (e.g., demographics, etc.), and how the data is reported (binary, continuous, categorical, etc)

The data collected here for employee attrition, which can be utilized to derive insights into causes and symptoms leading to the employee not being retained within the organization.

There are 31 variables and 1470 observations. Below is the list of all the variables recorded:

Variable	Description	Type
Age	Age of the employee	Discrete- Numeric
Attrition	Attrition Status	Categorical (Yes/No)
BusinessTravel	Frequency of Travel	Categorical (Non_travel,Travel_Frequently, Travel_Rarely)
Department	Departmentt of employee	Categorical (Human Resources, Rearch & Development, Sales)
DistanceFromHome	Distance between Home and Office	Discrete- Numeric
Education	Level of Education	Categorical (1,2,3,4,5)
EducationField	Field of Education	Categorical (Human Resources, Life sciences, Marketing, Medical, Other, Technical Degree)
EmployeeCount	Employee Count	Discrete- Numeric
EmployeeNumber	Number of Employees	Discrete- Numeric
EnvironmentSatisfaction	Satisfaction level of the enviornment at work	Categorical (1,2,3,4)
Gender	Gender	Categorical (Male, Female)
JobInvolvement	Level Involvement in the job	Categorical (1,2,3,4)
JobLevel	Level of Job	Categorical (1,2,3,4)
JobRole	Job Role	Categorical (Healthcare representative, Human resources, Laboratory Technician, Manager, Manufacturing Director, Research Director, Research Scientist, Sales Executive, Sales Representative)
JobSatisfaction	Job Satisfaction level	Categorical (1,2,3,4)
MaritalStatus	Marital Status	Categorical (Single, Married)
MonthlyIncome	Monthly Income	Discrete- Numeric
NumCompaniesWorked	Number of companies worked before	Discrete- Numeric
Over18	Above the age of 18	Categorical (Yes/No)
OverTime	Worked over time	Categorical (Yes/No)
PercentSalaryHike	Percent of Salary Increased	Discrete- Numeric
PerformanceRating	Rating of Perfomance	Categorical (1,2,3,4)
RelationshipSatisfaction	Satisfaction level of relationship	Categorical (1,2,3,4)
StockOptionLevel	Stock Option level	Categorical (0,1,2,3)
TotalWorkingYears	Total number of years worked	Discrete- Numeric
TrainingTimesLastYear	Number of trainings taken	Categorical (1,2,3,4,5,6)
WorkLifeBalance	Work Life Balance	Categorical (1,2,3,4)
YearsAtCompany	Number of years worked at the company	Discrete- Numeric
YearsInCurrentRole	Number of years in the current role	Discrete- Numeric
YearsSinceLastPromotion	Number of years since last promotion	Discrete- Numeric
YearsWithCurrManager	Number of years with current manager	Discrete- Numeric

2. Do the data support the two assertions of the head of R&D as described in the problem statement? Explain why or why not.

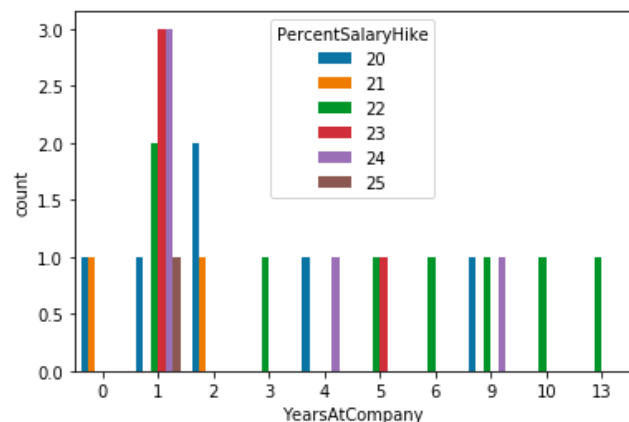
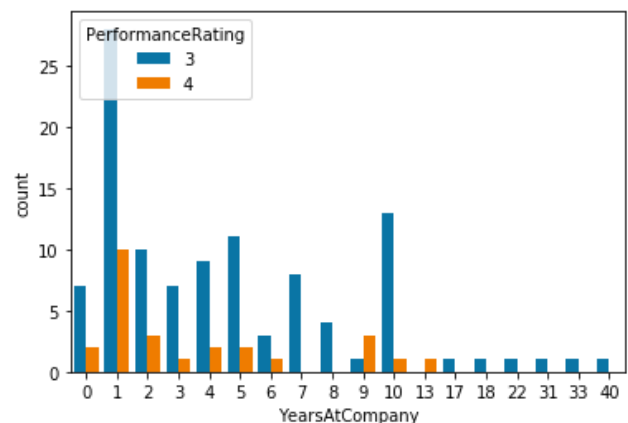
The head of R&D is concerned with losing critical talent in the upcoming organizational change initiative. She is concerned with the fact that well performing experienced talent who have been with the organization longer, have the highest risk of attrition.

To validate her hypothesis regarding the attrition trend, we will need to see if there is any correlation between the factors and the employees who have already left. We make the below assumptions:

1. Employees only from RnD Department
2. Employees who have left the company, i.e. Attrition as Yes

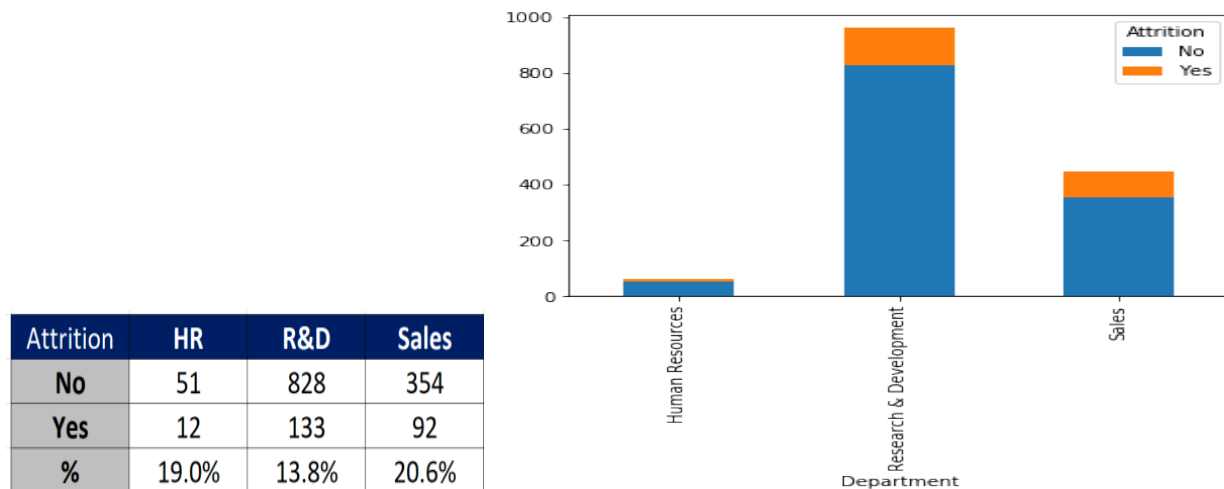
Once we filter the data based on the above-mentioned criteria

In this first figure, we see that for employees who could not be retained, most of them spent fewer number of years at the company. Also, amongst them, the higher attrition rate was for employees whose performance rating was 3, on a scale of 1 to 4. However, it should be noted that, none of the employees who quit from RnD had lower Performance Rating (1 or 2).



In this next figure, we are trying to see correlation between higher Salary Hike as a measure of performance plotted against years of employment. It can be noted that, for the highest salary hike for 1 year employment contributed to the maximum attrition.

Let's consider the assertion that RnD has disproportionately high rates of attrition. From data we see the below percentage.

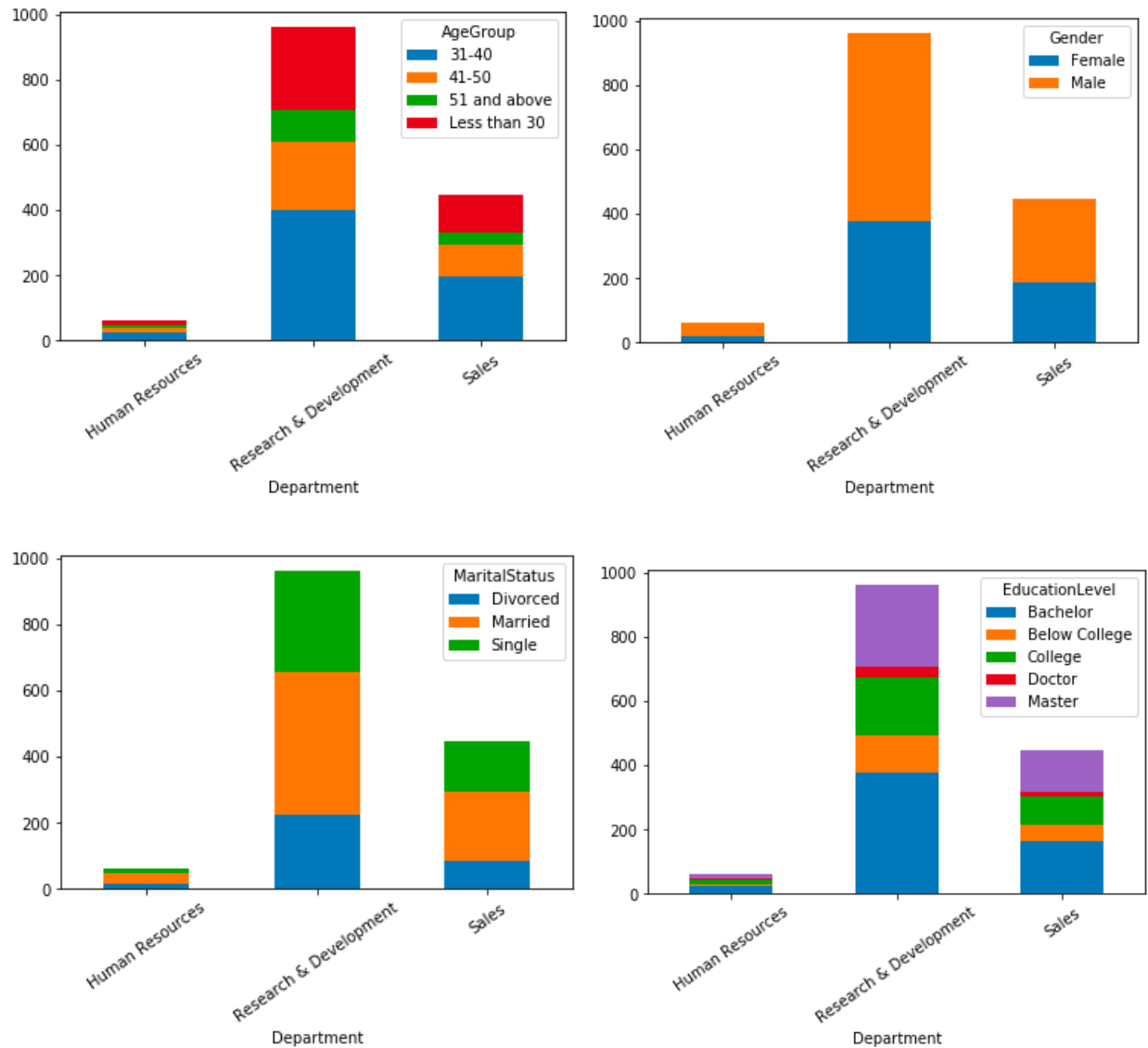


It is clear that amongst all the departments, HR, RnD and Sales, RnD has the lowest percentage of attrition. So even though the total number of employees quitting is highest for RnD, comparatively the percentage is low.

Based on the findings, we can say that the data doesn't support the assertions.

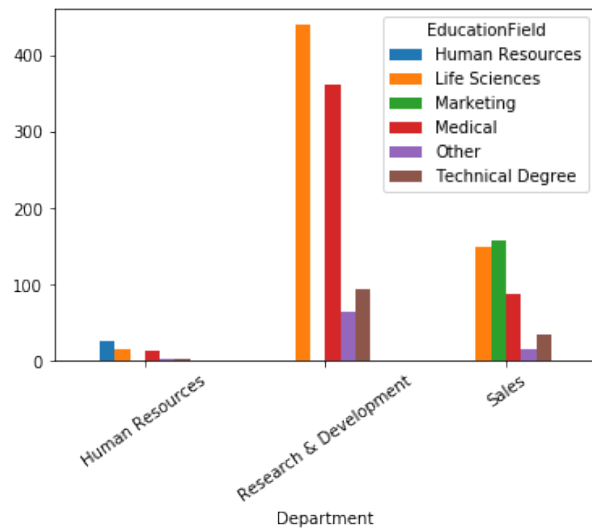
3. Summarize the key metrics for each of the three divisions (e.g., total salary, number of employees, demographics, etc). Show your analysis.

Demographics: Key metrics to be analyzed are : Age, Gender, Marital Status, Education, and Education Field



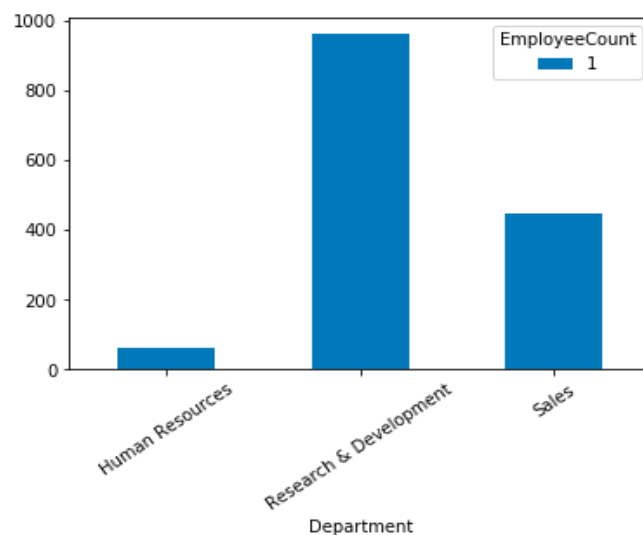
Key pointers:

- Most percentage of employees in all the three departments are in the range of 31-40 years
- There are more male employees in all three departments



- There are more married employees in all three departments
- RnD has a high percentage of employees with bachelor's degree which is closely followed by Doctorates

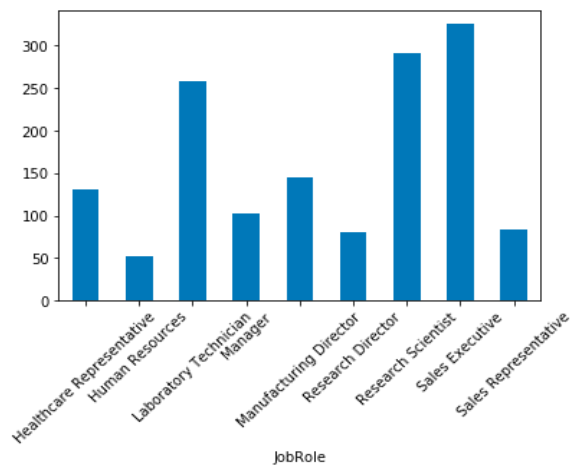
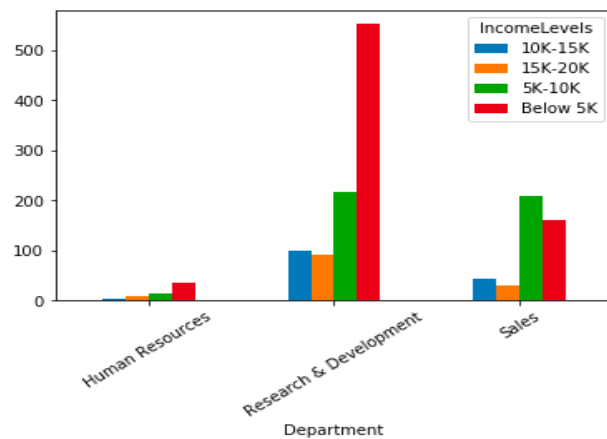
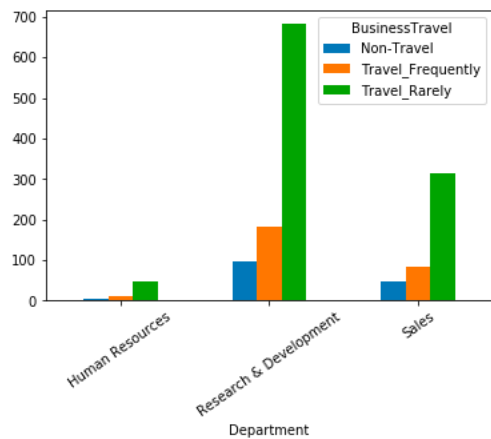
Number of Employees: RnD has the highest number of employees, with the total count almost close to 1000 (961), followed by Sales at 400. Human Resources has the lowest number of employees at 446.



Department	
Human Resources	63
Research & Development	961
Sales	446

Most of the Employees in RnD are from Life Sciences and Medical fields. As expected from Sales, most of them are from Marketing background, closely followed by LifeSciences.

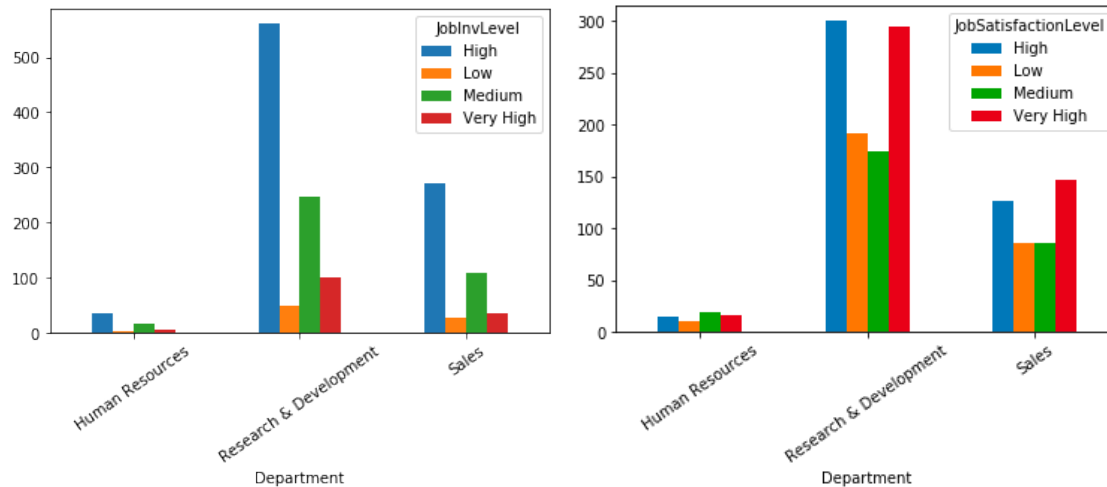
Employment related key metrics: Travel Frequency, Monthly income range, and Job role



Key Points:

- Most of the employees in all the departments don't travel much for work
- Most of the Employees in RnD are earning below 5K monthly. Infact, except for Sales department, the same trend is applicable. For Sales, the most percentage of employees are earning 5K-10K
- Maximum number of employees are working in the Role of 'Research Scientist', closely followed by 'Research Director'

Employee Sentiment related Key Metrics: Job Involvement



Key Points:

- High Job Involvement Level can be noticed for all the departments, but is significantly more in RnD
- Job satisfaction within RnD and Sales is quite high. However, HR department's job satisfaction levels are Medium-High

4. Your boss, the Chief Analytics Officer, wants to demonstrate the value of talent analytics to the executive committee. You do not have resources to support all three divisions. Which division will you support to prove the value that you can generate? Explain the rationale for your choice.

I would select Sales department to illustrate talent analytics. Firstly, as seen here, this division has the highest attrition rate. It would be worthwhile to dive in deeper to find causes for this.

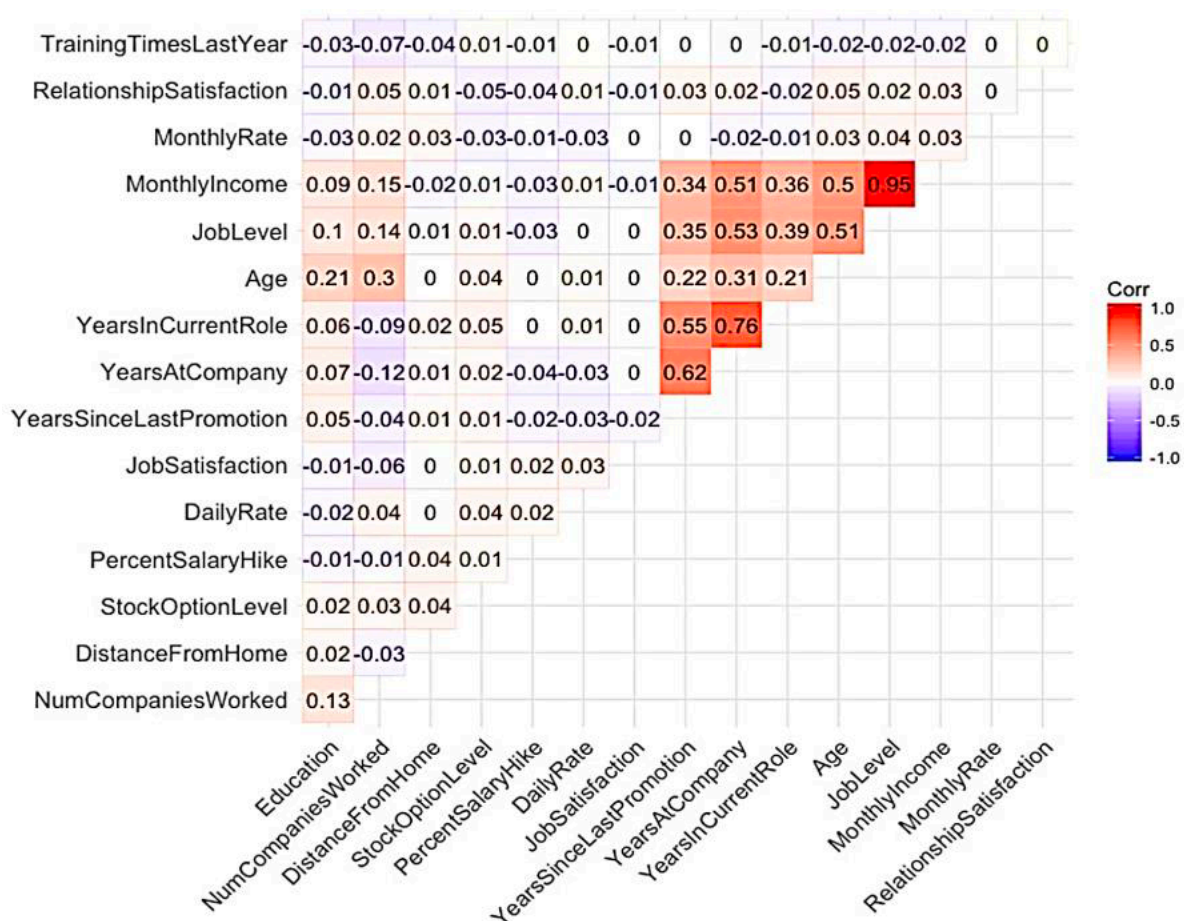
Attrition	HR	R&D	Sales
No	51	828	354
Yes	12	133	92
%	19.0%	13.8%	20.6%

HR	R&D	Sales
6655	6281	6959

Also, the highest salary is churned by Sales at \$6959. It would be beneficial to know why the attrition rate is so high despite the higher salary pulled by this division. Since Sales department with any organization is highly correlated to revenues generated by it, it would be critical for the

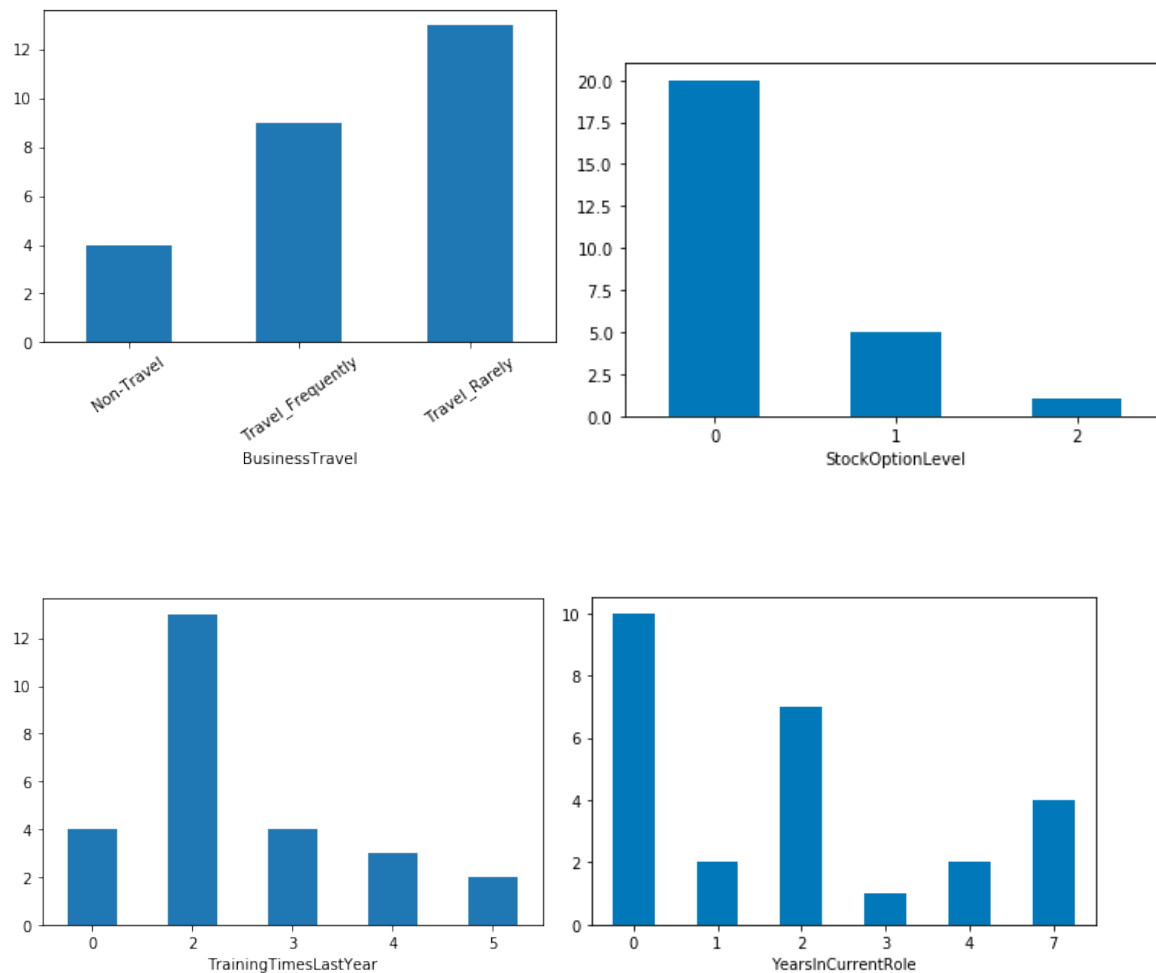
company to invest on improving the issues related to the department. Talent acquisition being a major factor alongside technology for the domain, so that the job at associate level adds to job satisfaction level overall.

5. Identify at least one subset of employees in the division that you chose to support, who are at disproportionate risk for leaving based on the data provided. You can use any tool that you wish, or the work can be conducted with pivot tables in Excel



I performed a heatmap and logistic regression while considering all the variables that are possibly significant to attrition. It was noted that 7 variables are not significantly correlated: education, department, education field, job role, marital status, percent salary hike and performance rating. Amongst the ones that are highly correlated: years in current role and years in company, years since last promotion, monthly income and job level. Removing the insignificant variables to avoid misdirected analysis, and then applying feature selection

algorithm (step-wise selection), I have concluded that the best model (best performing , low AIC) consists of the below features: age, business travel, distance from home, education field, environmental satisfaction, gender, job involvement, job role, job satisfaction, number of companies worked over time, relationship satisfaction, stock option level, years in current roe. Years at company, work life balance and total working hours. Considering these variables, I conclude that traveling rarely, low stock options, more enough training, and recent hires are most likely to quit. (Below figures are depiction of trends of people who have quit so far)



6. What results and insights did you find most unexpected and interesting?

Few of the unexpected results and insights I found are:

- RnD firms hire more people from technical backgrounds. However, salary for the Sales department was highest, which begs the question of ethical corporate salary structure
- Amongst sales division, where one would expect more travel, employees quitting are from the group who travels the most.
- Unmarried employees tend to have higher attrition than their married counterparts

7. What recommendations would you make to the head of the division that you chose to support to address the risk factors for attrition

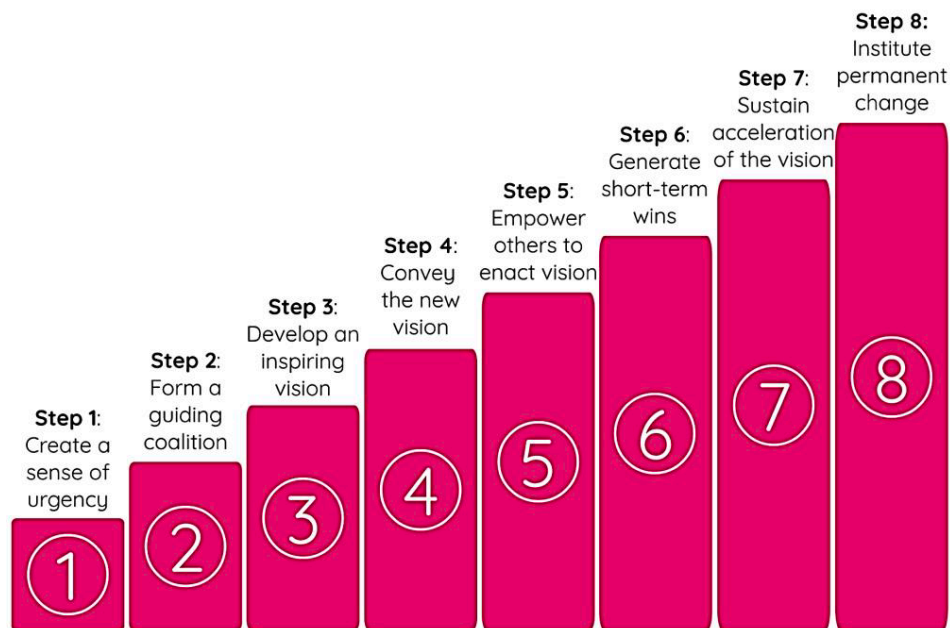
Below would be my recommendation in order of priority:

1. **Implement Analytics:** From my analysis, it can be noted that employees are more prone to quit within the first year of employment with the organization. I would recommend Sales division to motivate the employees to be with the organization beyond the first year. It would also be vital to consider if the attrition rate consists of employees whose contracts are not extended by the company beyond the trial period, which could have further indication of bad hiring. Employing analytics to dive deeper into the area could highlight issues and derive actionable insights.
2. **Training and Development:** Analysis shows that attrition rate is directly correlated to lower training levels. Implementing an in-house training program(s) would be beneficial in curbing the trend as well as add value to improving Employee Performance levels across the board.
3. **Promotion and Growth:** Many organizations have development opportunities designed at finding the next team leader from the agent population, such schemes could be extended to include many other support roles
4. **Communication:** gathering feedback from current employees on job satisfaction levels which could be a function of various factors, would be vital in formulating a retention plan

5. **Work-Life Balance:** A work-life balance should not only be the prerogative of an employee but of the organization itself. Creating a variety of lifestyle schedule options that give employee more choice, whilst still meeting business needs. These schedules are often created via focus groups, and can be a great way at finding the most suitable solutions for all
6. **Recognition and Rewards:** Recognition is one of the vital parameters for employees in their decision-making process whether to stay with an organization. Periodic recognition related activities which can be teamed with townhalls organized by top management has been proven to be successful with larger corporations

8. **For one of your recommendations, how would you design a rapid experiment to learn whether your recommendation successfully mitigates attrition? What information beyond employee survey data would you want to track? How would you collect and report the data?**

Using Kotter's 8 step model for the purpose of learning the success of recommendation. Below are the 8 steps defined in the model



1. **Create Urgency:** Develop a sense of urgency around the need for change, which can spark the initial motivation to get things moving. Instead of showing statistics of the need, an open dialogue about the current marketplace and competitors can be used as an effective tool for motivation. Identifying potential threats, developing scenarios can visualize futuristic possibilities. Opportunities that could be exploited should be explored
2. **Form Coalition:** Convince people that change is necessary. Effective change leaders can be found throughout the organization. A team of influential people whose power comes from variety of sources, including job title, status, expertise, and political importance, is crucial.
3. **Vision for Change:** Clarity on the vision is vital in creating and maintaining momentum for the change. When people see for themselves what we are trying to achieve, then the directives given to them make more sense. Define the values cognizant to the change proposed. Create a strategy to execute the vision in detail as well as in summary for varying audiences
4. **Convey the Vision:** Communicating the vision throughout the organization is paramount. Leaders should take every opportunity to discuss it so that it stays fresh on everyone's mind. Furthermore, the constant dialogue can bring about issues not thought about earlier, which can be addressed, including concerns and anxieties.
5. **Empower others to enact the vision:** As the vision is communicated across all the channels, leaders should be aware of resistance or obstacles for the change. By knowing about them, people involved could be empowered and inspired and can be brought in to the vision
6. **Generate Short-Term wins:** Nothing is more motivational at the individual level than success. By deconstructing the project into smaller building blocks, short-term goals, a clear trajectory of progress can be crafted. Once these goals are achieved, individuals will be inspired to continue and reach the next milestone.
7. **Sustain Acceleration of the Vision:** As per Kotter, organizations fails to sustain real change as they declare victory over their change initiates prematurely. Real change runs deep. Quick wins are only the beginning of what needs to be done to achieve long-term change. Each success should provide an opportunity to build on what went right and to identify what can be improved upon.

8. **Institute Permanent Change:** Finally, for any change to be permanent, it has to become part of the core of the organization. Corporate culture often determines what gets done. Ensuring that the change is seen in every aspect of the organization will help change a permanence. Leaders should continue to support the change, including existing staff as well as new leaders. The progress of the initiative must be monitored closely and regularly in order to consolidate it at a deeper level. This should include discussions with individuals from across the organization, as their inspiration and cooperation with the new change is crucial, and it is easy for this to drop off over time.

My recommendation would be a Rewards and Recognition to be implemented on quarterly basis, to decrease the attrition rate:

- a. Create a template to be followed for recognition. E.g. every division needs to get all teams involved to suggest and vote on deserved recognition. A certain percentage of employees would be rewarded based on their contribution, etc
- b. Every quarter structure townhall including senior management to discuss key points related to marketplace and competition. Reward ceremony to be concluded at the last leg of the townhall
- c. Track the number of employees recommended. Also, repeated recommendation should be categorized and rewarded accordingly
- d. Track performance pre and post recognition and/or rewards. Analyze the data showcasing job satisfaction levels based on the category of rewards
- e. Analyze the different attrition rates based on difference in rewards, recognition, frequency of recommendations for employees

This analysis should provide us sufficient and quantifiable insights on whether the program was successful or not. If not, then it could direct us to the root cause of failure. If it is a success in curbing the attrition rates, it should be implemented throughout the organization.