HR Analysis Project Report

1. Project Overview

This project focuses on analyzing employee-related data to understand workforce distribution, attrition trends, job roles, and employee performance metrics. The goal of the analysis is to support HR decision making by identifying key factors affecting employee retention, satisfaction, and organizational structure using SQL, Power BI, and Excel.

2. Dataset Summary

- Rows: 1470
- Columns: 15

Key Features:

- Employee Number
- Gender
- Marital status
- Age group
- Age
- Department
- Education
- Education field
- Job role
- Business travel
- Employee count
- Attrition
- Attrition label
- Job satisfaction
- Active employee

The dataset represents employee-level HR records and is suitable for attrition and workforce analysis.

3. Exploratory Data Analysis

- Performed initial data exploration using Excel and Power BI to understand data distribution and patterns.
- Verified dataset completeness and consistency; the dataset contained no missing values.
- Reviewed key attributes such as department, education field, gender, age-groups , attrition status, and job satisfaction.
- Since the dataset was already clean and structured, no additional data cleaning or filtering was required, and Python-based preprocessing was not necessary for this project.

4. Data Analysis using SQL (Business Transactions)

SQL was used to extract business insights related to workforce behavior and HR metrics:

- Analyzed employee attrition counts and rates across departments and job roles.
- Compared attrition by gender to identify workforce trends.
- Evaluated average monthly income by department and role.
- Analyzed employee distribution by job role and education level.
- Identified high-risk attrition segments based on years at company and job satisfaction.
- SQL aggregation and grouping queries were used to support KPIs displayed in the dashboards.
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1. **Employee Count by Education Level**– Counted employees with specific education to understand workforce composition.

	education character varying (50) 🔒	employee_count numeric 🔒
1	Master's Degree	398
2	Associates Degree	282
3	Doctoral Degree	48
4	High School	170
5	Bachelor's Degree	572

2. **Attrition by Education Level** – Measured attrition within specific education levels.

	education character varying (50) 🔒	attrition_count bigint 🔒
1	Master's Degree	58
2	Associates Degree	44
3	Doctoral Degree	5
4	High School	31
5	Bachelor's Degree	99

3. **Attrition Rate** – Calculated the percentage of employees who left relative to total workforce.

	attrition_rate numeric
1	16.12

4. **Active Employees**– Computed current active employees by subtracting attrition from total employees.

	active_employees numeric
1	1233

5. **Attrition by Gender**– Compared attrition counts between male and female employees to identify gender-based trends.

	gender character varying (50)	attrition_count bigint
1	Male	150
2	Female	87

6. **Attrition by Department -** Analyzed attrition across departments and calculated percentage contribution of each department.

	department character varying (50)	count bigint	pct numeric
1	R&D	133	56.12
2	Sales	92	38.82
3	HR	12	5.06

7. **Employees by Age-group and Gender** – Segmented employee distribution by age and gender.

	age_band character varying (50) 🔒	gender character varying (50) 🔒	employee_count numeric 🔒
1	25 - 34	Female	217
2	25 - 34	Male	337
3	35 - 44	Female	196
4	35 - 44	Male	309
5	45 - 54	Female	113
6	45 - 54	Male	132
7	Over 55	Female	25
8	Over 55	Male	44
9	Under 25	Female	37
10	Under 25	Male	60

8. **Attrition by Education Field** - Counted attrition for each education field to see which qualifications have higher turnover.

	education_field character varying (50) 🔒	attrition_count bigint 🔒
1	Life Sciences	89
2	Medical	63
3	Marketing	35
4	Technical Degree	32
5	Other	11
6	Human Resources	7

9. **Job Satisfaction Rating** – Used crosstab query to pivot job satisfaction ratings by job role.

job_role character varying (50)	one numeric	two numeric	three numeric	four numeric
1	Healthcare Representati...	26	19	43	43
2	Human Resources	10	16	13	13
3	Laboratory Technician	56	48	75	80
4	Manager	21	21	27	33
5	Manufacturing Director	26	32	49	38
6	Research Director	15	16	27	22
7	Research Scientist	54	53	90	95
8	Sales Executive	69	54	91	112
9	Sales Representative	12	21	27	23

5. Dashboard in Power BI

Finally, I built an interactive dashboard in **Power BI** to present insights visually.

HR ANALYTICS DASHBOARD

| Associates Degree | Bachelor's Degree | Doctoral Degree | High School | Master's Degree |

| Overall Employees	Attrition	Attrition Rate	Active Employees	Average Age
1470	237	16.12%	1233	37
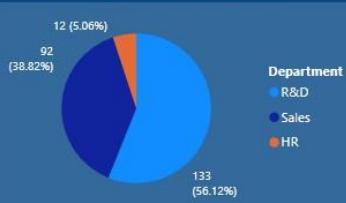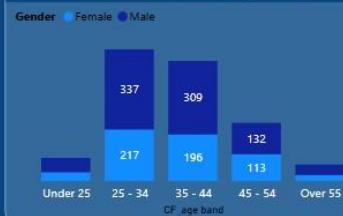
Department wise Attrition

12 (5.06%)
92 (38.82%)
133 (56.12%)

Department
- R&D
- Sales
- HR

No of Employees by Age Group

Gender ● Female ● Male

Under 25	25 – 34	35 – 44	45 – 54	Over 55
	337	309	132	
	217	196	113	

CF_age band
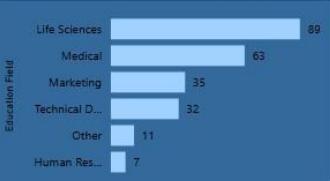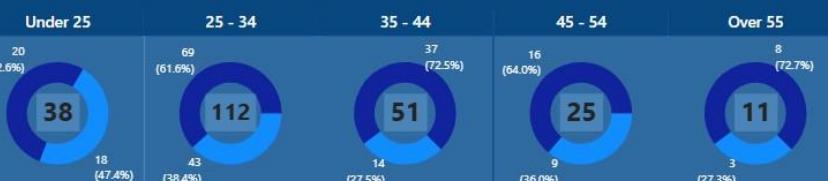
Job Satisfaction Rating

Job Role	1	2	3	4	Total
Healthcare Representative	26	19	43	43	131
Human Resources	10	16	13	13	52
Laboratory Technician	56	48	75	80	259
Manager	21	21	27	33	102
Manufacturing Director	26	32	49	38	145
Research Director	15	16	27	22	80
Research Scientist	54	53	90	95	292
Sales Executive	69	54	91	112	326
Sales Representative	12	21	27	23	83
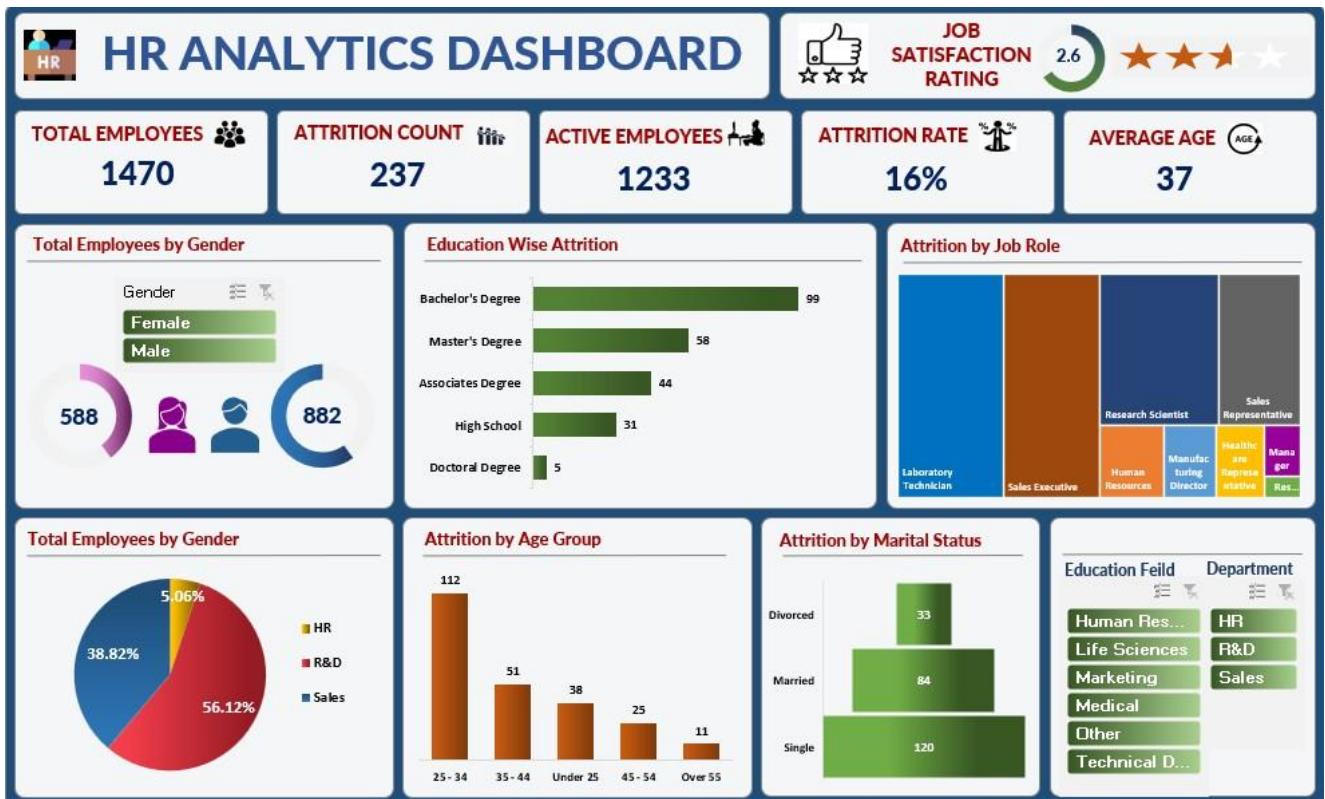
Education Field wise Attrition

Education Field	
Life Sciences	89
Medical	63
Marketing	35
Technical D...	32
Other	11
Human Res...	7

Attrition Rate by Gender for Different Age Groups

Under 25	25 – 34	35 – 44	45 – 54	Over 55
20 (52.6%)	69 (61.6%)	37 (72.5%)	16 (64.0%)	8 (72.7%)
38	**112**	**51**	**25**	**11**
18 (47.4%)	43 (38.4%)	14 (27.5%)	9 (36.0%)	3 (27.3%)

Dashboard in Excel

HR ANALYTICS DASHBOARD

JOB SATISFACTION RATING: 2.6 ★★★

TOTAL EMPLOYEES	ATTRITION COUNT	ACTIVE EMPLOYEES	ATTRITION RATE	AVERAGE AGE
1470	237	1233	16%	37

Total Employees by Gender
Gender: Female, Male
588 | 882

Education Wise Attrition
- Bachelor's Degree: 99
- Master's Degree: 58
- Associates Degree: 44
- High School: 31
- Doctoral Degree: 5

Attrition by Job Role
Laboratory Technician | Sales Executive | Research Scientist | Human Resources | Manufacturing Director | Healthcare Representative | Manager | Sales Representative | Res...

Total Employees by Gender
- HR: 5.06%
- R&D: 56.12%
- Sales: 38.82%

Attrition by Age Group
- 25 - 34: 112
- 35 - 44: 51
- Under 25: 38
- 45 - 54: 25
- Over 55: 11

Attrition by Marital Status
- Divorced: 33
- Married: 84
- Single: 120

Education Feild
- Human Res...
- Life Sciences
- Marketing
- Medical
- Other
- Technical D...

Department
- HR
- R&D
- Sales

6. Business Recommendations

● Reduce Employee Attrition – Focus retention strategies on departments and job roles with the highest attrition rates.

● Enhance Job Satisfaction – Implement engagement programs, mentorship, and feedback mechanisms for employees with low job satisfaction ratings.

● Compensation & Benefits Review – Evaluate salary structures and benefits, particularly for roles or age bands with higher attrition, to improve employee retention.

● Targeted HR Policies – Design department-specific initiatives rather than generic policies to address unique workforce needs.

● Career Development Opportunities – Offer training, learning programs, and internal mobility options to increase employee growth and loyalty.

- Gender & Age-Focused Programs – Use attrition insights to create specific programs addressing workforce segments at higher risk of leaving.