

Project Report

Title: IBM HR Analytics Employee Attrition & Performance

1. Introduction

Employee attrition is among the most challenging issues for contemporary organizations. High levels of attrition add to recruitment and training expenses, lower productivity, and affect organizational stability. Identifying the root drivers of attrition is very important for organizations to formulate efficient retention strategies.

This project examines the IBM HR Analytics Employee Attrition dataset to identify factors that drive employee turnover, analyse workforce demographics, and examine correlations between employee attributes and attrition.

2. Project Details

Domain: Data Analytics & Data Science

Tools Used: Python (Pandas, NumPy, Matplotlib, Seaborn), SQL, Excel

Difficulty Level: Intermediate

Dataset Size: 1,470 records × 35 features

Source: IBM (imaginary dataset generated for HR analytics)

3. Objectives of the Study

1. Understand Current Turnover Rates

Gauge the overall attrition rate.

Examine attrition on a demographic basis like age, gender, education, department, and job role.

2. Identify Key Factors Determining Attrition

Investigate job satisfaction (job involvement, work-life balance, environment satisfaction).

Examine compensation factors (monthly income, salary increases, stock options).

Examine performance drivers and career advancement (job title, years with company, promotions).

3. Create Recommendations for HR Policy

Make actionable suggestions to retain employees and keep them engaged.

4. Methodology

4.1 Data Cleaning

Ensured dataset integrity (no duplicates, no missing values).

Verified data types (all properly formatted).

Ensured dataset size: 1,470 rows and 35 columns.

4.2 Exploratory Data Analysis (EDA)

Attrition Rate: 16.12% of employees quit the company.

Average Tenure: Employees worked for a mean of 7 years.

Demographics:

Age: Most employees are aged 30–35 years.

Gender: Most employees are male.

Departments: Research & Development has the largest number of employees.

4.3 Key Analyses

Attrition trends by age, gender, job functions, departments, and educational levels.

Correlation of attrition with work-life balance, environment satisfaction, and job satisfaction.

Effect of **income levels and promotions** on attrition.

5. Key Findings

1. Attrition Concentration

Employees who were younger than 35 had a greater chance of leaving.

Sales positions exhibited greater attrition than R\&D and HR.

Employees with regular business travel had greater attrition.

2. Compensation & Career Progression

The lower income groups were found to have a much higher attrition rate.

Absence of promotions and fewer years with the current manager correlated with more turnover.

3. Job Satisfaction & Work-Life Balance

Low environment satisfaction and poor work-life balance workers experienced higher attrition.

Workers classified as Overtime were more likely to quit the company.

6. Recommendations

1.Retention Policies

Offer competitive pay packages, particularly to junior-level staff.

Provide opportunities for career development by means of frequent promotions and development of skills.

2.Work-Life Balance

Adopt flexible working hours and remote/hybrid work arrangements.

Track and minimize excessive overtime.

3. Employee Engagement

Improve job satisfaction through solution of workplace environment issues.

Improve employee-manager relations by means of leadership development.

7. Conclusion

The IBM HR Analytics project emphasizes that attrition depends on a combination of demographic, financial, and job satisfaction factors. With a focus on compensation, career development, and work-life balance, organizations can decrease turnover and hold on to precious talent.

This analysis sets the stage for HR departments to create data-driven retention initiatives and build long-term employee engagement.

8. References

IBM HR Analytics Employee Attrition Dataset

Kaggle HR Attrition EDA (Febby Anggraini)

GitHub: [HR Analytics Employee Attrition Project](<https://github.com/Niranjankumar-c/HRAnalyticsEmployeeAttrition>)