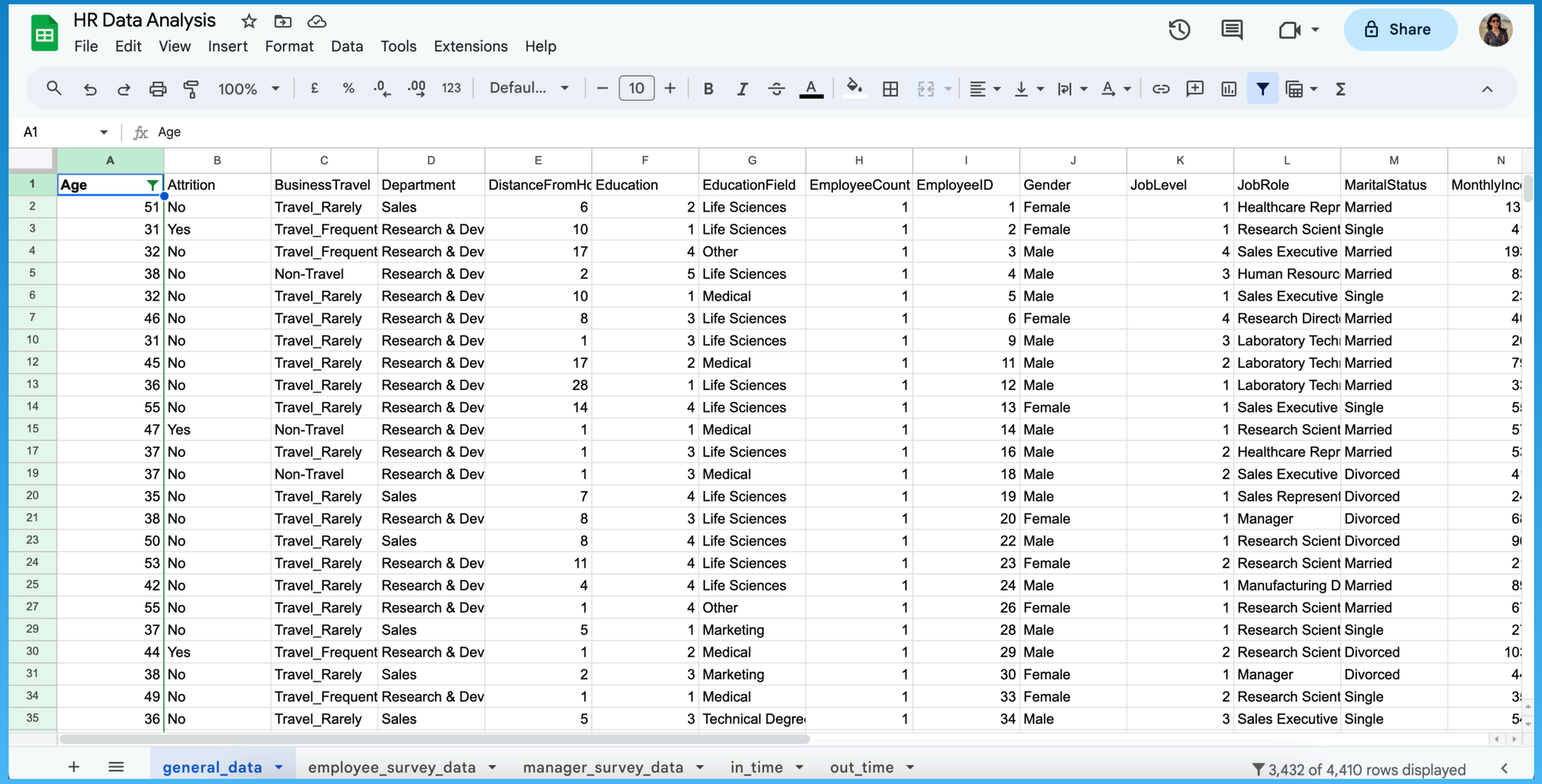
Task-1

HR Data Analysis

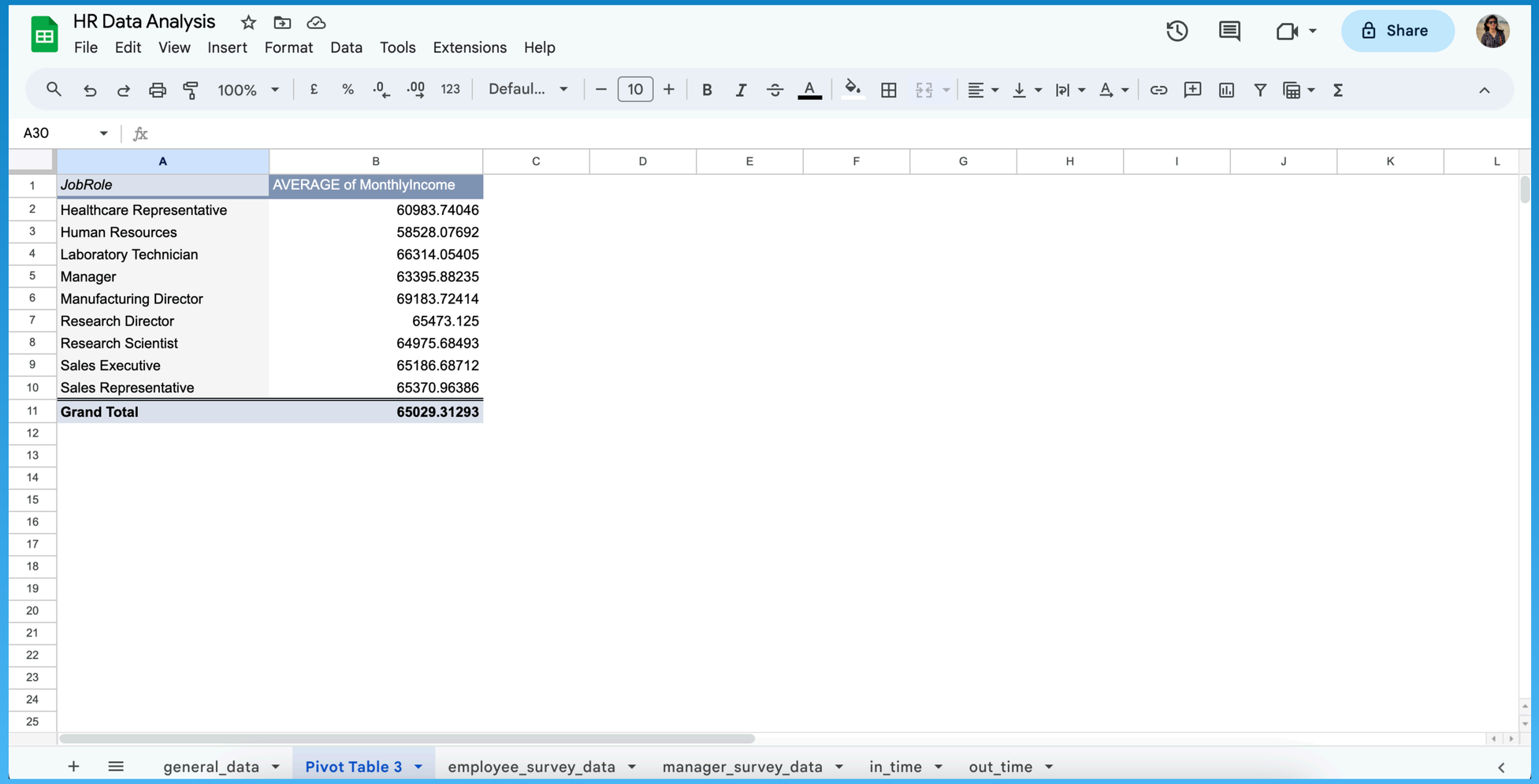
Samritha A.R

1. Using Excel, how would you filter the dataset to only show employees aged 30 and above



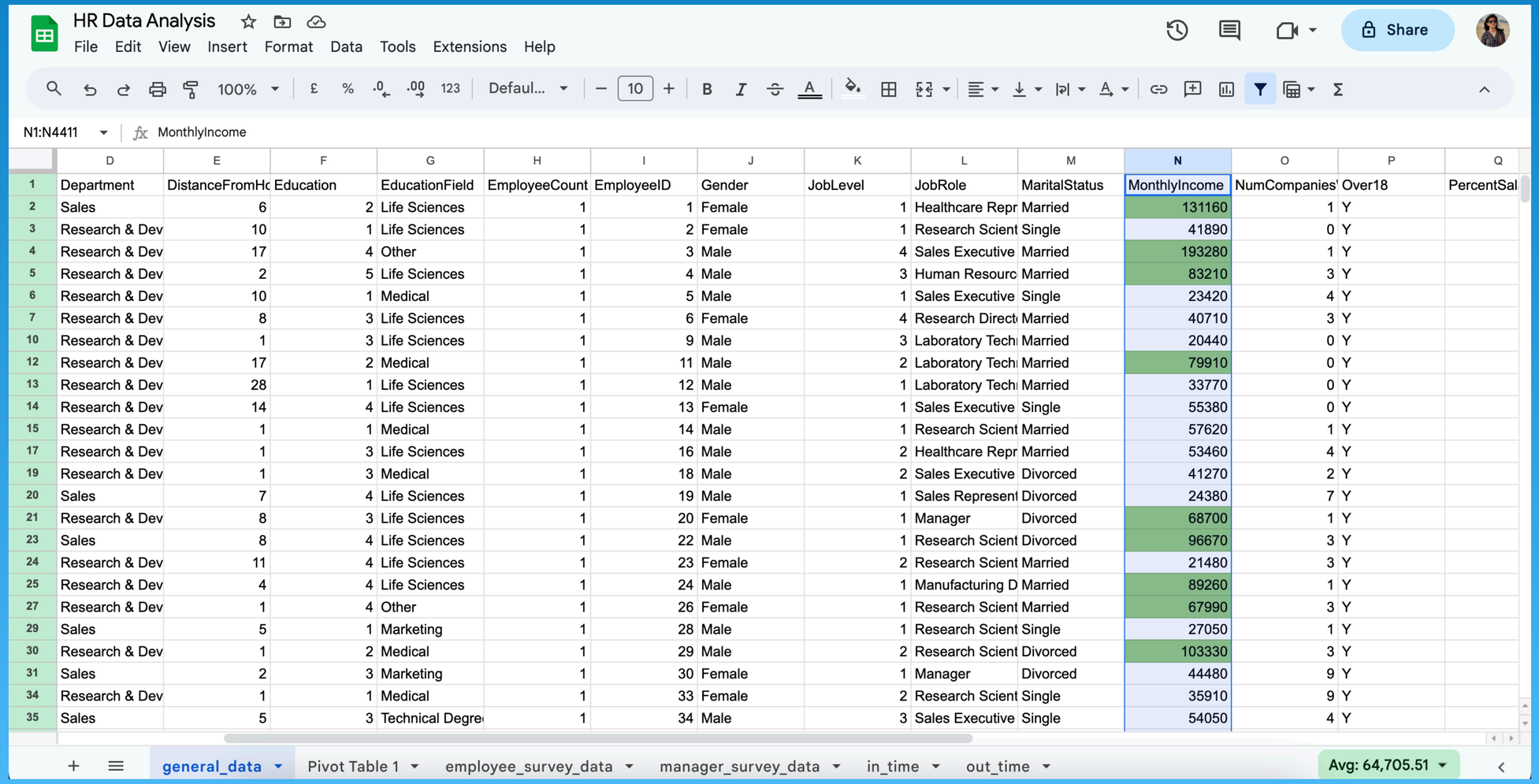
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Age	Attrition	BusinessTravel	Department	DistanceFromHc	Education	EducationField	EmployeeCount	EmployeeID	Gender	JobLevel	JobRole	MaritalStatus	MonthlyInc
2	51	No	Travel_Rarely	Sales	6	2	Life Sciences	1	1	Female	1	Healthcare Repr	Married	13
3	31	Yes	Travel_Frequent	Research & Dev	10	1	Life Sciences	1	2	Female	1	Research Scient	Single	4
4	32	No	Travel_Frequent	Research & Dev	17	4	Other	1	3	Male	4	Sales Executive	Married	19
5	38	No	Non-Travel	Research & Dev	2	5	Life Sciences	1	4	Male	3	Human Resourc	Married	8
6	32	No	Travel_Rarely	Research & Dev	10	1	Medical	1	5	Male	1	Sales Executive	Single	2
7	46	No	Travel_Rarely	Research & Dev	8	3	Life Sciences	1	6	Female	4	Research Direct	Married	4
10	31	No	Travel_Rarely	Research & Dev	1	3	Life Sciences	1	9	Male	3	Laboratory Tech	Married	2
12	45	No	Travel_Rarely	Research & Dev	17	2	Medical	1	11	Male	2	Laboratory Tech	Married	7
13	36	No	Travel_Rarely	Research & Dev	28	1	Life Sciences	1	12	Male	1	Laboratory Tech	Married	3
14	55	No	Travel_Rarely	Research & Dev	14	4	Life Sciences	1	13	Female	1	Sales Executive	Single	5
15	47	Yes	Non-Travel	Research & Dev	1	1	Medical	1	14	Male	1	Research Scient	Married	5
17	37	No	Travel_Rarely	Research & Dev	1	3	Life Sciences	1	16	Male	2	Healthcare Repr	Married	5
19	37	No	Non-Travel	Research & Dev	1	3	Medical	1	18	Male	2	Sales Executive	Divorced	4
20	35	No	Travel_Rarely	Sales	7	4	Life Sciences	1	19	Male	1	Sales Represent	Divorced	2
21	38	No	Travel_Rarely	Research & Dev	8	3	Life Sciences	1	20	Female	1	Manager	Divorced	6
23	50	No	Travel_Rarely	Sales	8	4	Life Sciences	1	22	Male	1	Research Scient	Divorced	9
24	53	No	Travel_Rarely	Research & Dev	11	4	Life Sciences	1	23	Female	2	Research Scient	Married	2
25	42	No	Travel_Rarely	Research & Dev	4	4	Life Sciences	1	24	Male	1	Manufacturing D	Married	8
27	55	No	Travel_Rarely	Research & Dev	1	4	Other	1	26	Female	1	Research Scient	Married	6
29	37	No	Travel_Rarely	Sales	5	1	Marketing	1	28	Male	1	Research Scient	Single	2
30	44	Yes	Travel_Frequent	Research & Dev	1	2	Medical	1	29	Male	2	Research Scient	Divorced	10
31	38	No	Travel_Rarely	Sales	2	3	Marketing	1	30	Female	1	Manager	Divorced	4
34	49	No	Travel_Frequent	Research & Dev	1	1	Medical	1	33	Female	2	Research Scient	Single	3
35	36	No	Travel_Rarely	Sales	5	3	Technical Degre	1	34	Male	3	Sales Executive	Single	5

2. Create a pivot table to summarize the average Monthly Income by Job Role



JobRole	AVERAGE of MonthlyIncome
Healthcare Representative	60983.74046
Human Resources	58528.07692
Laboratory Technician	66314.05405
Manager	63395.88235
Manufacturing Director	69183.72414
Research Director	65473.125
Research Scientist	64975.68493
Sales Executive	65186.68712
Sales Representative	65370.96386
Grand Total	**65029.31293**

3. Apply conditional formatting to highlight employees with Monthly Income above the company's average income



	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Department	DistanceFromHo	Education	EducationField	EmployeeCount	EmployeeID	Gender	JobLevel	JobRole	MaritalStatus	MonthlyIncome	NumCompanies'	Over18	PercentSal
2	Sales	6	2	Life Sciences	1	1	Female	1	Healthcare Repr	Married	131160	1	Y	
3	Research & Dev	10	1	Life Sciences	1	2	Female	1	Research Scient	Single	41890	0	Y	
4	Research & Dev	17	4	Other	1	3	Male	4	Sales Executive	Married	193280	1	Y	
5	Research & Dev	2	5	Life Sciences	1	4	Male	3	Human Resourc	Married	83210	3	Y	
6	Research & Dev	10	1	Medical	1	5	Male	1	Sales Executive	Single	23420	4	Y	
7	Research & Dev	8	3	Life Sciences	1	6	Female	4	Research Direct	Married	40710	3	Y	
10	Research & Dev	1	3	Life Sciences	1	9	Male	3	Laboratory Tech	Married	20440	0	Y	
12	Research & Dev	17	2	Medical	1	11	Male	2	Laboratory Tech	Married	79910	0	Y	
13	Research & Dev	28	1	Life Sciences	1	12	Male	1	Laboratory Tech	Married	33770	0	Y	
14	Research & Dev	14	4	Life Sciences	1	13	Female	1	Sales Executive	Single	55380	0	Y	
15	Research & Dev	1	1	Medical	1	14	Male	1	Research Scient	Married	57620	1	Y	
17	Research & Dev	1	3	Life Sciences	1	16	Male	2	Healthcare Repr	Married	53460	4	Y	
19	Research & Dev	1	3	Medical	1	18	Male	2	Sales Executive	Divorced	41270	2	Y	
20	Sales	7	4	Life Sciences	1	19	Male	1	Sales Represent	Divorced	24380	7	Y	
21	Research & Dev	8	3	Life Sciences	1	20	Female	1	Manager	Divorced	68700	1	Y	
23	Sales	8	4	Life Sciences	1	22	Male	1	Research Scient	Divorced	96670	3	Y	
24	Research & Dev	11	4	Life Sciences	1	23	Female	2	Research Scient	Married	21480	3	Y	
25	Research & Dev	4	4	Life Sciences	1	24	Male	1	Manufacturing D	Married	89260	1	Y	
27	Research & Dev	1	4	Other	1	26	Female	1	Research Scient	Married	67990	3	Y	
29	Sales	5	1	Marketing	1	28	Male	1	Research Scient	Single	27050	1	Y	
30	Research & Dev	1	2	Medical	1	29	Male	2	Research Scient	Divorced	103330	3	Y	
31	Sales	2	3	Marketing	1	30	Female	1	Manager	Divorced	44480	9	Y	
34	Research & Dev	1	1	Medical	1	33	Female	2	Research Scient	Single	35910	9	Y	
35	Sales	5	3	Technical Degre	1	34	Male	3	Sales Executive	Single	54050	4	Y	

4. Create a bar chart in Excel to visualize the distribution of employee ages

HR Data Analysis

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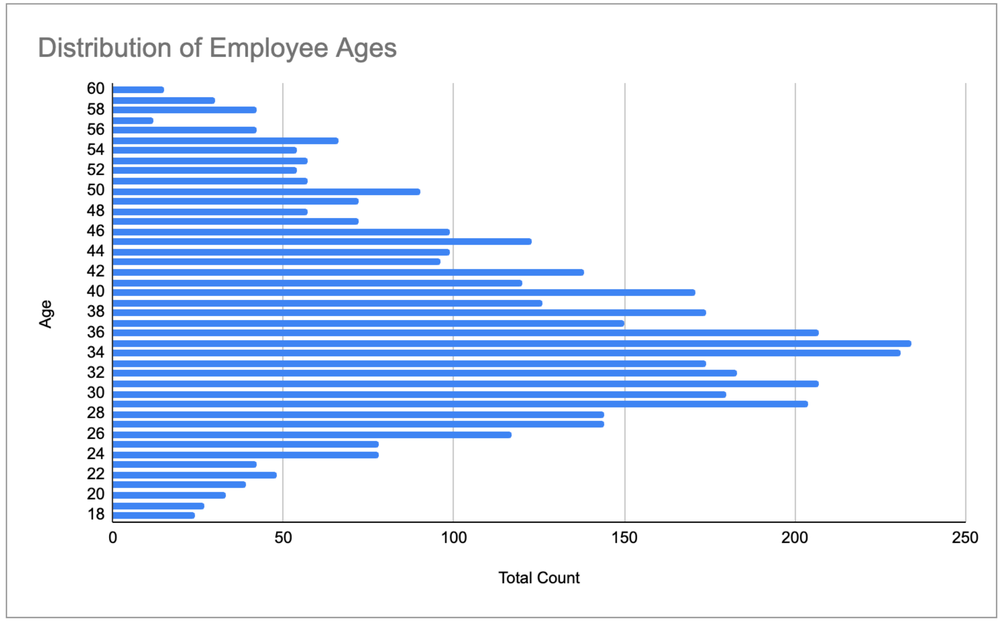
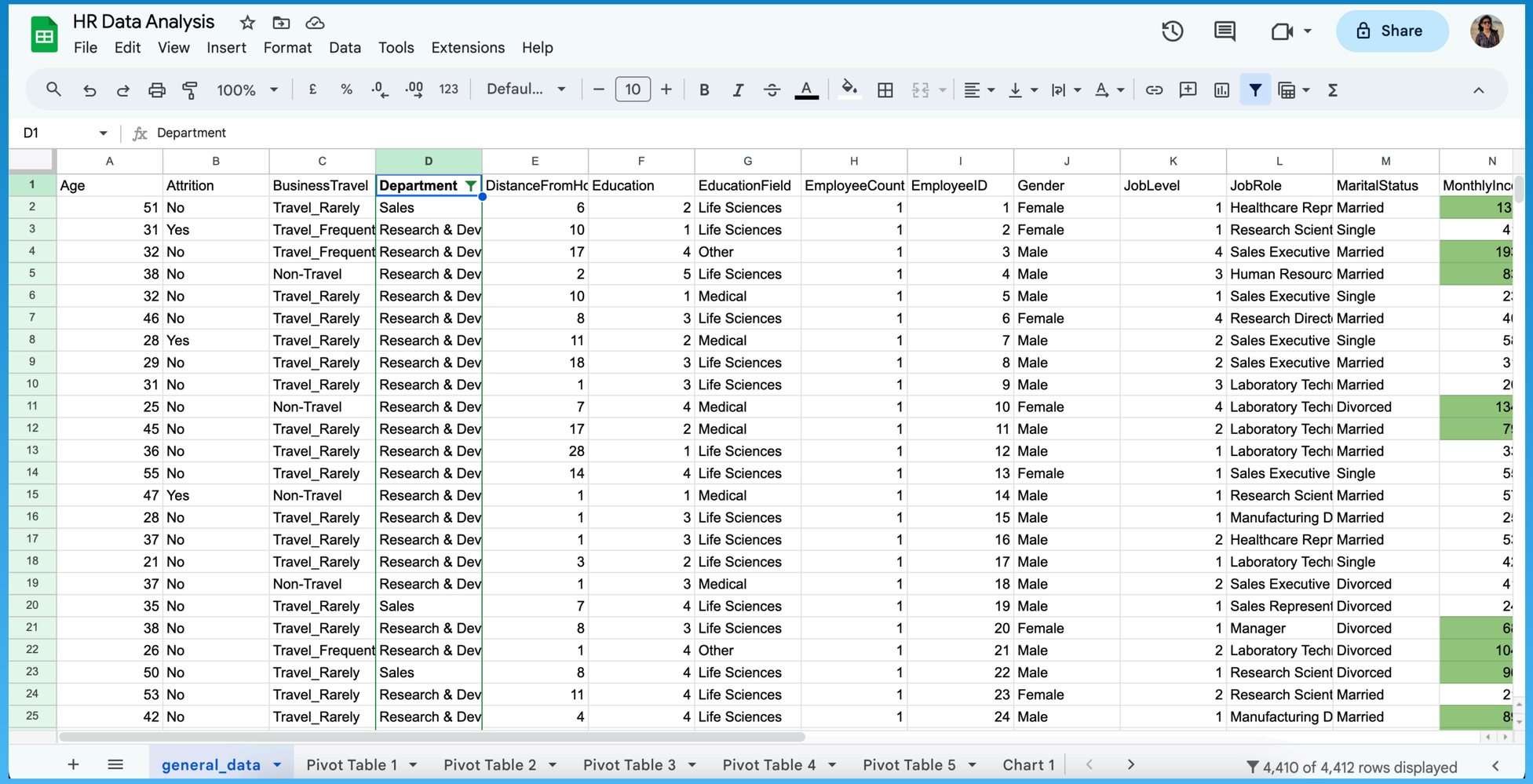
Age	COUNT of Age
60	15
59	30
58	42
57	12
56	42
55	66
54	54
53	57
52	54
51	57
50	90
49	72
48	57
47	72
46	99
45	123
44	99
43	96
42	138
41	120
40	171
39	126
38	174
37	150



general_data | Pivot Table 1 | Pivot Table 2 | employee_survey_data | manager_survey_data | in_time | out_time

5. Identify and clean any missing or inconsistent data in the "Department" column



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5	38	No	Non-Travel	Research & Dev	2	5	Life Sciences	1	4	Male	3	Human Resourc	Married	8
6	32	No	Travel_Rarely	Research & Dev	10	1	Medical	1	5	Male	1	Sales Executive	Single	2
7	46	No	Travel_Rarely	Research & Dev	8	3	Life Sciences	1	6	Female	4	Research Direct	Married	4
8	28	Yes	Travel_Rarely	Research & Dev	11	2	Medical	1	7	Male	2	Sales Executive	Single	5
9	29	No	Travel_Rarely	Research & Dev	18	3	Life Sciences	1	8	Male	2	Sales Executive	Married	3
10	31	No	Travel_Rarely	Research & Dev	1	3	Life Sciences	1	9	Male	3	Laboratory Tech	Married	2
11	25	No	Non-Travel	Research & Dev	7	4	Medical	1	10	Female	4	Laboratory Tech	Divorced	13
12	45	No	Travel_Rarely	Research & Dev	17	2	Medical	1	11	Male	2	Laboratory Tech	Married	7
13	36	No	Travel_Rarely	Research & Dev	28	1	Life Sciences	1	12	Male	1	Laboratory Tech	Married	3
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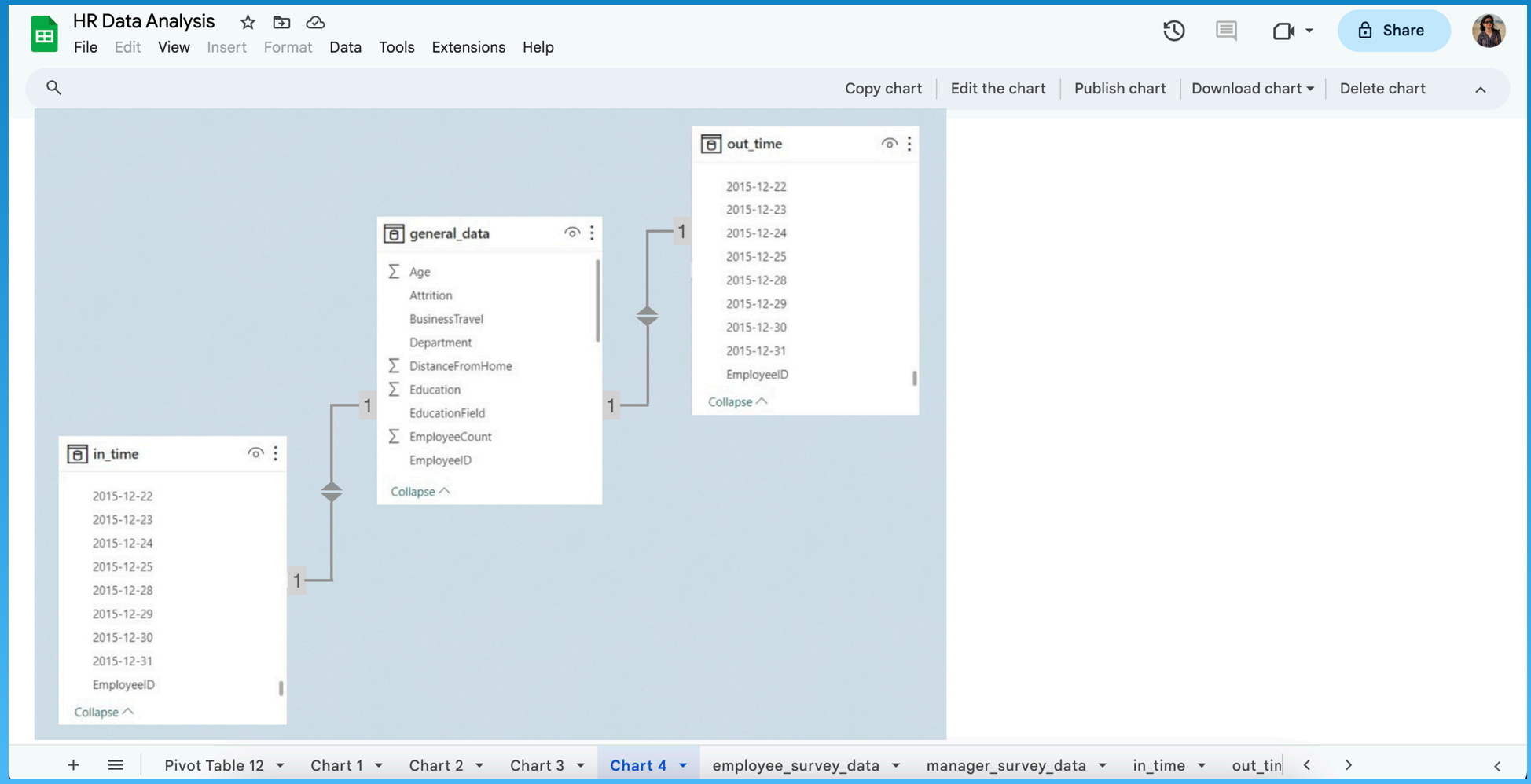
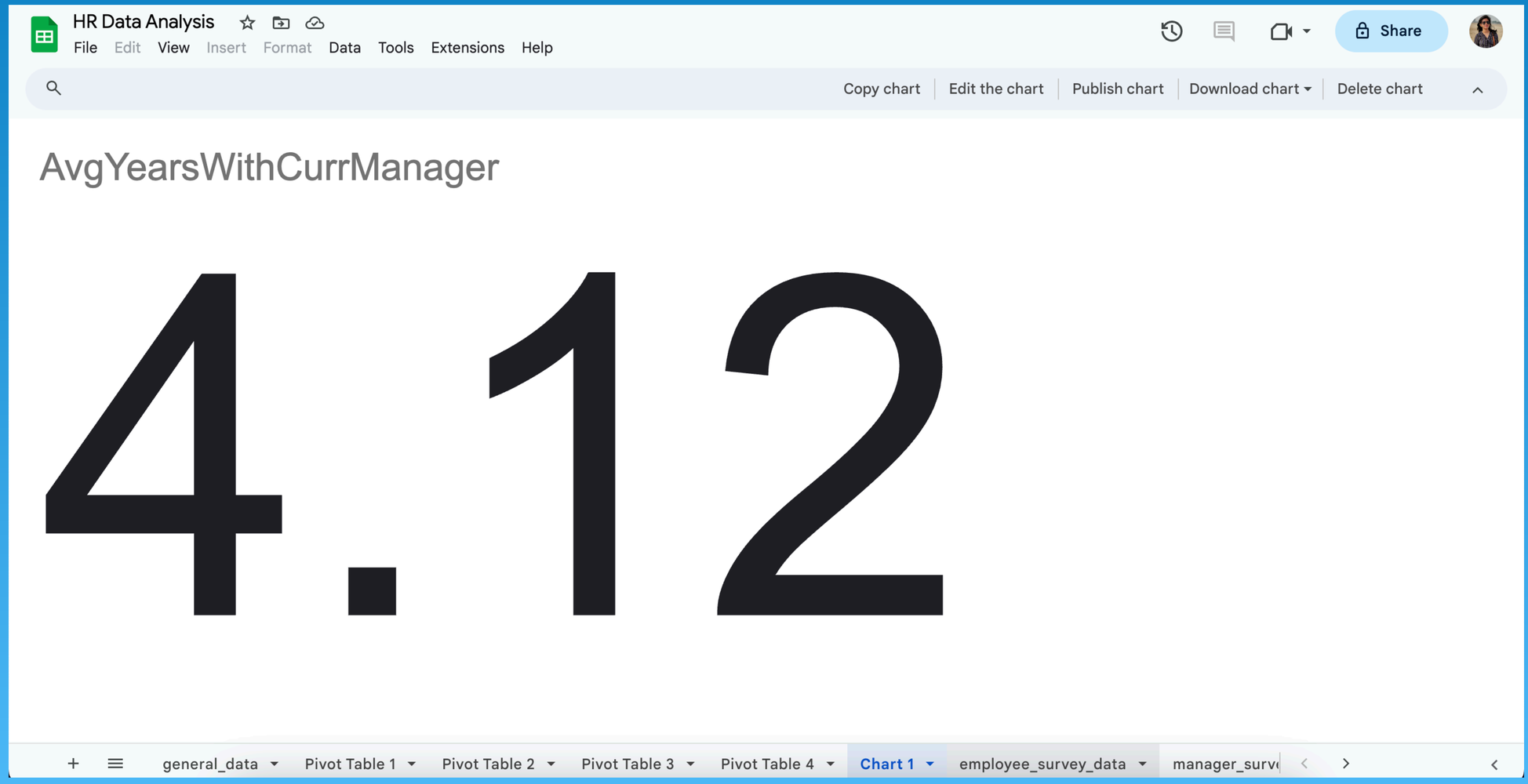
16	28	No	Travel_Rarely	Research & Dev	1	3	Life Sciences	1	15	Male	1	Manufacturing D	Married	2
17	37	No	Travel_Rarely	Research & Dev	1	3	Life Sciences	1	16	Male	2	Healthcare Repr	Married	5
18	21	No	Travel_Rarely	Research & Dev	3	2	Life Sciences	1	17	Male	1	Laboratory Tech	Single	4
19	37	No	Non-Travel	Research & Dev	1	3	Medical	1	18	Male	2	Sales Executive	Divorced	4
20	35	No	Travel_Rarely	Sales	7	4	Life Sciences	1	19	Male	1	Sales Represent	Divorced	2
21	38	No	Travel_Rarely	Research & Dev	8	3	Life Sciences	1	20	Female	1	Manager	Divorced	6
22	26	No	Travel_Frequent	Research & Dev	1	4	Other	1	21	Male	2	Laboratory Tech	Divorced	10
23	50	No	Travel_Rarely	Sales	8	4	Life Sciences	1	22	Male	1	Research Scient	Divorced	9
24	53	No	Travel_Rarely	Research & Dev	11	4	Life Sciences	1	23	Female	2	Research Scient	Married	2
25	42	No	Travel_Rarely	Research & Dev	4	4	Life Sciences	1	24	Male	1	Manufacturing D	Married	8

No missing data in “Department ” column

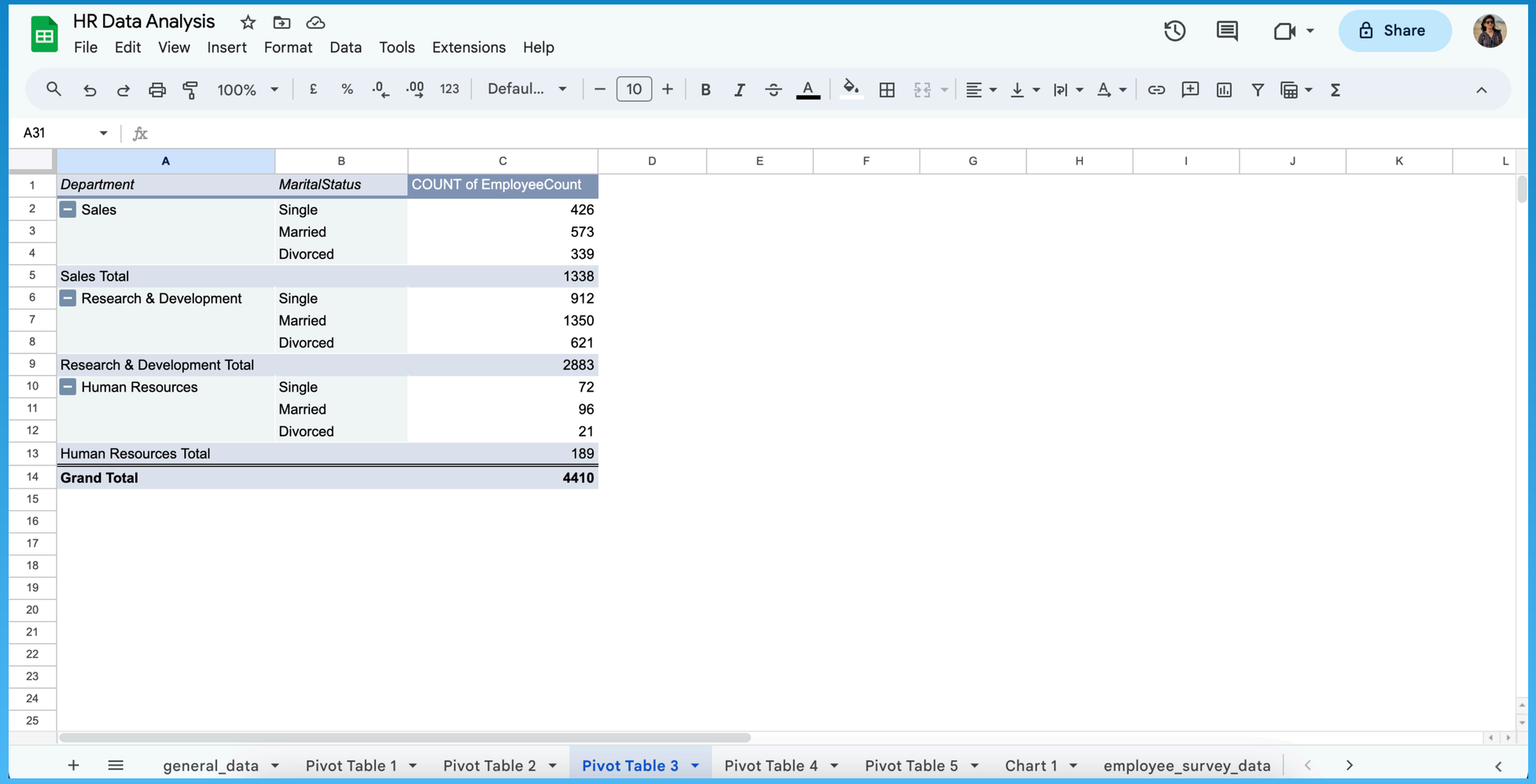
6. In Power BI, establish a relationship between the "EmployeeID" in the employee data and the "EmployeeID" in the time tracking data



7. Using DAX, create a calculated column that calculates the average years an employee has spent with their current manager

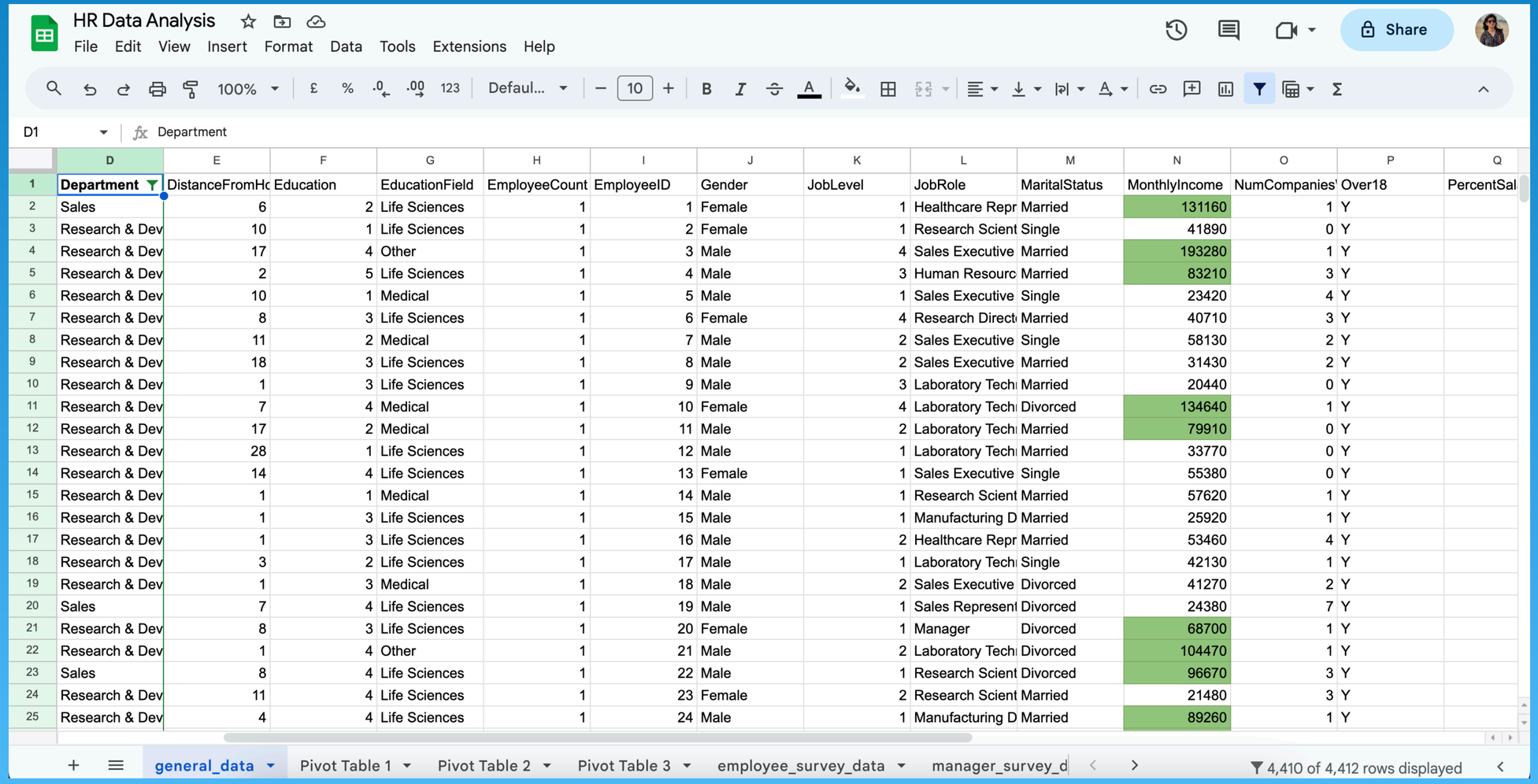


8. Using Excel, create a pivot table that displays the count of employees in each Marital Status category, segmented by Department



Department	MaritalStatus	COUNT of EmployeeCount
Sales	Single	426
	Married	573
	Divorced	339
Sales Total		1338
Research & Development	Single	912
	Married	1350
	Divorced	621
Research & Development Total		2883
Human Resources	Single	72
	Married	96
	Divorced	21
Human Resources Total		189
Grand Total		**4410**

9. Apply conditional formatting to highlight employees with both above-average Monthly Income and above-average Job Satisfaction



	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Department	DistanceFromHc	Education	EducationField	EmployeeCount	EmployeeID	Gender	JobLevel	JobRole	MaritalStatus	MonthlyIncome	NumCompanies'	Over18	PercentSal
2	Sales	6	2	Life Sciences	1	1	Female	1	Healthcare Repr	Married	131160	1	Y	
3	Research & Dev	10	1	Life Sciences	1	2	Female	1	Research Scient	Single	41890	0	Y	
4	Research & Dev	17	4	Other	1	3	Male	4	Sales Executive	Married	193280	1	Y	
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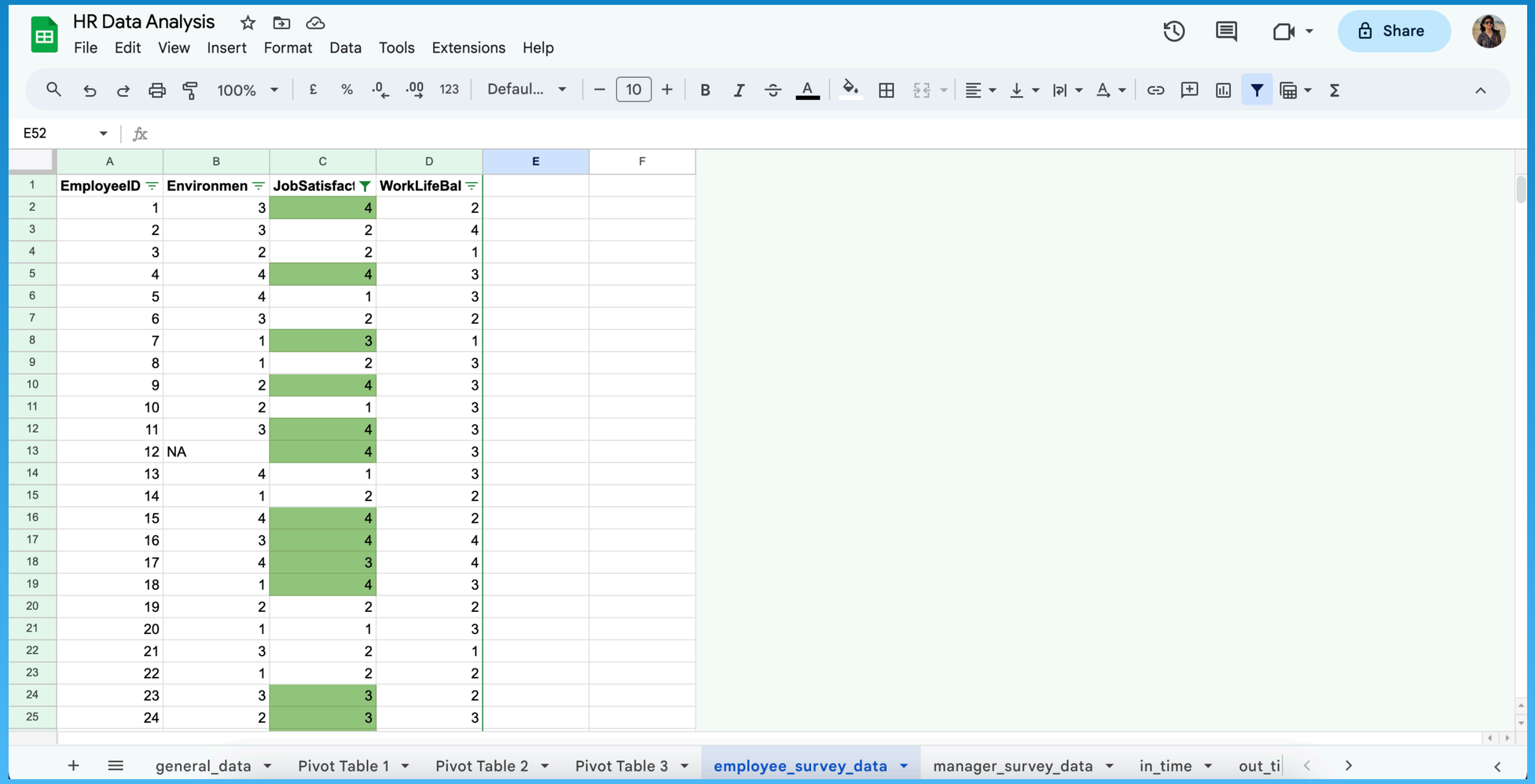
6	Research & Dev	10	1	Medical	1	5	Male	1	Sales Executive	Single	23420	4	Y	
7	Research & Dev	8	3	Life Sciences	1	6	Female	4	Research Direct	Married	40710	3	Y	
8	Research & Dev	11	2	Medical	1	7	Male	2	Sales Executive	Single	58130	2	Y	
9	Research & Dev	18	3	Life Sciences	1	8	Male	2	Sales Executive	Married	31430	2	Y	
10	Research & Dev	1	3	Life Sciences	1	9	Male	3	Laboratory Tech	Married	20440	0	Y	
11	Research & Dev	7	4	Medical	1	10	Female	4	Laboratory Tech	Divorced	134640	1	Y	
12	Research & Dev	17	2	Medical	1	11	Male	2	Laboratory Tech	Married	79910	0	Y	
13	Research & Dev	28	1	Life Sciences	1	12	Male	1	Laboratory Tech	Married	33770	0	Y	
14	Research & Dev	14	4	Life Sciences	1	13	Female	1	Sales Executive	Single	55380	0	Y	
15	Research & Dev	1	1	Medical	1	14	Male	1	Research Scient	Married	57620	1	Y	
16	Research & Dev	1	3	Life Sciences	1	15	Male	1	Manufacturing D	Married	25920	1	Y	
17	Research & Dev	1	3	Life Sciences	1	16	Male	2	Healthcare Repr	Married	53460	4	Y	
18	Research & Dev	3	2	Life Sciences	1	17	Male	1	Laboratory Tech	Single	42130	1	Y	
19	Research & Dev	1	3	Medical	1	18	Male	2	Sales Executive	Divorced	41270	2	Y	
20	Sales	7	4	Life Sciences	1	19	Male	1	Sales Represent	Divorced	24380	7	Y	
21	Research & Dev	8	3	Life Sciences	1	20	Female	1	Manager	Divorced	68700	1	Y	
22	Research & Dev	1	4	Other	1	21	Male	2	Laboratory Tech	Divorced	104470	1	Y	
23	Sales	8	4	Life Sciences	1	22	Male	1	Research Scient	Divorced	96670	3	Y	
24	Research & Dev	11	4	Life Sciences	1	23	Female	2	Research Scient	Married	21480	3	Y	
25	Research & Dev	4	4	Life Sciences	1	24	Male	1	Manufacturing D	Married	89260	1	Y	

Employees with above-average Monthly Income

9. Apply conditional formatting to highlight employees with both above-average Monthly Income and above-average Job Satisfaction



	A	B	C	D	E	F
1	EmployeeID	Environmen	JobSatisfac	WorkLifeBal		
2	1	3	4	2		
3	2	3	2	4		
4	3	2	2	1		
5	4	4	4	3		
6	5	4	1	3		
7	6	3	2	2		
8	7	1	3	1		
9	8	1	2	3		
10	9	2	4	3		
11	10	2	1	3		
12	11	3	4	3		
13	12	NA	4	3		
14	13	4	1	3		
15	14	1	2	2		
16	15	4	4	2		
17	16	3	4	4		
18	17	4	3	4		
19	18	1	4	3		
20	19	2	2	2		
21	20	1	1	3		
22	21	3	2	1		
23	22	1	2	2		
24	23	3	3	2		
25	24	2	3	3		

Employees with above-average Job Satisfaction

10. In Power BI, create a line chart that visualizes the trend of Employee Attrition over the years

HR Data Analysis

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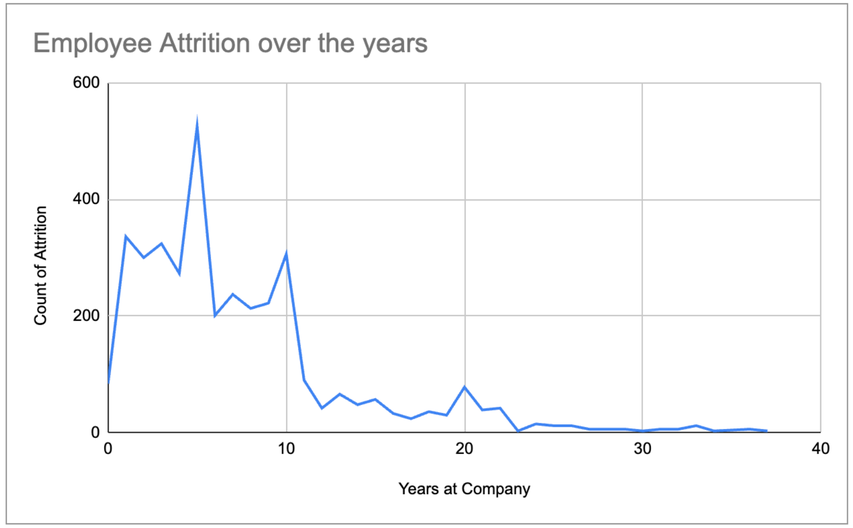
	A	B	C	D
1	COUNTA of Attrition	Attrition		
2	YearsAtCompany	Yes	No	Grand Total
3	40	3		3
4	37		3	3
5	36		6	6
6	34		3	3
7	33	3	12	15
8	32	3	6	9
9	31	3	6	9
10	30		3	3
11	29		6	6
12	27		6	6
13	26		12	12
14	25		12	12
15	24	3	15	18
16	23	3	3	6
17	22	3	42	45
18	21	3	39	42
19	20	3	78	81
20	19	3	30	33
21	18	3	36	39
22	17	3	24	27
23	16	3	33	36
24	15	3	57	60
25	14	6	48	54



general_data | Pivot Table 1 | Pivot Table 2 | Pivot Table 3 | Pivot Table 4 | employee_survey_data | manager_survey_data

11. Describe how you would create a star schema for this dataset, explaining the benefits of doing so

A star schema is a type of database schema used in data warehousing and business intelligence. It consists of one or more fact tables that store quantitative performance data and multiple dimension tables that store descriptive data related to the dimensions of the business.

Steps to Create a Star Schema:

Step 1: Identify Fact Table
- Determine the fact table that contains the primary quantitative measures (e.g., Attrition, MonthlyIncome, PercentSalaryHike, TotalWorkingYears)

Step 2: Identify Dimensions
- Identify dimensions related to the business process (e.g., EmployeeID, Gender, Department, JobRole)

Step 3: Define Primary Keys
- Assign primary keys to each dimension table and the fact table.

Step 4: Establish Relationships
- Connect the primary key in the fact table to the corresponding foreign keys in the dimension tables.

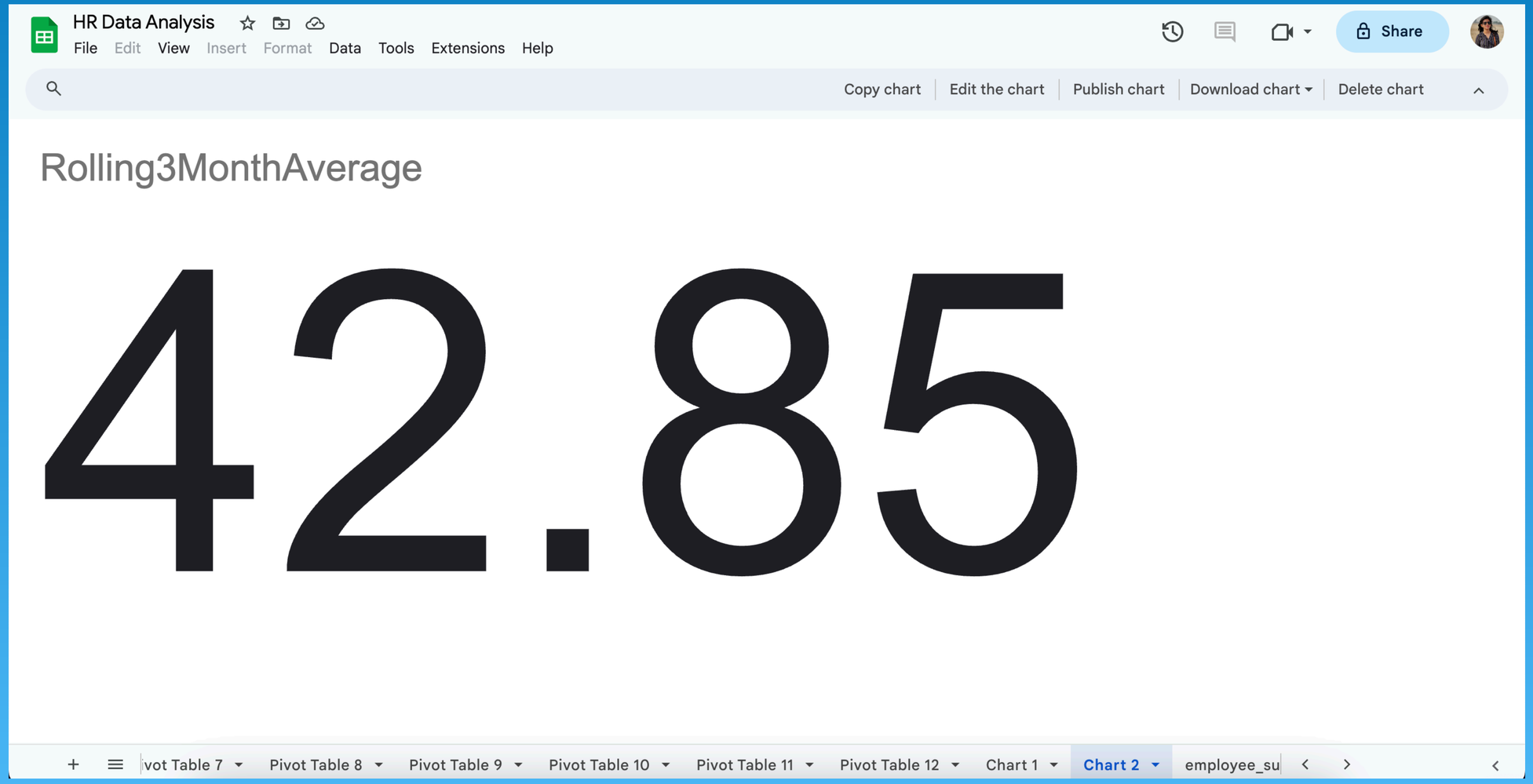
Step 5: Create Indexes
- Index the primary key columns in the dimension tables to improve query performance.

Step 6: Normalize Dimension Tables
- Normalize dimension tables to reduce redundancy and improve data consistency.

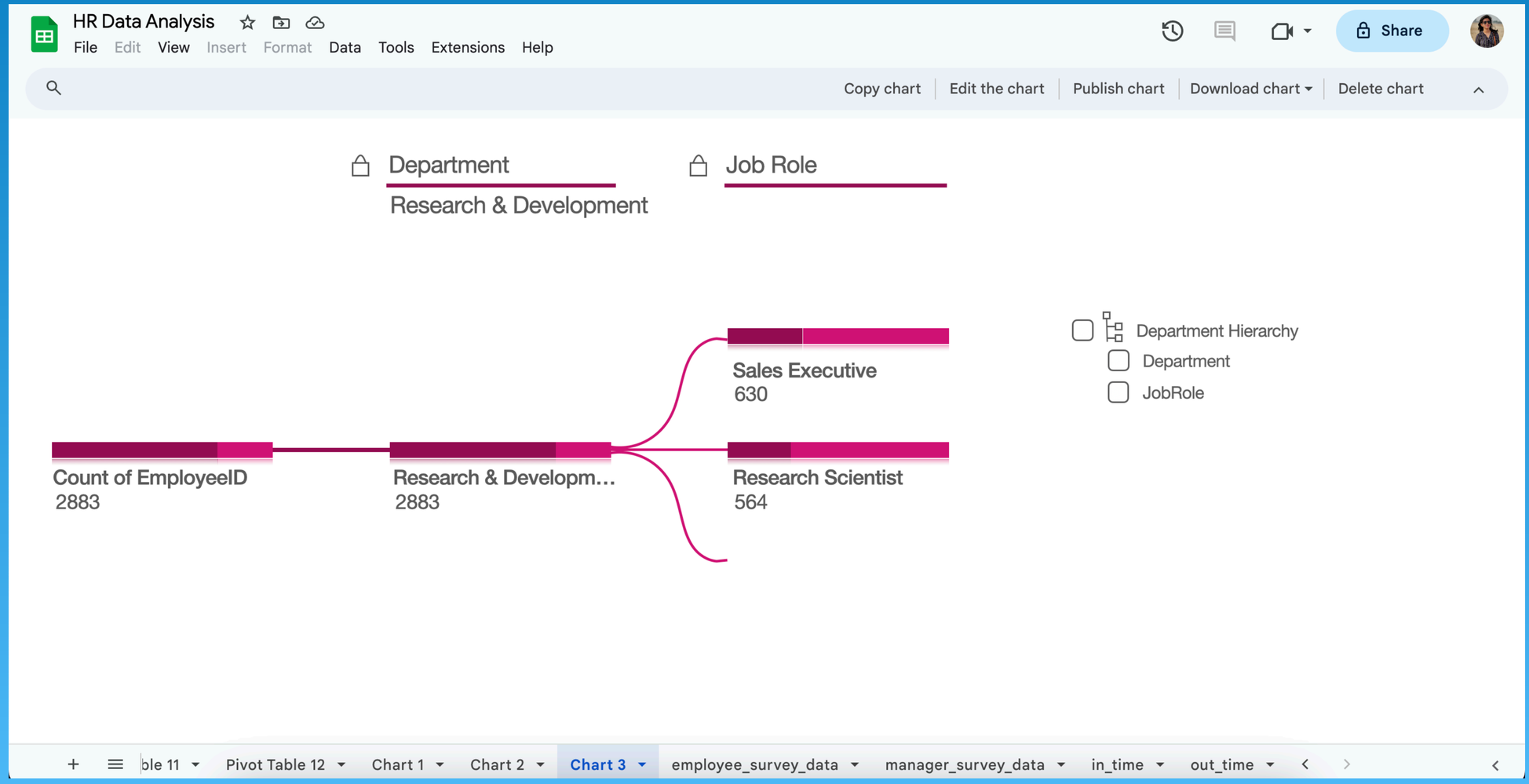
Benefits of Star Schema:

- Simplicity and Readability
- Query Performance
- Flexibility
- Ease of Maintenance
- Scalability
- Facilitates Business Intelligence (BI) Tools
- Optimized for OLAP
- Enhanced Data Consistency

12. Using DAX, calculate the rolling 3-month average of Monthly Income for each employee



13. Create a hierarchy in Power BI that allows users to drill down from Department to Job Role to further narrow their analysis



14. How can you set up parameterized queries in Power BI to allow users to filter data based on the Distance from Home column

In Power BI, parameterized queries can be set up using Power Query, the data preparation and transformation tool integrated into Power BI. Parameterized queries allow users to filter data dynamically based on user input.

Steps to set up a parameterized query:

Step 1: Load the Data into Power BI

- Open Power BI Desktop, Go to "Home" and click on "Get Data".
- Select your data source and load the data into Power BI.

Step 2: Open Power Query Editor

- In Power BI Desktop, go to "Home" and click on "Transform Data." This opens the Power Query Editor.

Step 3: Clean and Transform the Data

- Locate the "DistanceFromHome" column in the Power Query Editor.
- Clean and transform the data as needed. You may want to handle null values, data type conversions, or any other cleaning operations.

Step 4: Parameterize the Query

- In the Power Query Editor, go to the "Home" tab. Click on "Manage Parameters."
- In the Manage Parameters window, click on "New."
- Enter a name for the parameter (e.g., DistanceParam) and choose the data type (e.g., Decimal Number). Set a default value for the parameter.
- Click "OK" to create the parameter.

Step 5: Apply the Parameterized Filter

- Go back to the Power Query Editor. In the "Home" tab, select the "Advanced Editor".
- Replace the existing formula with the following, adjusting column names and parameter names as needed
- Ensure that [DistanceFromHome] matches the actual column name in your dataset.

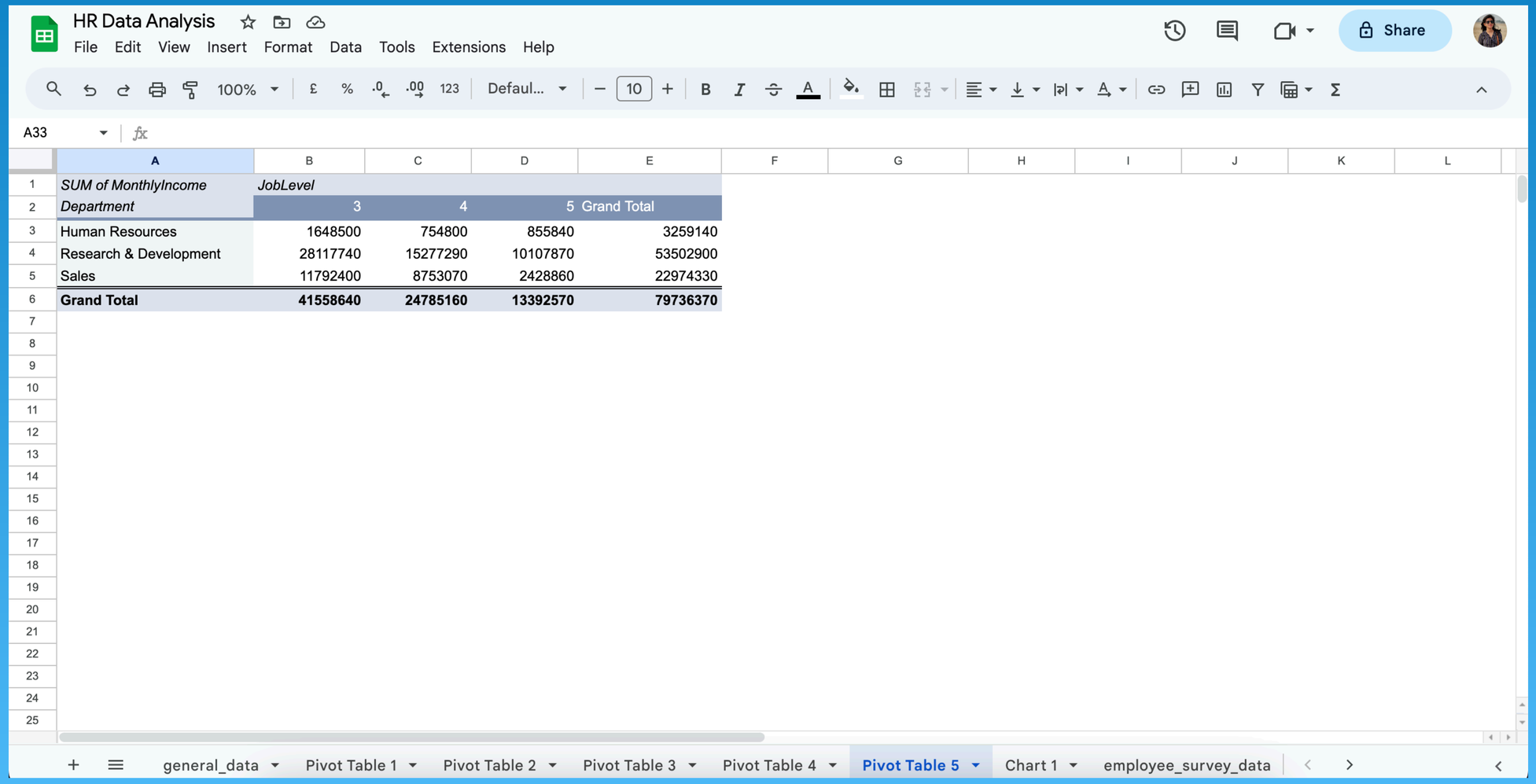
Step 6: Load the Parameterized Data

- Click "Done" to close the Advanced Editor.
- Click "Close & Apply" in the Home tab to apply the changes and load the parameterized data.

Step 7: Use the Parameter in Report

- Create your report as usual, and add a slicer visual. Use the parameter you created (e.g., DistanceParam) as the slicer field.
- Users can now interactively filter data based on the Distance from Home column using the slicer.

15. In Excel, calculate the total Monthly Income for each Department, considering only the employees with a Job Level greater than or equal to 3



SUM of MonthlyIncome	JobLevel			
Department	3	4	5	Grand Total
Human Resources	1648500	754800	855840	3259140
Research & Development	28117740	15277290	10107870	53502900
Sales	11792400	8753070	2428860	22974330
Grand Total	**41558640**	**24785160**	**13392570**	**79736370**

16. Explain how to perform a What-If analysis in Excel to understand the impact of a 10% increase in Percent Salary Hike on Monthly Income

Performing a What-If analysis in Excel involves using a data table to see how changing one or more input values (in this case, a 10% increase in Percent Salary Hike) impacts a calculated result (Monthly Income).

Steps to conduct What-If Analysis:
Having a dataset in Excel with columns like "Percent Salary Hike" and "Monthly Income".

Step 1: Set Up Your Data
- Data:
  Have a column with various values for Percent Salary Hike and a column with the corresponding Monthly Income values.
- Calculate New Monthly Income:
  In an empty cell, calculate the new Monthly Income based on a 10% increase. The original Monthly Income is in cell N1, you can use the formula:
  =N1 * (1 + 0.10)

Step 2: Set Up Data Table
- Enter Input Values:
  In a nearby empty area of your worksheet, create a column for different values of Percent Salary Hike. For example, you might have values like 5%, 10%, 15%, etc.
- Create Data Table:
  Highlight the range of your input values and the cell where you calculated the new Monthly Income (including headers).
  "Data" tab -> “What-If Analysis” -> “Data Table."
- Enter Row Input Cell:
  In the Data Table dialog box, enter the reference to the cell containing the original Percent Salary Hike. The original Percent Salary Hike is in cell Q1, enter A1 as the Row Input Cell.
- Click OK
  Click "OK" to create the data table.

Step 3: Review the What-If Analysis
- Review the Data Table:
  The data table will populate with different Monthly Income values based on the Percent Salary Hike values you entered.
- Interpret the Results:
  Examine how changes in Percent Salary Hike impact the resulting Monthly Income. This gives you insights into the potential impact of a 10% increase in Percent Salary Hike on Monthly Income.

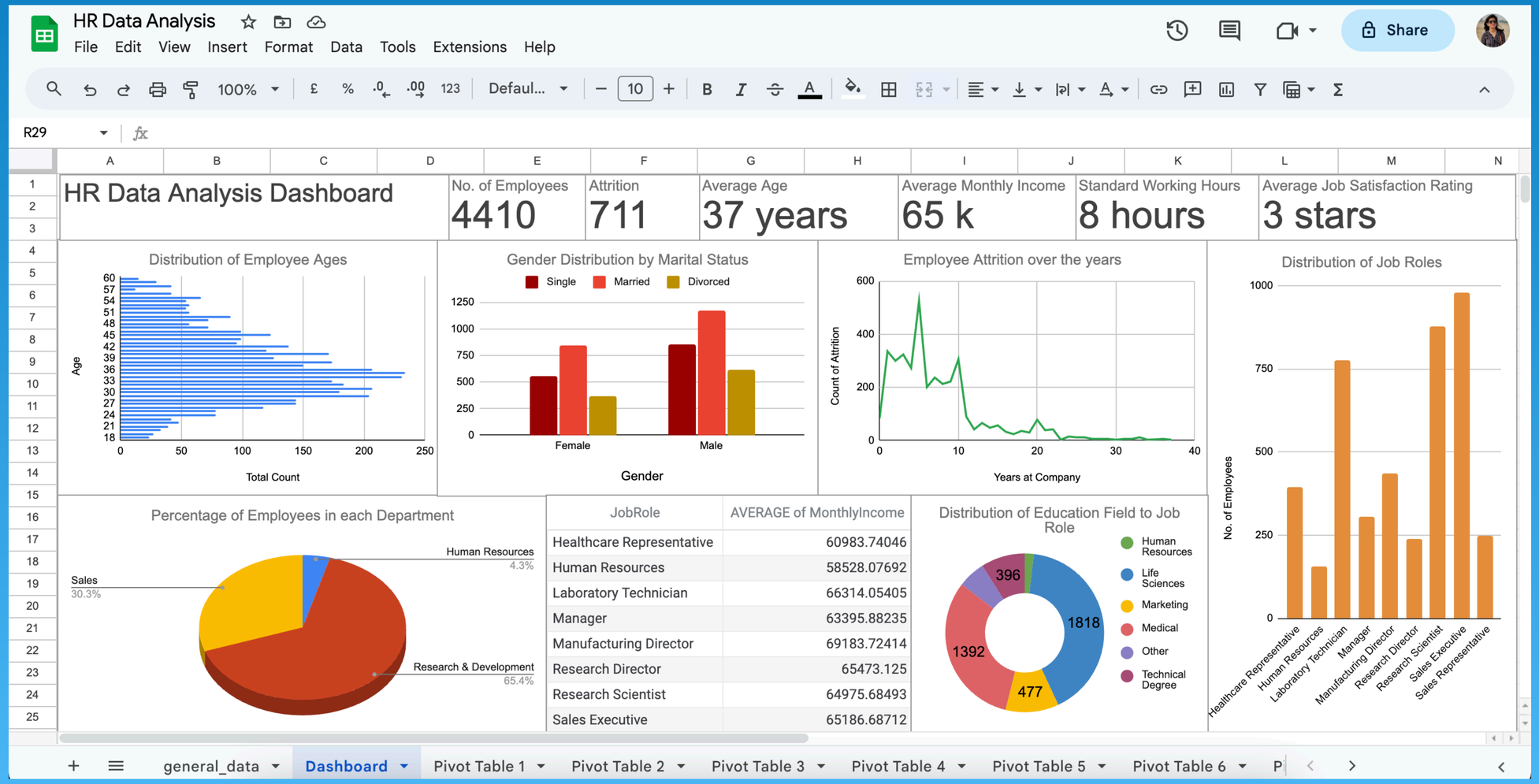
Step 4: Visualize the Results (Optional)
- Create a Chart:
  You can create a chart to visualize the impact. For example, create a line chart with Percent Salary Hike on the x-axis and Monthly Income on the y-axis.
- Analyze the Chart:
  The chart allows for a visual representation of the What-If analysis, making it easier to interpret the impact of different Percent Salary Hike values on Monthly Income.

17. Verify if the data adheres to a predefined schema. What actions would you take if you find inconsistencies

Verifying if data adheres to a predefined schema involves the process of checking whether the actual data in a dataset aligns with the expected structure and rules outlined in the predefined schema. As of the current status of the data, there are specific actions that need to be taken to ensure alignment with the predefined schema:

1. **Reordering 'EmployeeID' Column:**
   The 'EmployeeID' column needs to be reordered to adhere to the expected sequence outlined in the predefined schema. This ensures consistency and facilitates better data organization.
2. **Changing Data Type of 'TotalWorking Hours' Column:**
   The data type of the 'TotalWorking Hours' column should be modified to match the specified data type in the predefined schema. This adjustment ensures data uniformity and accurate representation of working hours.
3. **Handling Missing and Blank Values:**
   Missing values and blank entries in the "general_data," "employee_survey_data," and "manager_survey_data" need to be addressed. Appropriate methods, such as imputation or filling with default values, should be applied to ensure completeness and reliability in the dataset.
4. **Adding 'EmployeeID' Label in 'In-Time' and 'Out-Time' Data:**
   The 'EmployeeID' label is missing in the 'in-time' and 'out-time' data. It is crucial to include this label to maintain consistency across different datasets and enable proper linkage between data sources.
5. **Data Profiling and Validation:**
   Rigorous data profiling and validation processes should be implemented to identify and rectify any inconsistencies, anomalies, or discrepancies in the dataset. This involves scrutinizing the data against the predefined schema to ensure accurate representation and adherence to expected standards.
6. **Addressing Inconsistencies in Data Files:**
   Any inconsistencies found in the data files should be carefully addressed. This may include correcting errors, standardizing formats, and resolving discrepancies to bring the data in line with the predefined schema.
7. **Implementing Data Quality Measures:**
   Robust data quality measures need to be implemented to enhance the overall quality of the dataset. This involves establishing and enforcing standards, ensuring accuracy, and promoting reliability in the data.
8. **Conforming to the Predefined Schema:**
   The dataset will conform to the predefined schema once the above-mentioned inconsistencies are resolved, and the recommended data quality measures are implemented. This alignment is essential for maintaining the integrity and reliability of the data.

HR Data Analysis Dashboard



Thank you