

## **Case Study: HR Data Analysis and Power BI Dashboard Design**

### **Project Overview**

My client provided a comprehensive HR dataset containing 1480 rows with the following columns: employee id, age, age group, attrition, business travel, daily rate, department, distance from home, education, education field, employee count, employee number, environment satisfaction, gender, hourly rate, job involvement, job level, job role, job satisfaction, marital status, monthly income, salary slab, monthly rate, number of companies worked, over 18, over time, percent salary hike, performance rating, relationship satisfaction, standard hours, stock option level, total working years, training time last year, work life balance, years at company, years in current role, years since last promotion, and years with current manager. The primary goal was to clean and process this data, then design a Power BI dashboard to provide actionable insights.

## **Data Cleaning and Processing**

Using DAX in Power BI, I performed the following steps to prepare the data for visualization:

1. **Data Cleaning:**

- Removed duplicates and handled missing values.
- Ensured data consistency and corrected any data entry errors.

2. **Data Transformation:**

- Created additional columns to enhance the insights, such as calculating the attrition rate, average salary, and categorizing years of service.

## Dashboard Design

### Key Performance Indicators (KPIs)

To provide a quick overview of critical metrics, I included six KPI cards in the dashboard:

1. **Employee Count:** Total number of employees.
2. **Employee Attrition:** Total number of employees who left the company.
3. **Years with Company:** Average tenure of employees.
4. **Attrition %:** Percentage of employees who left the company.
5. **Average Salary:** Mean monthly income of employees.
6. **Average Age:** Mean age of employees.

### Visualizations

To offer detailed insights, I designed various charts and graphs:

1. **Clustered Column Chart:**
  - Displayed employee attrition by age group, highlighting which age groups had higher attrition rates.
2. **Stacked Bar Chart:**
  - Showed employee attrition by job role and job satisfaction, providing a dual perspective on how job roles and satisfaction levels impact attrition.
3. **Area Chart:**
  - Illustrated employee attrition by years at the company, showing trends over time.
4. **Donut Chart:**
  - Represented employee attrition by education field, offering insights into which educational backgrounds had higher attrition rates.
5. **Gender Slicer:**
  - Added a slicer to filter data by gender, allowing the client to analyze metrics for specific genders.

## Challenges

During the project, several challenges were encountered and addressed:

1. **Data Inconsistencies:**

- Some data entries were inconsistent or incorrect, requiring thorough cleaning and validation to ensure accuracy.

2. **Missing Values:**

- Handling missing values without skewing the data was critical. Different imputation methods were considered to maintain data integrity.

3. **Complex Relationships:**

- The data contained complex relationships between various attributes, necessitating careful consideration of how to visualize these relationships effectively.

4. **Performance Optimization:**

- With numerous visualizations and large datasets, ensuring the dashboard performed efficiently was a key challenge. Optimization techniques were implemented to enhance performance.

## Results and Insights

The Power BI dashboard provided the client with a comprehensive view of employee attrition and other key metrics. Key insights included:

- **Attrition Trends:** Identified age groups and job roles with higher attrition rates.
- **Satisfaction Levels:** Correlated job satisfaction with attrition rates, helping the client understand the impact of employee satisfaction on retention.
- **Educational Backgrounds:** Analyzed attrition rates by education field, guiding the client on potential areas for targeted retention efforts.
- **Gender Analysis:** Enabled gender-specific analysis to identify any discrepancies in attrition rates between male and female employees.

## Conclusion

By transforming raw HR data into a visually engaging and insightful Power BI dashboard, I provided the client with valuable tools to monitor and analyze employee attrition. The dashboard's interactive elements, such as the gender slicer and detailed visualizations, empowered the client to make data-driven decisions aimed at improving employee retention and overall HR management.

