
“EMPLOYEE ATTRITION ANALYSIS”



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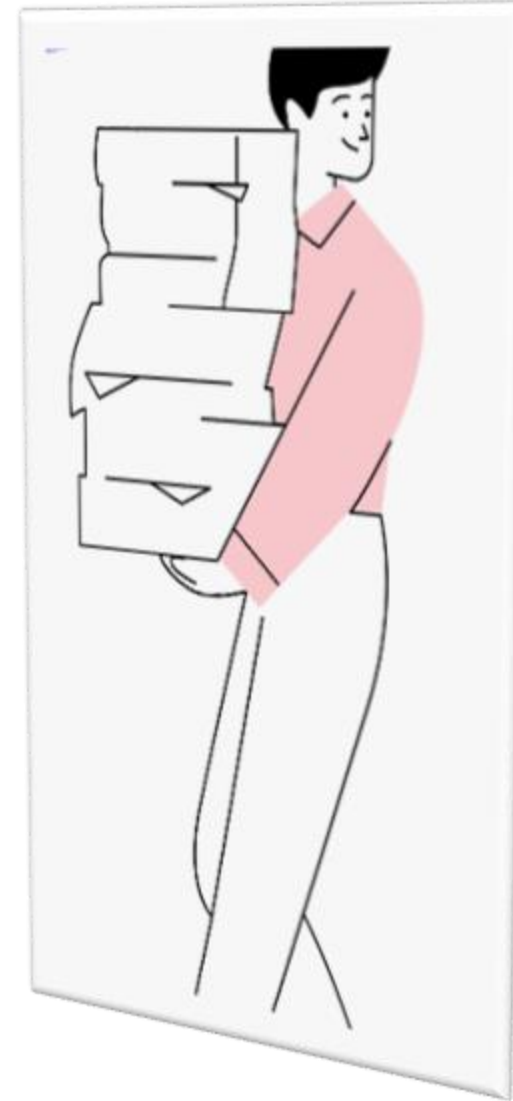
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INTRODUCTION

Employee attrition is a critical challenge for organizations, impacting productivity, team morale, and operational costs. Our project focuses on analyzing employee data to understand the underlying reasons behind a company's high attrition rate.

Through comprehensive HR analytics, we aim to uncover key factors contributing to employee attrition. Our data-driven approach will enable the company to make informed decisions to reduce the attrition rate, thereby enhancing productivity and reducing financial losses.



BUSINESS PROBLEM STATEMENT:

A Company, established a few years ago, is grappling with a [persistent 15% annual employee attrition rate](#). This high turnover is significantly impacting productivity, team morale, and operational costs. Analysis shows that replacing an employee cost approximately 1.5 to 2 times their annual salary and much more in lost productivity, translating to substantial financial losses for the company.

To address this issue, we propose conducting a HR analytics study. This data-driven approach will enable the company to make informed decisions, potentially [reducing the attrition rate to below 10% within the next fiscal year](#) and saving financial losses for the company.

DATA SOURCE

The dataset used for this analysis comprises information from XYZ Company, focusing on factors influencing employee attrition rates. It includes a [total of 4,410 records with 26 attributes per employee](#).

Key features such as age, monthly income, job role, and job satisfaction levels are included, providing a [comprehensive view of the workforce dynamics](#).

The dataset has been preprocessed to handle missing values and encoded for analysis, aiming to identify significant predictors of attrition and propose data-driven strategies to mitigate it.

PROJECT STATEMENT

To effectively address the high attrition rate, [we need to translate the business problem into a data science problem statement](#). This will guide us in generating relevant insights and following appropriate analytical steps.

Attrition Rate: The attrition rate quantifies employee turnover as a percentage. A healthy organization typically has an [attrition rate of 10% or less](#). High attrition negatively impacts the company's costs, productivity, and morale.

Given our company's attrition rate above 15%, [it is crucial to identify the underlying reasons to develop targeted retention strategies](#).

Key questions for analysis include:

- How are the KPIs performing?
- How do employee demographics affect attrition?
- Are salary and financial incentives adequate?
- Do certain departments and job roles have higher attrition rates?
- Is the company's work culture satisfactory?
- Which factors have the largest impact on attrition?

By answering these questions through data analysis, we aim to reduce the attrition rate to below 10% and mitigate financial losses

TOOLS USED:

Python: For Data cleaning and Exploratory Data Analysis(EDA)



Pandas: For Data Manipulation



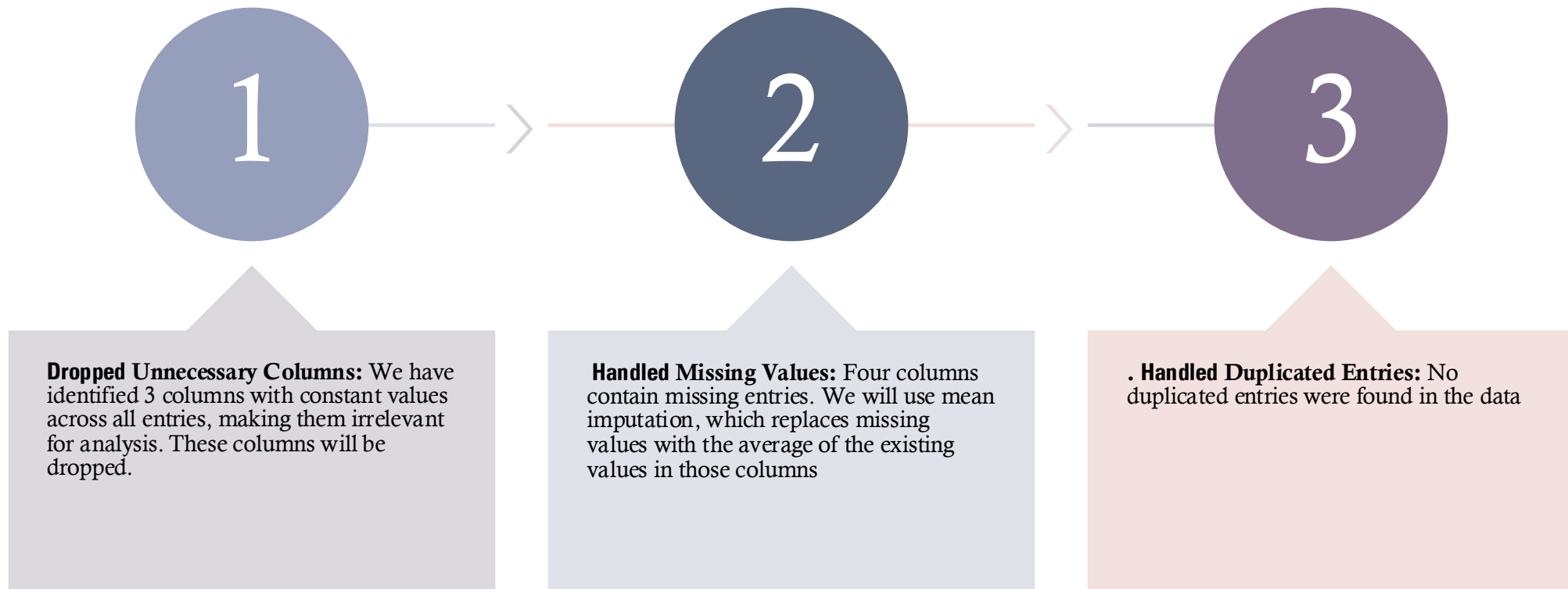
Matplotlib & Seaborn: For Data Visualization



Power BI: For Data Visualization using Interactive dashboards

DATA CLEANING

Data Cleaning process involves fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset, to prepare data for analysis.



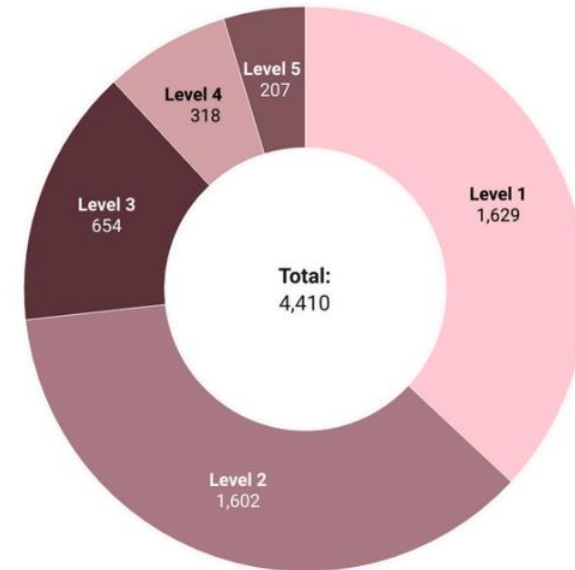
DESCRIPTIVE STATISTICS

Our analysis of the employee dataset reveals that out of 4410 employees, 711 have left the company, indicating a significant attrition rate. The workforce is composed of 1764 females and 2646 males.

The distribution across departments shows a concentration in Research & Development with 2883 employees, followed by Sales with 1338 employees, and Human Resources with 189 employees.

These insights provide a clear picture of the current workforce demographics and departmental distribution, helping us to better understand the areas most impacted by attrition.

Employees Per Job Level



KEY PERFORMANCE INDICES (KPIs)

Key Performance Indicators (KPIs) are critical metrics that [help in evaluating the effectiveness and overall health of the organization](#). They provide insights into various aspects of the workforce, such as attrition, retention, salary, performance, and employee satisfaction.

- Department-wise, Research & Development has the highest attrition rate at 63.71%, followed by Sales at 28.27%, and Human Resources at 8.02%.
- The average distance from home to the office is 9.19 miles.
- The average employee experience is 11.28 years.
- Work environment, job satisfaction, and work-life balance have average ratings of 2.73, 2.73, and 2.76 respectively.

These KPIs provide valuable insights into the factors influencing employee satisfaction and retention. [High attrition rates in certain departments highlight areas needing attention](#), while average ratings on [job satisfaction and work-life balance](#) can guide improvements in workplace policies and practices

Attrition Rate: 16.12%

Retention Rate: 83.88%

Average Salary: ₹65,029.31

Average Salary Hike: 15.21%

Average Performance Rating:
3.15

ANALYSIS & INSIGHTS

To facilitate a comprehensive understanding of the various factors contributing to employee attrition, we have grouped them into several key categories.

These groupings are essential because no single factor can solely account for attrition.

By categorizing similar factors, we can gain comprehensive insights into the reasons for attrition and identify areas that require attention.

Demographics

Includes age, gender, and marital status.

Salary and Financial Incentives

Includes salary, salary hike, and stock option level.

Job Related Factors

Includes department, job role, and years with current manager.

Work Culture

Includes environment satisfaction, job satisfaction, work-life balance, and job involvement.

Career Progression

Includes job level, years since last promotion, and training times last year.

Commute & Traveling

Includes business travel and distance from home.

Employee Portfolio

Includes performance rating, total experience, years at the company, and number of companies worked

1.DEMOGRAPHICS

1.1 Gender

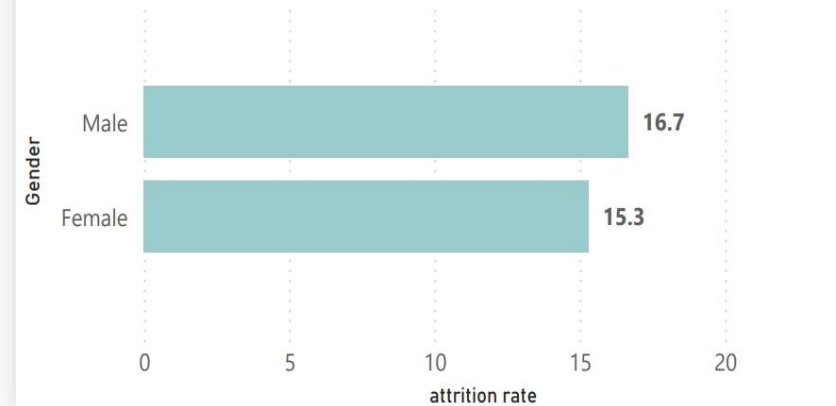
The attrition rate among male employees is 16.67%, compared to 15.31% among female employees. Gender seems to have a moderate effect on attrition rates, with male employees showing slightly higher rates. Possible reasons for this disparity might include differences in job roles, career aspirations, or workplace dynamics influenced by gender-specific factors.

1.2 Marriage Status

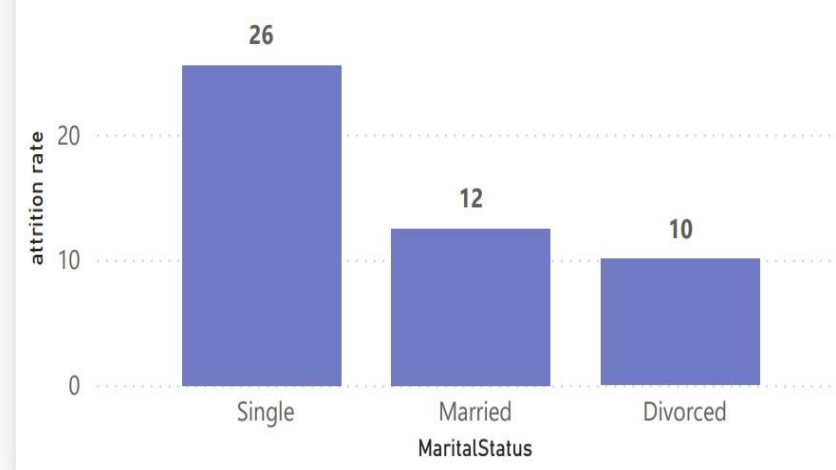
Employees who are single exhibit a significantly higher attrition rate of 25.53%, in contrast to 12.48% for married employees and 10.09% for divorced employees. Marital status plays a crucial role in attrition, with single employees showing the highest tendency to leave.

This disparity could be attributed to factors such as career mobility, personal life changes, or job dissatisfaction that are influenced by marital status.

Attrition Rate Based on Gender



Attrition Rate Based on Marital Status



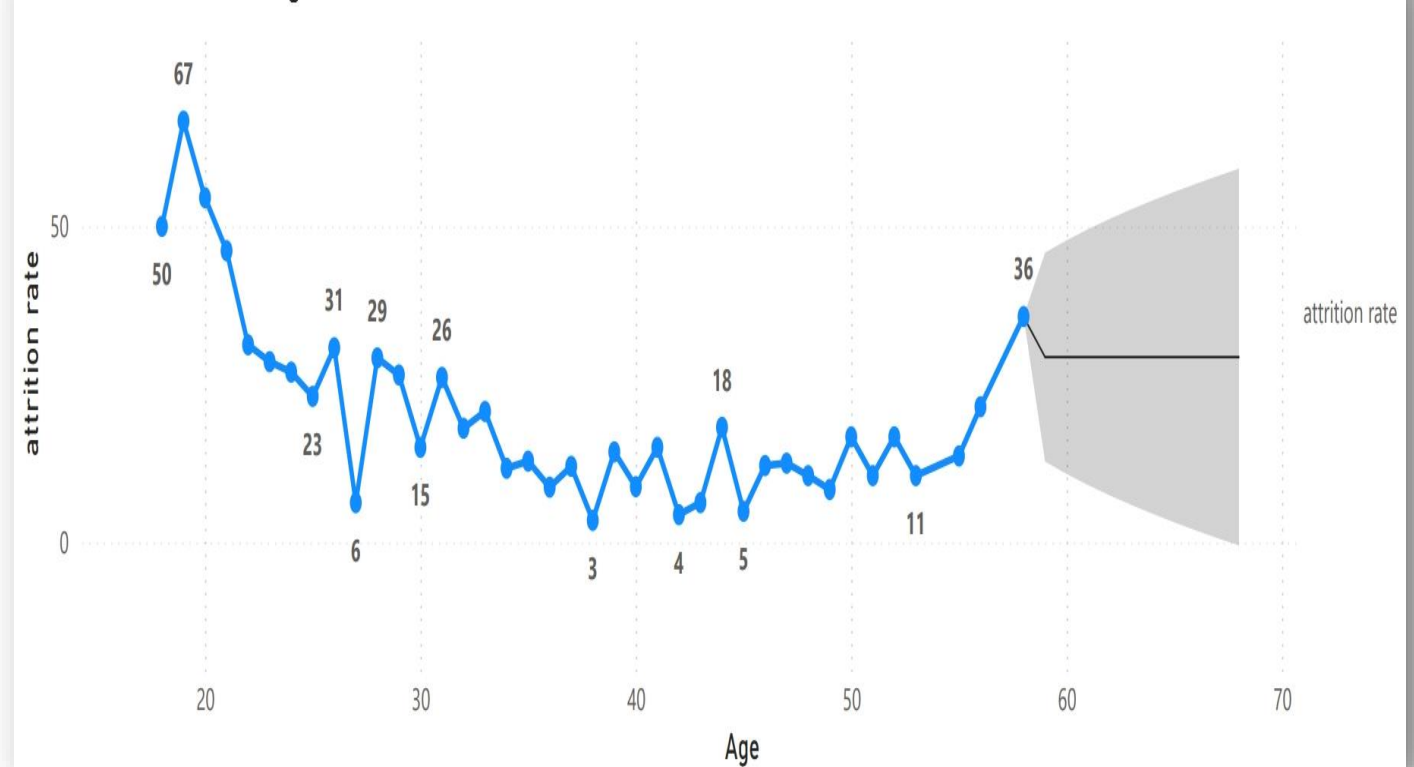
1.DEMOGRAPHICS

1.3 Age

Attrition rates vary across different age groups, with notable spikes observed among younger employees (e.g., 18 to 22 years) and fluctuations throughout mid-career stages.

Age-related attrition patterns reflect stages of professional development, career aspirations, and workplace experiences. Younger employees may seek rapid career progression or explore diverse opportunities, leading to higher turnover.

Attrition Rate Based on Age



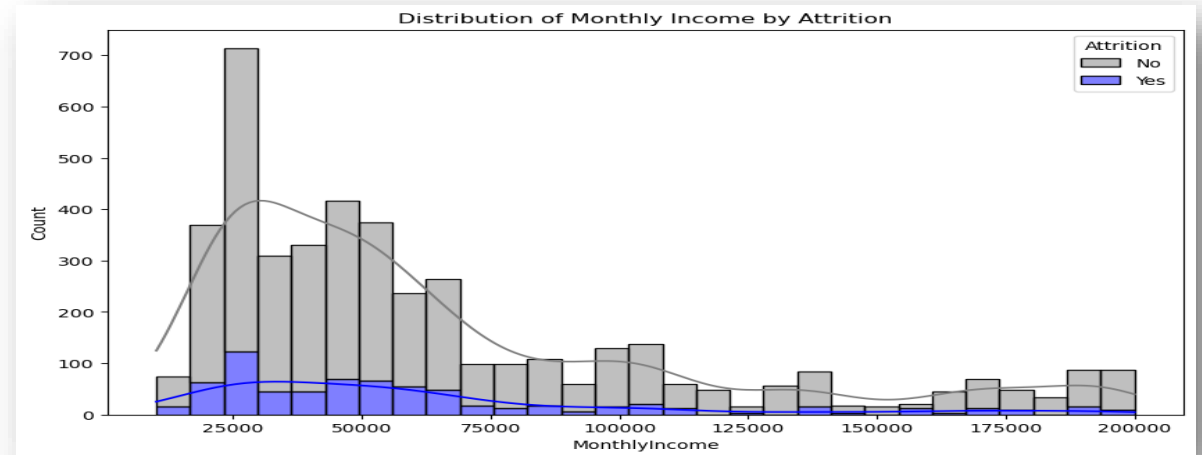
2. SALARY AND FINANCIAL INCENTIVES

2.1 Salary

The data indicates that **employees with lower monthly incomes are more likely to leave the company**. As the monthly income increases, the attrition rate decreases. This trend highlights that compensation for lower-level employees is inadequate compared to industry standards. It also reiterates the importance of competitive salaries in retaining employees.

2.2 Percentage Salary Hike

Higher attrition rates are observed at salary hike levels of 15%, 17%, 19%, 21%, 22%, 23%, and especially 25%. This suggests that incremental salary hikes do not necessarily correlate with reduced attrition. In some cases, employees might feel **that the salary hike is insufficient compared to their expectations** or industry standards.



Attrition Rate Based on Percentage Salary Hike



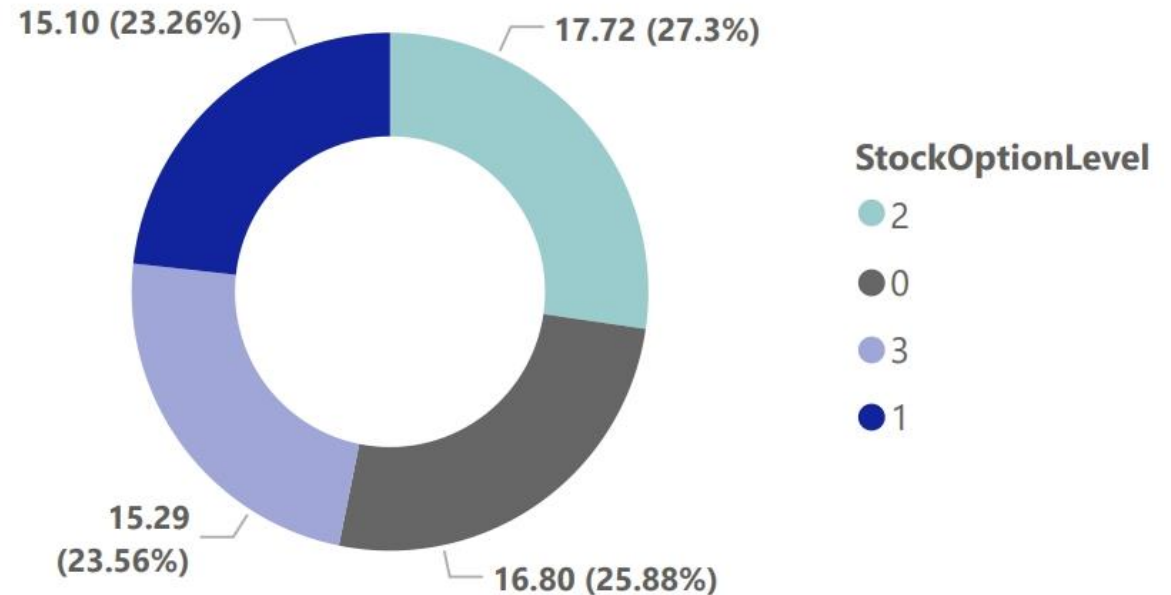
2. SALARY AND FINANCIAL INCENTIVES

2.3 Stock Option Level

Employees with stock options at level 2 show a slightly higher attrition rate compared to other levels.

This suggests that while stock options are an incentive, they may not be a strong enough factor alone to significantly reduce attrition. Employees might value more immediate or tangible rewards.

Companies should consider a mix of financial incentives. While stock options are beneficial, combining them with other forms of compensation may be more effective in retaining employees



3. JOB RELATED FACTORS

3.1 Department

The high attrition rate in Human Resources suggests possible dissatisfaction within this department, perhaps due to job stress, lack of growth opportunities, or insufficient support.

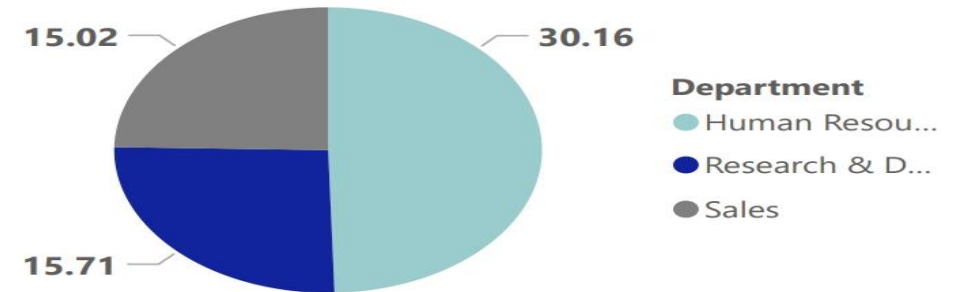
Research & Development and Sales have relatively lower attrition rates but are still significant.

3.2 Job Role

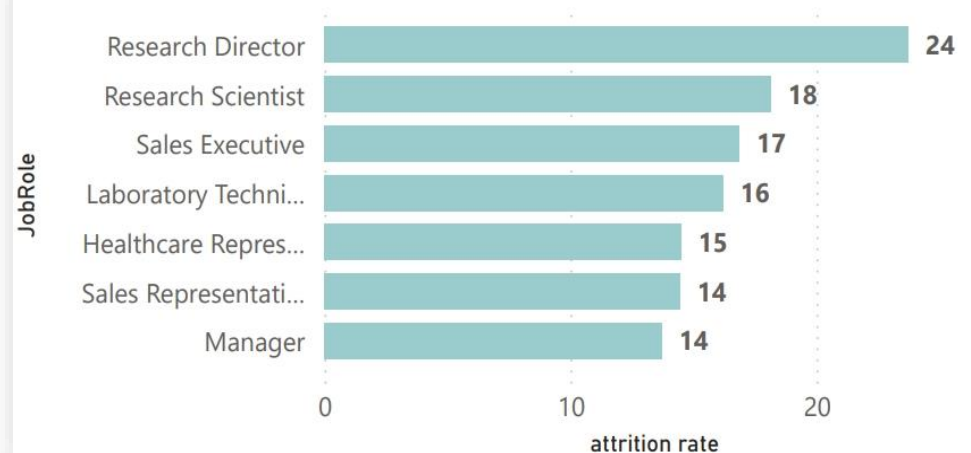
The highest attrition rates are among Research Directors and Research Scientists, indicating potential issues with job satisfaction or career progression in these roles.

Lower attrition rates among Managers and Manufacturing Directors suggest better job stability and satisfaction.

Attrition Rate Based on Department



Attrition Rate Based on Job Role



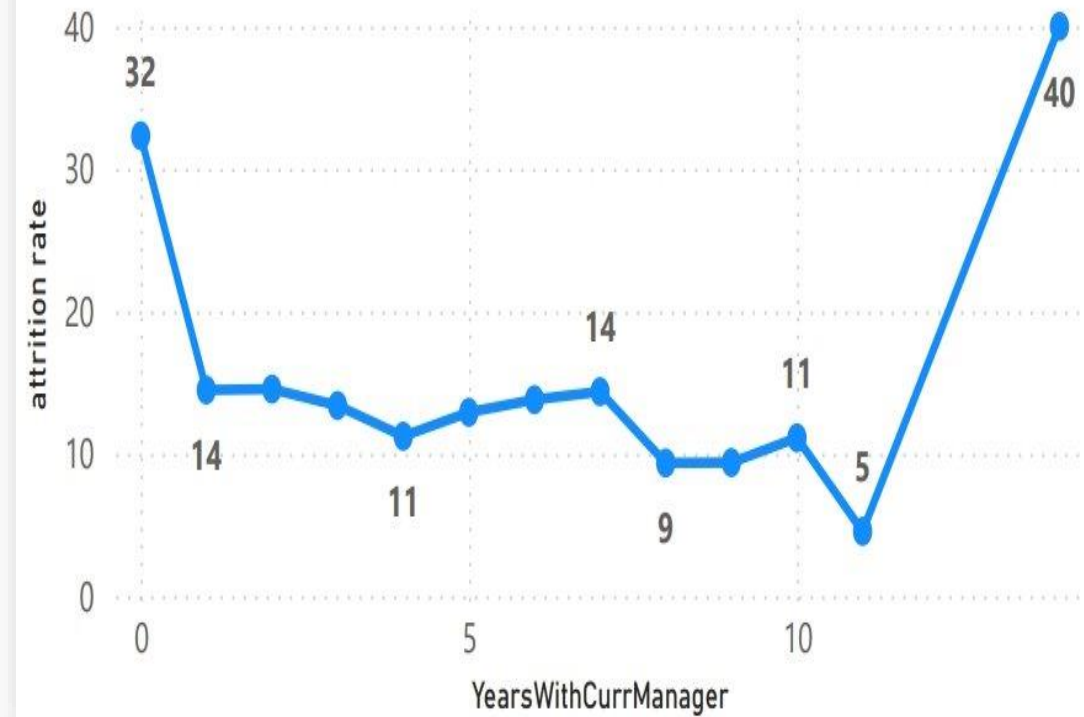
3. JOB RELATED FACTORS

3.3 Years with Current Manager

The highest attrition rate occurs among employees who have been with their current manager for less than a year, suggesting a critical period of adjustment. The spike at 14 years indicates a potential outlier or unique situation.

Generally, longer tenure with a manager correlates with lower attrition rates, highlighting the importance of stable and positive manager-employee relationships.

Attrition Rate Based on Years With Current Manager



4. WORK CULTURE

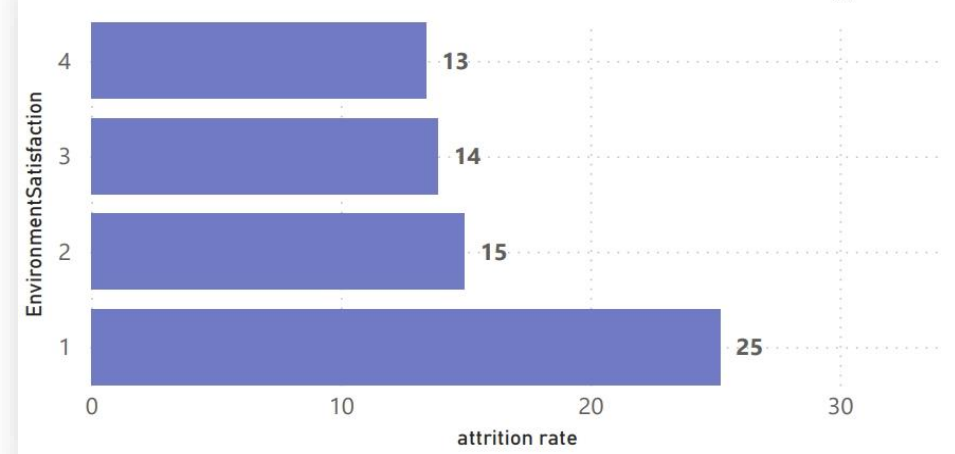
4.1 Environment Satisfaction

Employees with the lowest satisfaction with their work environment (rating 1) have the highest attrition rate. As satisfaction increases, attrition decreases significantly, indicating that a positive work environment plays a crucial role in retaining employees. Poor work environment satisfaction can lead to high turnover, reducing team cohesion and productivity.

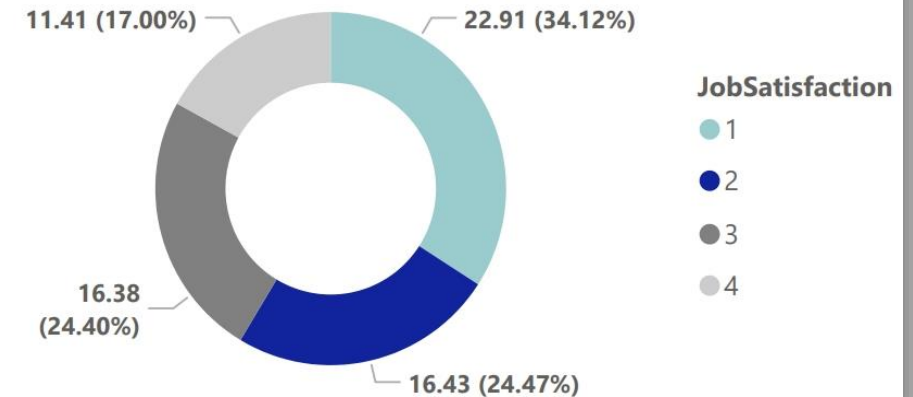
4.2 Job Satisfaction

Similar to work environment satisfaction, employees with the lowest job satisfaction (rating 1) exhibit the highest attrition rate. Higher job satisfaction is associated with lower attrition, highlighting the importance of ensuring employees find their roles fulfilling and rewarding.

Attrition Rate Based on Environment Satisfaction Rating



Attrition Rate Based on Job Satisfaction Rating



4. WORK CULTURE

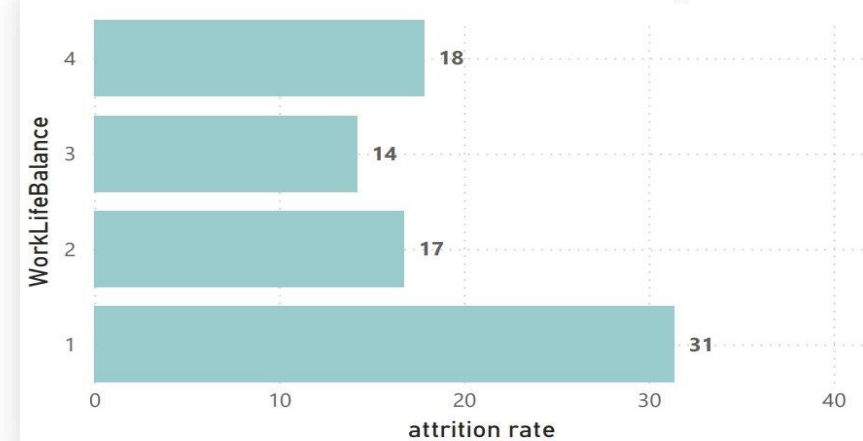
4.3 Work-Life Balance

Employees with the poorest work-life balance (rating 1) have the highest attrition rate, which significantly drops as work-life balance improves. Interestingly, the attrition rate slightly increases for the highest rating (4), suggesting possible outliers or differing expectations. Poor work life balance is a major driver of attrition, leading to burnout and dissatisfaction.

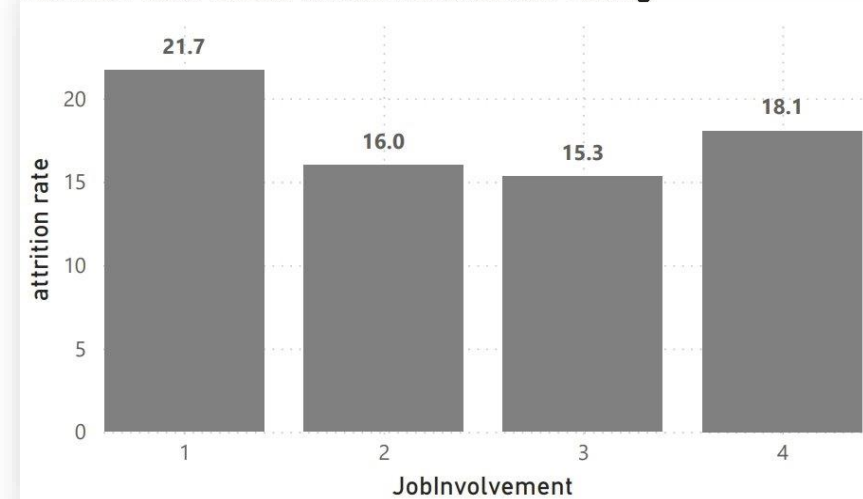
4.4 Job Involvement

Employees with the lowest job involvement (rating 1) exhibit higher attrition rates, indicating disengagement and lack of connection to their work. However, the highest job involvement rating (4) also shows a higher attrition rate, possibly due to burnout or over-commitment. Both low and excessively high job involvement can lead to attrition.

Attrition Rate Based on Work Life Balance Rating



Attrition Rate Based on Job Involvement Rating



5. CAREER PROGRESSION

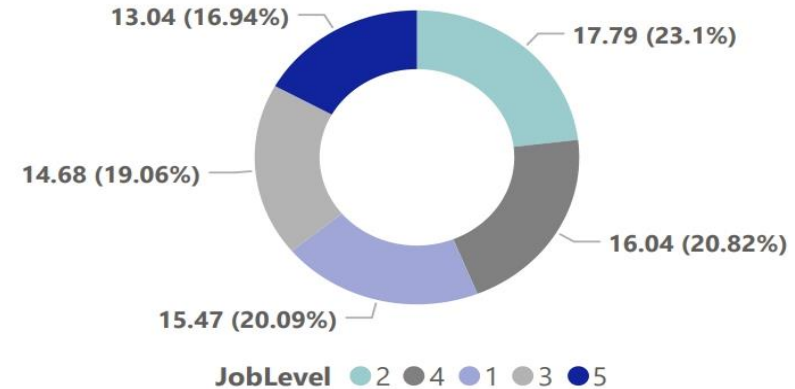
5.1 Job Level

Employees at mid-level positions (Job Level 2) exhibit the highest attrition rates. Attrition decreases as job levels increase, with senior level employees (Job Level 5) having the lowest attrition rates. This suggests that employees in lower and mid-level positions may feel less secure or less satisfied with their career progression.

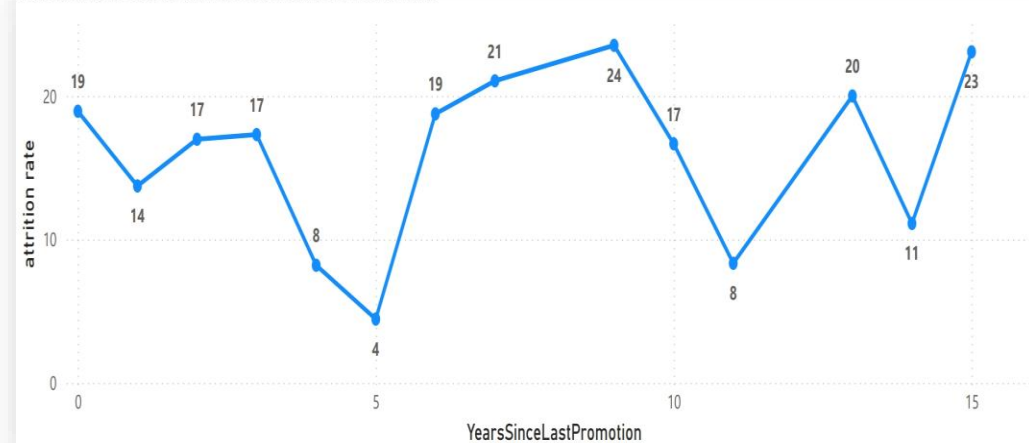
5.2 Years Since Last Promotion

Employees who have not received a promotion recently (0 years) have a high attrition rate, but surprisingly, attrition decreases significantly at the 4-5 year mark. However, employees who haven't been promoted for 6 years or more show a spike in attrition, indicating frustration or stagnation. Lack of promotion opportunities can lead to dissatisfaction and higher attrition, especially among employees who feel overlooked.

Attrition Rate Based on Job Level



Attrition Rate Based on Years Since Last Promotions



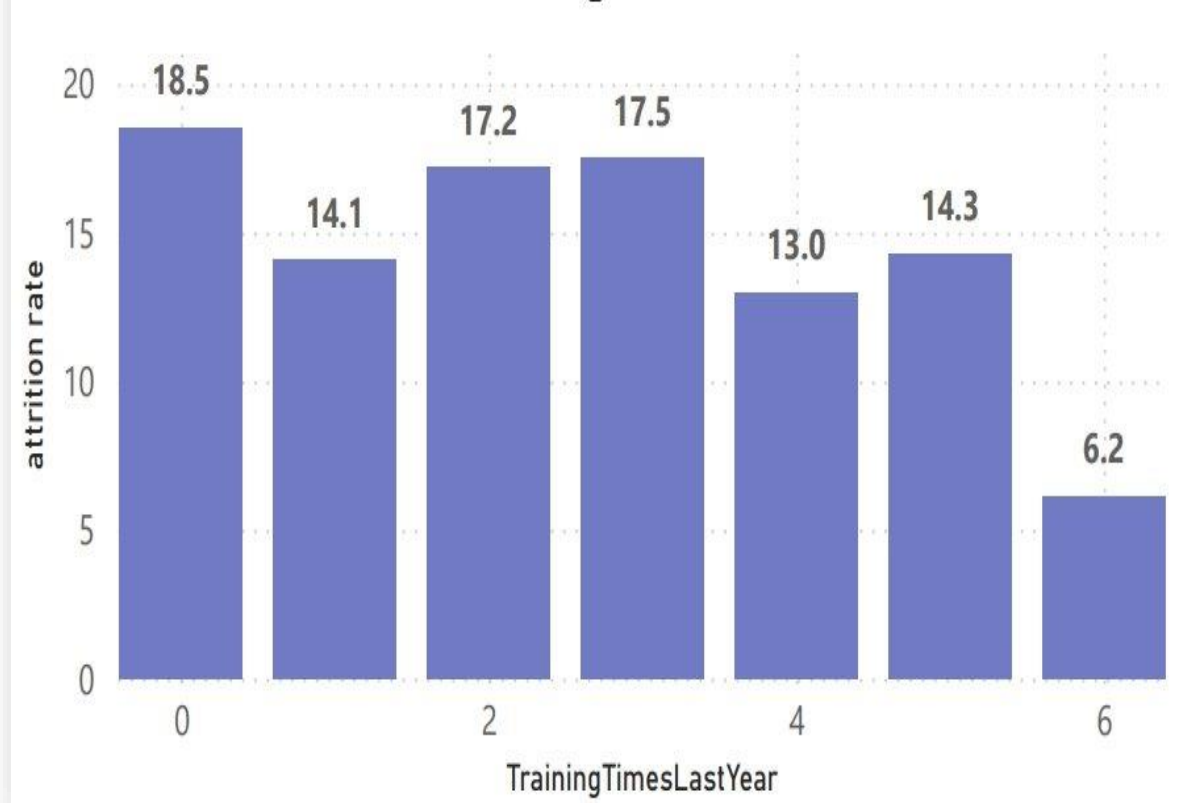
5. CAREER PROGRESSION

5.3 Training Times Last Year

Employees who received no training last year have the highest attrition rate. Training participation correlates with lower attrition rates, particularly notable for employees receiving training 4-6 times a year.

Lack of training opportunities can result in higher attrition due to perceived stagnation and lack of skill development.

Attrition Rate Based on Training Time Last Year



6. COMMUTE & TRAVELLING

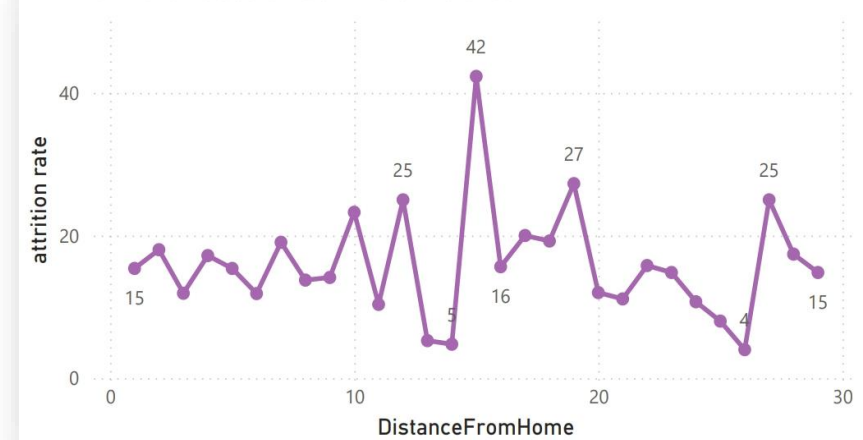
6.1 Commute Distance

Employees who commute longer distances (e.g., 12 km, 15 km, 19 km) show significantly higher attrition rates, with the peak at 15 km (42.31%). Conversely, employees with very short or moderate commutes (e.g., 3 km, 13-14 km, 26 km) exhibit lower attrition rates. Employees with lengthy commutes may struggle with work-life balance, leading to increased turnover

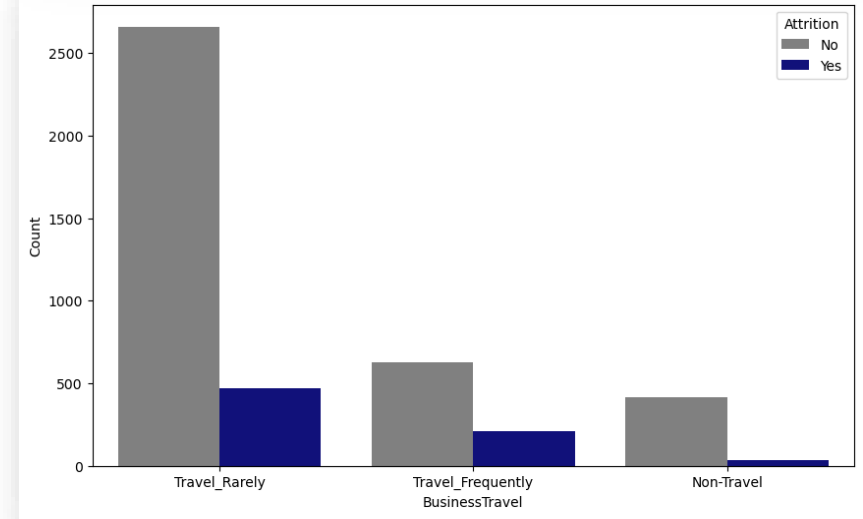
6.2 Business Travel

Employees who travel frequently for business exhibit the highest attrition rates, followed by those who travel rarely. Non-traveling employees have the lowest attrition rate. Frequent travel can be taxing, leading to burnout and reduced job satisfaction.

Attrition Rate Based on Commute Distance



Attrition Rate Based on Business Travel



7. EMPLOYEE PORTFOLIO

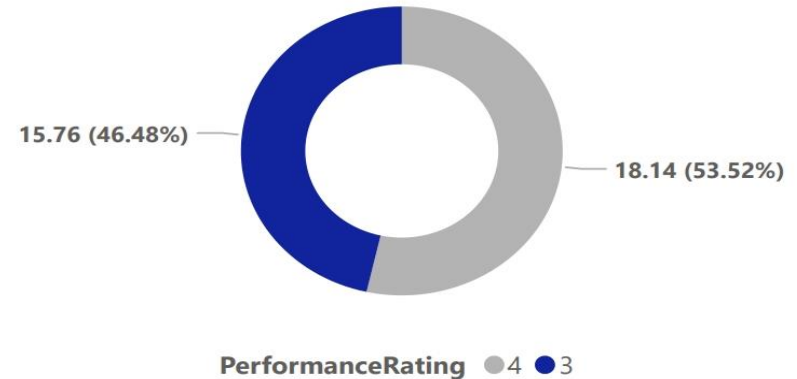
7.1 Performance Rating

Employees with higher performance ratings (4) have a higher attrition rate compared to those with a lower rating (3). High performers may feel underappreciated or seek better opportunities elsewhere. These employees often drive innovation and efficiency within the company, and their departure can result in decreased performance and morale.

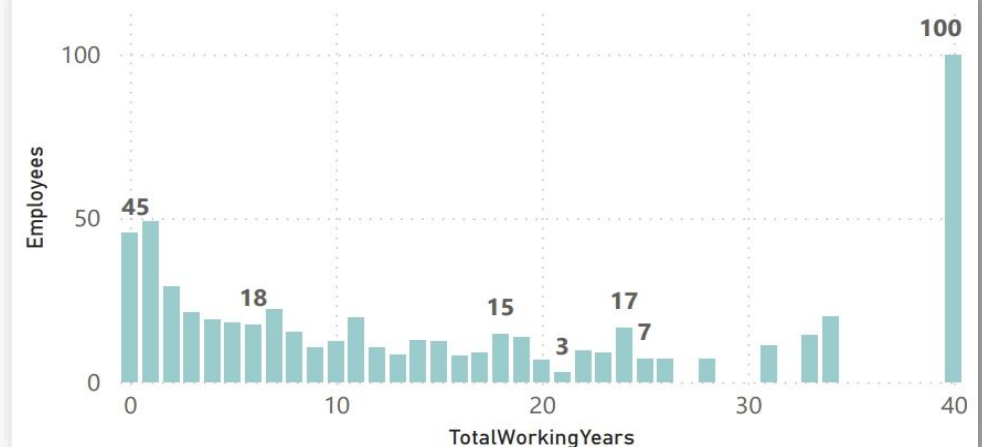
7.2 Total Experience

Attrition rates decrease as work experience increases. High attrition rates at 0 and 1 year indicate that new hires are more likely to leave, possibly due to poor onboarding, unmet job expectations, or a mismatch with company culture. The spike at 40 years suggests retirement or end-of-career departures.

Attrition Rate Based on Performance Rating



Attrition Rate by Total Working Years



7. EMPLOYEE PORTFOLIO

7.3 Years at Company

Attrition rates are highest at 0 years (36.36%), 1 year (34.50%), and again at higher tenure milestones like 23 years (50%) and 40 years (100%).

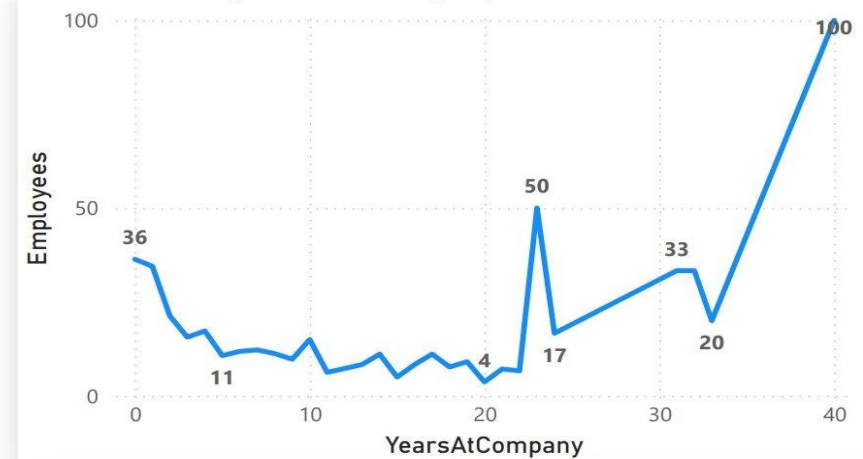
High early attrition suggests issues with integration or satisfaction during the initial employment period. Attrition at longer tenures may be due to retirement or seeking new challenges.

7.4 Total Companies Employees Worked

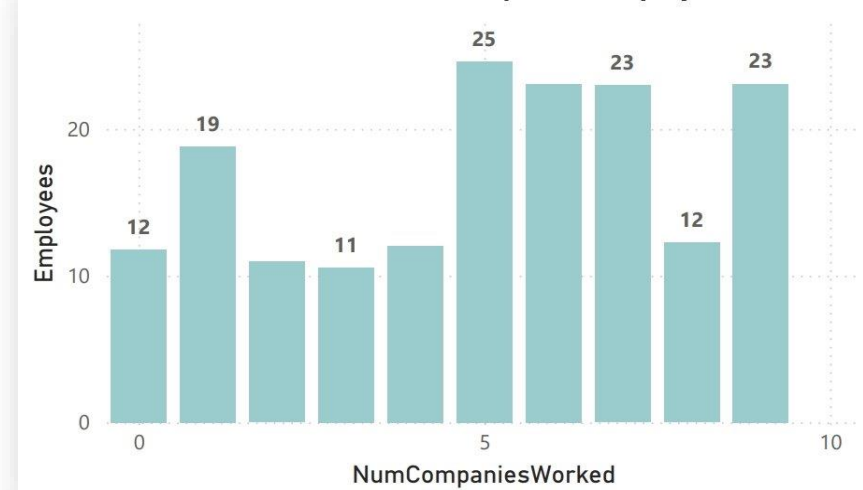
Employees who have worked for more companies (5 or more) tend to have higher attrition rates.

Those with varied work histories might be more adaptable and marketable, leading to higher attrition as they seek better opportunities. Conversely, employees with fewer past employers generally tend to stay longer.

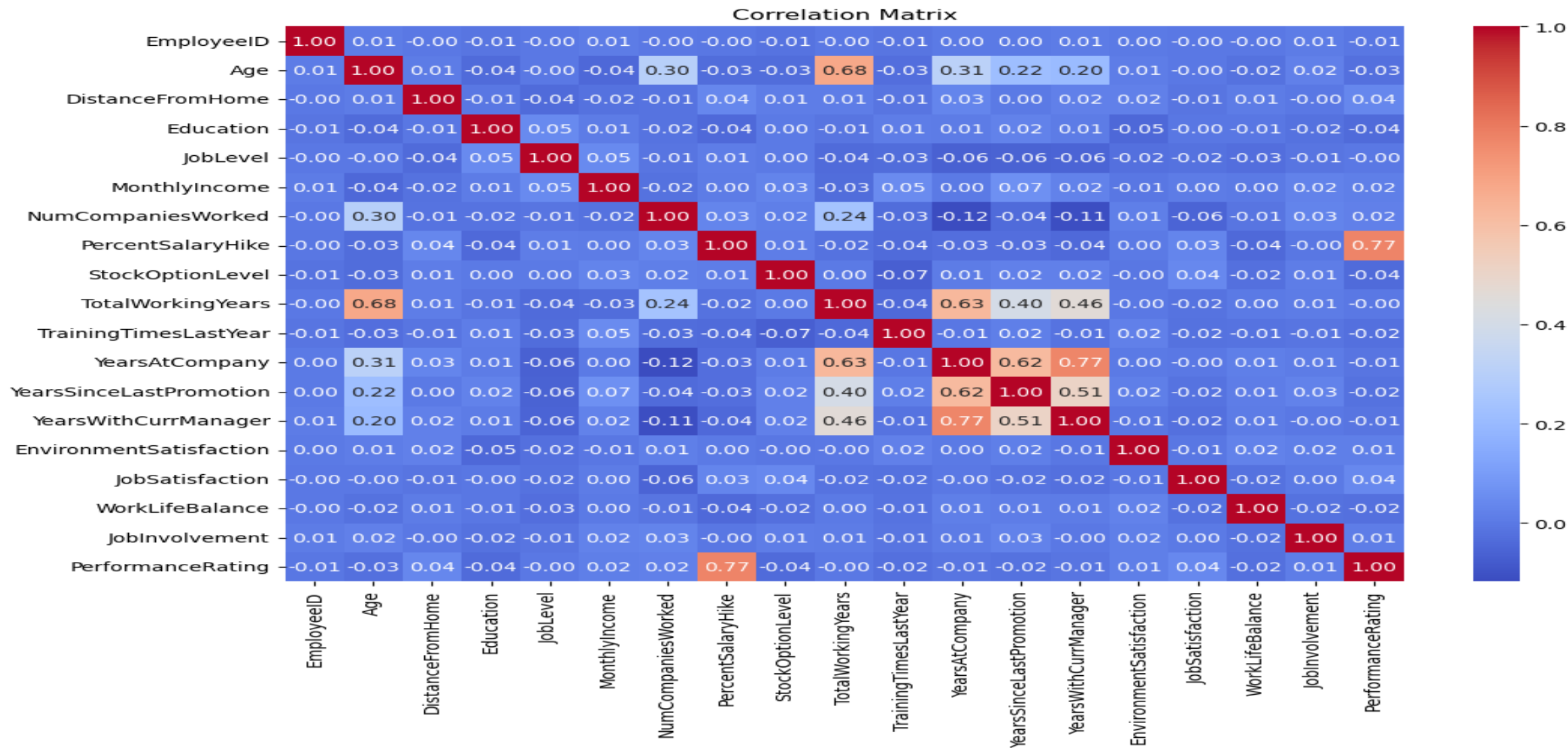
Attrition Rate by Years at Company



Attrition Rate Based on Num of Companies Employees Worked



CORRELATION ANALYSIS



CORRELATION ANALYSIS

Strong Correlations: Total Working Years and Age (0.68) show that older employees typically have more working years. Job Level and Monthly Income (0.47) indicate higher job levels are linked with higher incomes. Percent Salary Hike and Stock Option Level (0.77) reveal that higher salary hikes are strongly associated with higher stock options.

Moderate Correlations: Years At Company and Years With Current Manager (0.77) suggest that longer tenure at the company often means more time with the current manager. Total Working Years and Years Since Last Promotion (0.40) indicate that more working years generally result in more time since the last promotion. Environment Satisfaction and Job Satisfaction (0.50) show a moderate link, suggesting satisfaction in the work environment is related to overall job satisfaction.

Weak Correlations: Distance From Home and Monthly Income (0.01) indicate a minimal effect on income. Units Sold and Unit Price (-0.20) suggest that higher sales volumes may slightly reduce unit prices.

Employees with more working years tend to be older and advance in their careers, while higher job levels and salary hikes are linked to increased incomes and stock options. Longer tenure at a company often means more time with the current manager, and job satisfaction is related to environment satisfaction. Distance from home has little effect on income, and higher sales volumes may slightly reduce unit prices.

SUMMARY

Demographics: Higher attrition is observed among younger employees, especially those aged 18-22, as well as single individuals and males. These groups demonstrate significantly elevated turnover rates.

Salary and Financial Incentives: There is a moderate correlation between stock options, salary increases, and attrition. Employees receiving lower stock options or minimal salary hikes are more likely to leave the company.

Job-Related Factors: Attrition is higher in certain departments, such as Human Resources, and in specific roles like Research Directors. Employees who have spent 0 years under their current manager also exhibit the highest turnover rates.

Work Culture: Poor work environment satisfaction, low job satisfaction, and inadequate work-life balance are strongly linked to increased attrition.

Career Progression: Employees at lower job levels and those who have experienced long gaps since their last promotion show higher attrition. Frequent job changes and a lack of recent promotions contribute significantly to turnover.

Commute and Travel: Employees with longer commutes (15+ units) and those who travel frequently for work tend to leave at higher rates.

Employee Portfolio: New hires and employees with varied job histories, including those with many previous employers, show a greater likelihood of leaving the company. Extensive work experience across multiple jobs also correlates with higher attrition.

RECOMMENDATIONS

Enhance Employee Engagement: Introduce programs that focus on improving job satisfaction and work-life balance, with a special emphasis on younger and single employees to address their unique needs

Review Financial Incentives: Offer competitive salary increases and stock options to retain talent, especially for employees receiving minimal raises, ensuring compensation is aligned with performance and market standards.

Support Career Development: Establish clear career progression paths and provide regular opportunities for promotions and skill development, helping to boost employee morale and commitment.

Improve Work Environment: Cultivate a positive work culture that emphasizes employee satisfaction and job involvement, creating an environment where employees feel valued and engaged.

Optimize Commute and Travel Policies: Implement flexible working arrangements and reduce the need for frequent business travel to help lower attrition rates and enhance work-life balance.

Monitor and Support New Hires: Focus on supporting new hires and employees with varied job histories by offering mentorship and integration programs to promote retention and smoother transitions

LIMITATIONS

Data Quality: Issues like missing values, inaccuracies, or outdated information in the dataset could compromise the reliability of the analysis and lead to misleading conclusions.

Limited Scope: The analysis focuses primarily on internal company data, potentially overlooking external factors such as industry trends, economic conditions, and regional job markets, which may influence attrition.

Lack of Real-Time Data: The analysis is based on historical data and may not capture real-time changes or emerging trends that could affect employee behavior and attrition patterns.

Generalizability: The insights and predictions generated are specific to the company under study and may not apply to other organizations with different contexts, cultures, or employee demographics.

THANK YOU
