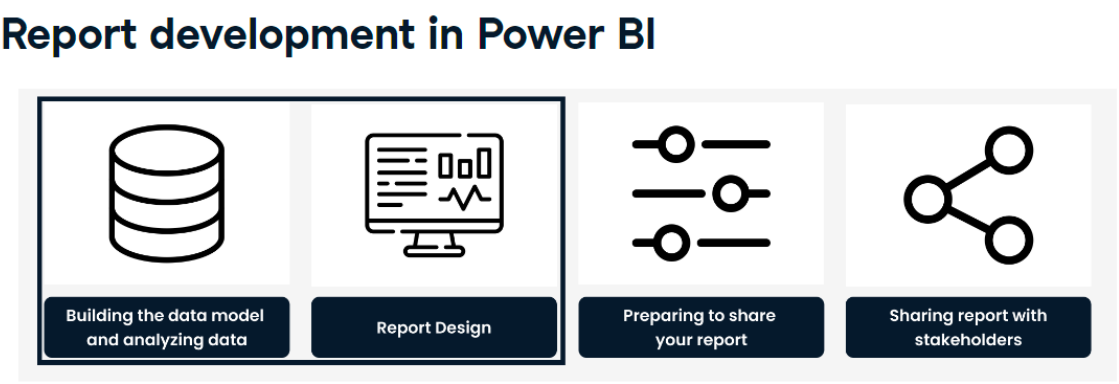
1. Introduction

In this Power BI case study, I will explore a dataset for a fictitious software company called Atlas Labs. This report focuses on importing, analysing, and visualising Human Resources data in Power BI. I will carry out exploratory data analysis and will use DAX to help build powerful visualisations. I will finish my analysis by diving deeper into attrition and what factors impact attrition. This analysis will help the organisation determine what action they will need to take to retain more employees. I will finalise the case study by making design changes to the report that provides a clean, branded design.

2. Data Modeling and EDA

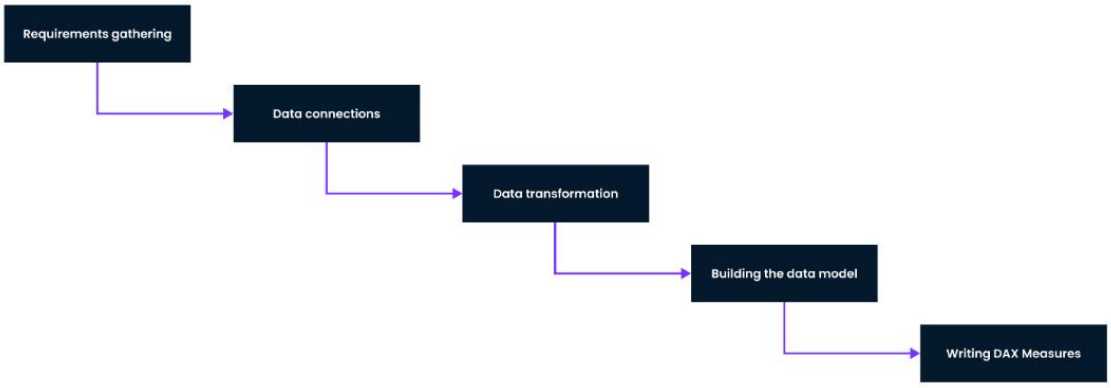
2.1 Report Development in Power BI

There are four key steps when developing reports in Power BI:



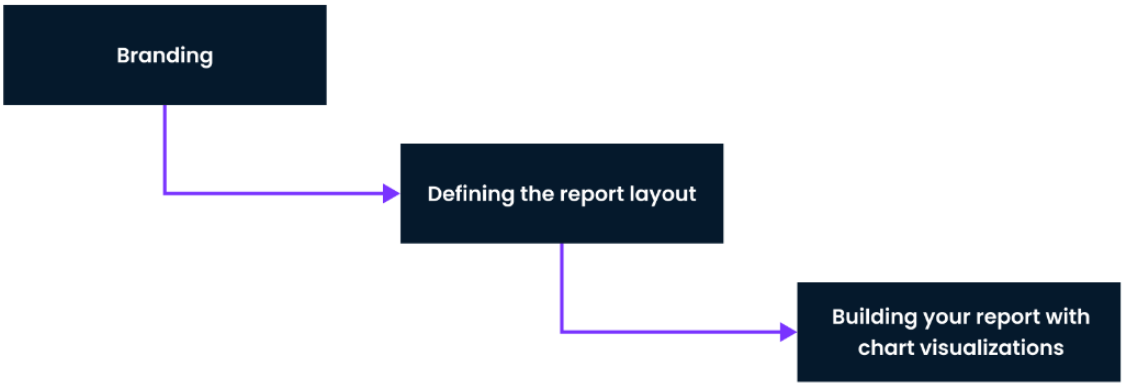
(a) Building the Data Model and Analysing Data

In Step 1, I will focus on 5 key areas: requirements gathering, connecting to data sources, data transformation, building the data model, and writing the initial DAX measures.



(b) Report Design

In Step 2, I will focus on 3 key areas: branding, defining the report layout, and building the report with chart visualisations.



2.2 Objectives

The core goal of this case study is to build a report using fictitious datasets from a Tech company called Atlas Labs. Atlas Labs HR team wants to be able to monitor key metrics on employees. Their secondary goal is to understand what factors impact employee attrition.

2.3 Dataset

2.3.1 Fact Table

In a typical Power BI report development process, there is some form of data modeling being carried out. In this case study, using the Kimball Model approach I will work with facts and dimensions to build the model. From the dataset, the fact table stores the Performance Ratings. This table contains information about employees' yearly reviews and helps Atlas Labs manage their employees' performance on a regular basis. This is the central point of the snowflake schema. It contains 11 different columns and has multiple rows per employee.

Performance		
Column	**Description**	**Datatype**
PerformanceID	A unique ID that identifies an individual performance review.	text
EmployeeID	A unique ID that identifies an employee. Connects to DimEmployee.	text
ReviewDate	Date an employee's review took place.	date
EnvironmentSatisfaction	Rating for employees' satisfaction with their environment. Connects to DimSatisfiedLevel.	number
JobSatisfaction	Rating for employees' satisfaction with their job role. Connects to DimSatisfiedLevel.	number
RelationshipSatisfaction	Rating for employees' satisfaction with their relationships at work. Connects to DimSatisfiedLevel.	number
WorkLifeBalance	Rating for employees' satisfaction with their work-life balance. Connects to DimSatisfiedLevel.	number
SelfRating	Rating for employees' performance based on their own view. Connects to DimRatingLevel.	number
ManagerRating	Rating for employees' performance based on their manager's view. Connects to DimRatingLevel.	number
TrainingOpportunitiesWithinYear	Number of training opportunities offered in the last 12 months.	number
TrainingOpportunitiesTaken	Number of training opportunities taken.	number

2.3.2 Dimension Tables

For this case study I will work with multiple dimension tables. They provide more context to the data - the who, what, when, where, and why. There are 5 dimension tables that I will be working with, i.e., Employee, EducationLevel, RatingLevel, SatisfiedLevel, and Date.

Employee		
Column	**Description**	**Datatype**
EmployeeID	A unique ID that identifies an employee.	text
FirstName	First name of an employee.	text
LastName	Last name of an employee.	text
Gender	Self-defined employee gender identity.	text
Age	Current age of an employee.	number
BusinessTravel	Frequency of business travel - three categories: Frequent Traveller, Some Travel, and No Travel.	text
Department	Department an employee works in - three categories: Technology, HR, and Sales.	text
DistanceFromHome	Kilometer distance between an employee's home and their office.	number
State	State where the employee lives.	text
Ethnicity	Self-defined employee ethnicity.	text
Education	Education level for employees'. Connects to DimEducationLevel.	number
EducationField	Employee field of study.	text
Job Role	Current/latest employee job role.	text
MaritalStatus	Current/latest employee marital status.	text
Salary	Current/latest employee salary.	number
StockOptionLevel	The banding level for stock options that the employee has.	number
Overtime	Contains "Yes" and "No" to indicate whether an employee is expected to work overtime in their role.	text
HireDate	Date the employee joined the company.	date
Attrition	Contains "Yes" and "No" to indicate whether an employee has left the organization.	text
YearsAtCompany	Number of years since the employee joined the organization.	number
YearsInMostRecentRole	Number of years the employee has been in their most recent role.	number
YearsSinceLastPromotion	Number of years since the employee last got promoted.	number
YearsWithCurrManager	Number of years the employee has been with their current manager	number

Satisfied Level

Column	Description	Datatype
SatisfactionID	A unique ID that connects to EnvironmentSatisfaction, JobSatisfaction, RelationshipSatisfaction, and Work-Life Balance in FactPerformanceRating.	number
SatisfactionLevel	Provides meaning to the satisfaction level: Very Satisfied, Satisfied, Neutral, Dissatisfied, and Very Dissatisfied	text

Rating Level

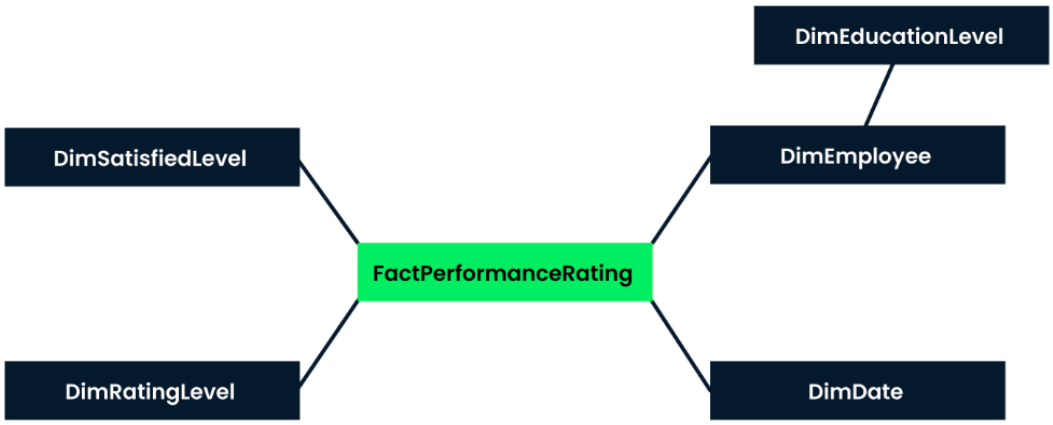
Column	Description	Datatype
RatingID	A unique ID that connects to SelfRating and ManagerRating in FactPerformanceRating	number
RatingLevel	Provides meaning to the rating level: Above and Beyond, Exceeds Expectation, Meets Expectation, Needs Improvement, and Unacceptable.	text

Education Level

Column	Description	Datatype
EducationLevelID	A unique ID that connects to Education in DimEmployee.	number
EducationLevel	Provides meaning to the education level: Doctorate, Masters, Bachelors, High School, and No Formal Qualifications.	text

2.3.3 Snowflake Schema

The final data model will follow a snowflake schema. There is only one dimension table that does not directly attach to the fact table. This is how the final data model will look.



2.4 Loading CSVs

I have imported the following CSV files:

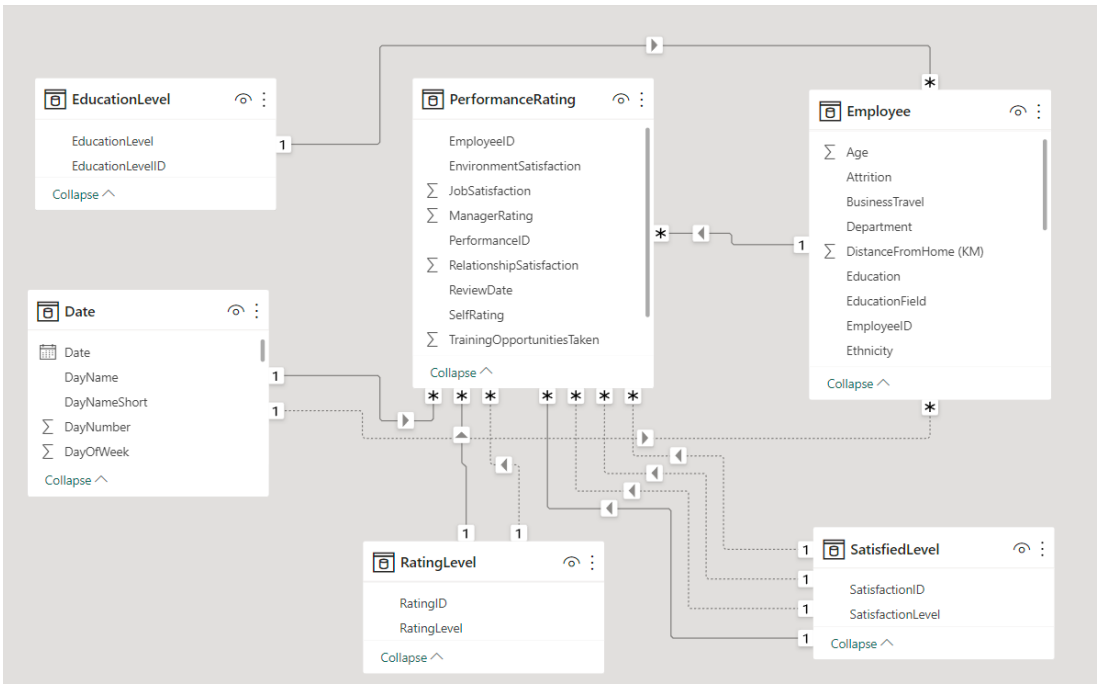
- EducationLevel.csv
- Employee.csv
- PerformanceRating.csv
- RatingLevel.csv
- SatisfiedLevel.csv

2.5 Date Dimension and Relating Tables

In a Power BI report, a dedicated date table is highly recommended for accurate date and time reporting. I have created a date table to use throughout this case study.

```
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
)
```

Modelling data is one of the four pillars of Power BI report development as it enables connecting different data tables together in the form of a Star or Snowflake schema. I have connected the six tables together with both active and inactive relationships.



2.6 Exploring the Data

The leadership team at Atlas Labs is looking to have visibility on high-level metrics about the state of its employees. In particular, the organisation is looking to understand the attrition at the company.

I have created the following measures:

- "TotalEmployees" which gives the count of all employees present in the company.
- "ActiveEmployees" which gives the count of all employees that are currently Active.
- "InactiveEmployees" which gives the count of all employees that are currently Inactive.
- "% Attrition Rate" which gives the percentage of employees that left the company.

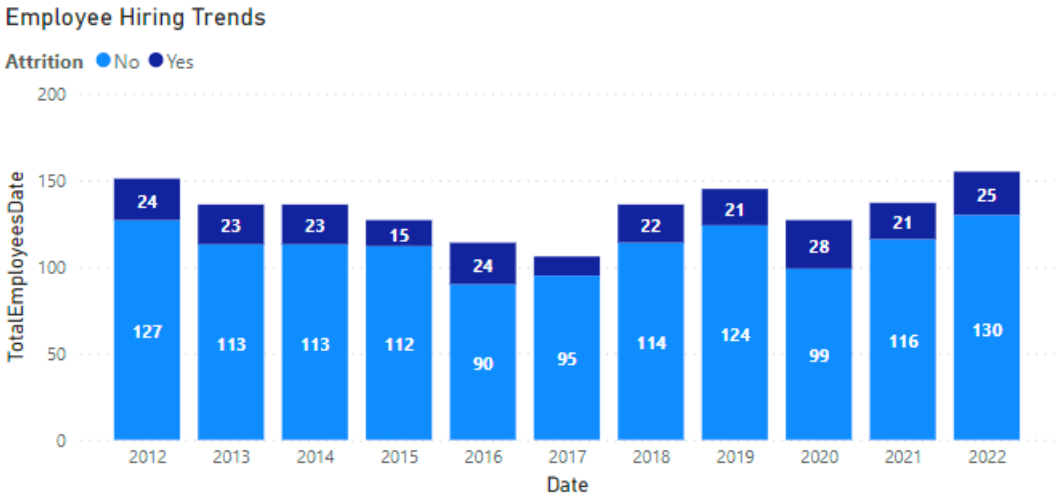
1470	1233	237	16.1%
TotalEmployees	ActiveEmployees	InactiveEmployees	% Attrition Rate

2.7 Hiring Trends over Time

The Head of HR has requested for a report to be created that enables them to have a view of the whole organisation's key metrics. This will enable them to be able to benchmark their HR metrics against organisations across their industry as well as understand how their employees are performing.

They would like to start by analysing their hiring trends over time to see where they see the biggest growth in new employees.

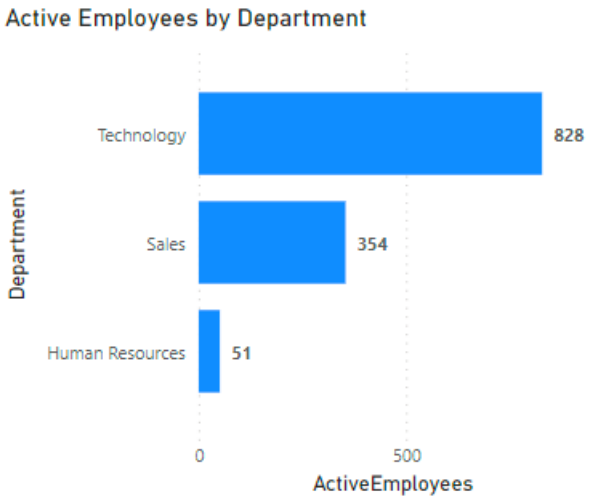
I have created a new measure "TotalEmployeesDate" to show the total number of employees by their hiring date.



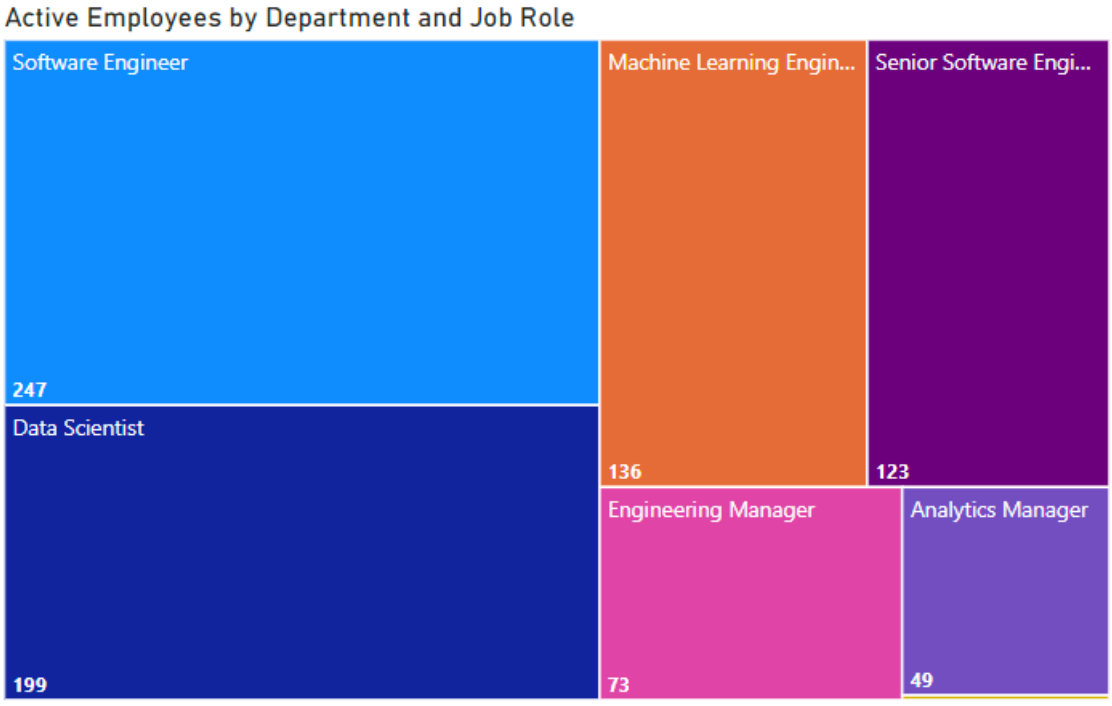
- 116 Employees that were hired in 2021 are still with Atlas.
- 127 Employees that were hired in 2012 are still with Atlas.

2.8 Analysing Departments and Job Roles

The HR team is working with department managers to understand their teams and what type of typical roles they are hiring into the organisation. This will enable every department to plan for new hiring requests in the future.



- Technology team has the greatest number of Active Employees.



- Software Engineer is the most common job title for the Technology team.

3. Analysing Demographics and Performance

In this section, I will extract insights using DAX and build custom visuals. I will answer some questions about employee demographics and performance.

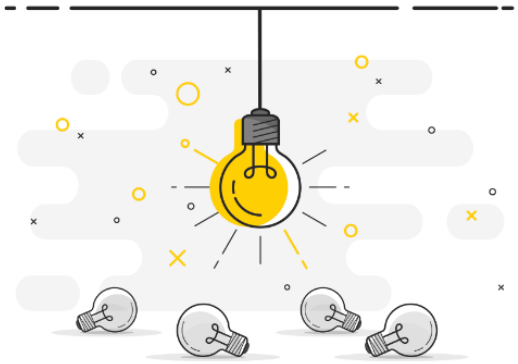
Specifically, I will be focusing on understanding Atlas Labs Diversity & Inclusion metrics and building a report page to track individual employee performance reviews.

Some key insights for Atlas Labs discovered so far:

- Atlas Labs has employed 1,470 people since its doors opened.
- At the point at which the data was collected, they had over 1,200 active employees.
- As expected, being a Software company, its largest department is Technology.
- All this can raise questions such as "Is Atlas Labs competitive enough as an employer?".
- We know that the attrition rate for Atlas Labs is 16%. This opens up more questions on attrition for the company and what ultimately impacts employee happiness.

Key insights uncovered

1. Atlas Labs has employed over **1,470** people.
2. Atlas Labs currently employs over **1,200** people.
3. The largest department by far is **Technology**.
4. The attrition rate for employees leaving the organization is **16%**.

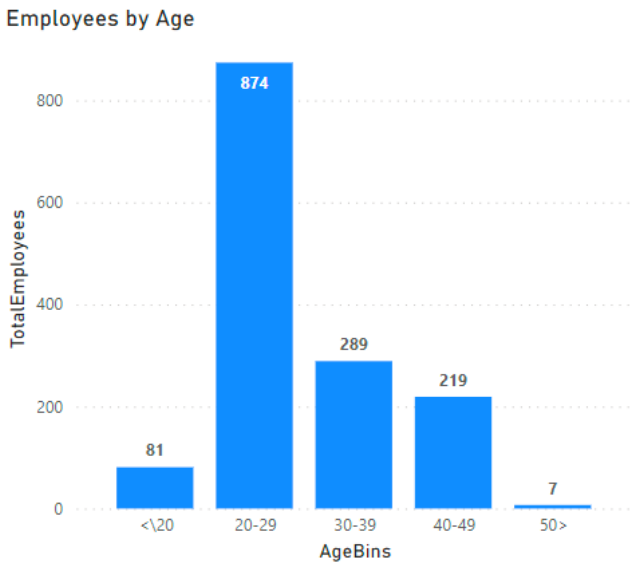


3.1 Demographics: Age and Gender

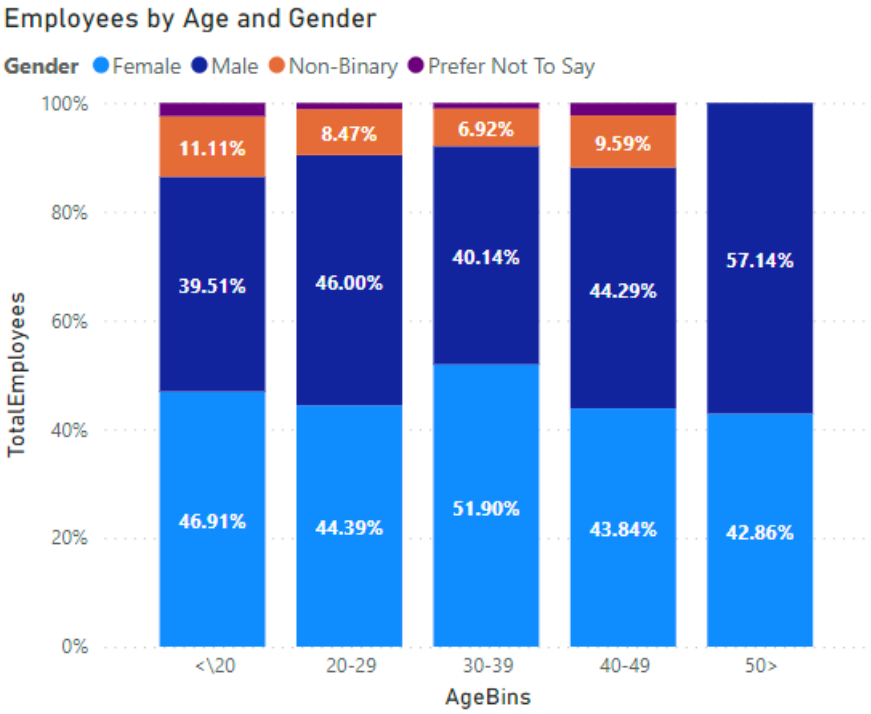
Youngest Employee	Oldest Employee
18	51

I have created a conditional column “AgeBins” that separates employees’ age by bins in the following structure:

- <\20
- 20-29
- 30-39
- 40-49
- 50>

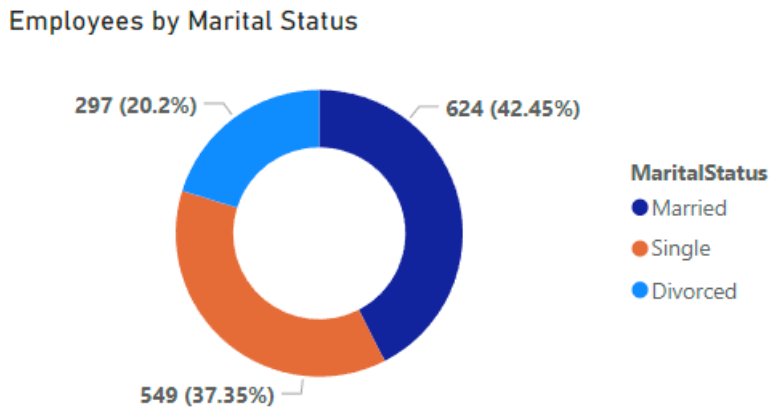


- Most employees are between 20-29 age group.



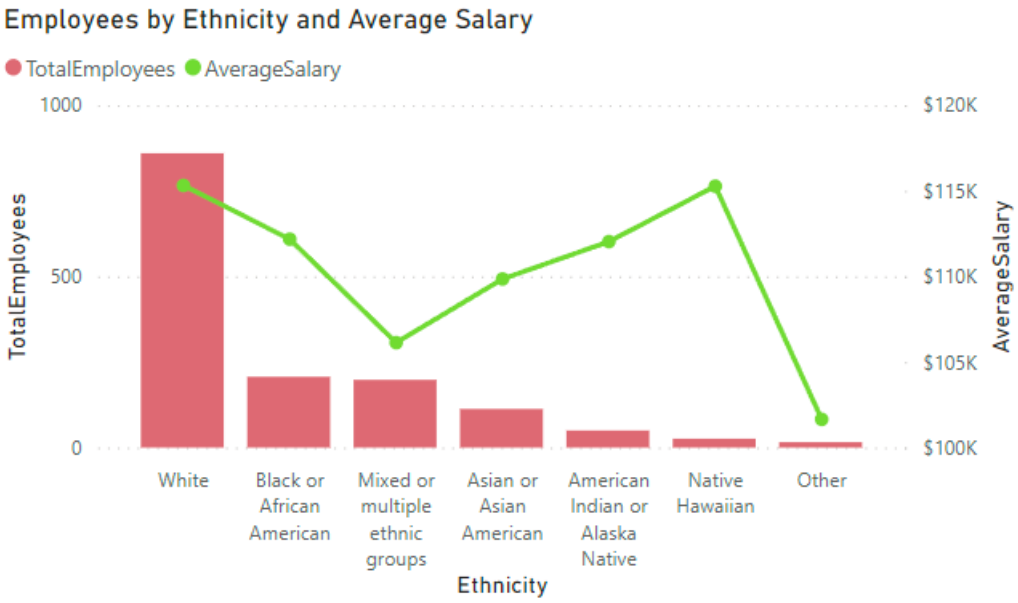
- There are 92 Active Female Employees between the ages of 40 and 49.
- There are 51.90% Female Employees between the ages of 30-39.

3.2 Demographics: Marital Status and Ethnicity



- 42.45% of the employees are Married.

I created a new measure called “AverageSalary” which calculates the average salary of all employees.



- Average Salary of an Employee who lists their Ethnicity as “Mixed or multiple ethnic groups” is $106,133.
- Employees having “White” Ethnicity is the highest in number and also have the highest Average Salary.
- “Native Hawaiian” Ethnic employees are very less in number but have a very high Average Salary.
- Average Salary of Employees whose Ethnicity is “Mixed or multiple ethnic groups” is one of the lowest.

3.3 Performance Tracker

In this section, I will build visualisations for the HR team to continually track an individual's performance scores based on their yearly performance reviews.

I have created the following column:

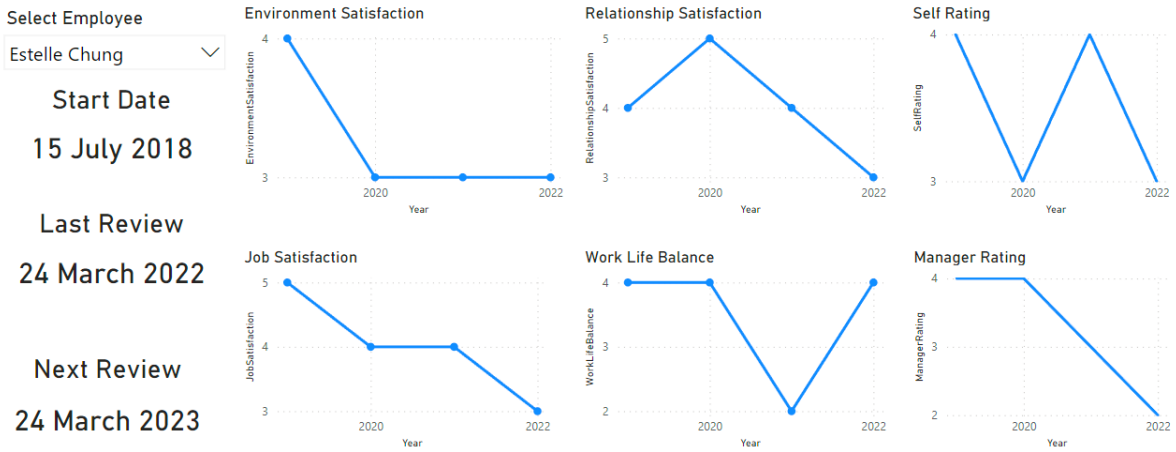
- A calculated column "FullName" that combines the "FirstName" and "LastName" of employees.

I have created the following measures:

- "LastReviewDate" that gets the last performance review for the selected individual.
- "NextReviewDate" that calculates when the next review is due (365 days after the "LastReviewDate"; if no review has occurred yet, it will be 365 days from the "HireDate".

I have also created the following measures which calculate the maximum value of their respective columns:

- "JobSatisfaction"
- "EnvironmentSatisfaction"
- "RelationshipSatisfaction"
- "WorkLifeBalance"
- "SelfRating"
- "ManagerRating"



- Some interesting insights about Estelle Chung have been uncovered. It can be seen that the managerial rating level and self-performance level do not always align and that most recently, Estelle received a 2 ("Needs improvement") rating.

- In order to support Estelle's growth and retain her, the HR/management team can organise a meeting to discuss needs and create an improvement plan.
- It is important to provide Estelle with the opportunity to give insight into what is happening and how the company can help support her.

4. Compiling the Insights

In this section, I will be focusing on delivering insights on attrition and what factors affect employee retention. Finally, I will create a user-friendly, clean, and branded experience.

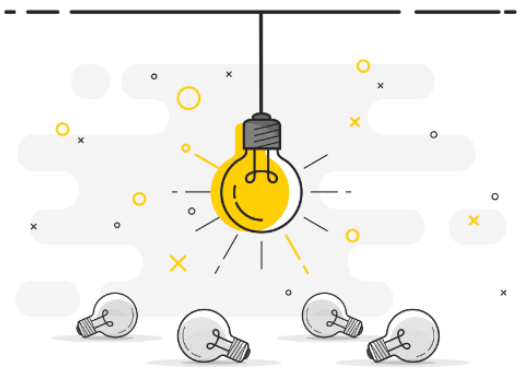
- The first insight is that the majority of employees hired at Atlas Labs are between the ages of 20 and 29 years old.
- Employees who identify as non-binary make up 8.5% of total employees.
- Employees who identify as white have the highest average salary and also making up the majority of the organisation.
- Employees who identify as mixed or multiple ethnic groups have one of the lowest average salaries.

Key insights uncovered

1. Majority of employees are between 20-29 years old.
2. Currently, Atlas Labs employ 2.7% more women than men.

Employees who identify as

1. Non-binary make up 8.5% of total employees.
2. White have the highest average salary
3. 'Mixed or multiple ethnic groups' have one of the lowest average salaries.

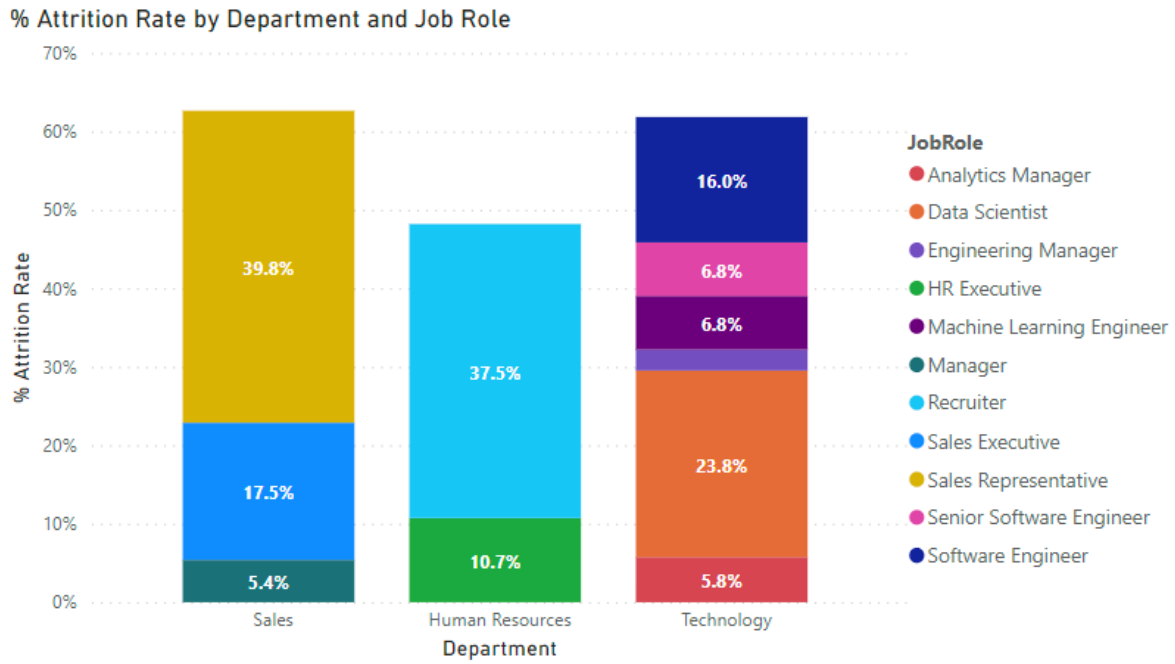


These insights are very useful and can help Atlas Labs review its hiring strategies to make improvements across the board.

An interesting question that comes from the insights uncovered is: "Do these demographics insights impact employee attrition?". I will be diving deeper into that question in this section.

4.1 Understanding Attrition

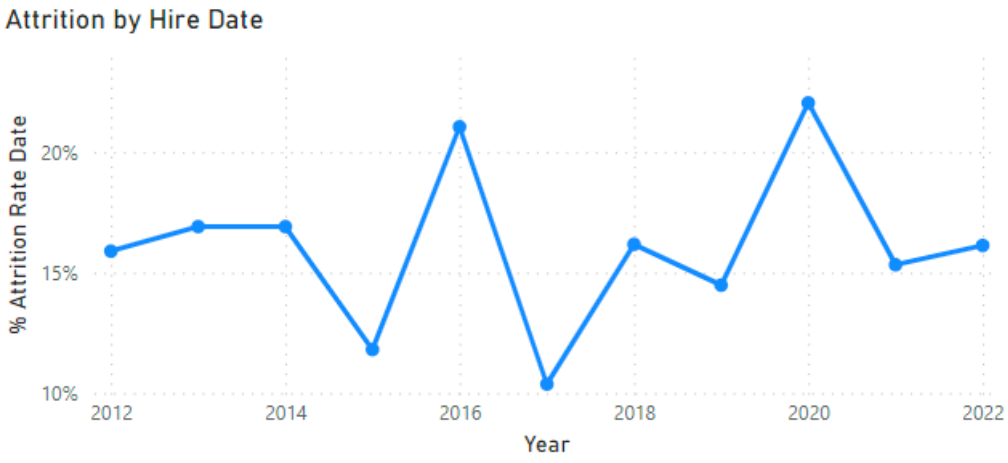
Employee Attrition, also known as Employee Churn or Turnover, refers to employees leaving an organisation for any reason (voluntary or involuntary).



- Sales department and Sales Representative job role have the highest Attrition Rate.
- Despite being one of the smaller job role groups in the organisation, it has the highest turnover.
- Further investigation needs to be done to understand why it is high and support decision-making.

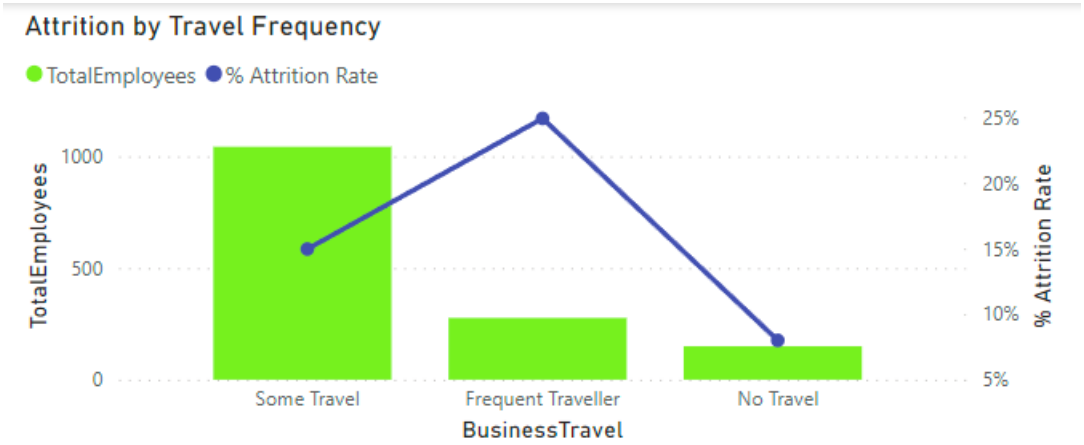
To understand the Attrition Rate based on Hire Date, I created the following measures:

- InactiveEmployeesDate
- % Attrition Rate Date

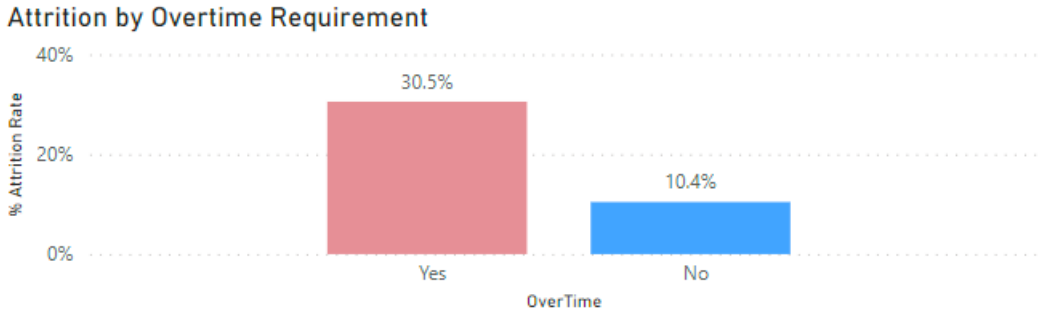


- Employees hired in the year 2020 had the highest Attrition Rate of 22%.

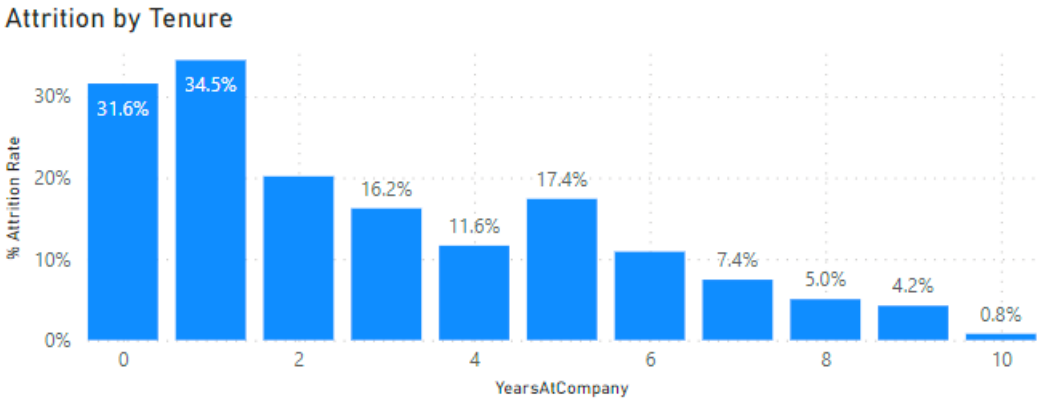
4.2 Other Factors that Impact Attrition



- Employees that have been considered Frequent Travellers have the highest Attrition Rate (24.9%) despite only making up 19% of the total hires.
- Perhaps the frequency of travel became an issue for some of the employees and led them to leave the organisation.
- The HR department should review the travel requirement policy and survey employees on feelings around travel frequency.



- For employees who work overtime, have a higher Attrition Rate (30.5%) than those who do not.



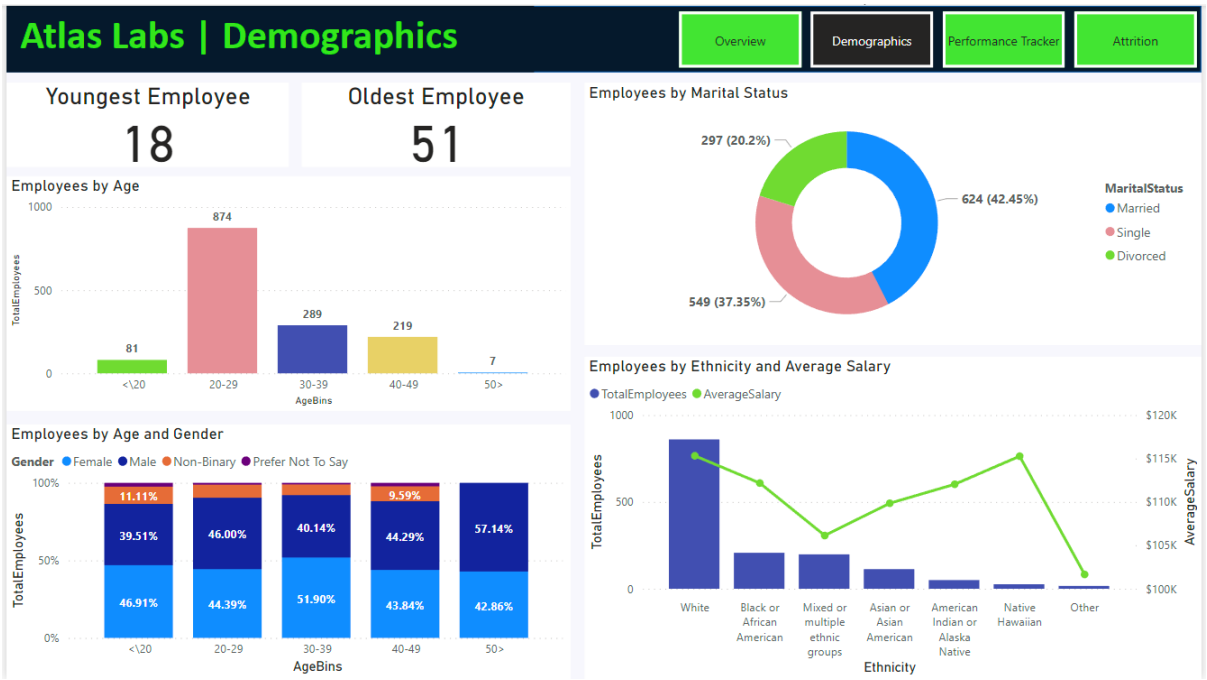
- Employees who have spent 1 year at the company have the highest Attrition Rate of 34.5%.
- A general trend can be seen that as the time spent at the company increases, the Attrition rate decreases.

5. Dashboard

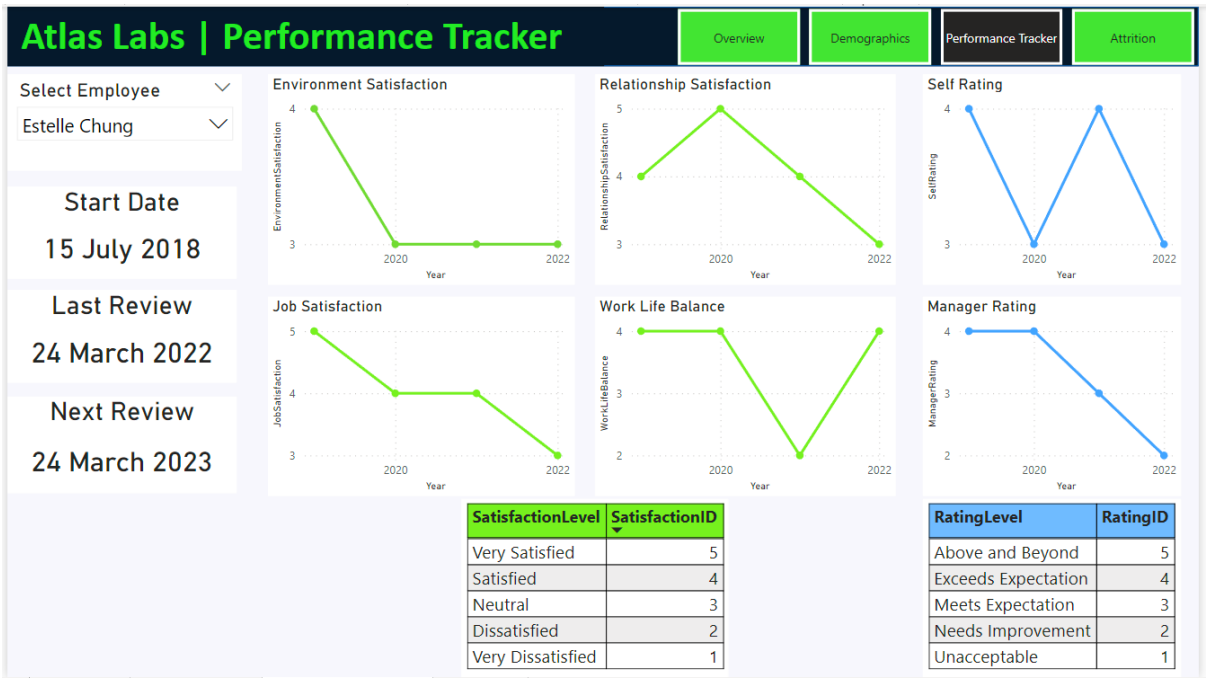
The Atlas Labs HR team can now easily navigate key metrics around the company employees. This will enable the company to make more informed decisions from measuring hiring to monitoring diversity and inclusion metrics, as well monitor employee performance and attrition.

5.1 Overview Page

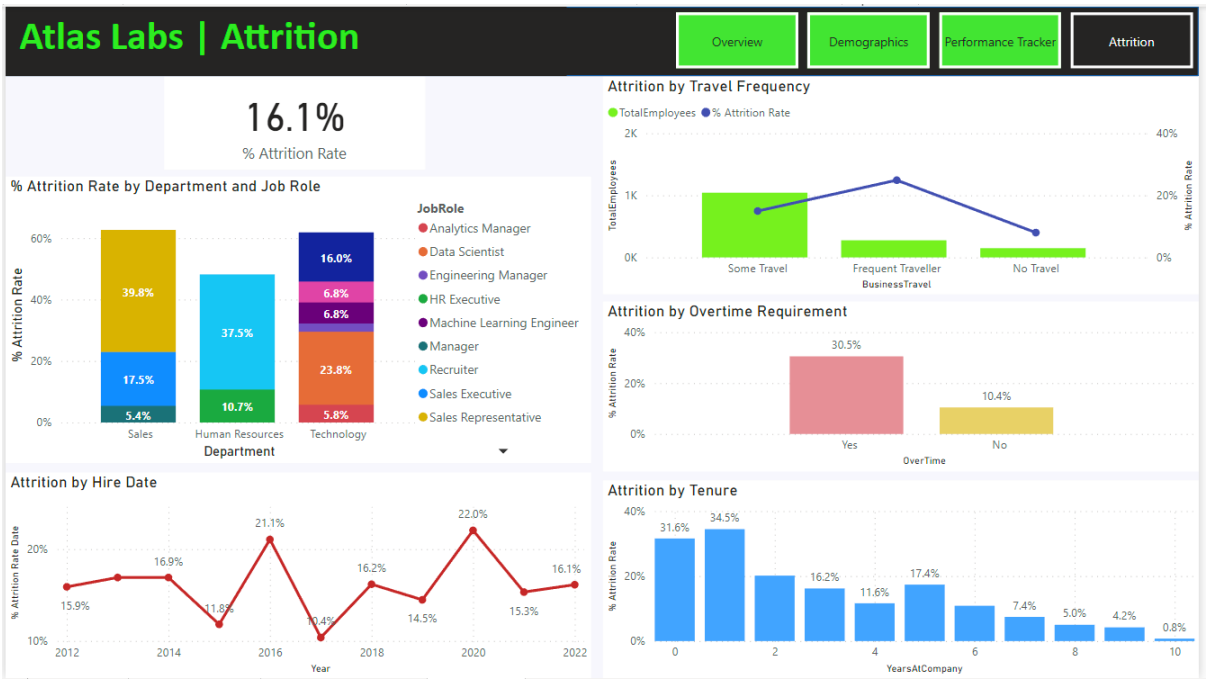
5.2 Demographics Page



5.3 Performance Tracker Page



5.4 Attrition Page



6. Communicating Insights with Stakeholders

6.1 Summary of Insights

(a) Workforce and Employee Retention:

- Atlas Labs currently has 1233 active employees out of a total of 1470 employees.
- The overall attrition rate at Atlas Labs is 16.1%, raising questions about employee satisfaction and retention.
- Employees hired in 2012 show one of the highest retention rates, indicating successful long-term recruitment strategies.
- The technology team has the most active employees, and software engineer is the most common job title within that department.

(b) Employee Demographics and Diversity:

- The majority of employees fall within the 20-29 age group, while the number of employees above 50 is the lowest.
- Females between the ages of 30-39 represent 51.90% of female employees.
- Approximately 42.45% of employees are married.

(c) Performance and Employee Support:

- An individual employee named Estelle Chung has shown misalignment between managerial rating and self-performance, highlighting the need for a discussion and improvement plan to support her growth and retention.

(d) Ethnicity and Salary:

- Employees identifying as "Mixed or multiple ethnic groups" have one of the lowest average salaries.
- Employees identifying as "White" have the highest average salary despite being the majority in the organisation.
- "Native Hawaiian" employees have high average salaries despite being few in number.

(e) Attrition Factors:

- The sales department and sales representative job role have the highest attrition rates, indicating the need for further investigation and support in decision-making.
- Employees hired in 2020 had the highest attrition rate of 22%.
- Frequent travellers and employees who work overtime have higher attrition rates, suggesting a need to review travel policies and overtime practices.
- Employees who have spent one year at the company have the highest attrition rate (34.5%), indicating potential challenges in retaining new hires.

These insights provide valuable information about attrition rates, employee demographics, and departmental dynamics, helping stakeholders identify areas for improvement and make informed decisions to enhance employee satisfaction and retention at Atlas Labs.

6.2 Recommendations

Based on the provided insights, here are some practical recommendations for stakeholders at Atlas Labs to reduce employee attrition:

(a) Improve Employee Satisfaction and Retention Efforts:

- Conduct regular employee satisfaction surveys to identify areas of improvement and address any concerns.
- Enhance communication channels to foster a positive work environment and ensure employees feel heard and valued.
- Implement employee recognition programs to acknowledge and reward outstanding performance and contributions.
- Provide opportunities for professional development and growth to enhance employee engagement and job satisfaction.

(b) Enhance Recruitment and Onboarding Strategies:

- Analyse the successful long-term recruitment strategies employed in 2012 and identify key factors for retention.
- Develop a comprehensive onboarding program to ensure new hires feel welcomed, supported, and equipped to succeed.
- Provide mentorship programs or buddy systems to help new employees integrate into the company culture and establish connections.

(c) Review and Improve Sales Department:

- Conduct an in-depth analysis of the factors contributing to high attrition rates in the sales department.
- Identify potential issues such as workload, work-life balance, compensation, or career development opportunities.
- Implement targeted retention strategies for sales representatives, such as providing sales-specific training, setting realistic targets, and offering competitive incentives.

(d) Address Diversity and Inclusion:

- Foster a diverse and inclusive workplace culture by promoting equal opportunities and fairness for all employees.
- Develop diversity training programs to raise awareness and sensitivity to different cultures, backgrounds, and perspectives.
- Implement initiatives to support the advancement and professional growth of underrepresented groups.

(e) Enhance Employee Support and Performance Management:

- Address the misalignment between managerial ratings and self-performance for employees like Estelle Chung through open and honest discussions.
- Provide regular feedback and coaching to employees to help them improve and align their performance with organizational expectations.
- Establish clear performance goals and expectations, and ensure employees have the necessary resources and support to meet them.

(f) Evaluate Travel Policies and Overtime Practices:

- Review the travel requirement policy and assess the impact of frequent travel on employee satisfaction and attrition.
- Consider flexible work arrangements, virtual meetings, or alternative travel options to minimise the burden on employees.
- Monitor and manage overtime to maintain a healthy work-life balance for employees, ensuring that excessive overtime does not contribute to attrition.

These recommendations aim to address key insights related to employee satisfaction, retention, diversity, performance management, and specific departmental challenges. Implementing these strategies can help reduce employee attrition and create a more supportive and engaging work environment at Atlas Labs.