Study of Employee Attrition in a Pharmaceutical Company using Tableau

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- **INTRODUCTION**

HR analytics is characterized as “an HR practice enabled by information technology that uses descriptive, visual, and statistical analyses of data related to HR processes, human capital, organizational performance, and external economic benchmarks to establish business impact and to enable data-driven decision-making” (Marler and Boudreau, 2017, p. 15).
Human resources have undergone a significant shift in recent decades. Traditional human management has given way to a methodical, strategic approach. It revolutionizes workforce management by using data-driven decision-making to uncover insights and make well-informed choices. Why are businesses utilizing HR analytics?
1) To make well-informed decisions: It assists individuals in moving beyond physical labor and intuition. Human resources personnel can better comprehend data by using it, which empowers them to make decisions that are in line with organizational goals.

2) Predictive insights: The primary objective for effective human resource analytics is to consider current and future trends and challenges as well. HR Analytics employs predictive modeling to identify high-potential talent and anticipate staff turnover, enabling organizations to take appropriate action.

3)Optimizing Recruitment: The competition for top talent is fierce. By determining the best sourcing channels, evaluating candidate fit, and enhancing time-to-hire metrics, HR Analytics expedites the hiring process. (Ameer M., et al. 2020)

Problem Statement

A leading pharmaceutical company, with its dynamic regulatory environment and competitive nature, is confronted with the problem of high attrition. There could be a lot of underlying issues as to why people are leaving and to solve this concern an in-depth analysis of the underlying reasons, business ramifications, and strategic measures to decrease attrition are required. Our goal in completing this project is to create a solid HRM dashboard that not only solves the current issue of high attrition but also demonstrates the revolutionary potential of analytics in improving workforce management.

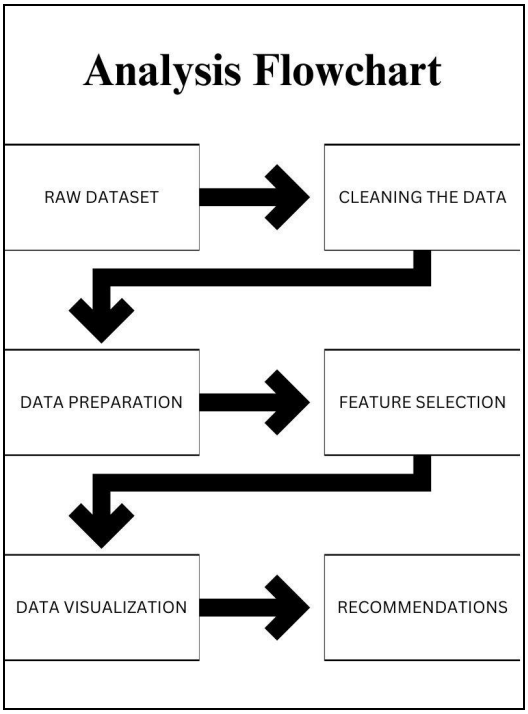
As we dive into the challenges caused by high attrition, the analysis that follows will not only clarify the difficulties encountered but also establish the framework for focused solutions. Through the application of HR analytics, our goal is to deliver practical approaches that meet the particular requirements of the pharmaceutical sector and build a strong, motivated workforce for sustained organizational growth.

-Impact on Development and Research: Employee Attrition in R&D departments can interfere with current projects, impede creativity, and delay the production of new pharmaceuticals.
-Marketing and Sales Disruption: In sales and marketing teams, attrition can damage existing client relationships, affect market share, and make it more difficult to carry out marketing plans.

-Stakeholder and Customer Relationships: Attrition can strain relationships and negatively affect a company's reputation in industries where interactions with stakeholders and customers are essential.

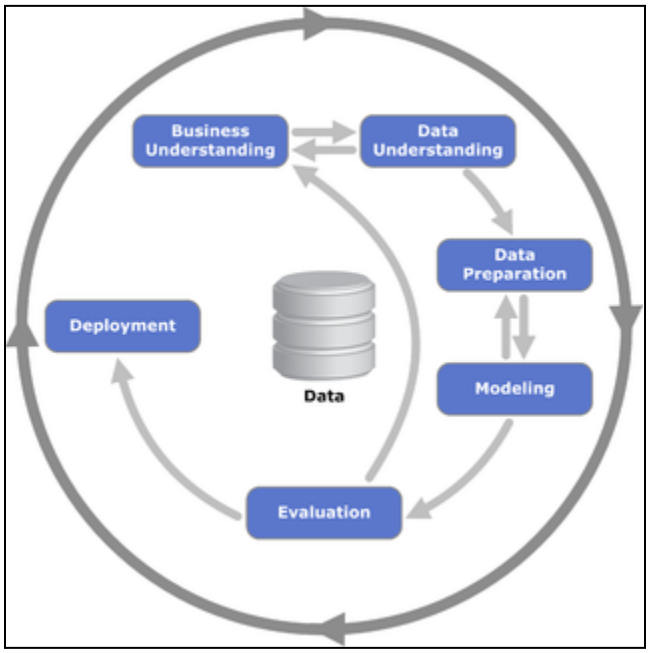
It is critical and vital that top HR managers and prospective business owners be the primary recipients of the HR analytics project and dashboard for several reasons.

Senior HR managers are the key decision-makers when it comes to employee engagement and workforce management.
To understand the organization's talent needs and design strategies to attract, retain, and grow a talented staff, senior HR managers and business owners play a critical role in strategic workforce planning.
In addition to meeting their demands, the dashboard should offer them actionable data that enable them to make wise decisions, improve HR procedures, and support the organization's long-term viability.
(Kesavan, L., *et al.* 2022)



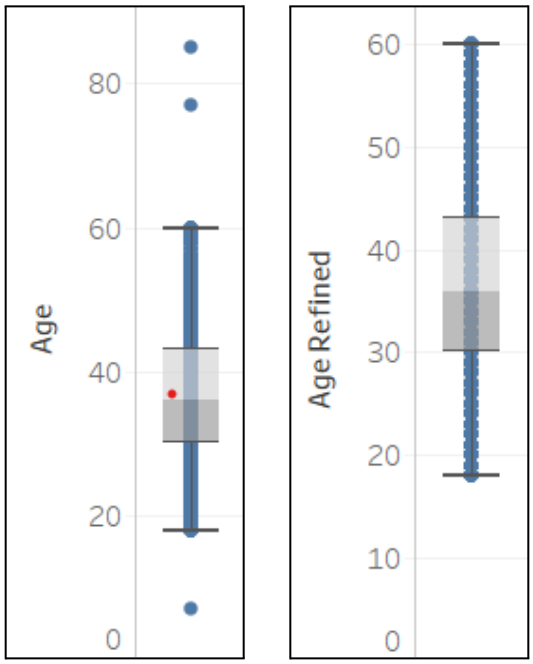
- **METHODOLOGY**

CRISP-DM:
For a more intuitive and comprehensive understanding, we will employ the CRISP-DM framework for this report's undertaking. This is a well-known and iterative approach for data mining and analytics. “The CRISP-DM reference model for data mining provides an overview of the life cycle of a data mining project. It contains the phases of a project, their respective tasks, and their outputs.”(Wirth, R., *et al*. 2000)
There are six phases in the CRISP-DM methodology, which are as follows:
1) Business Understanding
2) Data Understanding
3) Data Preparation
4) Modelling
5) Evaluation
6) Deployment



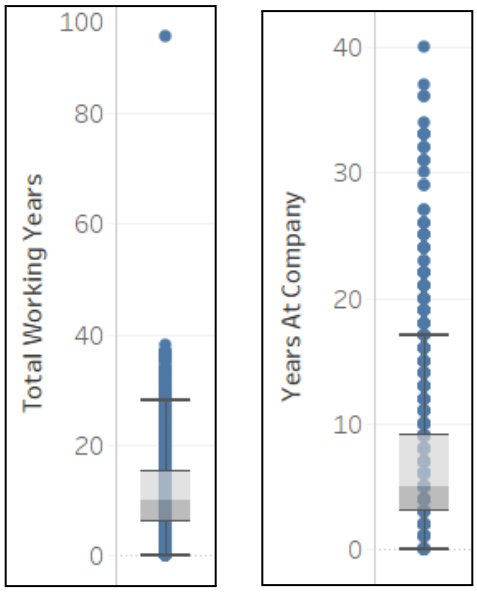
According to the CRISP-DM Methodology, the data preparation phase follows business and data understanding. During this phase, we identify problems with the quality of the data, categorize the different categories of data, and get our data ready for modeling.
The dataset underwent a thorough evaluation, which identified a number of data quality issues that needed to be addressed. It was crucial to find and fix these problems in order to guarantee the dependability and precision of the analysis that followed. Below is a list of the main problems with data quality that were found and the accompanying fixes that were put in place. (Martínez-Plumed, F., *et al.* 2021)

1. Outliers in the ‘Age’ Field:



A boxplot was utilized to identify the outliers, specifically 7 and 94, in the 'Age' field. After that, the outliers were fixed by removing extreme values to create a new variable called ‘Age Refined’ that represented the age distribution more accurately.

2. Outliers in the ‘Total Working Years’ field:

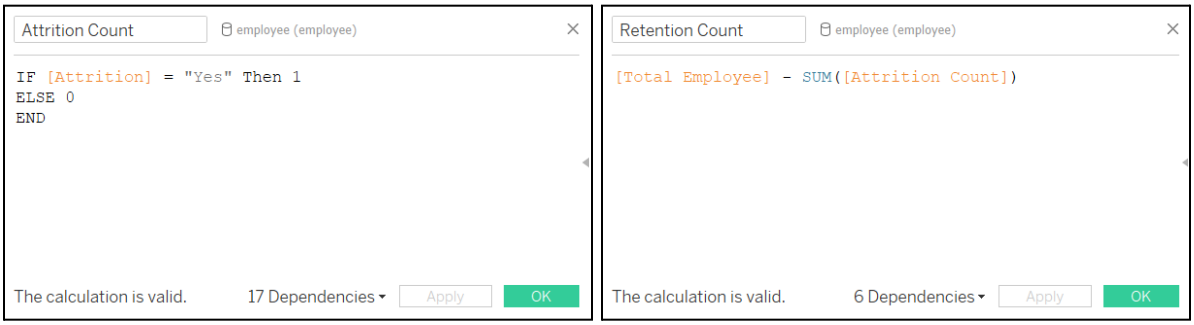


In this field ('Total Working Years') a boxplot was utilized to detect an outlier which was 94 years. This anomaly was addressed by creating a new field called 'Years in Company', providing a more accurate representation of the duration of employment.

3. ‘Department’ field Correction:

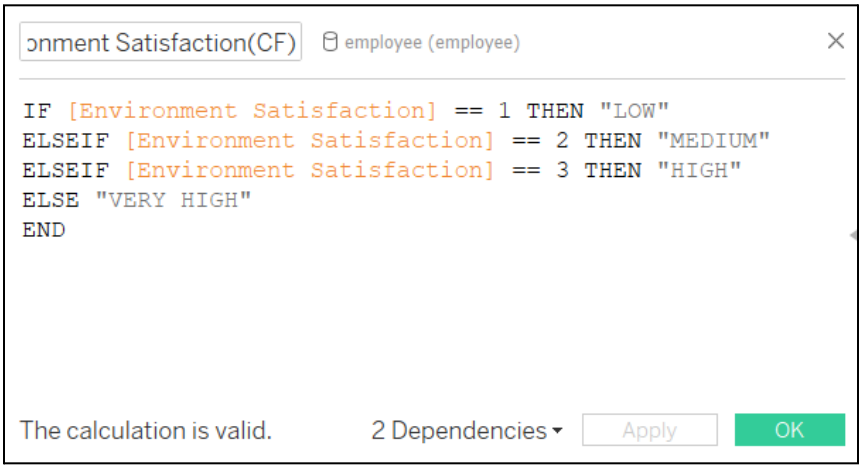
In this field, I consolidated synonymous entries together. Merged 'HR' and 'Human Resources' as well as 'R&D' and 'Research and Development' into a new field named 'Departments', ensuring proper categorization across the dataset.

4. ‘Attrition Count’ & ‘Retention Count’ fields:



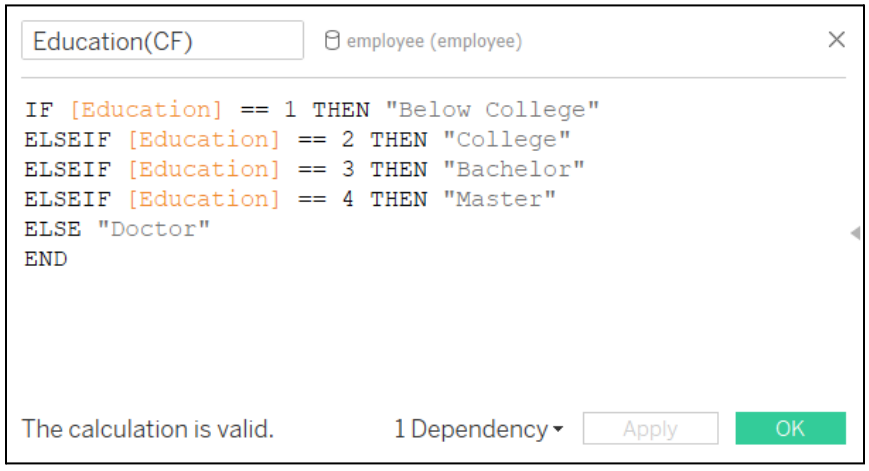
'Attrition Count' was derived by establishing a calculated field based on the Yes/No 'Attrition' status. Subtracted the ‘Attrition Count’ from the total number of employees to arrive at the ‘Retention Count’. This method offered a quantitative analysis, which made it easier to comprehend the dynamics of attrition and retention within the dataset.

5. Engagement Surveys:
    A. Environment Satisfaction
    B. Job Involvement
    C. Job Satisfaction
    D. Performance Rating
    E. Relationship Satisfaction
    F. Work-Life Balance



For the engagement surveys, the responses were standardized by creating a calculated field for each of them. Numeric ratings(1-4) were transformed into qualitative categories for improving data visualizations.
1 - Low
2 - Medium
3 - High
4 - Very High
These enhanced changes facilitate a clear interpretation of engagement metrics.

6. 'Education' field:



Created a new field from 'Education' by transforming the numeric values (1-5) to their descriptive categories. This conversion improves data interpretation in the context of educational levels.

Identifying Data types and how they can be grouped together:

1. Personal Information:
   ID
   Age
   DOB
   Gender
   Marital status
   Over 18

2. Work-Related Information:
   Department
   Job level
   Job role
   Total working years
   Years in current role
   Years since last promotion
   Years with current manager
   Year at company

3. Compensation and financials:
   Billable rate
   Monthly income
   Monthly rate
   Stock option level
   Percent salary hike

4. Employee Satisfaction & Engagement:
   Environment Satisfaction
   Job Involvement
   Job satisfaction
   Overtime
   Relationship satisfaction
   Training time last year
   Work-life balance

5. Performance Metrics:
   Performance rating
   Attrition
   Attrition count
6. Travel & Commuting:

Travel Frequency
Distance from Home

7. Educational Background:
   Education
   Education field

8. Job-Related Metrics:
   Num companies worked
   Hourly Pay rate
   Standard hours

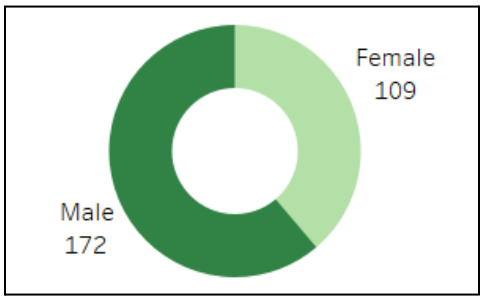
- **FINDINGS**

1. Key Performance Indicators

Total Employees	Attrition Rate	Retention Rate
1,467	19.15%	80.85%

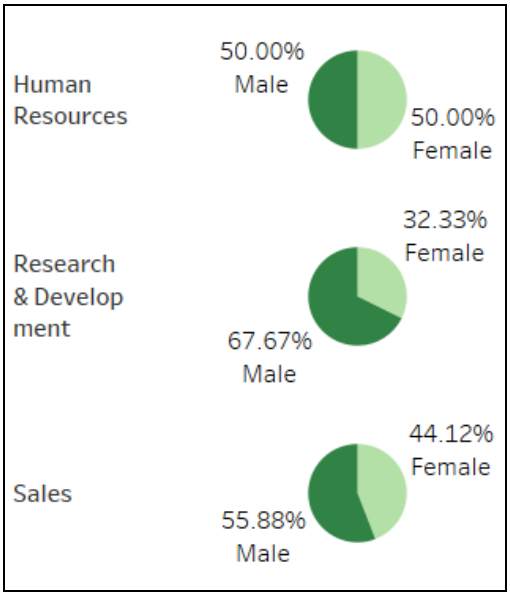
After the Data Preparation phase comes the Modelling phase where the data is used to form presentable visualizations.
Here, to show the overall comprehensive view of the data, I have selected three KPIs: Total Employees, Attrition Rate, and Retention Rate.
Total Employees: 1467
Attrition Count: 281
Retention Count: 1186
The total number of employees shows an understanding of the workforce scale.
The attrition Rate shows the percentage of employees who have left the organization, and the Retention Rate shows the percentage of active employees in the organization.

2. Gender-wise Attrition



Donut(Pie) Chart:
This chart depicts the division of male and female employees with respect to the attrition count of the division.
Pie Charts illustrate the distribution of parts within a whole so pie charts show the relationship between Gender Attrition to total.
The label in this chart shows:
The Respective Genders
Attrition Count of the Gender
By looking at the chart, we can clearly say that the number of male employees who have left the company is more than the number of female employees.

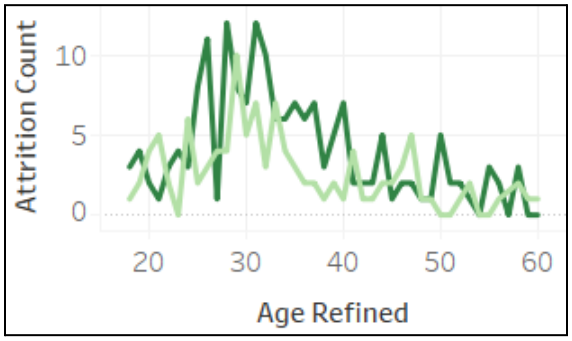
3. Department-Wise Attrition



Multiple Pie Charts:
These charts depict the attrition in different departments with Gender as a filter. Here also pie charts have been used because they show the division clearly and make it more visually appealing for the audience.
The label in the chart shows:
The respective genders
Attrition Rate of Male and Female Employees(in percentage)
And the Attrition Count(in detail)
By looking at these charts, we can clearly say that:

A. The number of Male employees have higher attrition rates except in HR which is equal to the attrition rate of Female Employees.
B. R&D and Sales Departments have higher attrition rates.

4. Attrition Count by AGE



Line Graph:

This chart depicts the Attrition count over the age field with respect to Gender. Line graphs are used to illustrate trends over another variable at a continuous period of time, here the two lines depict Males and Females and their interaction with the Attrition Count and Age.
By looking at this chart, We can clearly say that the attrition count increased after the age of 20 to 35 and started dropping again.
Employees in that age group are young and want to explore new jobs and learn new things and the employees who have passed the age of 40 want to start settling down, thus the attrition drops.

5. Survey Scores

SURVEY SCORE>>

Environment Satisfaction(CF)

	LOW	MEDIUM	HIGH	VERY HI..
Female	31	23	25	30
Male	49	26	54	43

Job Involvement(CF)

	LOW	MEDIUM	HIGH	VERY HIGH
Female	12	29	60	8
Male	17	54	94	7

Job Satisfaction(CF)

	LOW	MEDIUM	HIGH	VERY HIGH
Female	23	27	32	27
Male	52	26	51	43

Relationship Satisfaction(CF)

	LOW	MEDIUM	HIGH	VERY HIGH
Female	31	19	29	30
Male	32	33	57	50

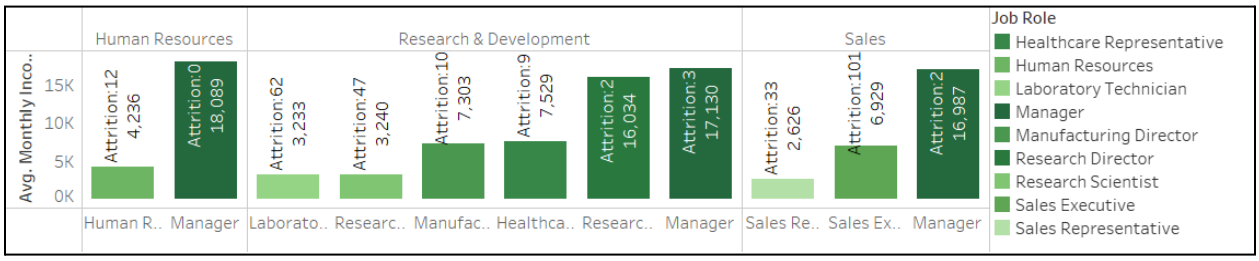
Work Life Balance(CF)

	BAD	GOOD	BETTER	BEST
Female	7	24	60	18
Male	18	44	94	16

Highlight Tables:
This chart depicts all the engagement surveys undertaken in a company with respect to Gender. It ranges from low to very high, low being 1 in the engagement survey to very high being 4 in the engagement survey.
I have used highlight tables to depict all this information because it gives quick data summaries and offers an efficient way to compare values and identify or highlight abnormal changes in the data.
The label used in the chart is:
Attrition count of the employees who have filled out the engagement survey
By looking at these charts, we can say that:
environmental satisfaction did not play a vital role in the attrition rate of employees as no matter what the survey result was the attrition rate did not drop.
Job Involvement, we can see that the employees who had low and very high job involvement ratings had very low attrition count whereas the employees who had medium to high job involvement ratings left the most.
Job Satisfaction, we can see that the attrition count decreases as the job satisfaction rating is higher. So it is safe to say that the employees satisfied with their jobs did not leave the organization.

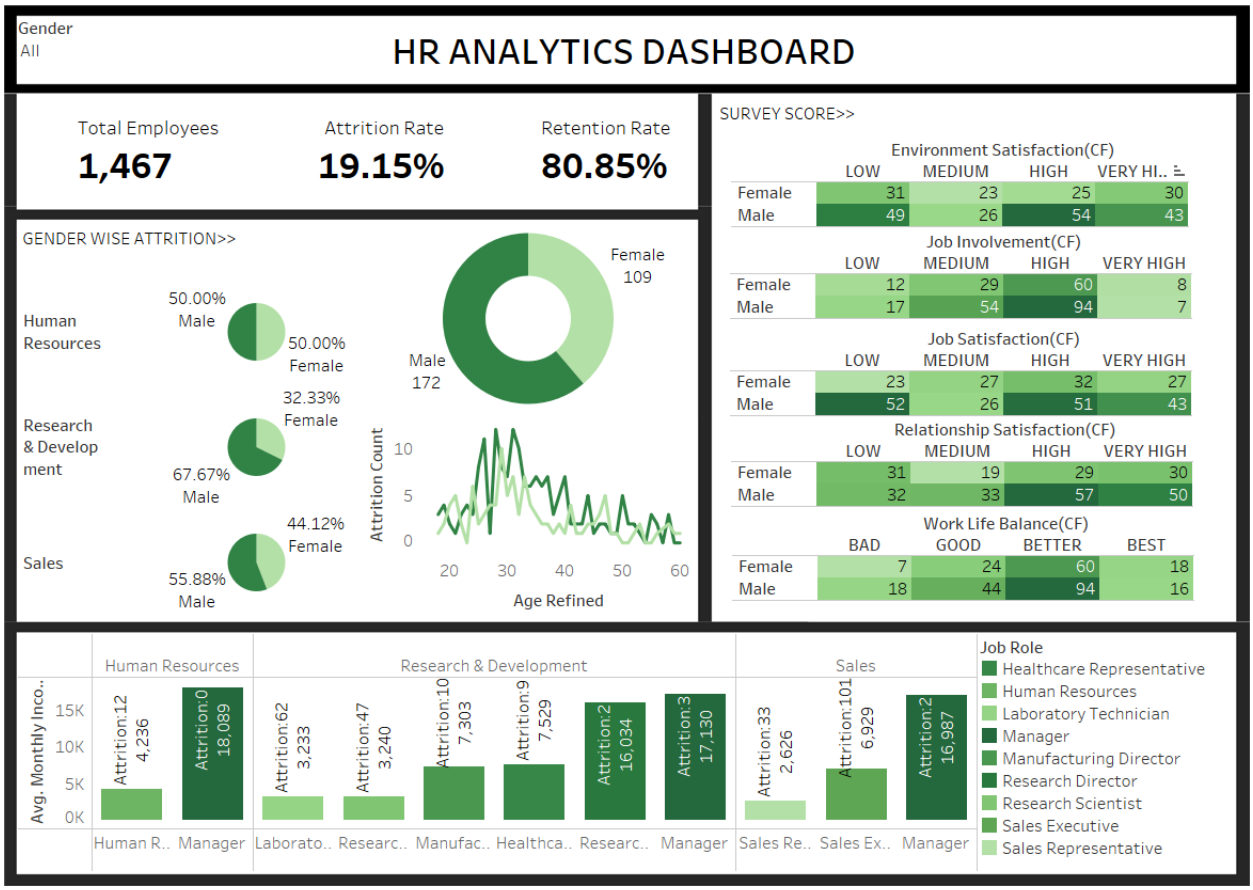
Relationship Satisfaction, we can see that the attrition count increases as the Relationship satisfaction rating with the manager gradually increases. This depicts that the people who were satisfied and happy with their managers left the organization.
Work-Life Balance, we can see that the people who have the best work-life balance stayed in the organization whereas the people who had low, good, and better work-life balance left the organization.

6. Average Monthly Income with Department



Bar Chart:
This chart shows the Average Monthly Income of the Employees with Job Roles divided by their Departments.
I have used Bar charts to effectively display the straightforward visual comparisons between the Average monthly income of different Job roles.
The labels in the chart show:
The attrition count by the Job roles
And the Average monthly income of employees in the particular job roles
By looking at this chart, we can clearly say that the people with high monthly incomes left the least whereas the people with lower monthly incomes left the most.

Dashboard:



This dashboard is based on Gender as the primary filter, depicting a comprehensive view of attrition in the organization. This dashboard combined with all the graphs shows a multi-faceted view approach on where the employees are leaving, how the employees are affected, and how attrition can be solved in the organization. The visualizations assist in identifying patterns, assessing the trends in departments, and recognizing changes which can help in implementing initiatives to mitigate attrition and promote a more inclusive and encouraging atmosphere. (Jindal, P., et al. 2017).

- **RECOMMENDATIONS & DISCUSSIONS**

To target the attrition rate in the organization, several decisions and initiatives can be taken starting from:
Gender-wise Attrition: Targeted programs and policies can be undertaken to address gender-specific concerns that can analyze the attrition and identify any problems that will help in promoting the inclusivity of each gender. (Agrawal, P., *et al*. 2019).
Department-wise Attrition: Identify which department has a higher attrition rate and implement strategies based on their needs, such as training help, mentorships, and reducing workloads.
Age-wise Attrition: Identify age-wise trends as to why people in certain age groups are leaving to cater career development plans and to arrange flexible working hours for every employee in different age groups. (Bucklin, B. A., *et al*. 2014).
Engagement Surveys: Implement programs to enhance job satisfaction and work-life balance to take care of overall employee well-being. (Kerdpitak, C., *et al*. 2020).
Monthly Income by Job Role: Identify the relation between monthly income and attrition and consider a well-versed program to give recognition to employees who work well, increase performance incentives, and also salary adjustments which will incline the employees to stay in the organization.(Kesavan, L., et al. 2022).

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