HR Attrition Analysis

## **PART A- Analysis Report using Tableau**

### Attrition Analysis:

1. **What is the overall attrition rate in the company?**

* Overall Attrition Rate of Company is 16.12% in last year.

1. **Is there a significant difference in attrition rates between different age bands or departments?**

* For employees of age Under 25, attrition rate is highest for all the departments. This attrition rate is highest i.e 66.67% for HR among all other departments. Reason can be as these employees are still at the phase to decide what is best for their career and in HR because most of the good growth opportunities are for students who have done their MBA from A grade colleges. Also, other factors like work stress and poor work life balance and the fact that they are still getting used to the working environment can contribute to attrition of this group for every department. But as age increase work life balance is improved especially in HR field because out of three departments HR has highest work life balance along with fair job level. If we talk about R&D then overall attrition is lowest in this department as this job comes with great Salary and other benefits although average work life balance and job level is lowest in this department. But we can see for employees in their 50’s attrition is highest as this job comes with great stress which is kind of hard to balance in late 50’s. Now let’s talk about Sales, we can see that for sales attrition rate is not continuously decreasing with age. There is increase and decrease in age as in sales field employee tries to change their company every few years in order to get hikes in salary and growth opportunities hence attrition in sales is highest.

1. **Are employees who travel frequently more likely to leave the company compared to those who travel rarely?**

* According to the visual it is clear that employees who travel frequently for business are more likely to leave the company as travelling frequently can lead to hectic schedule and poor work life balance.

1. **Does the presence of overtime have any correlation with attrition?**

* Out of 1470 employees of company, employees who does work time are 416 and out of 416, 127 left the company where as only 110 out of 1,054 employees who doesn’t do any overtime left the company. Therefore, we can say that attrition and overtime are positively correlated.

### Employee Demographic:

1. **What is the gender distribution among employees?**

* There are 882 male and 588 female employees in a company of 1470 employees.

1. **How does the marital status of employees impact their job satisfaction or attrition?**

* If we talk about the attrition rate for different marital status then we can say that single employees have highest attrition rate of 25.53% and divorced employees have lowest attrition rate of 10.09%. Reason can be single people are most likely to change companies as they are still exploring their options before they eventually find out the one which perfectly suits them as they don’t have much responsibilities over their shoulder whereas married and divorced will tend to be more risk averse as to leaving their job because of their family and children’s responsibilities. Although in all three categories attrition rate decrease with increase in Job satisfaction.

1. **Are there any differences in attrition rates based on education fields or levels?**

* There is some correlation found in attrition rate and education level. Employees with lower education have higher attrition. Reason can be there are limited opportunities of career growth.

### Job Role Analysis:

1. **Which job roles have the highest and lowest attrition rates?**

* Amongst all the job roles, Sales representatives has highest attrition rate of 39.76% and research director has lowest attrition rate. Reason cane be Sales representative is the lowest position in Sales field where employee tries to explore their options and change their companies in order to get more salary hikes, better incentives and career growth hence highest attrition rate whereas research director is the highest position in Research department which has more job security, good salary packages and other benefits hence attrition rate is lowest.

1. **Do certain job roles require more training compared to others, and does that affect attrition?**

* Amongst all the job roles, sales executive requires more training as this role has to get trained for every new product getting launched in the market and HR requires less training because HR’s role is mostly fixed. There is no significant impact of training times on attrition rate for any job role.

1. **Are there any patterns in overtime between different job roles?**

* We can see that employees working in sales do more overtime as compared to employees working in other departments. As in sales employee needs to reach their targets in order to get better incentives and in order to avoid getting canned and that’s why they tend to do more overtime.

### Employee Performance and Satisfaction:

1. **Is there a relationship between performance ratings and attrition rates?**

* There is not that much of a difference in attrition rate with performance. But employees with average performance have slightly lower attrition rate then good performers. Reason can be that sometimes good performers works harder that they fail to manage work life balance.

1. **How does employee satisfaction (environment satisfaction, job satisfaction, relationship satisfaction) impact attrition?**

* Employee satisfaction and attrition are closely related. Employee who are satisfied with the company tend to leave less.

1. **Does the number of training times in the last year affect performance ratings or job satisfaction?**

* We can see that more trainings are provided last year to the employees whose performance are average. Also, for both good performers and average performers, with increase in training time job satisfaction increases. Reason can be as with training employee starts performing well which can lead to less work stress and hence more job satisfaction.

### Work-Life Balance and Employee Tenure:

1. **Does work-life balance impact the number of years an employee stays with the company?**

* Work life balance and tenure in company is closely related. We can see that average work life balance is increasing with increase in tenure with few exceptions. Employees who feel they have a good work-life balance are more likely to be satisfied with their jobs and remain loyal to their employers. When employees can successfully manage their professional and personal responsibilities, they are less likely to experience feelings of resentment or frustration towards their work.

1. **Is there any correlation between the total working years and attrition rates?**

* Total working years and attrition rate is negatively correlated as we can see that with increase in total working years, attrition rate is decreasing. As employee get experience, they get promotions and better opportunities in a company.

### Compensation and Attrition:

1. **Is there a difference in attrition rates based on the distance from home or daily rate of employees?**

* As per the visual we can conclude that attrition rate increase if the distance of work from home is larger no matter how much is the daily rate of employee as commuting takes more time and lead to physical exhaustion, therefore poor work life balance.

1. **How does monthly income or salary hikes influence attrition?**

* Examining the chart uncovered a nuanced link between Percent Salary Hike, Average Monthly Income, and Attrition Count. Overall, there seems to be a correlation indicating that higher salary hikes are associated with lower attrition, supporting the significance of competitive compensation. Yet, anomalies at 13% and 22% salary hikes raise questions, prompting a closer look into unique circumstances. The Average Monthly Income shows fluctuations across various percent salary hike levels. Notably, a significant drop at a 20% hike, coupled with a lower attrition count, suggests that factors beyond salary may influence its effects on attrition.

### Promotion and Career Development:

1. **Are employees who stay longer with the company more likely to get promotions?**

* Yes, from visual we can conclude that with increase in tenure, there is significant increase in promotion rate. But we can find anomaly for the employees who stay in a company longer than 30 years. We can see that there is a drop in a promotion rate for these employees. Reason can be that for these employees they may reach the position where promotion is not available.

1. **Does the number of years in the current role affect attrition rates?**

* Yes, attrition rate decreases with increase in number of years in a current role. As more years in current role speaks stability of an employee. Hence these types of employees are far likely to leave the company unless they get good career opportunities.

### Departmental Analysis:

1. **Is there a particular department with consistently high or low attrition rates?**

* Sales has consistently high attrition rate and Research has consistently low attrition rate. Reason is that in sales, there are many factors like overtime, less salary, stress etc which leads to higher attrition rate.

1. **Are there any trends in the relationship between employee education level and department?**

* If I talk about HR department, then attrition rate is less for employees with bachelor’s degree as these employees are better suited for the role of HR. On the other hand, for Sales and Research, employees with doctoral degree have less attrition rate.

### Work Environment and Job Satisfaction:

1. **How does the work environment satisfaction impact job satisfaction and, in turn, attrition?**

* It is clear from a chart that when employee is satisfied with both environment and job then the attrition rate is lowest i.e 8.45. Also, we can see that when environment satisfaction rating is 4 and job satisfaction rating is 1 then attrition rate is 18.39% and when job is 4 and environment is 1 then attrition is 16.67%. Hence, we can say that even if employee is not satisfied with environment but satisfied with job then attrition rate is still lower.

1. **Is there any relationship between job involvement and attrition?**

* We can see from the line graph that if employee is more involve in job then attrition rate is less which is obvious as more involvement means good performance, better salary hikes and other opportunities.

### Performance vs. Education:

1. **Do employees with higher levels of education perform better or have higher job satisfaction?**

* If we talk about the average performance of employees based on their education level than employees with higher levels of education perform better as they have more knowledge and they work harder in order to get better promotion and salary hikes coz they can get a promotion which requires only higher level of education. On the other hand, Employees with higher education tends to have lower job satisfaction level. Reason can be that they expect from their job.

1. **How does the education level affect the number of companies an employee has worked for?**

* Employees with Master’s degree has worked in more company on average whereas, employees who has high school certificates worked in a smaller number of companies. So, we can say the more the education, more the number of companies employee has worked in. Reason might be as masters can be preferred more by companies hence opportunities are more for masters. But there is an anomaly as employees who has doctoral degree worked in lesser companies than employees with master’s degree. Reason can be that employees with doctoral degree can be seen as over qualified for the job hence it can be difficult for employees with doctorate to get a job.

## **Recommendations**

1. To enhance employee retention and satisfaction, it’s essential to address income disparities and tailor compensation structures to bridge gaps. Additionally, conduct regular surveys and feedback sessions to better understand and address varying job satisfaction levels among employees, ensuring that their concerns are actively acknowledged and resolved.
2. To reduce the high attrition rate of 16.12%, initiate a comprehensive investigation into the root causes of attrition. This should be followed by the development and implementation of proactive HR policies that take into account the diversity of employee demographics, emphasizing inclusivity and equal opportunities for career growth and development.
3. Acknowledge that employee satisfaction alone may not prevent attrition due to the multifaceted nature of attrition factors, including demographics, education, and historical characteristics, distance of work from home. Therefore, create a holistic approach to address these factors, ensuring that HR strategies consider the unique needs and circumstances of individual employees.
4. Recognize the correlation between total working years and career-related factors as an opportunity to tailor career development and mentorship programs. By doing so, it can enhance employee engagement and satisfaction, ultimately reducing attrition within the organization

## **PART B SQL- Analysis**

create Database PlacementProject;

use PlacementProject;

select count(\*) from Hr\_data;

create procedure selectData

as

begin

select \* from Hr\_data

end;

drop procedure selectData;

select count(\*) from Hr\_data;

-- checking datatype of columns in table

select column\_name,data\_type from

information\_schema.columns

where table\_name='Hr\_data';

-- we can see that following columns are in string despite being numerical column hence let's convert them to int so that we can perform arithmetic operation on them.

-- training\_times\_last\_year

-- Distance\_from\_Home

-- Employee\_count

-- Environment\_satisfaction

-- Job\_Involvement

-- Job\_Level

-- Job\_Satisfaction

-- Num\_Companies\_Worked

-- Relationship\_Satisfaction

-- Stock\_Option\_Level

-- Total\_Working\_Years

-- Work\_Life\_Balance

-- Years\_At\_Company

-- Years\_In\_Current\_Role

-- Years\_Since\_Last\_Promotion

-- Years\_With\_Curr\_Manager

--

alter table Hr\_data alter column training\_times\_last\_year int;

alter table Hr\_data alter column Distance\_from\_Home int;

alter table Hr\_data alter column Employee\_count int;

alter table Hr\_data alter column Environment\_satisfaction int;

alter table Hr\_data alter column Job\_Involvement int;

alter table Hr\_data alter column Job\_Level int;

alter table Hr\_data alter column Num\_Companies\_Worked int;

alter table Hr\_data alter column Job\_Satisfaction int;

alter table Hr\_data alter column Relationship\_Satisfaction int;

alter table Hr\_data alter column Stock\_Option\_Level int;

alter table Hr\_data alter column Total\_Working\_Years int;

alter table Hr\_data alter column Years\_At\_Company int;

alter table Hr\_data alter column Work\_Life\_Balance int;

alter table Hr\_data alter column Years\_At\_Company int;

alter table Hr\_data alter column Years\_In\_Current\_Role int;

alter table Hr\_data alter column Years\_Since\_Last\_Promotion int;

alter table Hr\_data alter column Years\_With\_Curr\_Manager int;

-- deleting duplicates from table if any.

delete from Hr\_data where id

in

(

select Employee\_Number from

(select Employee\_Number , row\_number() over (partition by employee\_number Order by Employee\_number) as r

from Hr\_data)a

where r>1);

-- 1.Compare an employee's performance rating with the average rating of their peers in the same department

exec selectData;

SELECT

e.emp\_no AS Employee\_Number,

e.performance\_rating AS Employee\_Performance\_Rating,

d.Department,

d.avg\_performance\_rating AS Average\_Department\_Performance\_Rating,

CASE

WHEN e.performance\_rating > d.avg\_performance\_rating THEN 'Above Average'

WHEN e.performance\_rating = d.avg\_performance\_rating THEN 'Average'

ELSE 'Below Average'

END AS Rating\_Comparison

FROM

Hr\_data e

JOIN

(SELECT

Department,

AVG(performance\_rating) AS avg\_performance\_rating

FROM

Hr\_data

GROUP BY

Department) d ON e.Department = d.Department;

-- 2.Analyze the trend of employee attrition over time

SELECT

CF\_age\_band,

COUNT(\*) AS Total\_Employees,

SUM(CASE WHEN Attrition = 'YES' THEN 1 ELSE 0 END) AS Attrited\_Employees,

SUM(CASE WHEN Attrition = 'YES' THEN 1 ELSE 0 END)\*1.0/count(\*) \* 100 as Attrition\_rate

FROM

Hr\_data

GROUP BY

CF\_age\_band

ORDER BY

CF\_age\_band;

-- From above query, we can see that attrition rate is highest amongst people in age under 25. Same result we got from our Tableau viz.

-- 3.Predict the likelihood of an employee leaving based on their age, job role, and performance rating

SELECT

age,

job\_role,

performance\_rating,

AVG(CASE WHEN attrition = 'Yes' THEN 1 ELSE 0 END) AS attrition\_probability

FROM

Hr\_data

GROUP BY

age, job\_role, performance\_rating;

-- 4.Compare the attrition rate between different departments

WITH CTE AS (

SELECT

Department,

COUNT(\*) AS Total\_Employees,

SUM(CASE WHEN Attrition = 'YES' THEN 1 ELSE 0 END) AS Attrited\_Employees

FROM

Hr\_data

GROUP BY

Department)

SELECT

Department,

Total\_employees,

Attrited\_Employees,

ROUND((Attrited\_Employees\*1.0/Total\_Employees)\*100,2) as Attrition\_Rate\_Percentage

FROM

CTE

ORDER BY

Attrition\_Rate\_Percentage DESC;

-- from above we can see that highest attrition rate is found in sales department and least is in R&D. Same result we got from our tableau viz

-- 5. Create Notification Alerts: Set up notification alerts in the database system to trigger when specific conditions are met

-- (e.g., sudden increase in attrition rate, take a threshold of >=10%)

DROP TRIGGER CheckAttritionRate;

CREATE TRIGGER CheckAttritionRate

ON Hr\_Data

FOR UPDATE

AS

BEGIN

DECLARE @previous\_attrition\_rate DECIMAL(10,2)

DECLARE @current\_attrition\_rate DECIMAL(10,2)

-- Retrieve previous and current attrition rates from database

SET @previous\_attrition\_rate = (SELECT SUM(CASE WHEN Attrition='YES' THEN 1 ELSE 0 END)\*1.0/COUNT(\*)\*100 AS Attrition\_rate FROM Hr\_Data)-

(SELECT SUM(CASE WHEN Attrition='YES' THEN 1 ELSE 0 END)\*1.0/COUNT(\*)\*100 AS Attrition\_rate FROM DELETED)

SET @current\_attrition\_rate = (SELECT SUM(CASE WHEN Attrition='YES' THEN 1 ELSE 0 END)\*1.0/COUNT(\*)\*100 AS Attrition\_rate FROM Hr\_Data)+

(SELECT SUM(CASE WHEN Attrition='YES' THEN 1 ELSE 0 END)\*1.0/COUNT(\*)\*100 AS Attrition\_rate FROM INSERTED)

-- Calculate increase in attrition rate

DECLARE @attrition\_rate\_increase DECIMAL(10,2)

SET @attrition\_rate\_increase = (@current\_attrition\_rate - @previous\_attrition\_rate) / @previous\_attrition\_rate \* 100

-- Check if increase exceeds threshold

IF @attrition\_rate\_increase >= 10

BEGIN

-- Send notification (e.g., print message)

PRINT 'Alert: Sudden increase in attrition rate detected!'

END

END

-- Checking if trigger works or not.

Update hr\_data set attrition='yes'

Where Attrition='no' and Employee\_Number<50;

exec selectData;

-- 6.Pivot data to compare the average hourly rate across different education fields.

SELECT DISTINCT(Education\_Field) from Hr\_data;

SELECT Attrition, [Life Sciences],[Technical Degree],[Marketing],[Medical],[Human Resources],[Other]

FROM

(SELECT Attrition,Education\_Field,[Hourly\_Rate] FROM Hr\_data) AS I

PIVOT

(AVG(Hourly\_Rate)

FOR Education\_Field

IN

([Life Sciences],[Technical Degree],[Marketing],[Medical],[Human Resources],[Other]) ) AS PT;