

HR Analytics Report

Dataset: HR data of a multinational corporation (MNC) with **2 million employee records**.

Tools: R (dplyr, ggplot2, tidyverse, effsize, lubridate, stringr, rworldmap, countrycode, scales).

Goal: To explore workforce distribution, salary structures, performance evaluation, attrition analysis, and hiring trends.

Data Summary

The dataset contains **12 key variables**, including Employee ID, Department, Job Title, Hire Date, Location, Performance Rating, Experience Years, Status, Work Mode, and Salary (INR).

Salary summary :

| Min. | 1st Qu. | Median | Mean | 3rd Qu. | Max. |
|--------|---------|--------|--------|---------|---------|
| 300000 | 616346 | 811027 | 896888 | 1073745 | 2999976 |

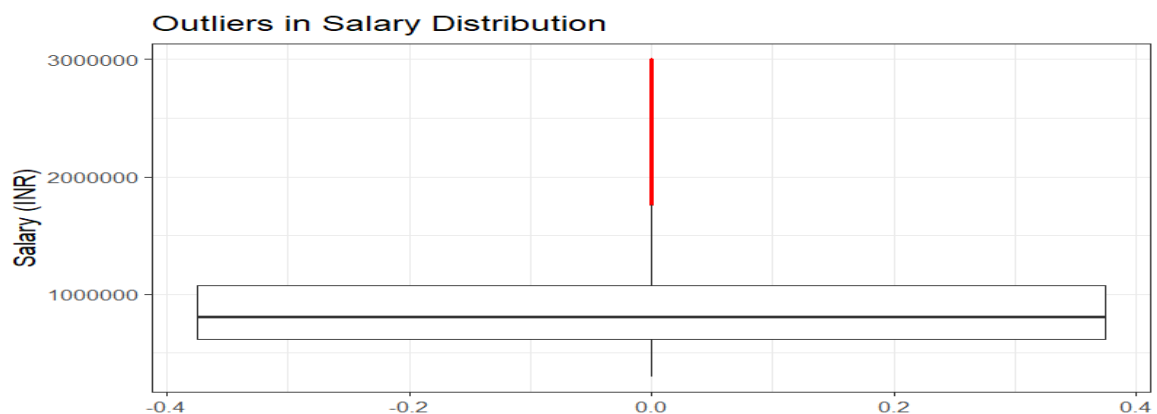
Outliers were detected in salary distribution, but results were validated with and without outlier adjustments.

Show the Quantile Q1, Q2, Q3

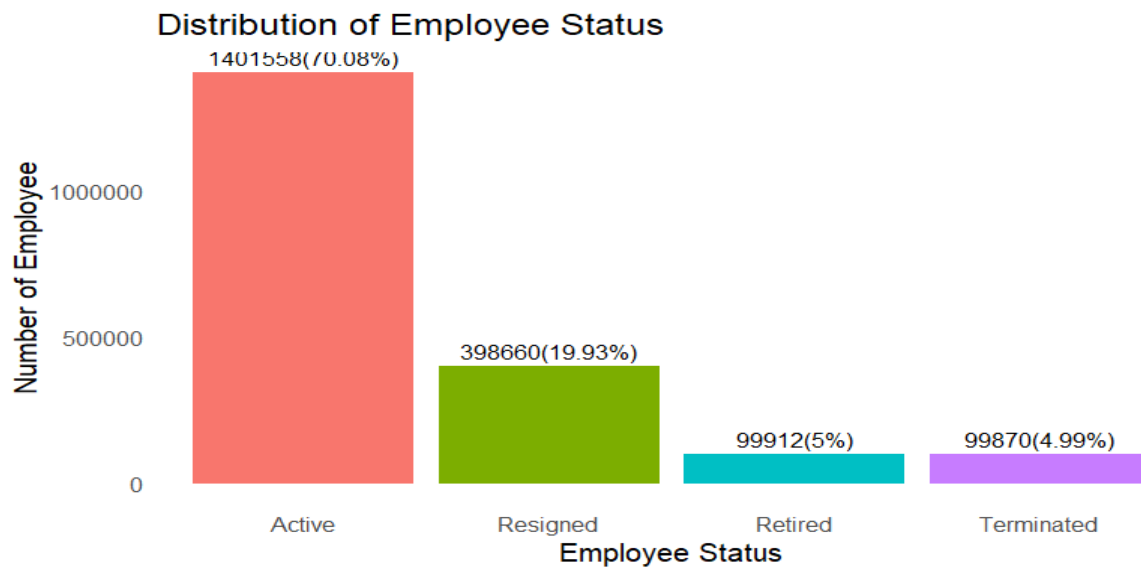
| 0% | 25% | 50% | 75% | 100% |
|----------|----------|----------|-----------|-----------|
| 300000.0 | 616346.0 | 811026.5 | 1073745.2 | 2999976.0 |

Lower.Bound 25% (-69752.88)

Upper.bound 75% (1759844)

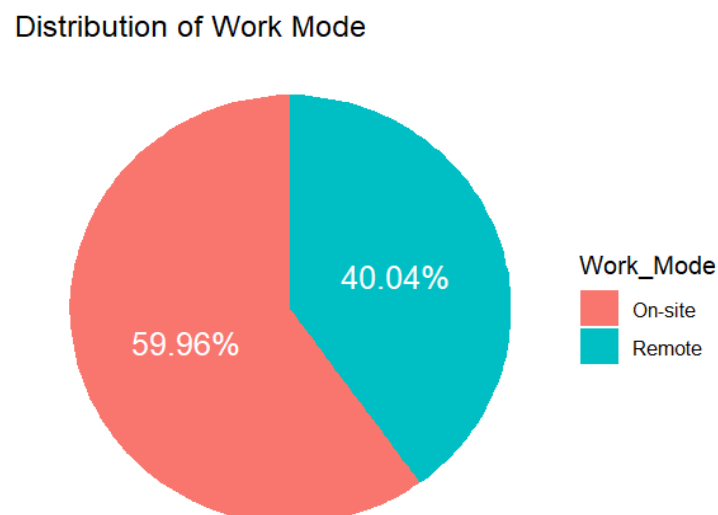


Q.1) What is the distribution of Employee Status (Active, Resigned, Retired, Terminated) ?



Comment: Most employees are active, but nearly 20% resigned—highlighting attrition concerns.

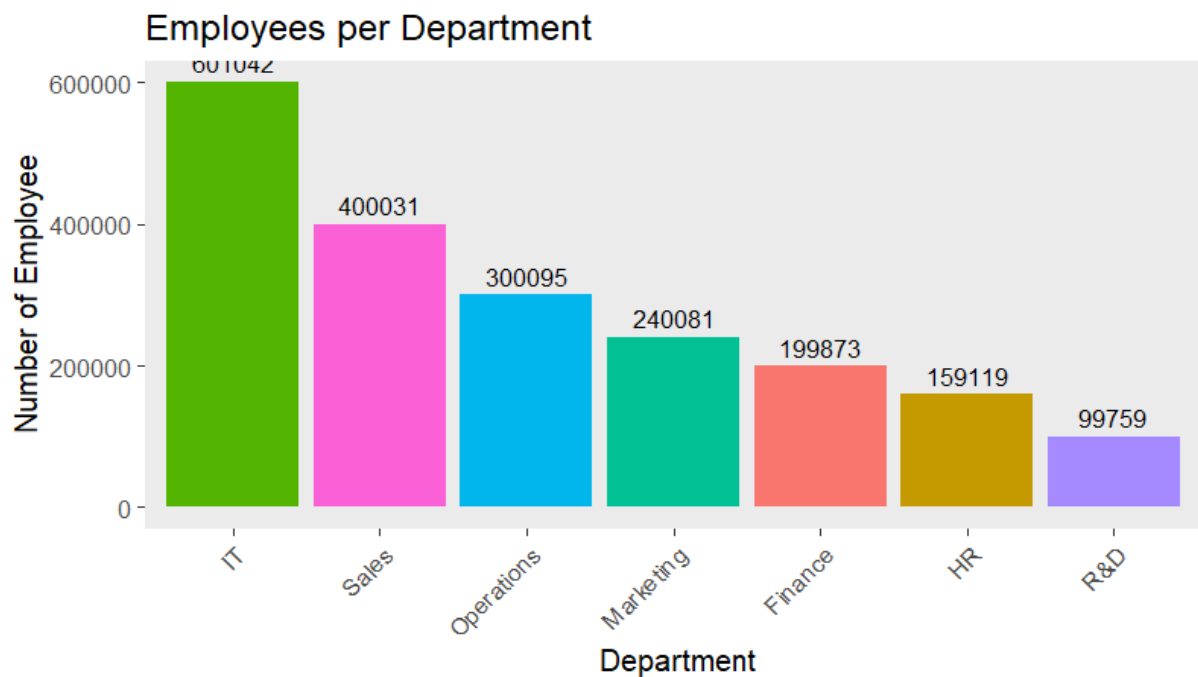
Q.2) What is the distribution of work modes (On-site, Remote) ?



Comment: A large proportion of employees are still on-site, but remote work represents a significant 40%, indicating hybrid workforce trends.

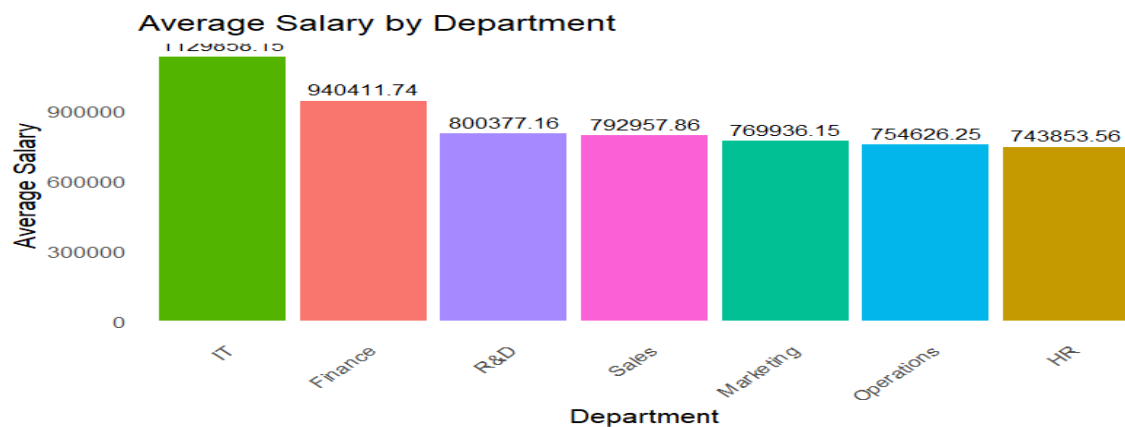
Q.3) How many employees are there in each department ?

Departments include IT, Marketing, HR, Operations, Finance, Sales, and R&D.



Comment: Distribution shows a balanced workforce, though IT and Operations dominate in headcount.

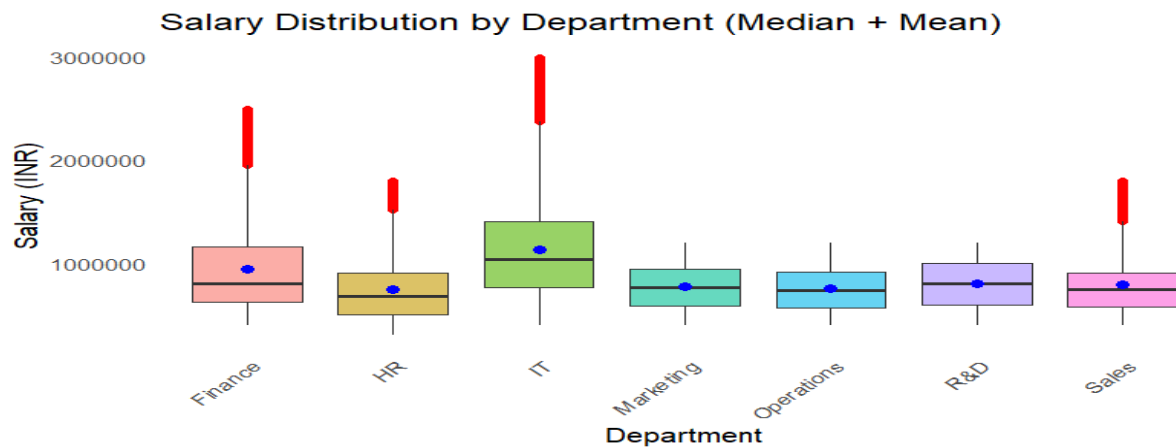
Q.4) What is the average salary by Department ?



Salary varies significantly across departments; IT and Finance show the highest averages.

Comment: Salary disparities reflect skill demand and market competitiveness.

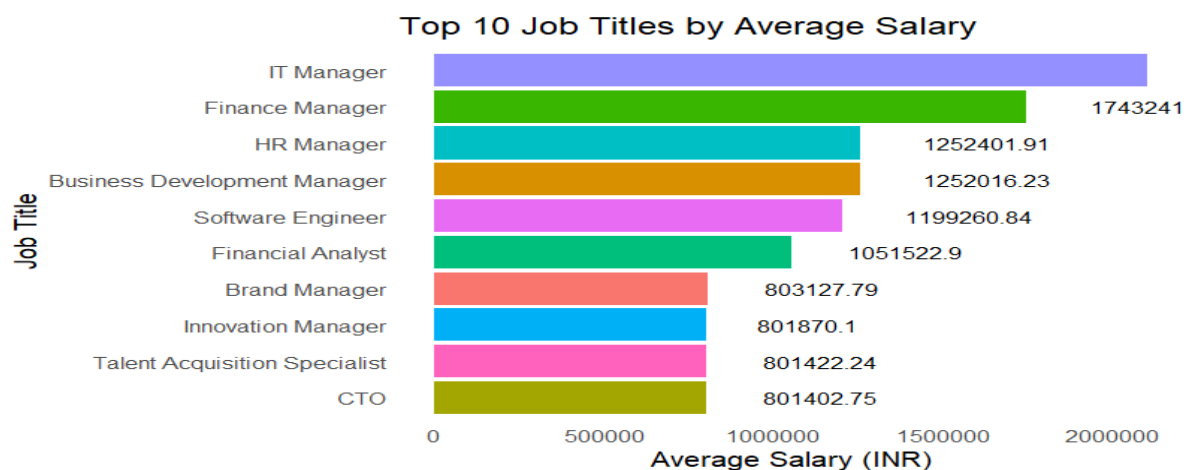
Outlier salary distribution by Department



Q.5) Which job title has the highest average salary ?

IT Manager: 2,098,156 (highest).

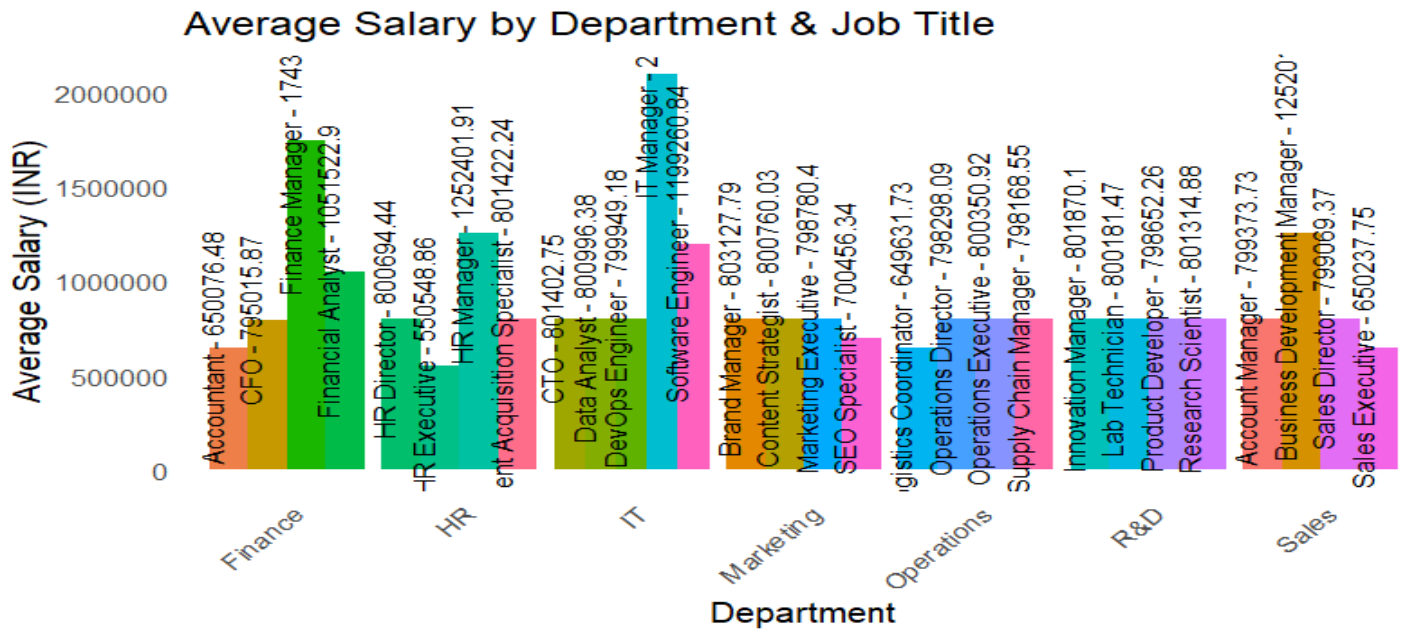
Comment: Leadership and technical management roles command premium salaries.



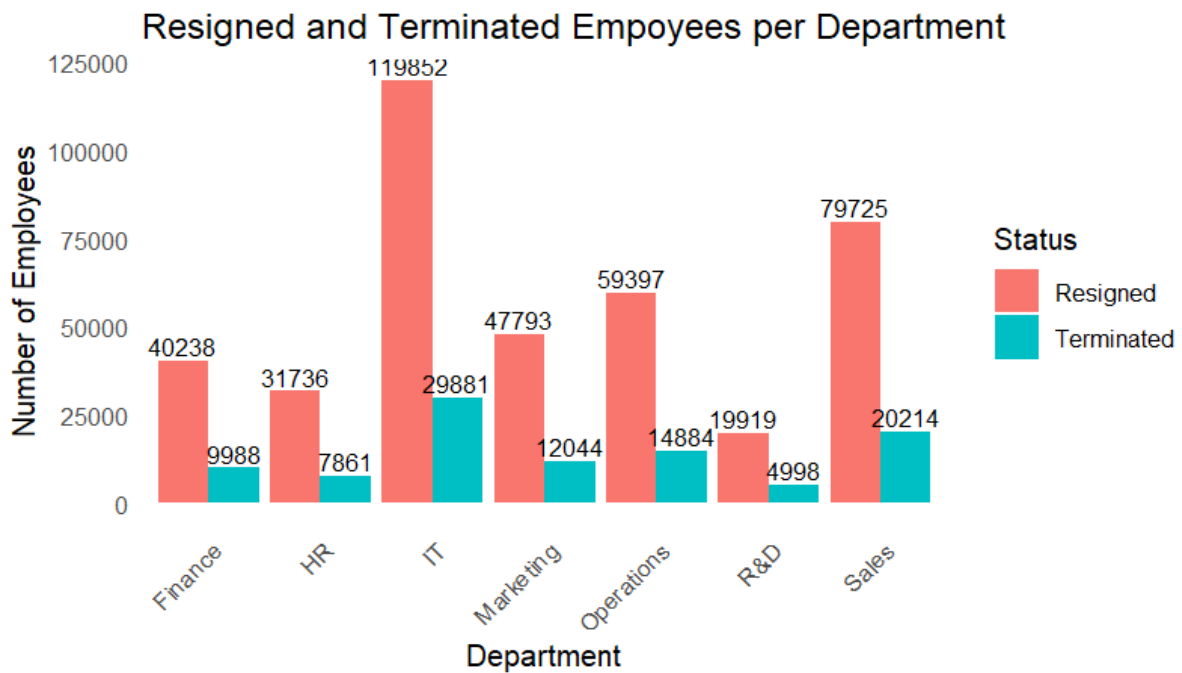
Q.6) What is the average salary in different Departments based on Job Title ?

Salary structures differ widely within departments, depending on job roles.

Comment: Salary differentiation is role-specific, not just department-specific.



Q.7) How many employees Resigned & Terminated in each department ?



Departments show varied exit patterns.

Comment: Attrition and terminations are higher in customer-facing and support roles (e.g., Sales, HR)

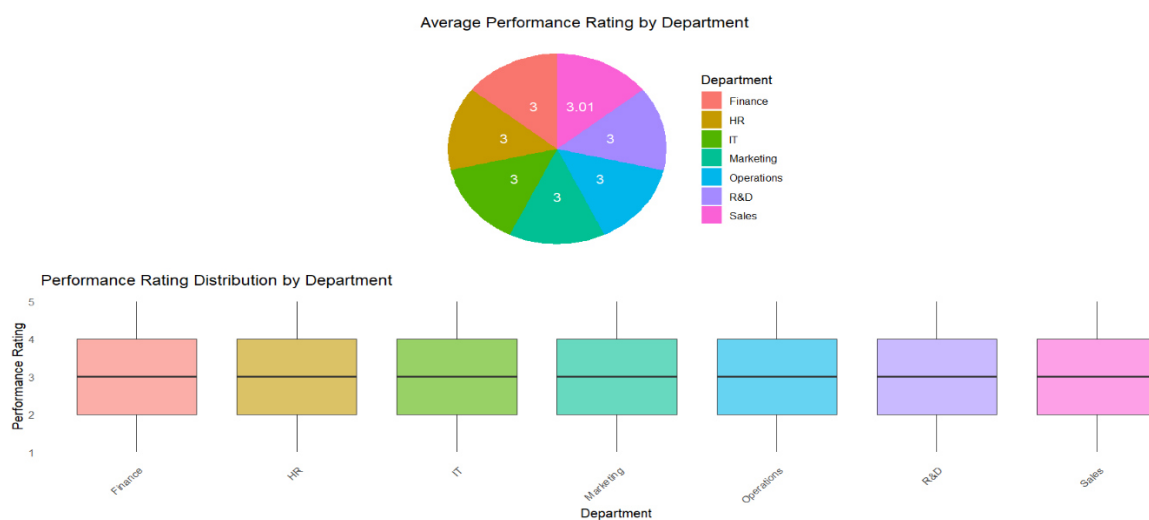
Q.8) How does salary vary with years of experience ?



Salary generally increases with years of experience, though growth stabilizes after mid-career.

Comment: Early experience strongly drives salary increases, but plateauing occurs after ~15–20 years.

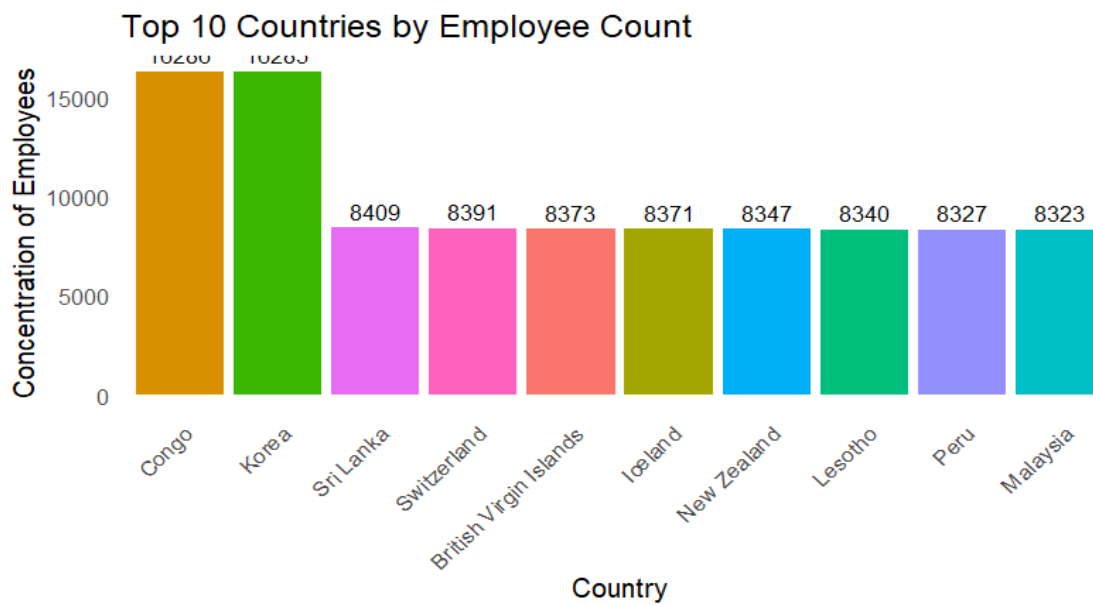
Q.9) What is the average performance rating by department ?



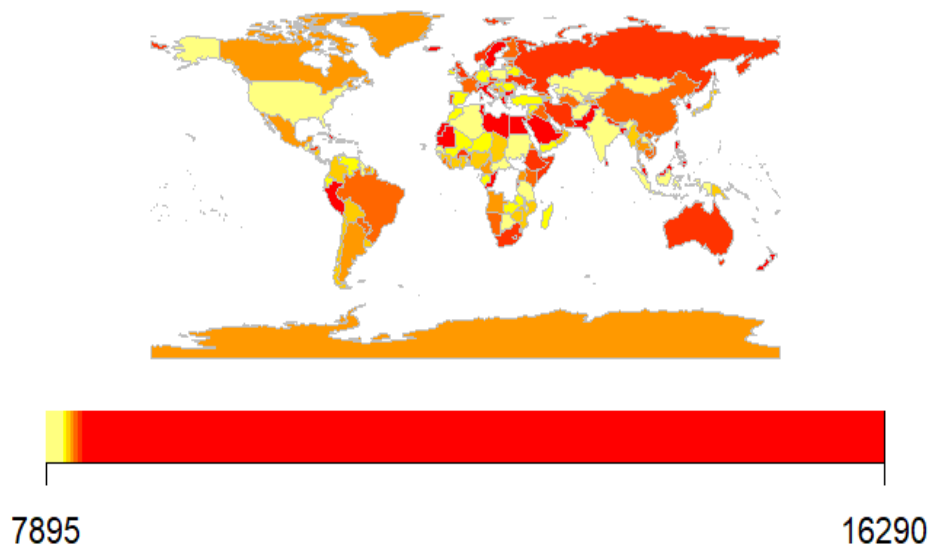
Departmental averages vary; some show consistently higher ratings.

Comment: Indicates differences in performance culture and possibly management practices.

Q.10) Which Country have the highest concentration of employees ?



Employee Distribution by Country



Certain countries dominate in workforce distribution.

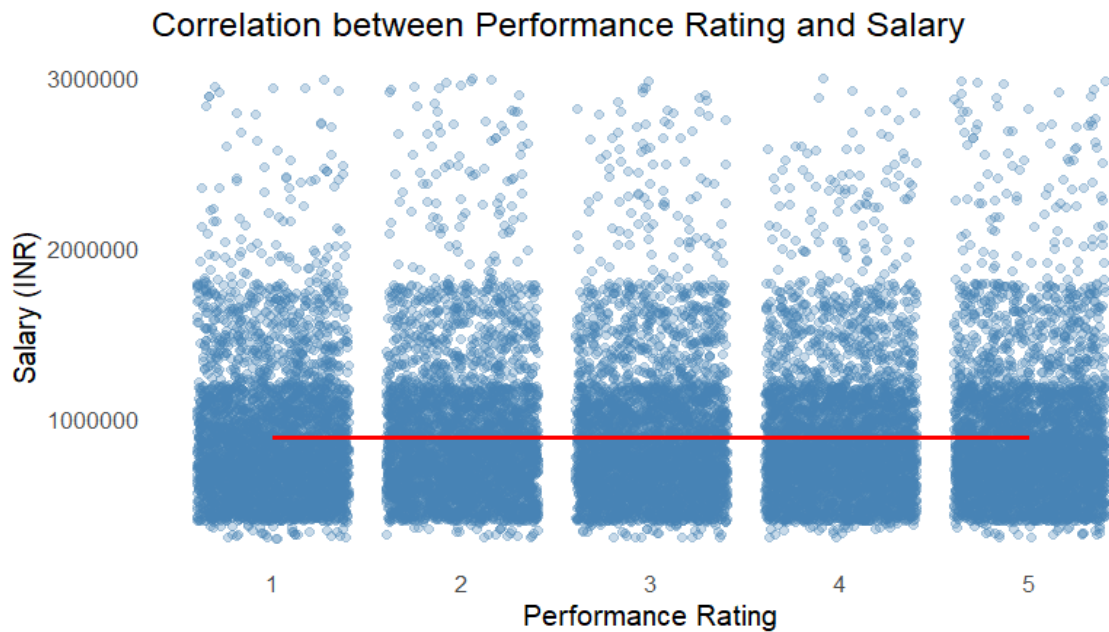
Comment: Geographic concentration suggests strategic operational hubs.

11) Is there a correlation between performance rating and salary ?

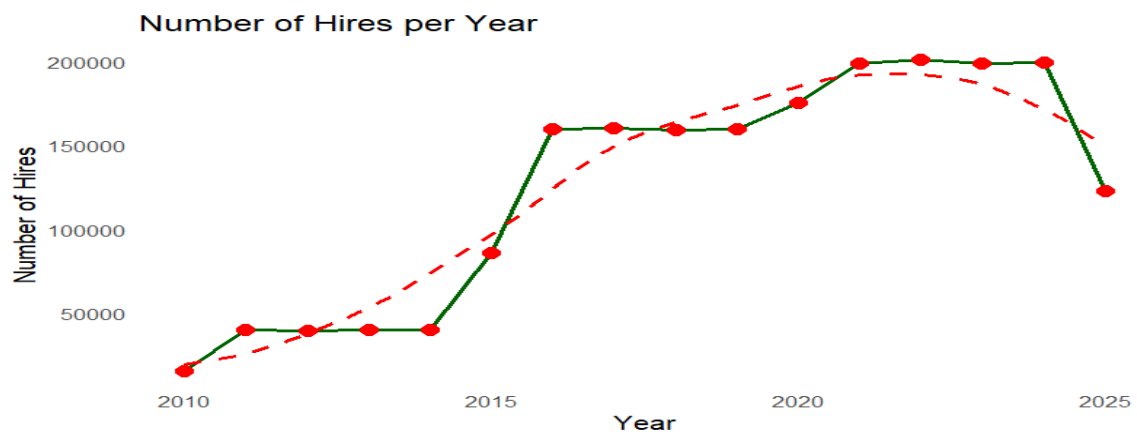
❑ **Correlation coefficient:** -0.0002 (negligible).

❑ **p-value:** 0.76 (not significant).

Comment: No meaningful relationship between salary and performance rating.



Q.12) How has the number of hires changed over time (per year) ?

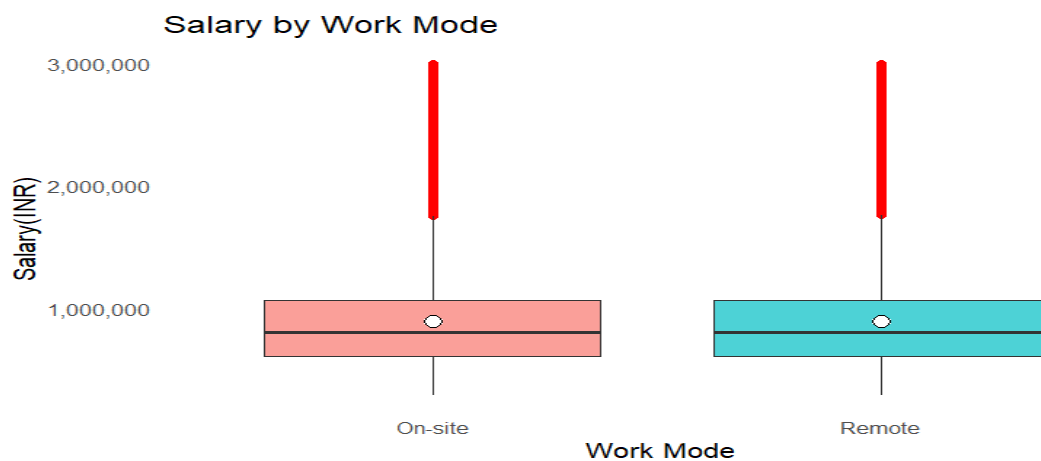


Hiring trends show clear variation, with peaks in expansion periods.

Comment: Suggests cyclical workforce planning tied to business strategy.

Q.13) Compare salaries of Remote vs. On-site employees — is there a significant difference ?

| Work_Mode | n | mean_Sal | median_Sal | sd_Sal |
|-----------|---------|----------|------------|---------|
| 1 On-site | 1199109 | 896836. | 811154 | 402594. |
| 2 Remote | 800891 | 896965. | 810814 | 402635. |



- Welch Two Sample t-test

$t = -0.22268$, $df = 1716436$, $p\text{-value} = 0.8238$

Alternative hypothesis: true difference in means between group On-site and group Remote is not equal to 0.

95 percent confidence interval: [-1268.164 1009.403]

sample estimates:

mean in group On-site 896835.9

mean in group Remote 896965.3

Comment: No evidence of salary differences between Remote and On-site employees

- Hedges's g

g estimate: -0.0003213542 (negligible)

95 percent confidence interval: [-0.003149795, 0.002507087]

Robustness: remove outliers and re-test

- **Welch Two Sample t-test**

$t = -0.24177$, $df = 1656602$, $p\text{-value} = 0.809$

alternative hypothesis: true difference in means between group On-site and group Remote is not equal to 0

95 percent confidence interval: [-1016.2639, 793.0719]

sample estimates:

mean in group On-site : 849699.9

mean in group Remote : 849811.4

- **Hedges's g**

g estimate: -0.0003551387 (negligible)

95 percent confidence interval: [-0.003233907, 0.002523629]

Q.14) Find the top 10 employees with the highest salary in each department.

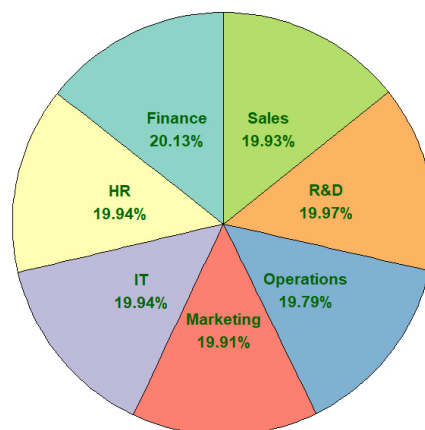
Department max_sal

| | |
|--------------|---------|
| 1 Finance | 2499958 |
| 2 HR | 1799839 |
| 3 IT | 2999976 |
| 4 Marketing | 1199997 |
| 5 Operations | 1199991 |
| 6 R&D | 1199995 |
| 7 Sales | 1799983 |

Comment: High salaries are concentrated in IT and Finance leadership roles.

Q.15) Identify departments with the highest attrition rate (Resigned %).

Attrition Rate by Department (Resigned %)



Attrition rates vary by department.

Comment: Departments like Sales and HR show higher resignation percentages, signaling retention challenges.

Conclusion

This HR Analytics project highlights key workforce insights:

- Attrition is significant (~20% resigned).
- Salary growth aligns with experience but flattens mid-career.
- Remote vs On-site compensation is virtually identical.
- IT and Finance dominate in salary levels.
- Attrition is department-specific, requiring tailored HR strategies.

These findings can guide **HR policy, retention strategies, and workforce planning** for large organizations.