

Attrition in an Organization

Why Employees Quit?

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Introduction

Employee attrition is a major challenge for organizations, as the continuous loss of employees leads to increased costs and decreased productivity, which negatively impacts performance stability and the achievement of strategic goals. As Business Intelligence Analysts, we aim to understand the root causes of this problem by analyzing available data and identifying the factors that influence attrition, to provide informed recommendations that help reduce employee turnover and improve the work environment.

About Our Dataset

Our dataset contain data with details about employees, including personal information, performance, job satisfaction, work history, and attrition status. This data helps analyze factors influencing employee attrition, such as income, travel, overtime, and other variables that can be used to identify patterns and trends to improve retention strategies and enhance the work environment.

- Columns and its description:

Column Name	Description
EmployeeNumbe	A unique identifier for each employee.
Age	The age of the employee.
Gender	The gender of the employee.
MaritalStatus	Marital status of the employee.
Education	Employee's level of education.
EducationField	The educational field or specialization of the employee.
Hire Date	Date when the employee was hired.
Department	The department where the employee works (e.g., Sales, Research & Development).
JobRole	The specific job role of the employee.
Attrition	Indicates if the employee left (Yes) or stayed (No).
BusinessTravel	Frequency of business travel for the employee (e.g., Rarely, Frequently).
OverTime	Whether the employee works overtime (Yes/No).
DistanceFromHome	Distance between the employee's home and workplace.
StandardHours	Official standard working hours.
HourlyRate	The employee's hourly pay rate.
DailyRate	The daily rate of pay for the employee.
MonthlyRate	Monthly rate of pay for the employee.
MonthlyIncome	Monthly income of the employee.
PercentSalaryHike	Percentage increase in salary.
StockOptionLevel	Level of stock options provided to the employee.
NumCompaniesWorked	Number of companies the employee worked for previously.
TotalWorkingYears	Total years of work experience for the employee.

TrainingTimesLastYear	Number of training sessions the employee attended last year.
PerformanceRating	Performance rating of the employee (scale of 1 to 4).
Performance Score	Overall performance score of the employee.
Emp Satisfaction	Overall satisfaction level of the employee.
RelationshipSatisfaction	Satisfaction with work relationships (scale of 1 to 4).
WorkLifeBalance	Employee's work-life balance rating (scale of 1 to 4).
YearsAtCompany	Total years the employee has worked in the company.
YearsAtCompany	Total years the employee has worked in the company.
YearsInCurrentRole	Number of years the employee has been in their current role.
YearsSinceLastPromotion	Years since the employee's last promotion.
YearsWithCurrManager	Years the employee has worked with their current manager.

Attrition report data preparation and cleaning

PYTHON:

- 1- Import pandas library to read csv file.
- 2- Change Hire Date type using to_datetime function.
- 3- View the table to check the columns and have a good look on the table's contents.

```
[1]: import pandas as pd

[7]: # Load the CSV file
hr = pd.read_csv("C:/Users/Hp/Desktop/jomana/capstone project/HRData.csv")
# Convert the column with serial numbers to datetime format
hr['Hire Date'] = pd.to_datetime(hr['Hire Date'], origin='1899-12-30', unit='D')

# Display the first few rows of the CSV data
hr.head()
```

- 4- Check the dataset for null and missing values using hr.info(), you can also see the dataset size and data type.

```
[9]: hr.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1470 entries, 0 to 1469
```

- 5- Remove irrelevant columns such as “POC or POC NA” which indicates “People of color and non-People of color”, other “ID” columns were removed for being irrelevant.

```
[11]: # Removing specified columns from the DataFrame
columns_to_remove = ['Perf Score ID', 'Gender ID', 'POC or POC NA', 'Position ID', 'Race Desc', 'Race ID', 'EmployeeNumber.1']
hr_cleaned = hr.drop(columns=columns_to_remove, errors='ignore')

# Display the first few rows of the cleaned dataset
hr_cleaned.head()
```

- 6- Drop/remove all duplicates.

```
[13]: hr_cleaned.drop_duplicates()
```

- 7- Check the now cleaned dataset.

```
[15]: hr_cleaned.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1470 entries, 0 to 1469
```

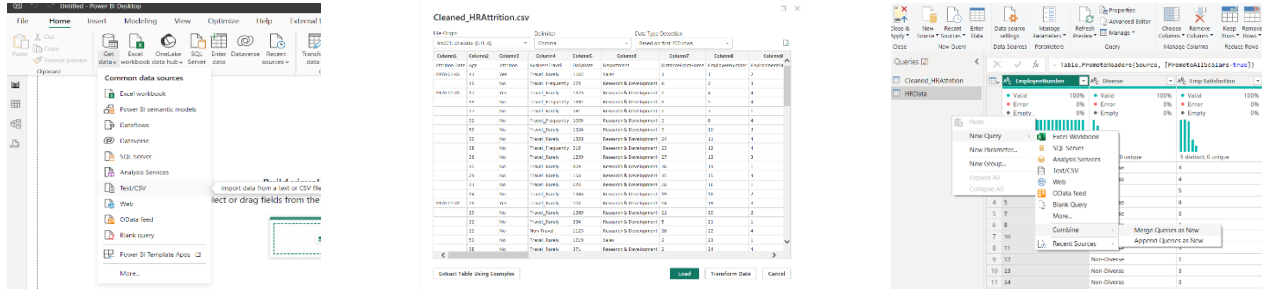
- 8- Save the file.

```
[17]: hr_cleaned.to_csv("C:/Users/Hp/Desktop/jomana/capstone project/HRData.csv", index=False)
print("Changes Saved")

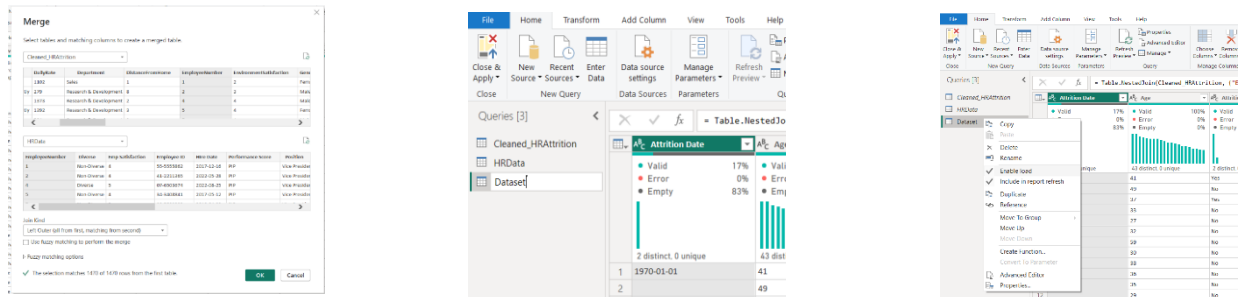
Changes Saved
```

POWER QUERY:

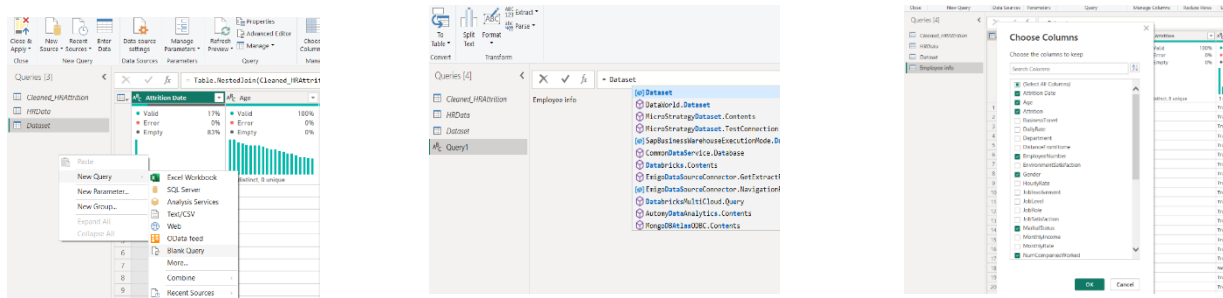
- Upload the cleaned dataset into power query (Cleaned_HRAAttrition + HRData)
- Merge the two tables in a new table.



- Merge columns on “EmployeeNumber”, this’ll act as a unique identifier
- Use first rows as headers and change datatypes, then change the merge table’s name to “dataset”.
- Uncheck Enable load from all 3 tables.



- Create 3 new blank queries (Employee info, Job details, Survey)
- Enter = *dataset* to get the merged table in each query.
- Choose the columns for Employee info, Job details and Survey.
- Change the table’s name.



KPI:

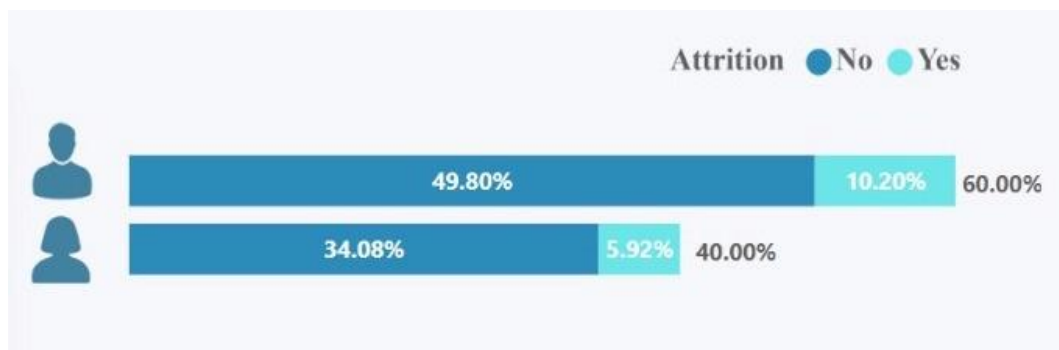
We used these KPIs to analyze the attrition rate and identify trends contributing to employee turnover.

- 1- Attrition Rate =
DIVIDE((COUNT('Employee info'[Employee ID]) - [Current Employees]), COUNT('Employee info'[Employee ID]), 0)
- 2- Current Employees =
CALCULATE(SUM('Employee info'[Employee Count]), 'Employee info'[Attrition] = "No")
- 3- Former Employees =
CALCULATE(COUNT('Employee info'[Employee ID]), 'Employee info'[Attrition] = "Yes")
- 4- Total Attrition =
CALCULATE(COUNTROWS('Employee info'), 'Employee info'[Attrition]="Yes")
- 5- Job Satisfaction =
CALCULATE([Current Employees], Survey[JobSatisfaction] IN {3, 4})

Structure of our analysis

This report will be structured in the following way:

1. **Questions:** We will present key questions to ensure that the visualizations in this report provide valuable insights.
2. **Insights:** We will provide insights after each section to clarify findings from the visualizations and data analysis.
3. **Recommendations:** We will offer recommendations aimed at helping the organization reduce its attrition rate.



Attrition by gender:

Questions:

- What is the attrition rate for male and female employees?
- Which gender shows a higher percentage of attrition?

Insights:

- The attrition rate for male employees is 10.20%, while for female employees it is 5.9%.
- This indicates that male employees have a significantly higher attrition rate than female employees (10.2% vs. 5.9%). This suggests that factors impacting attrition may be affecting male employees more strongly or that male employees might face unique challenges leading to higher turnover.

Recommendations:

- The difference in turnover rates between genders suggests there may be unique challenges faced by male employees that need to be addressed to improve retention.
- Conduct focus groups segmented by gender to identify specific challenges and work-life balance needs. Consider introducing flexible work policies or benefits tailored to each group's needs.



Questions:

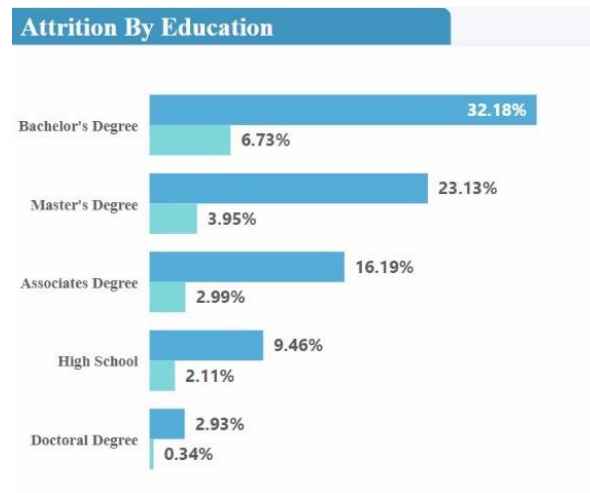
- Which age group has the highest attrition rate, and which has the lowest?

Insights:

- The age group 31-35 has the highest attrition, with 60 out of 343 employees leaving, while the age group 55+ has one of the lowest attrition rates, with only 8 out of 47 employees leaving.

Recommendations:

- Younger employees often seek rapid career progression and skill development, which might not be fully supported by existing programs.
- Enhance career development programs targeted at younger employees, such as mentorship, skill-building workshops, and clearly defined promotion paths. Flexible benefits packages may also help in meeting diverse age-specific needs.



Questions:

- Which education level has the highest attrition rate, and which has the lowest?

Insights:

- Employees with bachelor's Degrees have the highest attrition, with 99 out of 572 leaving, whereas those with Doctoral Degrees have the lowest attrition, with only 5 out of 48 leaving.

Recommendations:

- Employees with lower educational qualifications might feel limited in their career progression within the company, leading to higher attrition.
- Offer additional upskilling and training programs to allow employees with lower educational levels to advance within the organization. Provide clear career paths for all education levels to increase motivation and retention.



Questions:

- How many employees are in each department, and how many have left?
- Which department has the highest attrition rate, and which has the lowest?

Insights:

- In the Research and Development Department, the number of current employees is 828, and 133 have left. In the Sales Department, the number of current employees is 354, and 92 have left. In the Human Resources Department, the current employees are 51, and 12 have left.
- The Sales department shows higher attrition rates, with a significant portion of employees leaving, while the Research & Development department has the lowest relative attrition.

Recommendations:

- Each department has unique challenges, such as high targets in Sales or workload in R&D, which may contribute to higher turnover rates.
- Adjust department-specific goals to be more realistic and provide additional resources to manage workload in high-stress departments. In Sales, consider providing mental health support or implementing recharge days to reduce burnout.

Attrition By Job Role			
JobRole	Employees Number	Total Attrition	Attrition Rate ▼
Sales Representative	83	33	40%
Laboratory Technician	259	62	24%
Human Resources	52	12	23%
Sales Executive	326	57	17%
Research Scientist	292	47	16%
Manufacturing Director	145	10	7%
Healthcare Representative	131	9	7%
Manager	102	5	5%
Research Director	80	2	3%

Questions:

- How many employees are in each job role, and how many have left?
- Which job role has the highest attrition rate, and which has the lowest?

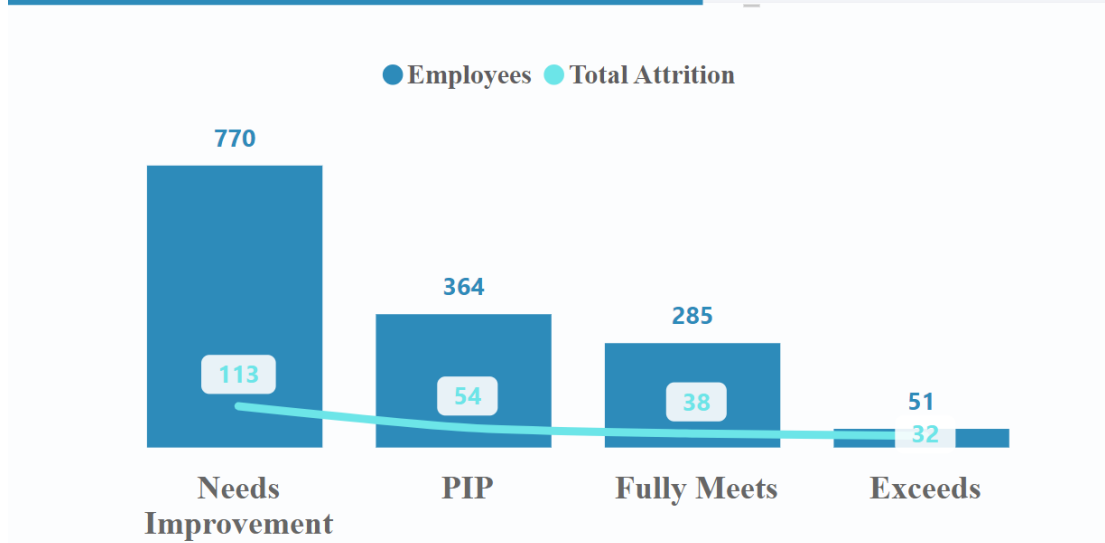
Insights:

- The Sales Representative role has the highest attrition, with 33 out of 83 employees leaving, followed by Laboratory Technician with 62 out of 259, and Human Resources with 12 out of 52 employees leaving. On the other hand, the Research Director role has the lowest attrition, with only 2 out of 80 employees leaving. Other roles, like Executives and Scientists, have more typical attrition rates compared to the highest and lowest roles.
- The job role with the highest attrition rate is Sales Representative, with 40% of employees leaving, while the role with the lowest attrition rate is Research Director, with only 3% attrition.

Recommendations:

- Focus on high- attrition jobs: Find out why sales reps and lab technicians leave their jobs. Then work to address those reasons.
- Offer career growth opportunities: Give employees in positions like sales manager and research scientist a clear path to advance in their careers. This will help them stay longer.
- Check in regularly: Talk to employees often, especially those in high- attrition positions, to understand their needs and make them feel valued.
- Make work fun: For positions with moderate attrition, like HR manager and manufacturing manager, try adding flexible hours or wellness programs to keep employees happy.
- Leverage Stability in Leadership: Low attrition among Managers and Research Directors can be an asset. Encourage them to mentor high- attrition teams, like Sales and Lab staff, to boost engagement and morale across the company

Attrition By Employees Performance



Questions:

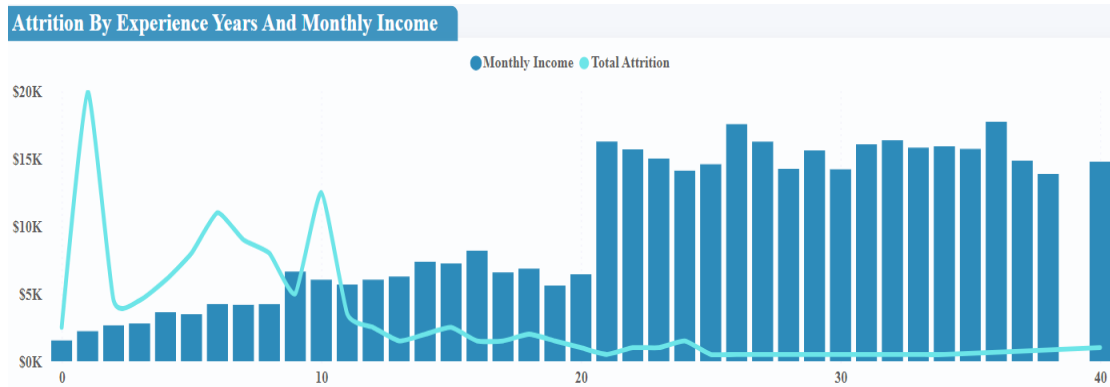
- Is there a relationship between employee performance and their desire to leave?
- How does performance impact the attrition rate?

Insights:

- There is an inverse relationship between attrition and performance. As performance ratings go up, attrition rates go down.
- Needs Improvement: Highest attrition rate, with 113 out of 770 employees leaving.
- PIP (Performance Improvement Plan): Second highest, with 54 out of 364 leaving.
- Fully Meets: Lower attrition rate, with 38 out of 285 leaving.
- Exceeds: Lowest attrition rate, with only 32 out of 51 leaving. Employees with higher performance ratings are more likely to stay.
- Employees with lower performance ratings are more likely to leave.

Recommendations:

- Help Employees Who Need Improvement: Offer extra training and support for employees in the "Needs Improvement" group. This can help them do better and make them less likely to leave.
- Reward High Performers: Give bonuses or promotion chances to employees rated as "Exceeds Expectations." This will make them want to stay longer.
- Improve the PIP Program: Strengthen the Performance Improvement Plan (PIP) by offering more support to those in it, like regular check-ins and personal guidance.
- Act Early: Spot low performers early and provide help right away. This can prevent them from leaving later on.



Questions:

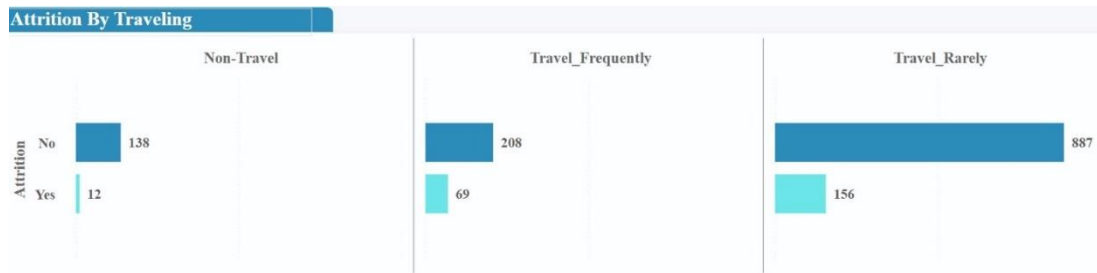
- What is the relationship between attrition rate, monthly income, and years of experience? And how is attrition affected by these factors?

Insights:

- There is an inverse relationship between attrition, experience, and income. As employees gain more experience, they typically earn more, which results in fewer of them leaving.
- Employees with over 15 years of experience and an income between \$14,100 and \$17,700 have very low attrition rates
- Around 10 years of experience, attrition rises, possibly because employees reach a level of experience without a corresponding increase in income.

Recommendations:

- **Focus on Retaining New Employees:** Build loyalty with new hires by giving them special training, clear growth paths, and good benefits. Show them from the start that they have a future in the company.
- **Adjust Salaries Based on Experience:** Regularly check and adjust salaries to match employees' experience and years at the company. This will help keep mid-career employees, especially those with around 10 years of experience, who might feel underpaid.
- **Maintain Benefits for High Earners:** Offer bonuses and extra benefits to long-term, high-earning employees. This keeps experienced talent happy and less likely to leave.



Questions:

- Is there a relationship between Employee Attrition and Business Travel?

Insights:

- Frequent Travel appears to have a higher correlation with turnover compared to non-travel, possibly due to travel demands.
- Rare Travelers also show significant attrition, suggesting that travel frequency alone isn't the only factor; other workplace conditions might be influencing these employees' decisions to leave.
- This analysis highlights that travel patterns alone don't fully explain attrition; other job satisfaction or work-life balance issues likely play a role.

Recommendations:

Reducing business trips for employees can have a positive impact on their comfort and stability. And using alternative ways:

- Encourage Remote Work: Promote working from home or other locations to boost comfort and productivity.
- Use Virtual Meetings: Implement tools like Zoom or Teams to minimize travel for meetings.
- Limit Essential Travel: Evaluate trips to ensure only necessary ones are undertaken.
- Provide Support: Offer mental health and wellness programs to manage travel-related stress.
- Foster Work-Life Balance: Create a culture that values rest and balance.
- Offer Incentives: Provide rewards for employees who choose remote work over travel.
- Engage Employees: Communicate with employees to gather feedback on travel experiences and improve policies.



Questions:

- Is there a relationship between Employees Stock Option Level and Employee Attrition?

Insights:

- Employees without stock options have a high retention rate (477 stay vs. 154 leave).
- Employees with stock options at Level 1 tend to stay at a high rate, indicating that some stock options may help with retention.
- Higher stock option levels (2 and 3) correlate with low attrition, suggesting that generous stock options are effective in retaining employees.
- Higher stock option levels are associated with lower attrition, indicating that employees may feel more valued and motivated to stay when they receive significant stock incentives.

Recommendations:

- We need to encourage our employees to invest in our stocks, promising increased returns and offering bonus shares exclusively for employee investors.



Questions:

- Is there a relationship between Overtime and Employee Attrition?

Insights:

- Low Overall Attrition: A majority of employees (944) did not leave the company
- Overtime Impact: A higher proportion of employees who left (127) worked overtime, suggesting a potential link between overtime and attrition.

Recommendations:

- Implement policies that encourage a healthy work-life balance, such as flexible scheduling and limits on mandatory overtime. This can help reduce employee burnout and improve overall job satisfaction, potentially lowering attrition rates. Regularly check in with employees to assess their workload and well-being.

Employee ID	Age	Education	YearsAtCompany	YearsWithCurrManager	Performance Score	TrainingTimesLastYear	YearsSinceLastPromotion	MonthlyIncome
00-8763986	18	Bachelor's Degree	0	0	Needs Improvement	4	0	\$1,514
12-6179294	18	Bachelor's Degree	0	0	PIP	2	0	\$1,200
40-6560534	18	Bachelor's Degree	0	0	PIP	2	0	\$1,420
53-2512832	18	Associates Degree	0	0	Exceeds	2	0	\$1,569
54-0299293	18	Associates Degree	0	0	Needs Improvement	2	0	\$1,051
66-0067366	18	Bachelor's Degree	0	0	Needs Improvement	3	0	\$1,878
68-6990856	18	Bachelor's Degree	0	0	Needs Improvement	5	0	\$1,611
96-5408830	18	High School	0	0	Needs Improvement	0	0	\$1,904
07-5340389	19	Bachelor's Degree	1	0	PIP	3	1	\$1,102
17-2302434	19	Bachelor's Degree	1	0	Needs Improvement	3	0	\$2,121
21-6532043	19	High School	0	0	PIP	2	0	\$1,675
27-0873868	19	Bachelor's Degree	1	0	Needs Improvement	2	0	\$1,859
40-8491363	19	High School	1	0	PIP	3	0	\$1,483
54-4557834	19	Bachelor's Degree	1	1	Needs Improvement	2	0	\$2,994
69-3858295	19	Associates Degree	1	0	Needs Improvement	4	0	\$2,552
82-8183947	19	Associates Degree	1	0	Needs Improvement	3	0	\$2,564
88-1512941	19	High School	0	0	PIP	5	0	\$2,325
04-4772506	20	Bachelor's Degree	1	0	Needs Improvement	0	0	\$2,836

Questions:

- What is the correlation between 'YearsAtCompany' and 'Performance Score'?

Insights:

We can observe that employees with fewer years at the company are more likely to have lower performance scores, with many in the "Needs Improvement" or "PIP" categories. However, there are also employees with longer tenure who still have performance issues, suggesting that both new and tenured employees may face challenges in meeting performance expectations. Additionally, some employees with higher "YearsSinceLastPromotion" also appear to have lower performance scores, which could indicate a lack of motivation due to limited growth opportunities.

Recommendations:

- Introduce a more comprehensive onboarding and early development program to better equip newer employees for success.
- Implement regular performance reviews and feedback sessions for both new and long-tenured employees to address performance issues proactively and support their growth.
- Review promotion and recognition policies, especially for employees who haven't been promoted in several years.
- Customized Training Based on Tenure and Performance.

Score >>	1	2	3	4
Environment Satisfaction				
Attrition	72	43	62	60
Retention	212	244	391	386
Job Involvement				
Attrition	28	71	125	13
Retention	55	304	743	131
Job Satisfaction				
Attrition	66	46	73	52
Retention	223	234	369	407
Relationship Satisfaction				
Attrition	57	45	70	64
Retention	219	258	388	368
Work Life Balance				
Attrition	25	58	127	27
Retention	55	286	766	126

Questions:

- What factors most contribute to employee attrition?
- How do satisfaction levels correlate with retention rates?
- What actions can we take to enhance employee satisfaction and reduce attrition?

Insights :

- Environment Satisfaction

When employees rated their environment with a score of 1, we saw an attrition rate of 72. As satisfaction improved to a score of 4, attrition decreased to 60, indicating the need for a positive work environment to retain talent

- Job Involvement

Attrition rose to 125 at a score of 3 but dropped to 13 at a score of 4. This highlights the importance of fostering employee engagement to enhance retention.

- Job Satisfaction

At a score of 1, we lost 66 employees, while retention increased to 407 at a score of 4. Job satisfaction is critical for workforce stability.

- Relationship Satisfaction

Attrition was 57 at lower satisfaction scores, but strong relationships kept retention high at 368. Building connections within teams promotes loyalty.

- Work-Life Balance

We saw attrition peak at a score of 3, with 127 employees leaving. Supporting a healthy work-life balance is essential.

Recommendations:

To reduce attrition rates, we recommend:

- Enhancing the Work Environment: Foster a supportive workplace culture.
- Encouraging Job Involvement: Offer opportunities for employee engagement in decision-making.
- Focusing on Job Satisfaction: Regularly assess and address employee feedback
- Strengthening Workplace Relationships: Promote team building and mentorship.
- Supporting Work-Life Balance: Provide flexible working options and resources

By addressing these areas, we can create a workplace where employees feel valued and engaged.

Conclusion

The analysis of employee attrition reveals multiple factors influencing turnover across different demographics and job roles. Key findings include:

1. **Gender:** Male employees have a higher attrition rate (10.2%) compared to female employees (5.9%). This difference suggests potential unique challenges faced by male employees, which may require targeted retention efforts.
2. **Age Group:** The 31–35 age group has the highest attrition, likely due to career development needs. Younger employees often seek advancement, indicating the need for structured career progression programs.
3. **Education Level:** Employees with Bachelor's degrees exhibit the highest attrition, potentially due to perceived career limitations. Providing upskilling opportunities may help retain talent across educational backgrounds.
4. **Department:** The Sales department shows the highest attrition, while Research & Development has lower turnover. Department-specific support, such as wellness programs, may help reduce stress in high-turnover areas.
5. **Job Role:** Sales Representatives have a high attrition rate (40%), while Research Directors have low turnover. Offering clear career paths and regular check-ins could improve retention in high-attrition roles.
6. **Performance:** An inverse relationship exists between performance and attrition. Employees with lower ratings are more likely to leave. Strengthening support for underperforming employees and rewarding high performers are essential for retention.
7. **Income & Experience:** Higher-income, experienced employees show lower attrition. Adjusting compensation to match experience levels may reduce mid-career turnover.
8. **Business Travel & Overtime:** Frequent travel and overtime correlate with higher attrition. Reducing travel requirements and promoting work-life balance can lower turnover in affected groups.

In conclusion, this report highlights the critical factors influencing employee attrition within the organization, from demographic variations to role-specific challenges. Through this analysis, we've gained a deeper understanding of where attrition rates are highest and what underlying issues may contribute to turnover. Addressing these insights is essential to building a more resilient and engaged workforce. By implementing targeted strategies, the organization can foster a supportive environment that values career growth, work-life balance, and employee well-being. A focused effort on these areas will help the organization retain its talent, enhance morale, and strengthen overall productivity.

Final Recommendations

1. Develop Targeted Retention Programs

Implement department- and role-specific initiatives to address unique challenges, such as flexible work policies for high-stress departments and mental health support in high-turnover areas.

2. Enhance Career Development Opportunities

Provide structured promotion paths, skill-building workshops, and mentorship for younger employees and high-turnover roles. Clear career progression can increase engagement and retention.

3. Promote Work-Life Balance

Reduce mandatory overtime, expand remote work options, and offer wellness resources to support a balanced work environment and minimize burnout.

4. Implement Recognition and Rewards Programs

Create incentives for high-performing employees, such as bonuses and advancement opportunities, to increase motivation and reinforce loyalty across the workforce.

5. Conduct Regular Employee Check-Ins

Use periodic feedback sessions to understand evolving employee needs, identify potential stressors early, and make adjustments to improve job satisfaction and engagement.

By prioritizing these recommendations, the organization can build a culture where employees feel valued, supported, and motivated to contribute to long-term success.