ATLAS LABS HR ANALYTICS WITH POWER BI

Final Project Report

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Tool Used: Microsoft Power BI

Project Type: HR Data Analysis & Visualization

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Executive Summary :

This report presents a comprehensive HR analytics solution developed for Atlas Labs using Power BI, aimed at monitoring workforce dynamics and uncovering key drivers of employee attrition. The solution is built on a robust data model with a custom date dimension and active/inactive relationships to support time aware analysis. Through Power Query, HR and performance data were ingested and transformed, and a suite of validated DAX measures was created to calculate core KPIs including headcount, attrition rates, satisfaction scores, and performance metrics.

The final output consists of four interactive dashboards:

- The **Overview dashboard** provides a high-level snapshot of workforce size, hiring trends, departmental distribution, and overall attrition.
- The **Demographics dashboard** explores employee composition across age, gender, marital status, ethnicity, and salary, offering insights into diversity and equity.
- The **Performance Tracker dashboard** enables detailed analysis of individual employee satisfaction and performance trends over time, helping identify areas for development and support.
- The **Attrition dashboard** breaks down turnover by department, travel frequency, overtime, tenure, and hire date, revealing patterns and potential risk factors.

Each dashboard is dynamic and fully filterable, allowing users to drill down by employee, department, or metric to uncover deeper trends and comparisons. This flexibility empowers HR teams and leadership to make data-driven decisions, prioritize targeted interventions, and continuously monitor progress. Recommendations and validation steps are included to ensure findings are actionable and aligned with organizational goals.

Project Objectives

The primary objective of this project is to deliver a comprehensive HR analytics solution for Atlas Labs that enables leadership and HR to monitor workforce health, detect emerging attrition risks, and prioritize targeted retention actions. The analysis focuses on quantifying headcount dynamics and attrition (overall and cohort-based by hire date and tenure), tracking time-based trends, and surfacing measurable relationships between employee satisfaction dimensions (work-life balance, manager rating, job satisfaction, environment and relationship satisfaction) and turnover.

From an analytical and technical perspective, the project aims to implement a robust snowflake data model anchored on a fact table of performance ratings and supported by dimensional tables (employee, date, satisfaction and rating scales) with correctly defined active/inactive relationships for time-sliced analysis. The work includes a documented ETL pipeline in Power Query, a suite of validated DAX measures for KPIs (counts, rates, averages, and date logic), and reproducible validation steps to ensure calculations reconcile with source data. Finally, the solution must present

clear, actionable visuals across four report pages with consistent design, interactive filtering, and accessible metrics so stakeholders can quickly interpret results and take prioritized, measurable actions.

Data Sources and Pipeline

The project started by loading each CSV table into Power BI as a separate query and applying a consistent ETL process in Power Query to prepare the data for analysis. For every table the workflow enforced correct data types, trimmed and cleaned text fields, normalized and validated date columns, removed duplicates, and handled missing or inconsistent values so that aggregates and joins behave predictably.

After transforming and validating each source table to a model-ready state, a dedicated DimDate table was generated using a DAX expression to provide a contiguous calendar with calendar and fiscal year/quarter/month attributes, week bounds, and formatted labels. The cleaned tables together with the DimDate support subsequent measure development and report construction.

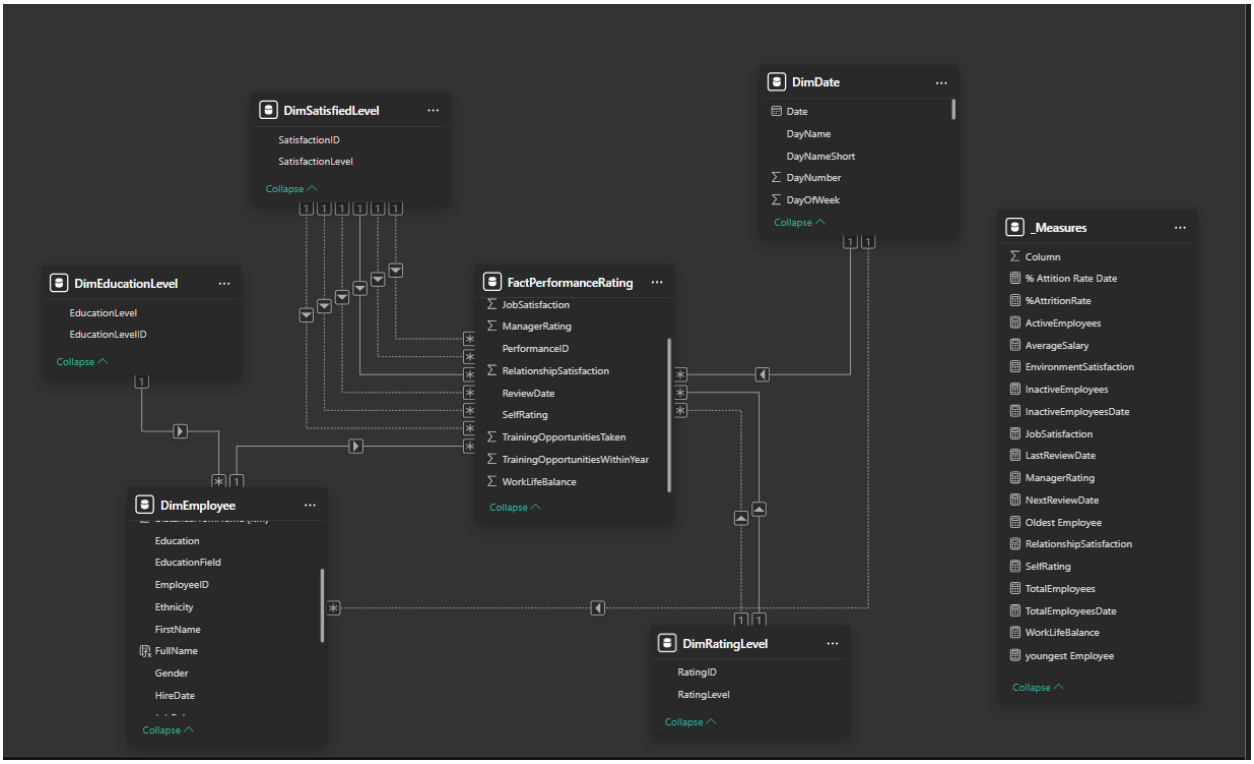
Data Model and Architecture

The solution uses a snowflake schema centered on a fact table of performance ratings, with supporting dimension tables for employee attributes, satisfaction and rating mappings, education, and a dedicated date table. This normalized layout keeps the fact table focused on review level records while enabling reusable lookup tables for descriptive attributes. A screenshot of the model is included to show table names, keys, and relationship directions.

Time intelligence is driven by a custom DimDate table created with DAX; the calendar spans the full range of hire and review dates and includes calendar and fiscal year, quarter, month, week bounds, and formatted labels for consistent axis and slicing across reports. The date table is the primary axis for trend analysis and cohort calculations, ensuring measures behave correctly for both calendar and fiscal reporting.

Multiple relationships were defined between date columns and the fact/employee tables to support analyses on different date fields (for example, hire date versus review date). Because Power BI allows only one active relationship between two tables, the model implements one active link and additional inactive relationships; measures use USERELATIONSHIP to activate the appropriate date context when required. This pattern prevents ambiguous filter propagation and enables precise time-sliced calculations without duplicating tables.

An empty Measures table was also created in the model to serve as a dedicated container for all DAX measures developed for the project. Placing measures in a single, purpose-built table improves organization, discoverability, and maintenance of KPI logic across the report suite.



Measures, Calculations and Business Logic

A comprehensive set of DAX measures and KPIs was created to convert the cleaned data model into actionable metrics. Measures are grouped by function (Headcount & Attrition, Satisfaction, Performance, Time Intelligence, Utility) to keep related logic together and make the catalogue easy to navigate.

A separate, empty Measures table was added to hold all DAX measures. Centralizing measures in one table improves discoverability, simplifies maintenance, and helps enforce consistent naming and formatting across the model.

Below, each measure will be listed with its name, a one-line purpose, and the full DAX expression for easy reference and validation.

DAX Measures Reference Table (With Code)

Measure Name	**Purpose / Business Meaning**	**DAX Code**
TotalEmployees	Counts total number of employees.	TotalEmployees = COUNT(DimEmployee[EmployeeID])
ActiveEmployees	Counts employees currently active (Attrition = 'No').	ActiveEmployees = CALCULATE([TotalEmployees], DimEmployee[Attrition] = "No")

InactiveEmployees	Counts employees who have attrited (Attrition = 'Yes').	InactiveEmployees = CALCULATE([TotalEmployees], DimEmployee[Attrition] = "Yes")
%AttritionRate	Overall attrition percentage.	%AttritionRate = DIVIDE([InactiveEmployees], [TotalEmployees])
%Attrition Rate Date	Attrition percentage across time.	%Attrition Rate Date = DIVIDE([InactiveEmployeesDate], [TotalEmployeesDate])
InactiveEmployeesDate	Inactive employee count aligned to date table.	InactiveEmployeesDate = CALCULATE([InactiveEmployees], USERELATIONSHIP(DimEmployee[HireDate], DimDate[Date]))
TotalEmployeesDate	Total employees aligned to date table.	TotalEmployeesDate = CALCULATE([TotalEmployees], USERELATIONSHIP(DimEmployee[HireDate], DimDate[Date]))
AverageSalary	Average employee salary.	AverageSalary = AVERAGE(DimEmployee[Salary])
Oldest Employee	Maximum employee age.	Oldest Employee = MAX(DimEmployee[Age])
Youngest Employee	Minimum employee age.	Youngest Employee = MIN(DimEmployee[Age])
JobSatisfaction	Job satisfaction score.	JobSatisfaction = MAX(FactPerformanceRating[JobSatisfaction])
ManagerRating	Manager performance rating using alternate relationship.	ManagerRating = CALCULATE(MAX(FactPerformanceRating[ManagerRating]), USERELATIONSHIP(FactPerformanceRating[ManagerRating], DimRatingLevel[RatingID]))
SelfRating	Self evaluation rating.	SelfRating = CALCULATE(MAX(FactPerformanceRating[SelfRating]), USERELATIONSHIP(FactPerformanceRating[SelfRating], DimRatingLevel[RatingID]))
EnvironmentSatisfaction	Environment satisfaction rating.	EnvironmentSatisfaction = CALCULATE(MAX(FactPerformanceRating[EnvironmentSatisfaction]), USERELATIONSHIP(FactPerformanceRating[EnvironmentSatisfaction], DimSatisfiedLevel[SatisfactionID]))
RelationshipSatisfaction	Relationship satisfaction rating.	RelationshipSatisfaction = CALCULATE(MAX(FactPerformanceRating[RelationshipSatisfaction]), USERELATIONSHIP(FactPerformanceRating[RelationshipSatisfaction], DimSatisfiedLevel[SatisfactionID]))
WorkLifeBalance	Work-life balance satisfaction score.	WorkLifeBalance = CALCULATE(MAX(FactPerformanceRating[WorkLifeBalance]),

		USERELATIONSHIP(FactPerformanceRating[WorkLifeBalance], DimSatisfiedLevel[SatisfactionID]))
LastReviewDate	Most recent performance review date.	LastReviewDate = FORMAT(COALESCE(MAX(FactPerformanceRating[ReviewDate]), "No Review Has Happened"), "mm/dd/yyyy")
NextReviewDate	Next expected review date (+365 days after last review or hire).	NextReviewDate = FORMAT(var revieworhire = IF(MAX(FactPerformanceRating[ReviewDate]) = BLANK(), MAX(DimEmployee[HireDate]), MAX(FactPerformanceRating[ReviewDate])) return revieworhire + 365, "mm/dd/yyyy")

A dedicated DimDate table was created using a custom DAX expression to generate a contiguous calendar covering the range of hire and review dates. This table provides calendar and fiscal attributes used for all time-based analysis in the model.

DAX Code for DimDate Table :

```
DimDate =
VAR _minYear = YEAR(MIN(DimEmployee[HireDate]))
VAR _maxYear = YEAR(MAX(DimEmployee[HireDate]))
VAR _fiscalStart = 4
RETURN
ADDCOLUMNS(
   CALENDAR(
            DATE(_minYear,1,1),
            DATE(_maxYear,12,31)
),
"Year",YEAR([Date]),
"Year Start",DATE( YEAR([Date]),1,1),
```

"YearEnd",DATE(YEAR([Date]),12,31),

"MonthNumber",MONTH([Date]),

"MonthStart",DATE(YEAR([Date]), MONTH([Date]), 1),

"MonthEnd",EOMONTH([Date],0),

"DaysInMonth",DATEDIFF(DATE(YEAR([Date]), MONTH([Date]), 1),EOMONTH([Date],0),DAY)+1,

"YearMonthNumber",INT(FORMAT([Date],"YYYYMM")),

"YearMonthName",FORMAT([Date],"YYYY-MMM"),

"DayNumber",DAY([Date]),

"DayName",FORMAT([Date],"DDDD"),

"DayNameShort",FORMAT([Date],"DDD"),

"DayOfWeek",WEEKDAY([Date]),

"MonthName",FORMAT([Date],"MMMM"),

"MonthNameShort",FORMAT([Date],"MMM"),

"Quarter",QUARTER([Date]),

"QuarterName","Q"&FORMAT([Date],"Q"),

"YearQuarterNumber",INT(FORMAT([Date],"YYYYQ")),

"YearQuarterName",FORMAT([Date],"YYYY")&" Q"&FORMAT([Date],"Q"),

"QuarterStart",DATE(YEAR([Date]), (QUARTER([Date])*3)-2, 1),

"QuarterEnd",EOMONTH(DATE(YEAR([Date]), QUARTER([Date])*3, 1),0),

"WeekNumber",WEEKNUM([Date]),

"WeekStart", [Date]-WEEKDAY([Date])+1,

"WeekEnd",[Date]+7-WEEKDAY([Date]),

"FiscalYear",if(_fiscalStart=1,YEAR([Date]),YEAR([Date])+ QUOTIENT(MONTH([Date])+(13-_fiscalStart),13)),

"FiscalQuarter",QUARTER(DATE(YEAR([Date]),MOD(MONTH([Date])+ (13-_fiscalStart) -1 ,12) +1,1)),

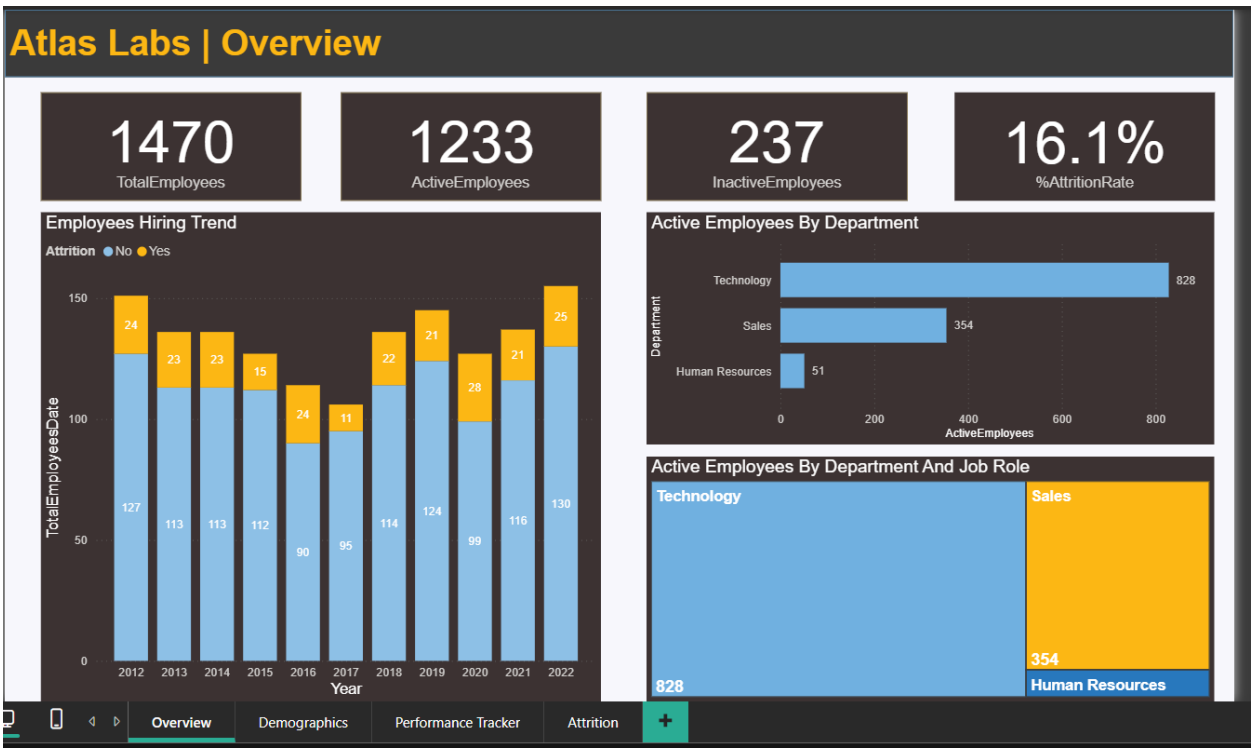
"FiscalMonth",MOD(MONTH([Date])+ (13-_fiscalStart) -1 ,12) +1)

Report Pages and Visual Design

Four dashboard reports were created to meet different stakeholders needs: which are Overview, DemoGraphics, Performance Tracker and Attrition.

Overview Dashboard Summary

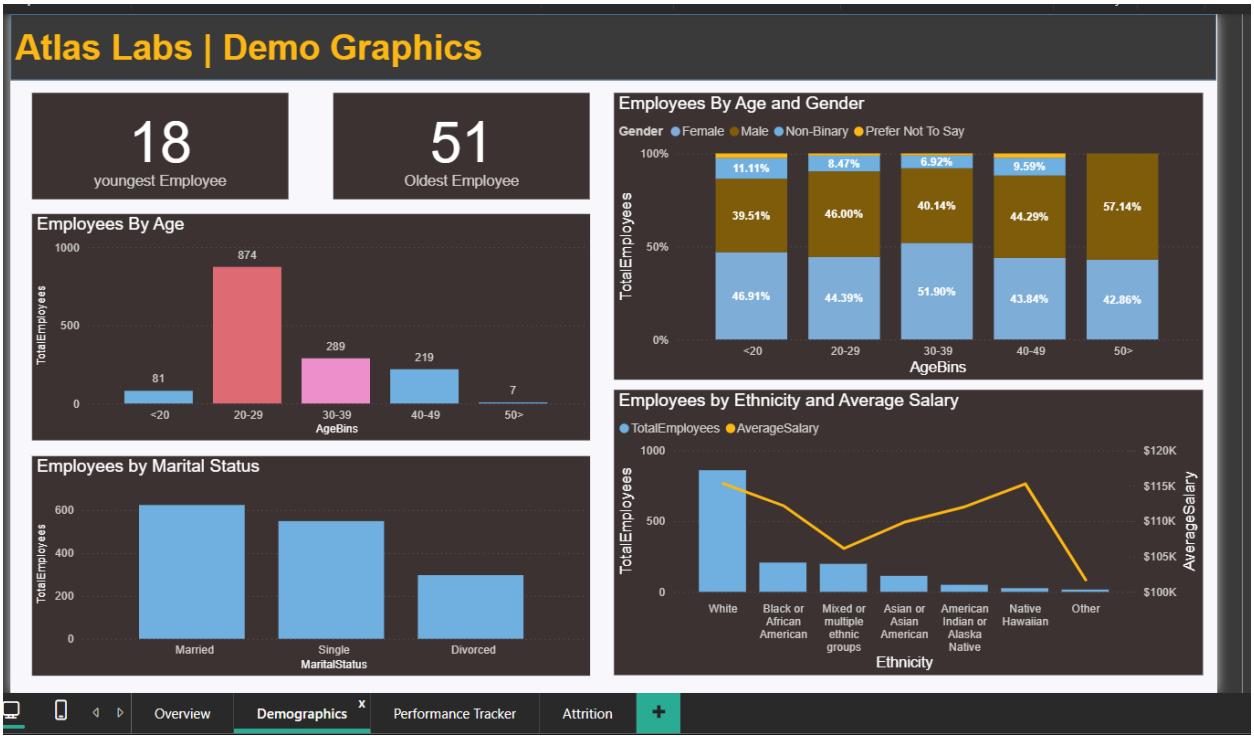
The **Overview Dashboard** provides a high-level snapshot of the organization's current workforce structure and attrition status. It highlights key headcount KPIs, hiring trends over time, and the distribution of active employees across departments and job roles. This dashboard is designed to give HR leadership and management a quick understanding of workforce scale, departmental composition, and turnover levels.



Demographics Dashboard Summary :

This dashboard presents key employee demographic insights using a mix of summary cards and visual charts. It includes KPIs that highlight age distribution, gender breakdown, marital status, and ethnicity composition across the workforce. Visuals are designed to show how different demographic groups are represented, with stacked bar charts for age and gender, standard bar charts for marital status, and combined bar-line charts to compare ethnicity with salary trends.

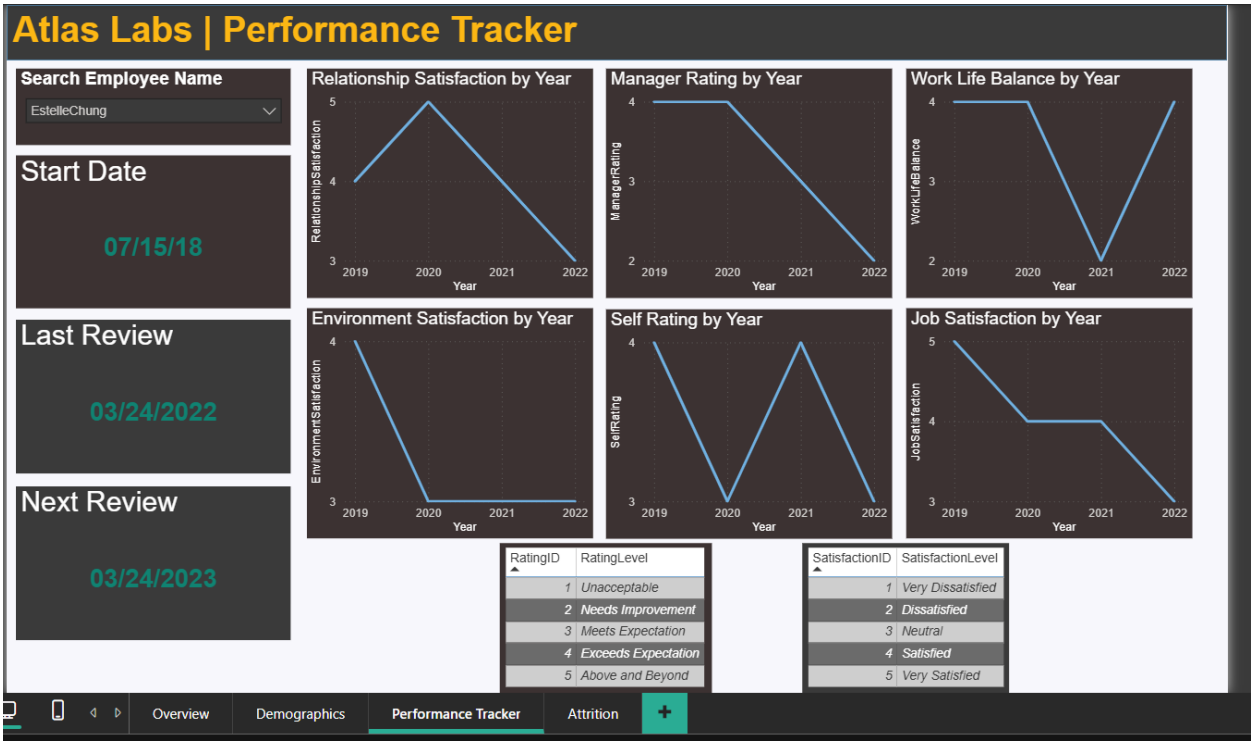
The layout balances high-level indicators with detailed breakdowns, helping HR teams and decision-makers understand workforce diversity, identify representation gaps, and explore correlations between demographic factors and compensation.



Performance Tracker Dashboard Summary:

The Performance Tracker dashboard focuses on individual employee performance and satisfaction trends over time. It includes KPIs such as review dates and tenure markers, along with a series of line charts that visualize year-over-year changes in key metrics like manager rating, job satisfaction, work-life balance, and self-evaluation.

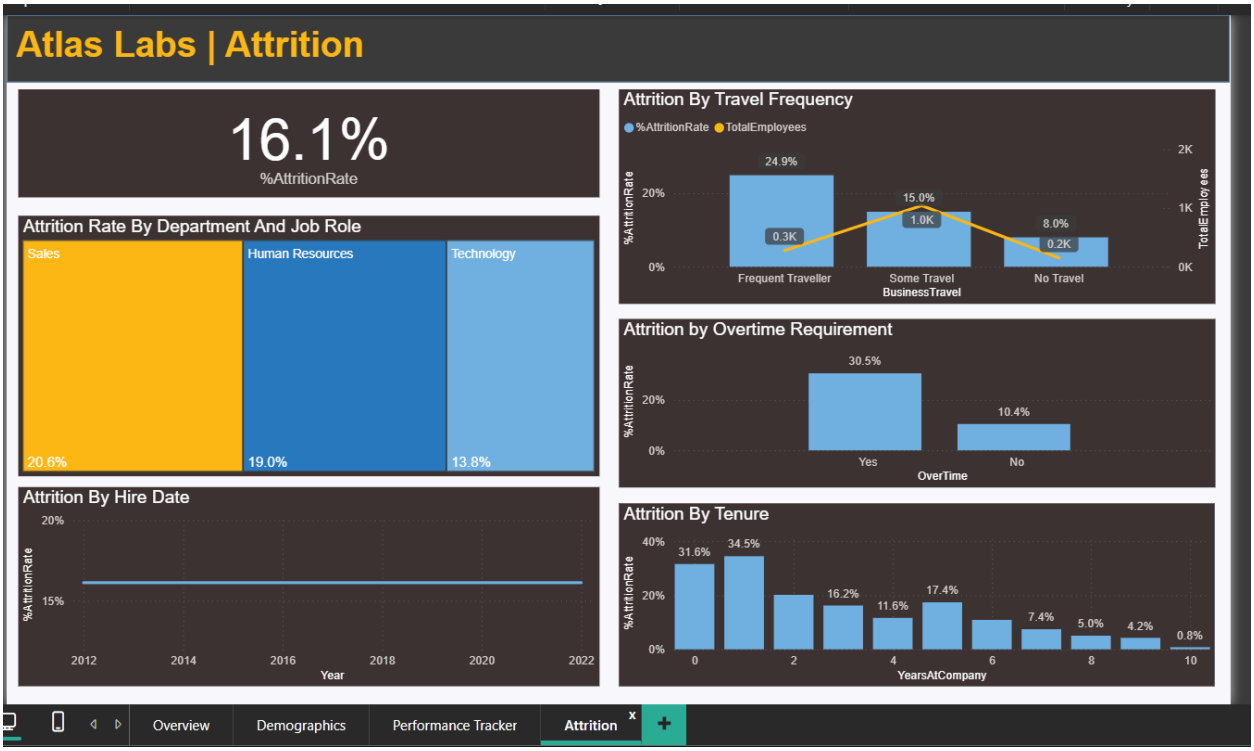
Each chart tracks a specific dimension of employee experience, helping identify patterns, improvements, or declines across review periods. The dashboard also includes rating and satisfaction level legends to contextualize the scores, making it easier to interpret performance outcomes against standardized benchmarks. This layout supports detailed performance reviews and helps managers make informed decisions about development, recognition, or support.



Attrition Dashboard Analysis:

The Attrition dashboard provides a focused view of employee turnover across multiple dimensions. It features a central KPI showing the overall attrition rate, supported by visual breakdowns that explore how attrition varies by department, job role, travel frequency, overtime status, hire date, and tenure.

Charts are designed to highlight patterns and potential drivers of attrition, using bar graphs, treemaps, and line charts to compare rates across categories. This layout helps HR teams and leadership identify high-risk groups, assess retention challenges, and prioritize interventions based on data-driven insights.



Insights and Analytical Findings:

Based on the four dashboards developed—Overview, Demographics, Performance Tracker, and Attrition—a range of insights were identified that highlight key patterns in workforce composition, performance, and retention.

- The **Overview dashboard** revealed a stable hiring trend over the years, with a noticeable concentration of active employees in the Technology department. The overall attrition rate provided a clear snapshot of organizational turnover, helping frame retention priorities.
- The **Demographics dashboard** surfaced diversity patterns across age, gender, marital status, and ethnicity. It showed a younger workforce skew and highlighted representation across gender identities and ethnic groups, offering valuable context for inclusion and compensation strategies.
- The **Performance Tracker dashboard** enabled detailed analysis of individual employee performance and satisfaction trends over time. It helped identify fluctuations in ratings and satisfaction dimensions, which can inform personalized development plans and managerial interventions.
- The **Attrition dashboard** provided a breakdown of turnover across departments, travel frequency, overtime status, hire date, and tenure. It highlighted higher attrition in specific roles and conditions, such as frequent travel and overtime, pointing to potential stress factors or policy gaps.

Each dashboard is fully interactive and allows filtering by employee, department, time period, or specific metrics. This dynamic setup enables users to uncover deeper trends, make targeted comparisons, and explore insights tailored to any variable of interest.

Recommendations and Action Plan:

This section outlines key recommendations based on the insights derived from the dashboards, along with suggested actions to improve workforce outcomes. The goal is to translate analytical findings into practical steps that support retention, performance, and diversity goals.

Recommendations may include:

- Addressing high attrition areas by reviewing workload, travel policies, or overtime expectations.
- Enhancing employee engagement through targeted programs based on satisfaction trends.
- Strengthening diversity and inclusion efforts by monitoring demographic representation and compensation equity.
- Supporting performance development with personalized feedback and training aligned to review trends.

Each recommendation is paired with an actionable step, responsible stakeholders, and suggested timelines to ensure follow-through and measurable impact. This section bridges data with decision-making and sets the foundation for continuous improvement.