HR Data Analysis

1. Project Overview

This project focuses on building an interactive HR Analytics dashboard using structured employee data. The dashboard provides a consolidated view of employee count, job roles, age distribution, salary trends, educational qualifications, and leave balance patterns over time. Filters such as Job Title and Gender allow users to dynamically explore workforce insights at different levels of detail.

2. Project Objective

The primary objective of this project is to analyze employee demographic, job, salary, and leave data to gain actionable HR insights. The dashboard is designed to support data-driven decision-making in workforce planning, compensation analysis, employee distribution, and leave management.

3. Problem Statement

HR teams often face challenges in:

- Understanding workforce composition across job roles and demographics
- Monitoring salary distribution and identifying compensation trends
- Tracking leave utilization patterns across years and quarters
- Analyzing employee distribution by age and education level

Without a centralized analytical view, strategic HR decisions become time-consuming and less accurate. This project addresses these challenges by transforming raw HR data into a visually driven, insight-oriented dashboard.

4. Attributes (Key Columns / Fields)

- Emp_ID – **Unique employee identifier**

- Name – **Employee name**

- Gender – **Male / Female**

- Age – **Employee age**

- Job Title – **Role or designation**

- Education Level – **High School Diploma, Diploma, Bachelor's Degree, Master's Degree**

- Salary – **Employee salary**

- Leave Balance – **Available leave count**

- Year – **Calendar year**

- Quarter – **Quarterly classification of leave data**

5. Tools & Technologies

- **Power BI**
  - Data modeling
  - DAX measures (Employee Count, Average Salary, Leave Balance metrics)
  - Interactive visualizations and slicers
- **Power Query**
  - Data transformation
  - Column standardization and data type handling

6. Data Pre-Processing (Power Query)

1. Duplicate and Missing Value Handling

- Identified duplicate employee records using **Employee ID** and removed redundant entries to ensure data integrity.
- Detected missing or null values in critical fields such as **Age**, **Salary**, **Job Title**, and **Gender**.
- Applied appropriate handling:
    - Replaced null values where applicable
   - Removed incomplete records that could impact analysis accuracy

2. Column Standardization

- Renamed columns to follow a consistent and readable naming convention Standardized categorical values to avoid inconsistencies:
    - Unified gender values (Male/Female)
    - Normalized job titles and education levels
- Assigned correct data types:
    - Numeric → Salary, Leave Balance
    - Whole Number → Age
    - Text → Job Title, Education Level

3. Data Transformation

- **Split columns** where multiple values were stored in a single field.
- **Merged related columns** to improve analytical usability.
- **Replaced inconsistent or incorrect values** using conditional logic.

7. Data Modelling and DAX (Power BI)
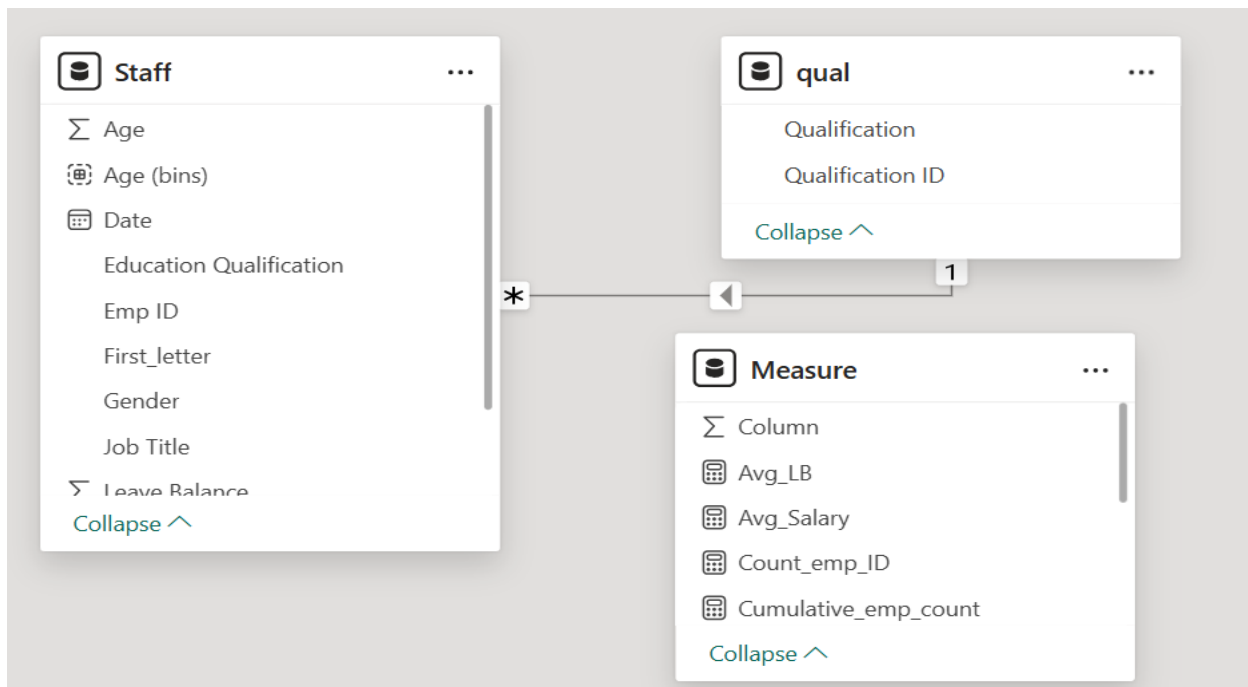
DAX Measure created:

Avg_LB = AVERAGE(Staff[Leave Balance])
Avg_Salary = AVERAGE(Staff[Salary])
Count_emp_ID = COUNT(Staff[Emp ID])
Cumulative_emp_count=VARcurrentDate=LASTDATE(Staff[Date])RETURN
CALCULATE([Count_emp_ID],ALL(Staff[Date]),Staff[Date]<=currentDate)
LB_Below_20 = calculate([Count_emp_ID],Staff[Leave Balance]<=20)
LB_Over_20days = CALCULATE([Count_emp_ID],Staff[Leave Balance]>20)
Max = MAX(Staff[Salary])
Min = min(Staff[Salary])

8. Analysis and Visualizations (Power BI)

Analysis
- Over view
- Education Level analysis

Visualizations Used:

CARDS
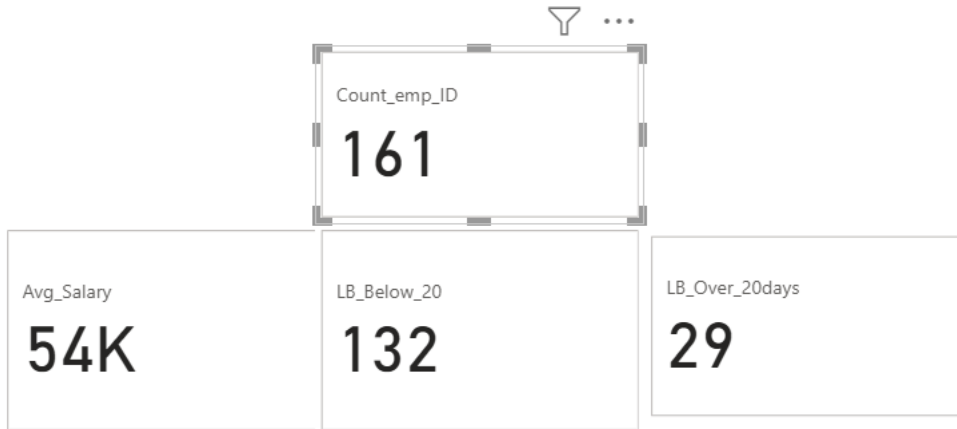
INSIGHTS

- **Total Employees:** 161

- **Average Salary:** ~54K

- **Leave Balance Distribution:**

  - Employees with **Leave Balance < 20 days:** 132
  - Employees with **Leave Balance > 20 days:** 29

 This indicates that the majority of employees are actively utilizing leave, with a smaller group holding higher unused balances—potentially a burnout or leave-policy concern.

Cluster Bar chart: Staff Count by Job Title
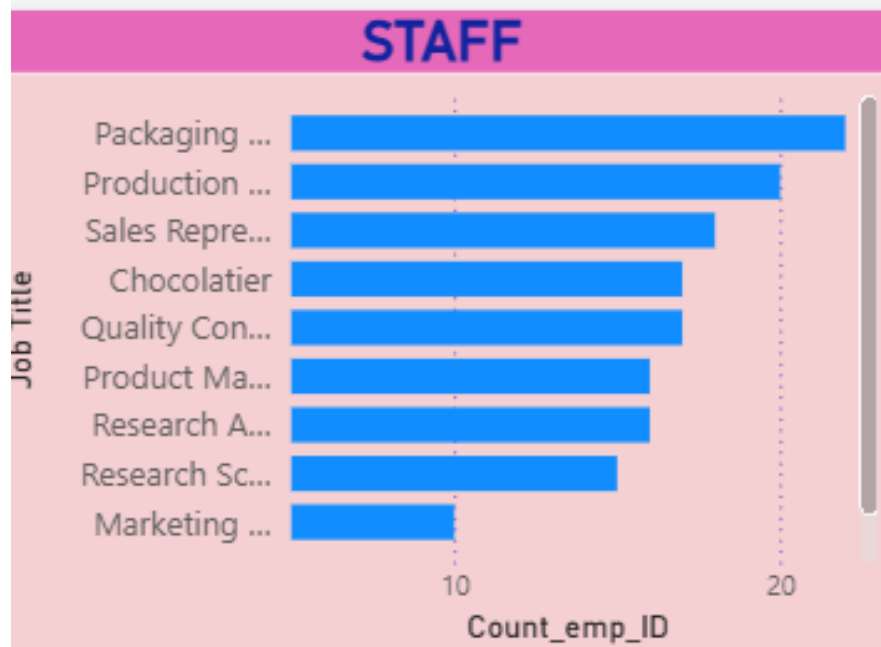
INSIGHT

- Packaging Associate **has the highest headcount.**
- **Production Operator** follows closely, confirming operations-heavy staffing.
- **Sales Representative, Chocolatier, and Quality Control** show moderate staffing.
- **Research Analyst/Scientist and Marketing** have the lowest headcount, indicating specialized and lean teams.

Age Distribution

Insight:

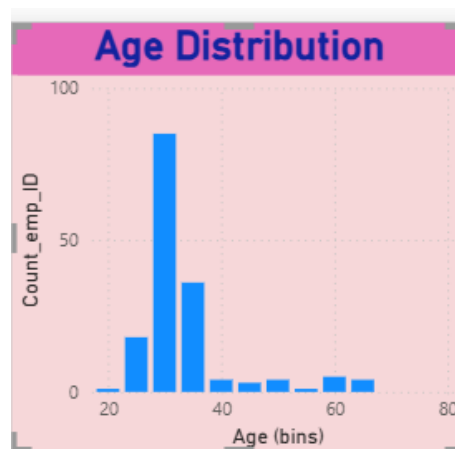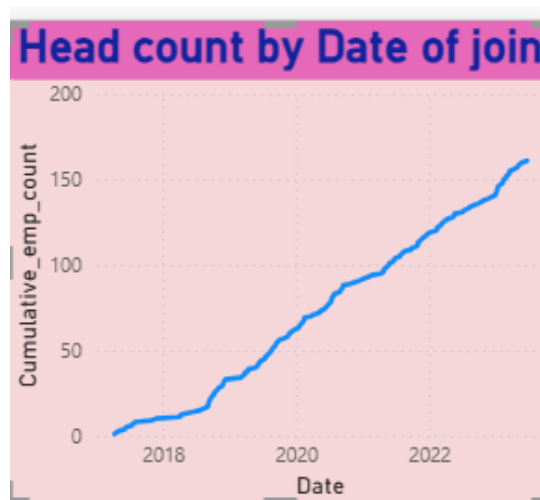- Majority of employees fall between **25–40 years**.
- Very few employees are above 50 years of age.

Headcount by Date of Joining (Line Chart)

Insight:

- Steady and consistent growth from **2017 to 2022**.
- Acceleration in hiring after 2019.
- Growth stabilizes toward recent years.

Employee Details Table (Matrix)

Emp ID	Name	Gender	Education Qualification	Sum of Salary
AC0041	Dell Molloy	Female	High School Diploma	79300
AC0133	Aanya Trivedi	Female	High School Diploma	79200
AC0097	Aanya Kapoor	Female	Bachelor's Degree	78900
AC0076	Teressa Udden	Male	Bachelor's Degree	78400
AC0151	Aanya Singh	Female	High School Diploma	78200
AC0142	Siya Sharma	Female	Bachelor's Degree	77800
AC0124	Siya Rawat	Female	Bachelor's Degree	77500
AC0005	Gigi Bohling	Male	Master's Degree	77300
AC0115	Aanya Singh	Female	High School Diploma	77100
AC0057	Tatum Hush	Female	High School Diploma	77000
AC0160	Siya Sharma	Female	Bachelor's Degree	76900
AC0022	Jehu Rudeforth	Male	Bachelor's Degree	76800
AC0085	Leilah Yesinin	Male	High School Diploma	76700
AC0067	Constantino Espley	Female	Bachelor's Degree	76300
AC0106	Siya Trivedi	Female	Bachelor's Degree	76100
AC0123	Krish Trivedi	Male	Diploma	74900
Total				8731200

Insight:

- Majority of employees hold a **Bachelor's Degree**.
- Salaries vary significantly within the same qualification level, driven by job role and experience.
- High-paying roles are clustered in managerial and research positions.

Qualification-Based Navigation (Buttons)

● Bachelor's Degree

Largest employee segment,Moderate leave accumulation over time.

● Diploma / High School Diploma

Smaller workforce,More fluctuation in leave balance, likely due to operational workload.
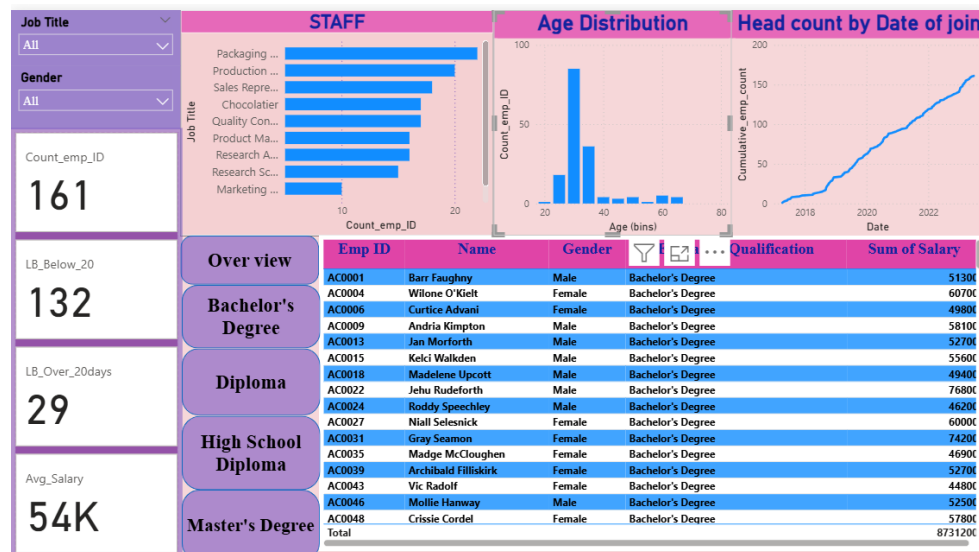
● Master's Degree

Lowest headcount, Highest average salary and lower leave usage.

Insight:
Higher education correlates with higher pay but lower leave utilization due to increased responsibility.
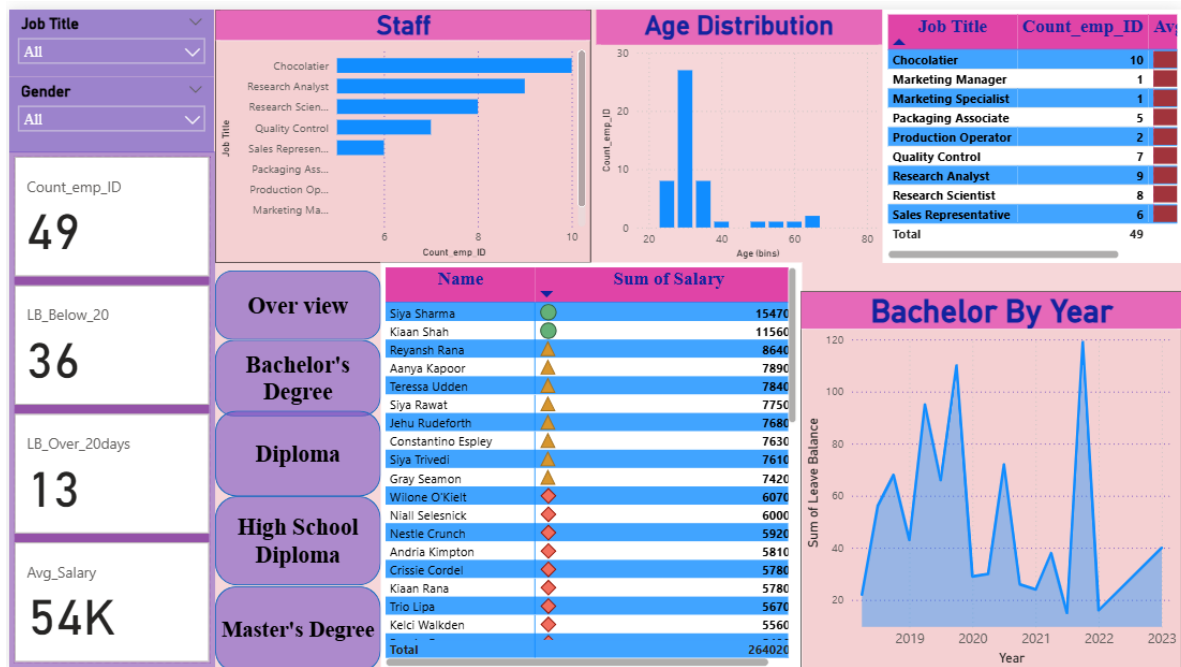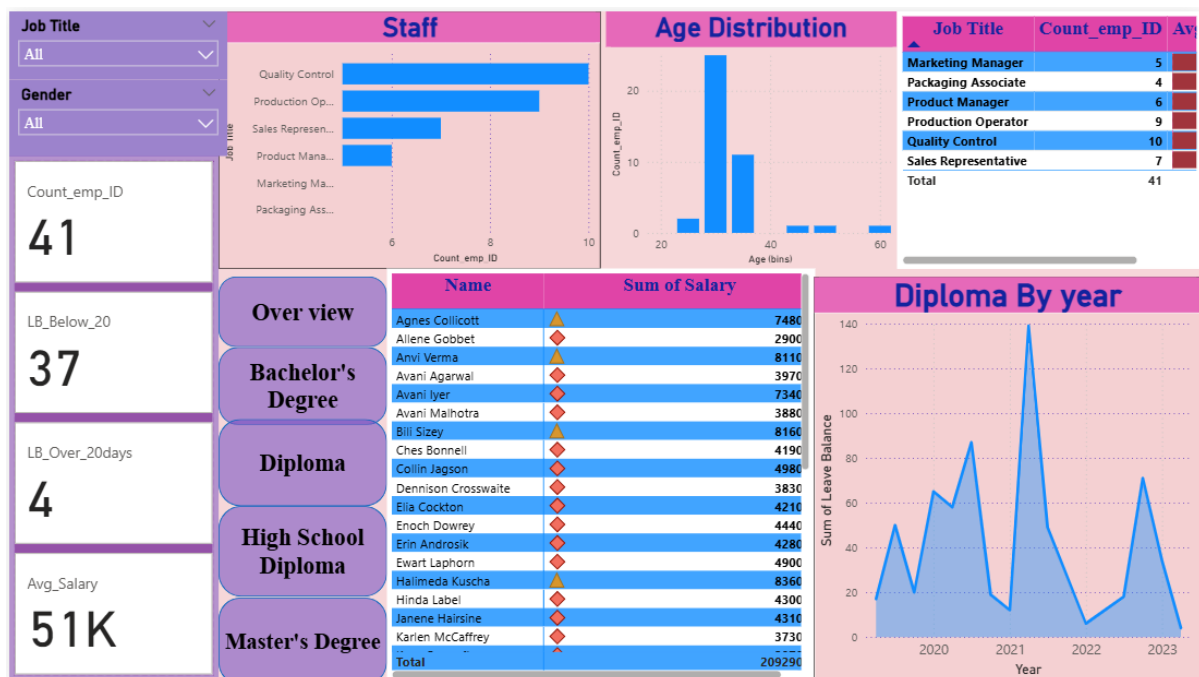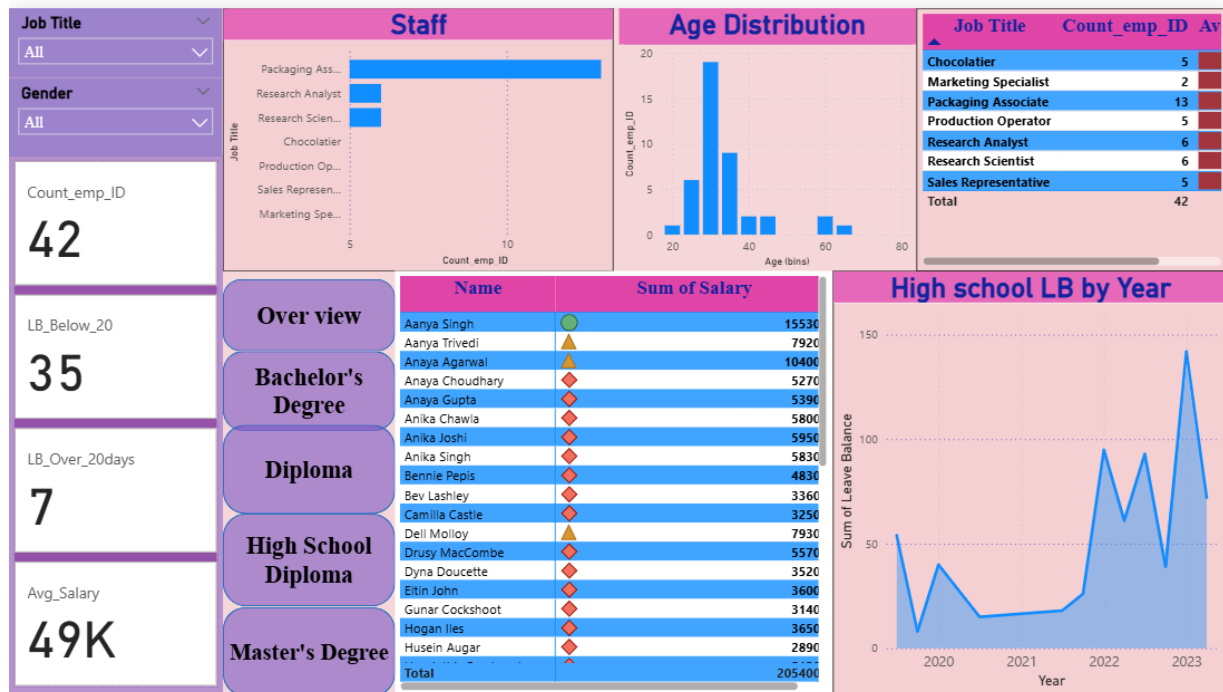
9.INSIGHTS & CONCLUSION

HR ANALYSIS OVER VIEW

BACHELOR'S DEGREE

Job Title
All

Gender
All

Count_emp_ID
49

LB_Below_20
36

LB_Over_20days
13

Avg_Salary
54K

Over view

Bachelor's Degree

Diploma

High School Diploma

Master's Degree

Staff

Chocolatier
Research Analyst
Research Scien...
Quality Control
Sales Represen...
Packaging Ass...
Production Op...
Marketing Ma...

Count_emp_ID

Age Distribution

Count_emp_ID — Age (bins)

Job Title	Count_emp_ID	Avg
Chocolatier	10	
Marketing Manager	1	
Marketing Specialist	1	
Packaging Associate	5	
Production Operator	2	
Quality Control	7	
Research Analyst	9	
Research Scientist	8	
Sales Representative	6	
Total	49	

Name	Sum of Salary
Siya Sharma	15470
Kiaan Shah	11560
Reyansh Rana	8640
Aanya Kapoor	7890
Teressa Udden	7840
Siya Rawat	7750
Jehu Rudeforth	7680
Constantino Espley	7630
Siya Trivedi	7610
Gray Seamon	7420
Wilone O'Kielt	6070
Niall Selesnick	6000
Nestle Crunch	5920
Andria Kimpton	5810
Crissie Cordel	5780
Kiaan Rana	5780
Trio Lipa	5670
Kelci Walkden	5560
Total	264020

Bachelor By Year

Sum of Leave Balance — Year (2019, 2020, 2021, 2022, 2023)

DIPLOMA

Job Title
All

Gender
All

Count_emp_ID
41

LB_Below_20
37

LB_Over_20days
4

Avg_Salary
51K

Over view

Bachelor's Degree

Diploma

High School Diploma

Master's Degree

Staff

Quality Control
Production Op...
Sales Represen...
Product Mana...
Marketing Ma...
Packaging Ass...

Count_emp_ID

Age Distribution

Count_emp_ID — Age (bins)

Job Title	Count_emp_ID	Avg
Marketing Manager	5	
Packaging Associate	4	
Product Manager	6	
Production Operator	9	
Quality Control	10	
Sales Representative	7	
Total	41	

Name	Sum of Salary
Agnes Collicott	7480
Allene Gobbet	2900
Anvi Verma	8110
Avani Agarwal	3970
Avani Iyer	7340
Avani Malhotra	3880
Bill Sizey	8160
Ches Bonnell	4190
Collin Jagson	4980
Dennison Crosswaite	3830
Elia Cockton	4210
Enoch Dowrey	4440
Erin Androsik	4280
Ewart Laphorn	4900
Halimeda Kuscha	8360
Hinda Label	4300
Janene Hairsine	4310
Karlen McCaffrey	3730
Total	209290

Diploma By year

Sum of Leave Balance — Year (2020, 2021, 2022, 2023)

HIGH SCHOOL DIPLOMA

Job Title
All

Gender
All

Count_emp_ID
42

LB_Below_20
35

LB_Over_20days
7

Avg_Salary
49K

Staff

Job Title	Count_emp_ID
Packaging Ass...	
Research Analyst	
Research Scien...	
Chocolatier	
Production Op...	
Sales Represen...	
Marketing Spe...	

Age Distribution

Job Title Table

Job Title	Count_emp_ID	Av
Chocolatier	5	
Marketing Specialist	2	
Packaging Associate	13	
Production Operator	5	
Research Analyst	6	
Research Scientist	6	
Sales Representative	5	
Total	42	

Over view
Bachelor's Degree
Diploma
High School Diploma
Master's Degree

Name	Sum of Salary
Aanya Singh	15530
Aanya Trivedi	7920
Anaya Agarwal	10400
Anaya Choudhary	5270
Anaya Gupta	5390
Anika Chawla	5800
Anika Joshi	5950
Anika Singh	5830
Bennie Pepis	4830
Bev Lashley	3360
Camilla Castle	3250
Dell Molloy	7930
Drusy MacCombe	5570
Dyna Doucette	3520
Eitin John	3600
Gunar Cockshoot	3140
Hogan Iles	3650
Husein Augar	2890
Total	205400

High school LB by Year

MASTER'S DEGREE

Job Title
All

Gender
All

Count_emp_ID
29
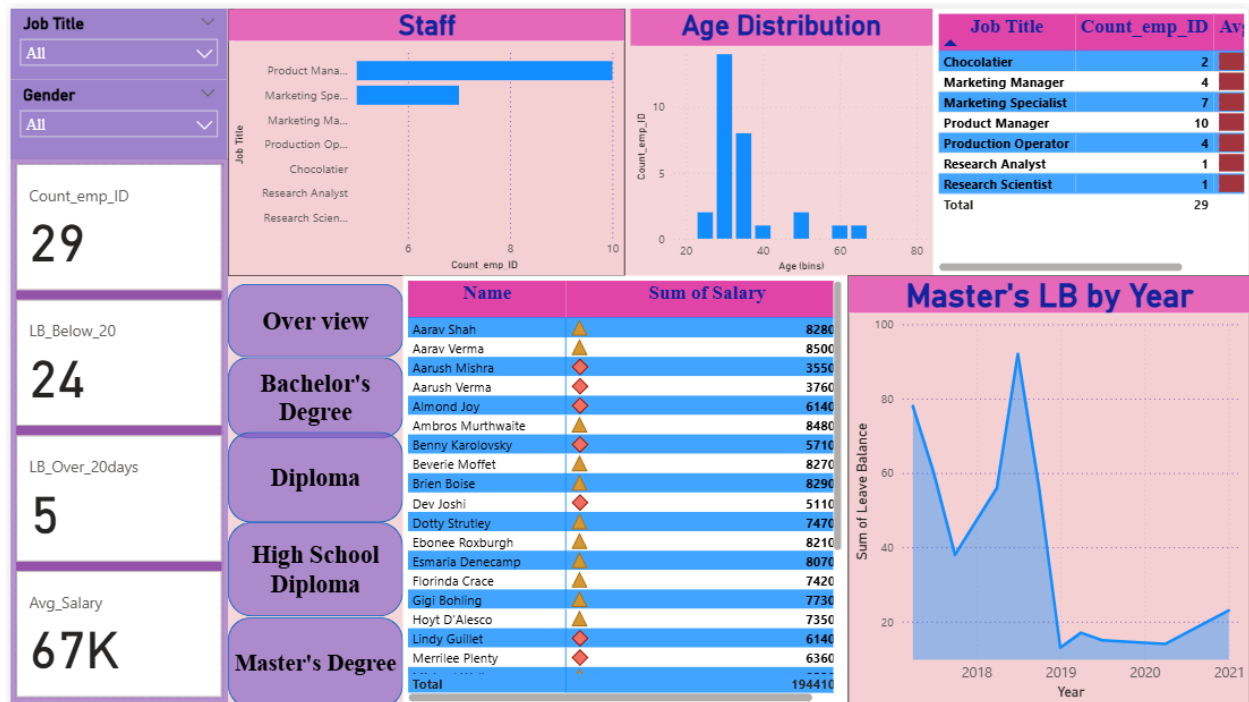
LB_Below_20
24

LB_Over_20days
5

Avg_Salary
67K

Staff

Job Title	Count_emp_ID
Product Mana...	
Marketing Spe...	
Marketing Ma...	
Production Op...	
Chocolatier	
Research Analyst	
Research Scien...	

Age Distribution

Job Title Table

Job Title	Count_emp_ID	Av
Chocolatier	2	
Marketing Manager	4	
Marketing Specialist	7	
Product Manager	10	
Production Operator	4	
Research Analyst	1	
Research Scientist	1	
Total	29	

Over view
Bachelor's Degree
Diploma
High School Diploma
Master's Degree

Name	Sum of Salary
Aarav Shah	8280
Aarav Verma	8500
Aarush Mishra	3550
Aarush Verma	3760
Almond Joy	6140
Ambros Murthwaite	8480
Benny Karolovsky	5710
Beverie Moffet	8270
Brien Boise	8290
Dev Joshi	5110
Dotty Strutley	7470
Ebonee Roxburgh	8210
Esmaria Denecamp	8070
Florinda Crace	7420
Gigi Bohling	7730
Hoyt D'Alesco	7350
Lindy Guillet	6140
Merrilee Plenty	6360
Total	194410

Master's LB by Year

<p align="center" style="color:blue">ANALYSIS INSIGHT</p>

1. Descriptive Insights

- The organization has **161 employees**, with an **average salary of 54K**.
- The workforce is dominated by **operational roles**, especially **Packaging Associates** and **Production Operators**.
- Most employees fall within the **25–40 age group**, indicating a young to mid-career workforce.
- **132 employees** have a leave balance **below 20 days**, while only **29 employees** have higher leave balances.
- Employees with a **Bachelor's degree** form the largest educational group, followed by Diploma and High School Diploma holders.
- Leave balance trends fluctuate by **year and quarter**, showing seasonal patterns.

2. Diagnostic Insights

- Higher employee counts in operational roles suggest the organization's core activities are production-driven.
- Lower leave balances for most employees may be due to:
    - High workload in operational roles
    - Limited staffing backup
    - Employees postponing leave due to operational demands
- Salary variations across employees are influenced by:
    - Job role and responsibility level
    - Educational qualification
    - Experience and specialization
- Fewer employees with Master's degrees indicate limited demand for advanced specialization or higher hiring costs.

3. Predictive Insight

- If current trends continue, **operational roles will continue to dominate hiring**.
- Sustained low leave balances may lead to:
    - Increased employee fatigue
    - Higher attrition risk in operational roles
- A young workforce suggests:
    - High growth potential
    - Possible increase in internal promotions and training needs
- Salary expenses are expected to rise gradually with workforce expansion and role progression.

4. Prescriptive Insights

- **Workforce Planning**
    - Introduce balanced staffing or shift rotations to reduce workload pressure in operational roles.
- **Leave Policy Optimization**
    - Encourage planned leave utilization to prevent burnout.
    - Monitor departments with consistently low leave balances.
- **Compensation Strategy**
    - Periodically review salary structures to ensure pay equity across similar roles.
- **Talent Development**
    - Invest in upskilling and certification programs for Bachelor's and Diploma holders.
    - Identify high-potential employees for leadership development.
- **Retention Strategy**
    - Implement engagement initiatives focused on young and mid-career employees to reduce attrition risk.

Conclusion

The HR Analytics dashboard provides a comprehensive view of the organization's workforce, highlighting an **operations-driven structure supported by a young and skilled employee base**. With the majority of employees concentrated in packaging and production roles, the organization demonstrates strong operational capacity, while specialized functions such as research and marketing are maintained with lean, high-impact teams.

Employee demographics indicate a **predominantly mid-career workforce**, which supports productivity, adaptability, and long-term growth. Compensation patterns are well-aligned with education level and job responsibility, reflecting a structured and equitable pay framework. Leave utilization is generally healthy; however, a smaller segment of employees with high leave balances signals the need for proactive workload and well-being management.

Overall, the dashboard enables **data-driven HR decision-making** by identifying workforce concentration, growth trends, compensation alignment, and potential risk areas. By leveraging these insights, the organization can improve workforce planning, enhance employee engagement, and ensure sustainable operational and strategic growth.