

# **HR Analysis- Insights and Observations**

## **Introduction:**

This report will provide insights and observations for two aspects - 'Factors influencing employees attrition' and 'Effectiveness of training programs'. This analysis is based on different metrics like age, department, position, experience, salary, working hours, promotion, performance ratings etc.

## **Objectives:**

The objectives of the project are

- I. Analysing the factors influencing the employees attrition.
- II. Analyse the effectiveness of training programs and recommend improvements to enhance employee skills and performance.

## **Data Preparation:**

The initial data set was containing several discrepancies. A new table is created from the existing table and the data cleaning involved:

- a. In the gender column it was containing 'Male' and 'M', 'Female' and 'F'. The 'Male' was replaced by 'M' and 'Female' is replaced by 'F'.
- b. In position column, 'DataScientist' is replaced by 'Data Scientist' and 'Marketinganalyst' was replaced by 'Marketing Analyst'.
- c. The new table which is derived from the existing table in which two columns were included- Age group and Salary bucket.
  - The age group consists of two categories
    - i. <= 30 years
    - ii. > 30 years
  - The salary bucket column consists of following categories
    - i. 50k-60k
    - ii. 60k-70k
    - iii. 80k-90k
    - iv. 90k-100k

## **Analysis and Insights**



### **Objective 1- Analysing the factors influencing the employees attrition.**

#### **i. Overall Calculations**

The above picture give the details like average age, average years of experience, average

Total_employees	AvgAge	AvgYearsOfService	AvgSalary	AvgSatisfactionScore	AvgPerformanceRating	AvgWorkHours	AvgTrainingHours
160	31	5	67719	4	4	41	20

salary, average satisfaction score, average performance rating, average working hours, average training hours.

Result Grid  Filter Rows: <input type="text" value="Search"/> Export: 										
Attrition	Total_employees	Attrition_Count	Attrition_Count	Total_Active_employe...	AvgAge	AvgYearsOfService	AvgSalary	AvgSatisfactionScore	AvgWorkHours	AvgTrainingHours
Yes	54	54	100.00	0	31	6	70907	4	43	19
No	106	0	0.00	106	30	5	66094	4	40	21
Result 186										

- The above picture depicts the total attrition analysis. The total employees are 160 in which the attrition count is 54, average age is 31 and the average salary is greater than the average salary of the employees who are still working with the company.
- The average working hours of the employees who left the company is greater than the employees who are still working with the company, this might be the reason for attrition.
- Similarly the no of training hours for the employees who left the company is less than the employees who are still working with the company, this might also be the reason for attrition.

Agegroup	Department	Total_employees	AvgYearsOfService	AvgSalary	AvgSatisfactionScore	AvgWorkHours	AvgTrainingHours
> 30 years	IT	27	7	67963	4	42	19
<= 30 years	IT	24	5	65000	4	42	18
<= 30 years	Finance	18	4	81667	4	41	23
> 30 years	Finance	10	8	84000	4	42	20
> 30 years	HR	9	7	58333	4	40	22
<= 30 years	HR	15	5	61000	4	42	21
<= 30 years	Marketing	19	4	55684	3	40	21
> 30 years	Marketing	14	7	62286	4	40	23
> 30 years	Sales	13	7	79615	3	41	18
<= 30 years	Sales	11	4	65909	3	41	21

## ii. Age group

- The above picture gives the details about total no of employees based on the age group and department wise distribution. Using these details further analysis is performed to get the insights and observations.

Agegroup	Department	Total_employees	Attritioncount_Yes	Attritioncount_No	Attrition_CountYes	Attrition_Count...
<= 30 years	Finance	18	9	9	50.00	50.00
> 30 years	Finance	10	6	4	60.00	40.00
<= 30 years	HR	15	4	11	26.67	73.33
> 30 years	HR	9	2	7	22.22	77.78
<= 30 years	IT	24	6	18	25.00	75.00
> 30 years	IT	27	12	15	44.44	55.56
<= 30 years	Marketing	19	6	13	31.58	68.42
> 30 years	Marketing	14	4	10	28.57	71.43
<= 30 years	Sales	11	0	11	0.00	100.00
> 30 years	Sales	13	5	8	38.46	61.54

- Attrition analysis based on age group and gender
- It is observed that in the finance department with the employees average age > 30 years has maximum attrition rate (60%) which is alarming, next followed by the age of <= 30 years whose attrition rate(50 %) is also alarming.

- In IT department the employees whose age is > 30 years has attrition rate (44.4%) which is also high.
- In sales department the employees whose age is > 30 years has attrition rate (38.46%).
- In HR and Marketing departments the employees whose age is > 30 years has attrition rate little less than the age group <= 30 years in the respective departments.

***Overall it is observed that employees whose age is > 30 years has more attrition rate which is alarming as the companies need more experienced people.***

- Attrition analysis based on age group, salary, promotion and working hours. The salary less than

Agegroup	Attrition	Department	Position	TrainingHours	Promotion	YearsOfService	WorkHours
> 30 years	Yes	IT	Data Scientist	10	No	5	44
<= 30 years	Yes	IT	Data Scientist	10	No	5	44
> 30 years	Yes	IT	Data Scientist	10	No	4	45
> 30 years	Yes	IT	Data Scientist	20	No	8	45
<= 30 years	Yes	IT	Data Scientist	10	No	5	45
> 30 years	Yes	HR	HR Coordinator	20	No	4	45
<= 30 years	Yes	HR	HR Coordinator	15	No	2	44
<= 30 years	Yes	HR	HR Coordinator	20	No	2	44
<= 30 years	Yes	HR	HR Coordinator	10	No	6	44
> 30 years	Yes	HR	HR Coordinator	20	No	6	44
<= 30 years	Yes	HR	HR Manager	15	No	4	45
<= 30 years	Yes	Marketing	Marketing Analyst	25	No	3	42
<= 30 years	Yes	Marketing	Marketing Analyst	25	No	4	42
<= 30 years	Yes	Marketing	Marketing Manager	15	No	4	39
> 30 years	Yes	Sales	Sales Associate	30	No	7	40
> 30 years	Yes	IT	Software Engineer	25	No	8	42
> 30 years	Yes	IT	Software Engineer	10	No	9	45
<= 30 years	Yes	IT	Software Engineer	10	No	5	42

the average salary is considered.

- It is observed that the 10 employees whose age is <= 30 years and 8 employees whose age is > 30 years have left the company.
- It is observed that the maximum no of employees in the 10 employees whose age is <= 30 years have not got promoted ,their working hours is more than the average , their salary is also less than the average and they got less no of training hours.
- In the employees whose age is > 30 years bucket, their average working hours is more than the average , their salary is also less than the average and they have not got the promotion.

***Overall because no of working hours is more, their salary is less than the average salary and the training hours is also less might be the reason for attrition, in which the more no of employees in the age group <= 30 years have maximum attrition which is a concern as the company need young minds for their overall development.***

### iii. Department wise attrition

*It is observed that Finance department has maximum attrition rate (53.57%) followed by IT*

Department	Total_employees	Attritioncount_Yes	Attritioncount_No	Attrition_CountYes	Attrition_Count...
Finance	28	15	13	53.57	46.43
HR	24	6	18	25.00	75.00
IT	51	18	33	35.29	64.71
Marketing	33	10	23	30.30	69.70
Sales	24	5	19	20.83	79.17

*department which is concerning.*

Position	Total_employees	Attritioncount_Yes	Attritioncount_No	Attrition_CountYes	Attrition_CountNo
Data Scientist	29	9	20	31.03	68.97
Financial Analyst	21	9	12	42.86	57.14
Financial Manager	7	6	1	85.71	14.29
HR Coordinator	12	5	7	41.67	58.33
HR Manager	12	1	11	8.33	91.67
Marketing Analyst	22	4	18	18.18	81.82
Marketing Manager	11	6	5	54.55	45.45
Sales Associate	8	1	7	12.50	87.50
Sales Manager	16	4	12	25.00	75.00
Software Engineer	22	9	13	40.91	59.09

#### iv. Position wise attrition

- In this analysis, financial manager has maximum attrition rate (85.7%) , followed by marketing manager (54.55%). HR manager has least attrition rate (8.3%).

#### v. Performance Rating

In this analysis, the employees are filtered out based on performance rating less than the average performance rating

EmployeeID	Department	Position	Attrition
61	HR	HR Coordinator	Yes
63	HR	HR Coordinator	Yes
65	HR	HR Coordinator	Yes
67	HR	HR Coordinator	Yes
68	HR	HR Coordinator	Yes
86	Marketing	Marketing Analyst	Yes
101	Marketing	Marketing Analyst	Yes
104	Marketing	Marketing Manager	Yes
105	Marketing	Marketing Manager	Yes

*Performance rating might not be the significant reason for attrition as no of employees are 9 out of 54 whose rating is less than the average.*

Salarybucket	Total_employees	Attritioncount_Yes	Attritioncount_No	Attrition_CountYes	Attrition_CountNo
60k-70k	40	13	27	32.50	67.50
70k-80k	34	13	21	38.24	61.76
80k-90k	37	13	24	35.14	64.86
90k-100k	7	6	1	85.71	14.29
50k-60k	42	9	33	21.43	78.57

## vi. Salary bucket

- It is observed that the salary bucket of 90k-100k has maximum attrition rate(85.71)% followed by salary bucket 80k-90k(38.24%).
- I have checked the reason for attrition for salary bucket 90k-100k. It is observed that 5 employees out of 7 have not got promotion (all the employees belong to finance department. This might be the reason for attrition.

Salary	EmployeeID	Department	Position	promotion	Attrition
90000	51	Finance	Financial Manager	No	No
90000	52	Finance	Financial Manager	No	Yes
90000	53	Finance	Financial Manager	No	Yes
90000	54	Finance	Financial Manager	No	Yes
90000	55	Finance	Financial Manager	Yes	Yes
90000	56	Finance	Financial Manager	No	Yes
90000	57	Finance	Financial Manager	No	Yes

## vii. Employees salary X Average Salary

In this analysis, I have checked the employees whose salary is less than the average salary of total employees(Rs. 67719).

EmployeeID	Salary	YearsOfService	Attrition
5	60000	5	Yes
6	60000	5	Yes
7	60000	7	Yes
15	60000	4	Yes
19	55000	3	Yes
23	60000	8	Yes
24	60000	5	Yes
61	55000	4	Yes
63	55000	2	Yes
65	55000	2	Yes
67	55000	6	Yes
68	55000	6	Yes
81	65000	4	Yes
86	52000	3	Yes
101	52000	3	Yes
103	60000	4	Yes
105	60000	4	Yes
119	50000	7	Yes
151	65000	8	Yes
153	60000	9	Yes
158	65000	5	Yes
160	65000	7	Yes

*It salary is could be*

*is observed that 22 employees less than the average salary which possible reason for attrition as*

*most of the people have experience more than the average years of experience.*

Department	Avg(Salary)	COUNT(DISTINCT EmployeeID)
HR	56666.6667	6
IT	60909.0909	11
Marketing	56000.0000	4
Sales	50000.0000	1

- From the total 22 employees maximum (11) are from IT department and HR department(6).

### viii. Analysis based on working hours

- In this analysis I have filtered out the employees whose working hours is more than the average

EmployeeID	Department	Salary	WorkHours	YearsOfService	Promotion	Attrition
28	IT	75000	43	7	No	Yes
33	Finance	80000	43	3	No	Yes
36	Finance	80000	42	8	No	Yes
37	Finance	80000	44	3	No	Yes
45	Finance	80000	42	6	No	Yes
46	Finance	80000	43	3	No	Yes
53	Finance	90000	42	8	No	Yes
54	Finance	90000	45	3	No	Yes
55	Finance	90000	45	8	Yes	Yes
56	Finance	90000	45	7	No	Yes
57	Finance	90000	45	9	No	Yes
61	HR	55000	45			
63	HR	55000	44			
65	HR	55000	44			
67	HR	55000	44	6	No	Yes
68	HR	55000	44	6	No	Yes
81	HR	65000	45	4	No	Yes
82	Marketing	50000	40	0	No	Yes

hrdata 231

data-analytics-intensive-program---excel---cohort-2-day-7-a369e873b69b54cc2a38d6dc4e2f1b17.xlsx

tion Output

	Time	Action	Response
✓	1... 16:33:45	SELECT EmployeeID, Department, Salary,WorkHours,YearsOfService,Promotion ,Attriti...	15 row(s) returned
✓	1... 16:38:26	SELECT EmployeeID, Department, Salary,WorkHours,YearsOfService,Promotion ,Attriti...	16 row(s) returned
✓	1... 16:39:12	SELECT EmployeeID, Department, Salary,WorkHours,YearsOfService,Promotion ,Attriti...	18 row(s) returned
✓	1... 16:39:36	SELECT EmployeeID, Department, Salary,WorkHours,YearsOfService,Promotion ,Attriti...	68 row(s) returned
✓	1... 16:39:54	SELECT EmployeeID, Department, Salary,WorkHours,YearsOfService,Promotion ,Attriti...	39 row(s) returned

working hours.

*It is observed that 39 employees working hours is more than the average working hours and they have not got promotion. This might be the reason for attrition.*

- Further, I have filtered out based on the salary and experience is more than 3 years.  
*It is observed that 15 employees have less salary than the average salary.*

EmployeeID	Department	Salary	WorkHours	YearsOfService	Promotion	Attrition
5	IT	60000	44	5	No	Yes
6	IT	60000	44	5	No	Yes
15	IT	60000	45	4	No	Yes
23	IT	60000	45	8	No	Yes
24	IT	60000	45	5	No	Yes
61	HR	55000	45	4	No	Yes
67	HR	55000	44	6	No	Yes
68	HR	55000	44	6	No	Yes
81	HR	65000	45	4	No	Yes
103	Marketing	60000	42	4	No	Yes
151	IT	65000	42	8	No	Yes
153	IT	60000	45	9	No	Yes
158	IT	65000	42	5	No	Yes

## ix. Training hours X Attrition

- In this analysis I have filtered out the employees who have got less training than the average training hours.

EmployeeID	Department	Position	TrainingHours	Attrition
5	IT	Data Scientist	10	Yes
6	IT	Data Scientist	10	Yes
15	IT	Data Scientist	10	Yes
16	IT	Data Scientist	15	Yes
19	IT	Data Scientist	20	Yes
23	IT	Data Scientist	20	Yes
24	IT	Data Scientist	10	Yes
28	IT	Data Scientist	20	Yes
33	Finance	Financial Analyst	20	Yes
35	Finance	Financial Analyst	20	Yes
37	Finance	Financial Analyst	15	Yes
41	Finance	Financial Analyst	20	Yes
45	Finance	Financial Analyst	20	Yes
46	Finance	Financial Analyst	15	Yes
52	Finance	Financial Manager	20	Yes
53	Finance	Financial Manager	10	Yes
54	Finance	Financial Manager	20	Yes
55	Finance	Financial Manager	15	Yes
57	Finance	Financial Manager	20	Yes
61	HR	HR Coordinator	20	Yes
63	HR	HR Coordinator	15	Yes
65	HR	HR Coordinator	20	Yes
67	HR	HR Coordinator	10	Yes
68	HR	HR Coordinator	20	Yes
81	HR	HR Manager	15	Yes
90	Marketing	Marketing Analyst	15	Yes
104	Marketing	Marketing Manager	15	Yes
105	Marketing	Marketing Manager	15	Yes
110	Marketing	Marketing Manager	10	Yes
130	Sales	Sales Manager	10	Yes
135	Sales	Sales Manager	10	Yes
137	Sales	Sales Manager	10	Yes
146	IT	Software Engineer	15	Yes
153	IT	Software Engineer	10	Yes
154	IT	Software Engineer	15	Yes
155	IT	Software Engineer	10	Yes
158	IT	Software Engineer	10	Yes

It  
that 37

is observed  
employees got



*less training than the average training hours. When the training hours are less, the attrition rate tends to increase.*

- Further I have filtered out who did not promotion from the above results. It is observed that 33

EmployeeID	Department	Position	TrainingHours	Promotion	Attrition	
5	IT	Data Scientist	10	No	Yes	
6	IT	Data Scientist	10	No	Yes	
15	IT	Data Scientist	10	No	Yes	
16	IT	Data Scientist	15	No	Yes	
23	IT	Data Scientist	20	No	Yes	
24	IT	Data Scientist	10	No	Yes	
28	IT	Data Scientist	20	No	Yes	
33	Finance	Financial Analyst	20	No	Yes	
35	Finance	Financial Analyst	20	No	Yes	
37	Finance	Financial Analyst	15	No	Yes	
41	Finance	Financial Analyst	20	No	Yes	
45	Finance	Financial Analyst	20	No	Yes	
46	Finance	Financial Analyst	15	No	Yes	
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Action Output						
	Time	Action	Response			
1...	17:09:40	SELECT EmployeeID,Department,Position,TrainingHours,Attrition FROM hrdata WHERE...	37 row(s) returned			
1...	17:18:09	SELECT EmployeeID,Department,Position,TrainingHours,Promotion,Attrition FROM hrd...	33 row(s) returned			

employees didn't get the promotion.

**x. Years**

**of service X  
Promotion**

YearsOfService	Attrition	count(*)	Promoted	NotPromoted	
5	Yes	8	0	8	
7	Yes	10	3	7	
4	Yes	5	0	5	
3	Yes	11	3	8	
8	Yes	7	1	6	
6	Yes	6	2	4	
9	Yes	4	0	4	
2	Yes	2	0	2	
10	Yes	1	0	1	

*In this analysis I have observed that promotion might be the reason for attrition because promotion is consider to be important metric and recognition for the employees hard work.*

- I filtered out the employees whose salary is less than the average from the above analysis.

*It is observed that salary is also a reason for attrition along with the promotion.*



	YearsOfService	Attrition	Promoted	NotPromoted	
	5	Yes	0	4	
	7	Yes	2	1	
	4	Yes	0	5	
	3	Yes	2	1	
	8	Yes	0	2	
	2	Yes	0	2	
	6	Yes	0	2	
	9	Yes	0	1	

## xi. Satisfaction score X Attrition

- In this analysis I filtered out the employees satisfaction score less than the average satisfaction score.

EmployeeID	Department	Position	SatisfactionSco...	Promotion	Attrition
6	IT	Data Scientist	3	No	Yes
23	IT	Data Scientist	2	No	Yes
24	IT	Data Scientist	3	No	Yes
28	IT	Data Scientist	2	No	Yes
33	Finance	Financial Analyst	3	No	Yes
37	Finance	Financial Analyst	3	No	Yes
41	Finance	Financial Analyst	3	No	Yes
53	Finance	Financial Manager	3	No	Yes
61	HR	HR Coordinator	3	No	Yes
63	HR	HR Coordinator	3	No	Yes
67	HR	HR Coordinator	3	No	Yes
81	HR	HR Manager	3	No	Yes
86	Marketing	Marketing Analyst	2	No	Yes
90	Marketing	Marketing Analyst	2	No	Yes
105	Marketing	Marketing Manager	3	No	Yes
113	Marketing	Marketing Manager	3	No	Yes
119	Sales	Sales Associate	3	No	Yes
124	Sales	Sales Manager	2	No	Yes
151	IT	Software Engineer	3	No	Yes

*It is observed that 19 employees satisfaction score is less than the average satisfaction score and they have not got promoted. As they have not got promotion so their satisfaction score is less which can be the reason for attrition.*

## xii. Performance rating X Attrition

- In this analysis I filtered the employees whose performance rating is less than the average performance rating.

EmployeeID	Department	Position	PerformanceRati...	Promotion	Attrition
61	HR	HR Coordinator	3	No	Yes
63	HR	HR Coordinator	3	No	Yes
65	HR	HR Coordinator	3	No	Yes
67	HR	HR Coordinator	3	No	Yes
68	HR	HR Coordinator	3	No	Yes
86	Marketing	Marketing Analyst	3	No	Yes
104	Marketing	Marketing Manager	3	No	Yes
105	Marketing	Marketing Manager	3	No	Yes

*It is observed that performance rating is not the reason for attrition.*

## Objective 2- Analyse the effectiveness of training programs and recommend improvements to enhance employee skills and performance.

### i. Training Hours X Performance Rating

- In this analysis, I tried to check if the training hours is more than the average training hours which improved the performance of the employees.

Training...	AVG(PerformanceRating)	Total_employees
10	4.0909	22
15	3.9744	39
20	3.9730	37
25	3.8000	30
30	3.8750	32

- The above table gives the details of total employees and their average performance rating based on no. of training hours. From this I tried to filter out the employees who left the company.

Result Grid			Filter Rows: <input type="text" value="Search"/>
Training...	AVG(PerformanceRating)	Total_employees	
10	4.1538	13	
15	3.9091	11	
20	4.0769	13	
25	3.9167	12	
30	4.0000	5	

- The average training hours is 20 hours, From the above table it is observed that 30 employees who left the company had at least 20 hours of training and their performance rating is equal to or greater than the average performance rating.
- The 24 employees who left the company with less training hours also have the performance rating which is equal to or greater than the average performance rating.

*This implies that training can be the reason for attrition but it might not be the reason for improvement in performance rating because the training details are not available in the data set i.e the performance is calculated before or after training.*

## ii. Training X Promotion

- In this analysis I observed the relation between the training and promotion.

TrainingHours	^	Promotion	total_employees
10		No	21
10		Yes	1
15		No	36
15		Yes	3
20		No	30
20		Yes	7
25		No	18
25		Yes	12
30		No	22
30		Yes	10

- It is observed that from the total 99 employees 70 employees who got training hours more than or equal to the average training hours have not got promoted( other factors are not calculated).
- From this I attrition the filtered out based on the count and who didn't get promotion .

TrainingHours	^	Promotion	total_employees
10		No	12
10		Yes	1
15		No	9
15		Yes	2
20		Yes	1
20		No	12
25		Yes	3
25		No	9
30		Yes	2
30		No	3

*It can be observed that employees who got training more than the average have not got promoted and they have left the company. But this might not be significant reason that training have the impact on promotion.*

*For the overall development of the company and self development of the employees they must be trained equally irrespective of the promotion. The training can help in improvement of the ratings in the employees.*