**Understanding Employee Attrition: A Comprehensive Analysis of HR Data**

**Introduction**

The purpose of the project is to gain a deeper understanding of employee attrition in the HR data set. By examining various demographic factors such as age, gender, education and marital status, the project aims to identify patterns and factors that may be contributing to attrition. Additionally, it tries to examine the impact of work-related factors such as job satisfaction, work-life balance, job involvement, etc on attrition rates. The study will help the organization in making data-driven decisions to improve employee retention and create a better work environment. Ultimately, the project aims to identify actionable strategies that can improve talent management and reduce attrition.

The dataset is about HR attrition which contains detailed information about employees within an organization. It includes various aspects of the employees, including demographic data, job-related factors, and employee satisfaction. The dataset primarily focuses on understanding and analyzing the attrition rates and the factors that may influence employees’ decisions to stay with or leave the company. This comprehensive dataset also provides valuable insights into workforce dynamics, enabling the organization to make data-driven decisions to improve employee retention and create a better work environment.

I have downloaded the dataset from Kaggle.com. The link to the dataset: https://www.kaggle.com/datasets/whenamancodes/hr-employee-attrition/data

The dataset has 1470 rows, and the various columns are as follows: Age, Attrition, BusinessTravel, DailyRate, Department, DistanceFromHome, Education, EducationField, EmployeeCount, EmployeeNumber, EnvironmentSatisfaction, Gender, HourlyRate, JobInvolvement, JobLevel, JobRole, JobSatisfaction, MaritalStatus, MonthlyIncome, MonthlyRate, NumCompaniesWorked, Over18, OverTime, PercentSalaryHike, PerformanceRating, RelationshipSatisfaction, StandardHours, StockOptionLevel, TotalWorkingYears, TrainingTimesLastYear, WorkLifeBalance, YearsAtCompany, YearsInCurrentRole, YearsSinceLastPromotion, YearsWithCurrManager.

**Analysis Methodology Followed**

The analytical tool considered for this project is PowerBi because of its widespread usage and my familiarity with its features and functions. It is the leading business intelligence and data visualization tool developed by Microsoft. Power BI is well-known for its user-friendly interface, which makes it suitable for users of diverse levels of skills. For example, when working with complex datasets like HR attrition data, its extensive data connectivity options enable easy integration with a variety of data sources. Moreover, Power BI's connectivity with other Microsoft products improves data analysis and reporting capabilities, enhancing the tool's overall fit for this project.

To create Visualizations, first we need to clean the dataset and make sure that the table is complete and structured without any errors or missing values.

Visualization steps:

1. Select an appropriate graph for the visualization. In the below attached workforce age distribution visualization example, I have used a line and stacked column chart. This type of chart is suitable when we want to show how a whole category (age) is divided into subcategories (employee count within age groups) and understand the composition of each category.
2. Map the age column to the x-axis and count of Employees to the y-axis. We can just drag and drop the columns under the respective axis.
3. Customize the chart by selecting various colors, labels, and legends. I have used age group column as a legend to categorize the age.
4. It is very important to give a good and informative title to our visualizations. We can do this by going to format visual tab.
5. Finally, verify the accuracy of the data represented by the graph. Ensure that it effectively conveys the intended insights. If necessary, consider using filters to enhance its accuracy and effectiveness.

Examples:

* Visualization of Workforce Age Distribution

A graph of different colored bars

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* Visualization of Employee Job Satisfaction Distribution

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**Dashboards**

* Dashboard 1: Employee Demographics

A screenshot of a computer

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* Dashboard 2: Employee Job Satisfaction and Performance

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* Dashboard 3: Attrition Analysis

A screenshot of a data analysis

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**Analysis Result**

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| Dashboard 1 – Employee Demographics | |
| Positive Insights | Negative Insights |
| Gender diversity:  This insight can be observed from the gender distribution pie chart. The dashboard indicates a workforce that is gender diversified, with 63.29% males and 36.71% females. This balanced representation is a good indicator because variety promotes better problem solving, decision making, and innovation. It also allows the organization to attract and retain top people, demonstrating its commitment to inclusiveness and equal opportunity. A nearly equal gender ratio not only indicates less gender bias, but it also enhances overall satisfaction among employees, resulting in an inclusive and equitable workplace culture. Having a diverse workforce not only enhances the company's reputation but also ensures compliance with equal opportunity regulations, making it an attractive and legally compliant workplace. | Travelling distance:  The distance table shows that many employees (444) must travel a long way daily to work. This can lead to problems like stress, longer working hours, and less time for personal life. There are also quite a few employees (394) with moderately long commutes, who might be facing similar issues. To make things better, the company might want to think about ways to improve the balance between work and personal life, like letting employees work from home or giving them more flexible schedules, especially for those with long commutes. |
| Age diversity:  The dashboard shows that the organization has a good number of employees in the age group 18-40. This can be observed from the workforce age distribution line and stacked column graph. The organization has a combination of younger and more experienced employees. Younger individuals bring fresh perspectives, enthusiasm, and adaptability, while slightly older employees provide experience and stability. This combination of age groups provides a lively workplace where people of different generations can collaborate, learn from one another, and exchange vital expertise. It also indicates that the organization has a good balance of individuals who are just starting out their careers and those with more experience. This age diversity can improve how the company solves problems, boosts creativity, and creates a diverse and well-rounded workforce, all of which are critical for the company's long-term success and growth. |  |
| Education diversity:  This positive insight can be derived from the education distribution donut chart. With 41.77% of employees holding a bachelor's degree, we can say that the majority of the workforce is well-educated, which is excellent because it usually means they have a strong knowledge foundation and high critical thinking skills. The 24.47% with master's degrees have specific experience and advanced knowledge that might be beneficial for organizational innovation and leadership roles. The 18.57% of employees who have attended college add to the team's diversity, potentially offering practical skills and fresh perspectives. This diversity of educational backgrounds creates a learning culture in which employees may benefit from each other's abilities and experiences, enhancing workplace vibrancy and contributing to the company's success and competitiveness. |
| Good number of active employees:  From the active workforce overview graph, we can observe that 1233 out of 1470 employees are still actively working for the company, which shows that many employees choose to stay. This is a good sign because it means the company is good at retaining its employees. When employees stay, it helps the company work smoothly, and experienced employees can do their jobs well. It also suggests that the company is doing things right to keep employees happy and engaged, which is important for long-term success. Along with it, retaining employees saves the company money, as it's often cheaper to keep experienced employees instead of hiring and training new ones. In general, having a lot of active employees shows that the company has a healthy and successful work environment that supports its growth and stability. |

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| Dashboard 2 – Employee Job Satisfaction and Performance | |
| Positive Insights | Negative Insights |
| Job Satisfaction:  From the job satisfaction donut chart we can observe that, 31.22% and 30.07% of employees have opted their job satisfaction as ‘very high’ and ‘high’ respectively. This shows that the majority of employees are quite happy with their jobs, which is crucial to a company's success. Job satisfaction is directly related to higher employee motivation, engagement, and productivity. Moreover, higher levels of work satisfaction relate to lower levels of employee attrition, as content employees are less likely to leave their jobs. | Concerns with long term employees:  From the Employee Tenure Across Departments graph, we can see a concern for high attrition rate among employees with long tenure in their current job roles. It is high among the research and development team, followed by sales and HR department. This suggests that there might be some problems related to job satisfaction or career development within the team. Hence, to resolve this, the company might consider carrying in-depth exit surveys to identify the underlying causes for dissatisfaction. Additionally, the company can increase employee engagement and create professional by implementing career development and mentorship programs. |
| Job Roles and Satisfaction Drive High Performance:  This positive insight is derived from the performance by job role chart. The graph shows that sales executive teams have received the highest performance ratings, followed closely by research scientists and laboratory technicians. This indicates that specific job roles, particularly those in sales and research, have excelled in their performance, potentially due to their expertise and dedication. The correlation between high job satisfaction and high-performance ratings is evident. Employees who have reported high job satisfaction tend to receive high performance ratings, indicating that happy and motivated workers are more likely to succeed in their positions. |  |
| Married Employees Enjoy the Best Work-Life Balance:  From work-life balance and relationship satisfaction chart, the married employees have the highest relationship satisfaction and best work-life balance. This implies that being married may give a supportive and fulfilling personal life, which improves an employee's overall job satisfaction. Singles show positive relationship satisfaction and work-life balance, indicating that they are happy with their personal and professional lives. While divorced workers lag in these areas, they still report reasonably positive relationship satisfaction and work-life balance. This shows that personal happiness and strong relationships are important for a happy workplace and satisfied employees, which in turn, makes them work better and stay loyal to the company. |  |
| Long-term Employees are Satisfied:  From the employee tenure across different departments, we can observe that there are high number of employees in research and development, followed by sales, suggests a stable and satisfied workforce. A longer tenure of employees indicates that they are happy in their current roles, which improves the working environment. This consistency can boost efficiency and productivity since qualified people become proficient in their specific tasks. Additionally, it shows the company's work culture, displaying a supportive and engaging environment that helps in the retention of long-term employees. |  |

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| Dashboard 3 – Attrition Analysis | |
| Positive Insight | Negative Insight |
| Positive Impact of Supervisor Tenure on Employee Retention:  From the attrition and manager tenure by job role graph, we can say that employees who stay with their current managers for more years are less likely to leave the organization. This very much evident in case of sales executives, research scientists and laboratory scientists. This correlation shows that healthy work environment and good leadership improve the relationship between employees and their supervisor. Recognizing and strengthening these connections can make employees happier and more committed to their job. | Identifying discrepancies: high attrition among reportedly satisfied employees  From the relationship between job satisfaction and employee retention graph, it is observed that attrition count is high among employees who previously mentioned high job satisfaction. This outcome further raises a question about how the actual employee retention rates and perceived job satisfaction levels relate to one another. It shows that the reasons influencing an employee's decision to stay with the company may not match up with their feelings of job happiness. To address this issue the company might want to conduct in-dept exit surveys, regular employee feedback surveys and transparent communications such as open forums, town hall meeting, etc to know the employee’s real perception of job satisfaction. |
| Low attrition rate:  The data from the attrition rate measure card reveals a positive insight, showing a low attrition rate of 16.12%. The company has a total strength of 1470 employees of which 1233 are active, showing that majority of employees are choosing to stay with the company. This low attrition rate in turn indicates a strong workforce, which contributes to the company’s success and growth. | Commuting and Travel Challenges:  The attrition trends across distance ranges and impact of business travel on different age groups graphs highlight a possible issue for the company. There is a high attrition rates among employees who travel frequently and have a distant commute, particularly in the 41–50 years age range, suggesting that work-life balance and commute issues may be one of the major issues. To address this issue the company must take initiatives like remote working choices, flexible working hours, etc. Whereas, for employees who travel frequently, particularly those aged 41-50 years, the company may consider making travel policies more flexible. This could include finding other methods to handle frequent business travels or providing more support to help balance work and personal life. |
| Impact of commute distances:  The attrition trends across distance ranges tree map shows a positive insight that the attrition rate is least among employees with moderate travel distance, i.e, less than 10 miles. This indicates that employees are ready to travel over a manageable distance and they are satisfied with job. Higher attrition rate is among distant commuters, but this can be resolved by identifying the areas of concern and taking correct measures. |  |
| Work-Life Balance Impact:  The impact of work-life balance pie chart data shows a positive relationship between high work-life balance and low attrition rates. Employees who reported to have a more balanced and positive work-life balance are less likely to leave the company. This indicates that a healthy work-life balance is a key factor in determining the employee retention. Hence, the organization should definitely focus on improving work-life balance programs in order to create a pleasant and stable office environment, which will ultimately reduce the attrition rate in future. |  |

**Conclusion**

In conclusion, the study of the HR attrition dataset has provided significant understanding of the dynamics of the workforce, including causes of attrition and potential areas for development. The effects of work-related variables, demographic characteristics, and employee retention were all explored in this project. A few positive outcomes include age diversity, gender diversity and a well-educated employee, all of which show a healthy workplace culture. The low attrition rate further indicates that the organization was able to retain most of its staff.

However, a few commute-related issues, particularly for long-distance and regular travellers, appeared as possible attrition factors, especially for the 41–50 age range. In addition, there was a disparity in the correlation between job satisfaction and attrition, which highlights the significance of learning employees' true opinions through surveys and open forums. In order to improve employee retention, the organization should address these issues related to work-life balance and modify policies to accommodate employees of different age groups.

On the whole, the results obtained from this study can help the organization take better decisions and build a healthier and more supportive workplace for its employees.