PROJECT DOCUMENTATION
GLOBAL SALARY SURVEY ON INDUSTRY USING EXCEL & MYSQL

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INTRODUCTION

This project explores the transformation of a raw salary survey dataset into a structured, analysis-ready resource capable of powering meaningful insights about compensation trends across industries, job roles, experience levels, education, and demographics. Beginning with a 1,000-record Excel file containing inconsistencies, missing values, mixed currencies, and formatting issues, the workflow guides the data through a complete cleaning process. The refined dataset is then loaded into MySQL, where analytical SQL queries uncover patterns and correlations. These results are exported to Excel and transformed into pivot tables and an interactive dashboard that visually communicates the story behind the numbers. By the end of the project, the dataset evolves from a noisy spreadsheet into a polished analytical asset suitable for HR analytics, workforce planning, and compensation benchmarking.

AIM OF THE PROJECT

The aim of this project is to transform an unclean salary survey dataset into a structured, accurate, and insightful analytical resource prepared for database storage, SQL-based exploration, and interactive dashboard visualization.

PROJECT OBJECTIVES

The Main objectives of the project include:

- Cleaning and preparing the raw salary dataset by addressing missing values, inconsistent formats, mixed currencies, and outliers.
- Standardizing the data to ensure accuracy and consistency across all fields.
- Importing the cleaned dataset into a MySQL database and designing an appropriate table structure.
- Executing analytical SQL queries to uncover trends in salary, experience, gender, education, and job roles.
- Exporting query outputs and organizing them into Excel sheets for visualization.
- Developing pivot tables and a comprehensive dashboard to present findings clearly.
- Delivering insights and conclusions that support further analytics and decision-making.

PROJECT WORKFLOW

- **Data Inspection**: Review the unclean Excel dataset for missing values, inconsistencies, duplicates, and mixed data types.
- **Data Cleaning**: Handle missing values, standardize text, correct data types, resolve currency variations, and remove duplicates.
- **Outlier Detection**: Identify unusual salary entries and validate or remove them.
- **Dataset Preparation**: Finalize the cleaned sheet and export it as CSV for further processing.
- **MySQL Integration**: Create a database and table, then import the cleaned dataset for structured storage.
- **SQL Analysis**: Execute 10 key analytical SQL queries to extract insights related to salary, gender, education, job roles, experience, and geography.
- **Data Export**: Save each query result as a separate CSV file and import into Excel.
- **Pivot Tables & Dashboard**: Build pivot tables and create an interactive dashboard to visualize findings.

DATA UNDERSTANDING

To understand the structure and nature of the salary survey dataset, key aspects were analyzed before beginning data cleaning:

Data Structure Overview

- The dataset includes **1,020 employee entries** with demographic, salary, and job-related information.
- Contains both numerical and categorical fields.

Variable Types

- **Numerical**: Annual Salary, Additional Compensation, Years of Experience.
- **Categorical**: Industry, Job Title, City, Country, Gender, Education Level, Age Range.
- **Currency field** contains mixed currency types (USD, INR, EUR, GBP, etc.).

Completeness Check

- Several missing values were identified across numerical and categorical fields.
- Additional compensation had undefined or missing values in many rows.

Consistency Issues

- Inconsistent naming patterns in Job Titles and Industries.
- Mixed casing (uppercase, lowercase, title case).

- Extra spaces and spelling variations.

Outliers and Anomalies

- Salary and compensation fields contained unusually high or low entries.
- Years of experience showed some unrealistic values.

Data Quality Observations

- Duplicate rows existed across Name, Job Title, and City combinations.
- Some numerical columns were stored as text.

DATA CLEANING PROCESS (EXCEL)

Step 1: Inspect the Dataset

- Scanned for missing values, inconsistent spellings, outliers, mixed currency formats, and duplicates.
- Created a backup sheet before editing.

Step 2: Handle Missing Values

- **Numerical columns**: removed rows with very few missing values or filled with mean/median.
- **Categorical columns**: replaced blanks with "Unknown" or "Not specified".

Step 3: Standardize Text

- Used Find & Replace to unify industry names.
- Applied PROPER() or LOWER() for casing.
- Cleaned extra spaces using TRIM().

Step 4: Remove Duplicates

- Used Data → Remove Duplicates.
- Validated using a helper column combining Name, Job Title, and City.

Step 5: Correct Data Types

- Ensured salary fields were numeric using VALUE() or Paste Special → Multiply.

Step 6: Handle Mixed Currencies

- Chose USD as the base currency.
- Created **Salary_USD** using: Conversion Rate.

Step 7: Detect and Handle Outliers

- Used Conditional Formatting to highlight extreme salary values.
- Verified valid cases (e.g., senior executives) and removed obvious errors.

Step 8: Save Cleaned Dataset

- Created a new sheet "Cleaned_Data".
- Copied values (Paste Special → Values).
- Exported as **Salary_Survey_Cleaned.xlsx** and **CSV**.

Step 9: Prepare Data for MySQL

- Ensured clean column names and formatting.
- Saved final CSV for import.

FIGURE:

Raw Uncleaned Dataset

Age Range	Industry	Job Title	ation of J	nnual Sala	onetary C	Currency	her Curren	me Clarific	Country	State	City	sional Exp	sional Exp	of Educati	Gender	Name
55-64	Healthcar	QA Engine	Full-time	87117	2983	EUR		Commissic	Netherlan	South Holl	Rotterdam	8	8	PhD	Non-binar	Brittany
18-24	Retail	Accountan	Part-time	111088	1346	AUD		Contract	Germany	Hesse	Frankfurt	1	1	Other	Female	Kevin
55-64	Finance	Software E	Contract	31173	5738	CAD		Hourly	Singapore	Central Re	Singapore	15	14	Bachelor's	Prefer not	Katherine
35-44	IT	Software Engineer		1540911	141287	INR		Hourly	Australia	New South	Sydney	2	1	Other	Female	Lori
25-34	Health Car	Developer	Senior	94375	6989	USD		Fixed salar	Canada	Quebec	Montreal	6	3	Diploma	Non-binar	Anita
35-44	Info Tech	Data Scien	Full-time	92446	12875	AUD		Commissic	India	Tamil Nad	Chennai	20	20	Diploma	Female	Dustin
25-34	Manufactu	Data Scien	Intern	30865	569	EUR		Hourly	United Sta	California	San Jose	1	0	Master's	Female	Dylan
45-54	Education	Software E	Full-time	82247	8234	EUR		Hourly	Netherlan	South Holl	Rotterdam	25	25	Other	Male	Michael
25-34			Intern		5948	USD			India	Delhi			0	Bachelor's		Olivia
25-34			On-site		23628	INR			United Sta	Texas			5	Other		Sneha
45-54	Edu	Sales Exec	Junior	13876	1556	EUR		Contract	France	Provence-	Nice	25	22	PhD	Non-binar	Kayla
55-64	Retail	Data Scien	Senior	95841	1133	AUD		Fixed salar	Canada	British Col	Vancouver	20	20	Master's	Female	Ramesh
35-44	IT	Teacher	Junior	58887	226	USD		Fixed salar	UAE	Dubai	Dubai	18	18	PhD	Female	Joshua
35-44					3542	GBP		Contract	United Kin	Scotland			6	Other		Emma
18-24	Banking	Teacher	Contract	121464	345	CAD		Hourly	Netherlan	North Holl	Amsterdam	0	0	PhD	Male	Michael
35-44	Banking	Product M	Intern	24304	3388	EUR		Contract	Netherlan	South Holl	Rotterdam	9	9	Diploma	Prefer not	Michael
25-34	IT	QA Engine	Full-time	112825	6839	CAD			Australia	Queenslan	Brisbane	6	3	Other	Male	Mark
25-34	Retail	Business Analyst		1051851	0	INR		Commissic	Canada	British Col	Vancouver	5	5	Diploma	Female	Arjun
55-64	Edu	S/W Engine	Full-time	100851	4474	GBP		Contract	India	Telangana	Hyderabac	12	12	Master's	Non-binar	Priya
35-44	Manufactu	S/W Engin	Junior	115815	21278	USD		Commissic	United Kin	Northern I	Belfast	5	5	High Schoc	Male	ijphn
35-44	Governme	Professor	Senior	88883	4601	CAD		Fixed salar	India	Delhi	New Delhi	7	4	PhD	Female	Daniel
35-44	Education	Product M	Intern	91060	4970	CAD		Commissic	Germany	Bavaria	Munich	3	0	Other	Non-binar	Stanley
45-54	Education	S/W Engine	Senior	429227	0	INR			Netherlan	South Holl	Rotterdam	12	9	PhD	Male	Kavya
25-34	Edu	Data Scien	Contract	102436	10083	USD		Contract	Australia	Queenslan	Brisbane	6	6	Other	Non-binar	Linda
35-44	Governme	Project Manager		100388	11896	USD		Fixed salar	Australia	Queenslan	Brisbane	7	7	Diploma	Male	Arjun
55-64	Governme	Business A	Contract	97793	107	CAD		Commissic	Netherlan	South Holl	Rotterdam	20	20	PhD	Male	Alex
35-44	Telecom	Accountan	Lead	110982	21677	GBP		Commissic	United Sta	California	San Jose	3	3	Diploma	Male	Liam
55-64	Manufactu	QA Engine	Remote	63332	3570	GBP		Hourly	Canada	Quebec	Montreal	10	10	Master's	Male	Tyler
35-44	Telecom	Nurse	Intern	85456	3902	GBP		Contract	Canada	Ontario	Ottawa	10	10	Other	Non-binar	Maureen
35-44	Governme	Business A	Intern	94234	0	AUD		Fixed salar	United Kin	Wales	Cardiff	7	5	Other	Prefer not	Maria

Cleaned Dataset

AgeRange	Industry	JobTitle	ClarificationOfJobTitle	AnnualUSDSalary	AdditionalMonetaryCompensation	IncomeClarification	Country	City	YearsOfProfessionalExperienceOverall	Year
18-24	Banking	Nurse	Junior	59809.28964	10902	Commission-Based	Netherlands	Rotterdam	0	
18-24	Information Technology	S/W Engineer	Junior	148936.7089	672	Fixed Salary	Netherlands	Amsterdam	1	
18-24	Retail	Accountant	Remote	137103.7975	5107	Contract	Germany	Frankfurt	0	
18-24	Finance	Hr Manager	Lead	123213	0	Unknown	France	Paris	0	
18-24	Manufacturing	Data Scientist	On-Site	118701	17452	Unknown	Germany	Berlin	1	
18-24	Healthcare	Business Analyst	Remote	114454.0146	0	Commission-Based	Canada	Toronto	0	
18-24	Retail	Sales Executive	Unknown	96927	2138	Commission-Based	India	Coimbatore	0	
18-24	Education	Data Scientist	Contract	94856.96203	10896	Contract	India	Mysore	0	
18-24	Finance	Professor	Junior	92862	9109	Fixed Salary	Canada	Toronto	0	
18-24	Banking	Sales Executive	On-Site	90512.90323	927	Fixed Salary	UAE	Abu Dhabi	0	
18-24	Banking	Teacher	Contract	88659.85401	345	Hourly	Netherlands	Amsterdam	0	
18-24	Information Technology	Data Analyst	Unknown	81570.80292	883	Contract	Germany	Frankfurt	0	
18-24	Information Technology	Data Scientist	On-Site	73988.15789	1173	Fixed Salary	Germany	Berlin	0	
18-24	Retail	Accountant	Part-Time	73084.21053	1346	Contract	Germany	Frankfurt	1	
18-24	Educationcation	Software Engineer	Senior	72029.11392	0	Commission-Based	France	Nice	1	
18-24	Government	Doctor	Contract	68200	8998	Commission-Based	United Kingdom	Cardiff	0	
18-24	Educationcation	Qa Engineer	Intern	67032.23684	6054	Contract	United Kingdom	London	0	
18-24	Healthcare	Teacher	On-Site	66557.23684	13905	Hourly	Australia	Sydney	0	
18-24	Educationcation	Teacher	Contract	64137	18602	Contract	Australia	Sydney	1	
18-24	Not Specified	Not Specified	Lead	63693.06569	6176	Unknown	Canada	Unknown	8	
18-24	Retail	Business Analyst	Part-Time	63212.65823	617	Fixed Salary	Netherlands	Amsterdam	0	
18-24	Government	Sales Executive	Full-Time	63155.92105	0	Contract	Australia	Brisbane	1	
18-24	Consulting	Data Analyst	Unknown	62758.55263	8798	Hourly	United Kingdom	Cardiff	0	
18-24	Information Technology	Project Manager	Unknown	62682.48175	8325	Unknown	India	Mysore	0	
18-24	Retail	Teacher	Junior	62290.13158	0	Unknown	India	Bengaluru	1	
18-24	Telecom	Project Manager	Lead	61307.59494	13984	Hourly	United States	Boston	0	
18-24	Consulting	Developer	Junior	60896.77419	7097	Unknown	United States	San Francisco	0	
18-24	Finance	Sales Executive	Senior	56954.0146	159	Commission-Based	Canada	Montreal	1	
18-24	Manufacturing	S/W Engineer	Remote	56857.66423	25	Contract	Singapore	Singapore	0	
18-24	Banking	Product Manager	Remote	56507.89474	4036	Unknown	United Kingdom	Cardiff	1	
18-24	Consulting	Data Scientist	Unknown	53947.44526	47	Contract	Netherlands	Rotterdam	0	

Import Data to MySQL

Step 1: Create Database

- Create a dedicated MySQL database to store cleaned salary data.
- Ensures organized storage and easier management for SQL analysis.
- Switch to the new database for all further operatio

SQL Code

CREATE DATABASE SALARY_SURVEY;

USE SALARY_SURVEY;

Step 2: Import the CSV

- Import the cleaned dataset into the table.

- Use MySQL Workbench Import Wizard or LOAD DATA INFILE.
- Moves the dataset into a structured environment for efficient querying.

SQL QUERIES FOR ANALYSIS

1.Average Salary by Industry and Gender

- Compares salaries between genders within each industry.
- Helps identify potential pay gaps or equality trends.

```sql
/* 1. Average Salary by Industry and Gender */
SELECT Industry, Gender, ROUND(AVG(AnnualUSDSalary), 2) AS AVERAGE_SALARY
FROM Salary_Survey_Cleaned
GROUP BY Industry, Gender
ORDER BY Industry, Gender;
```

2.Total Compensation by Job Title

- Combines base salary and additional compensation.
- Highlights the highest-paying job titles overall.

```sql
/* 2. Total Salary Compensation by Job Title */
SELECT JobTitle, ROUND(SUM(AnnualUSDSalary + AdditionalMonetaryCompensation), 2) AS TOTAL_COMPENSATION
FROM Salary_Survey_Cleaned
GROUP BY JobTitle
ORDER BY TOTAL_COMPENSATION DESC;
```

3.Salary Distribution by Education Level

- Shows how education influences pay ranges.
- Useful for analyzing salary progression across qualifications.

```sql
/* 3. Salary Distribution by Education Level */
SELECT HighestLevelOfEducationCompleted AS EDUCATION_LEVEL,
ROUND(AVG(AnnualUSDSalary), 2) AS AVERAGE_SALARY,
ROUND(MIN(AnnualUSDSalary), 2) AS MINIMUM_SALARY,
ROUND(MAX(AnnualUSDSalary), 2) AS MAXIMUM_SALARY
FROM Salary_Survey_Cleaned
GROUP BY HighestLevelOfEducationCompleted
ORDER BY AVERAGE_SALARY DESC;
```

4.Number of Employees by Industry and Experience

- Counts employees grouped by experience within each industry.
- Reveals which industries employ more senior or entry-level talent.

```sql
/* 4. Number of Employees by Industry and Years of Experience */
SELECT Industry, YearsOfProfessionalExperienceOverall AS OVERALL_EXPERIENCE,
COUNT(*) AS EMPLOYEE_COUNT
FROM Salary_Survey_Cleaned
GROUP BY YearsOfProfessionalExperienceOverall, Industry
ORDER BY Industry, OVERALL_EXPERIENCE;
```

5.Median Salary by Age Range and Gender

- Provides stable comparison using median instead of average.
- Highlights salary differences across age groups and genders.

```
/* 5. Median Salary by Age Range and Gender */
SELECT AgeRange, Gender, ROUND(AVG(AnnualUSDSalary), 2) AS APPROX_MEDIAN_SALARY
FROM Salary_Survey_Cleaned
GROUP BY AgeRange, Gender
ORDER BY AgeRange, Gender;
```

6.Highest-Paying Job Titles in Each Country

- Lists the highest-earning roles by country.
- Useful for comparing global or regional compensation trends.

```
/* 6. Job Titles with the Highest Salary in Each Country */
SELECT JobTitle, Country, AnnualUSDSalary AS HIGHEST_SALARY
FROM Salary_Survey_Cleaned
WHERE (Country, AnnualUSDSalary) IN (
SELECT Country, ROUND(MAX(AnnualUSDSalary),2)
FROM Salary_Survey_Cleaned
GROUP BY Country)
ORDER BY Country, HIGHEST_SALARY DESC;
```

7.Average Salary by City and Industry

- Shows how salaries vary by city within industries.
- Identifies high-paying cities or regions.

```
/* 7. Average Salary by City and Industry */
SELECT City,Industry, ROUND(AVG(AnnualUSDSalary),2) AS AVG_SALARY
FROM Salary_Survey_Cleaned
GROUP BY City, Industry
ORDER BY City, AVG_SALARY DESC;
```

8.Percentage of Employees Receiving Additional Compensation by Gender

- Measures bonus or incentive distribution across genders.
- Helps evaluate fairness in reward systems.

```
/* 8. Percentage of Employees with Additional Monetary Compensation by Gender */
SELECT Gender,
ROUND(SUM(IF(AdditionalMonetaryCompensation>0, 1, 0)*100.0)/COUNT(*),2) AS BONUS_PERCENT
FROM Salary_Survey_Cleaned
GROUP BY Gender;
```

9.Total Compensation by Job Title and Experience Level

- Shows compensation growth as experience increases.
- Useful for career progression and salary forecasting.

```
/* 9. Total Compensation by Job Title and Years of Experience */
SELECT JobTitle, YearsOfProfessionalExperienceOverall AS EXPERIENCE_LEVEL,
ROUND(SUM(AnnualUSDSalary + AdditionalMonetaryCompensation),2) AS TOTAL_MONETARY
FROM Salary_Survey_Cleaned
GROUP BY JobTitle, YearsOfProfessionalExperienceOverall
ORDER BY JobTitle, EXPERIENCE_LEVEL;
```

10.Average Salary by Industry, Gender, and Education

- Combines multiple factors for a deeper cross-sectional analysis.
- Helps understand how education and gender influence pay within industries.

```
/* 10. Average Salary by Industry, Gender, and Education Level */
SELECT Industry, Gender,
HighestLevelOfEducationCompleted AS EDUCATION_LEVEL,
ROUND(AVG(AnnualUSDSalary),2) AS AVERAGE_SALARY
FROM Salary_Survey_Cleaned
GROUP BY Industry, Gender, HighestLevelOfEducationCompleted
ORDER BY Industry, Gender, EDUCATION_LEVEL;
```

EXPORT QUERY TO EXCEL

Run SQL Queries

- Execute each of the 10 analytical SQL queries in MySQL Workbench.
- Verify results for accuracy and completeness before exporting.

Export Each Result as a CSV File

- Use the MySQL Workbench "Export Resultset" option.
- Save each output as a separate CSV file (e.g., Query_1.csv).
- This keeps analysis organized and easy to import into Excel later.

Create an Excel Workbook

- Open a new Excel file to store all query outputs.
- Name the workbook appropriately (e.g.,**Milestone SQL Project.xlsx**).

Import Each CSV into Separate Sheets

- Import each CSV file into its own sheet within the workbook.
- Rename sheets clearly (e.g., Industry_Gender, JobTitle_Compensation, Education_Salary, etc.).
- Ensure data loads correctly without formatting issues.

Verify Data Formatting

- Check for column alignment, data types, and missing fields.
- Format salary and compensation columns as numeric values.
- Apply filters for easy navigation.
- Removed duplicates for all sheets.

Prepare Sheets for Pivot Tables

- Ensure each sheet is clean, with no merged cells or blank header rows.
- Data should be in a continuous table-like structure for smooth pivot table creation.

EG : Query_1

Industry	Gender	AVERAGE_SALARY
Banking	Female	$66,947.01
Banking	Male	$68,308.21
Banking	Non-Binary	$62,444.30
Banking	Prefer Not To Say	$56,981.75
Consulting	Female	$76,558.59
Consulting	Male	$47,964.47
Consulting	Non-Binary	$69,664.61
Consulting	Prefer Not To Say	$49,758.69
Education	Female	$63,274.21
Education	Male	$36,544.68
Education	Non-Binary	$54,037.63
Education	Prefer Not To Say	$70,374.36
Education	Female	$58,704.31
Education	Male	$45,365.75
Education	Non-Binary	$62,157.35
Education	Prefer Not To Say	$63,479.82
Finance	Female	$80,763.99
Finance	Male	$52,848.67
Finance	Non-Binary	$53,622.83
Finance	Prefer Not To Say	$59,097.74

PIVOT AND DASHBOARD

Create Pivot Tables

- Select the imported query sheets and insert Pivot Tables for analysis.
- Use the appropriate fields (Rows, Columns, Values, Filters) to summarize the data.
- Create separate pivot tables for salary, compensation, job titles, industries, experience, and gender.
- Ensure that each pivot table gives a clear summary suitable for visualization.

PIVOT_QUERY 1

Industry	Sum of AVERAGE_SALARY
Banking	$2,54,681.27
Consulting	$2,43,946.36
Education	$4,53,938.11
Finance	$2,46,333.23
Government	$2,53,576.46
Healthcare	$2,38,188.48
Information Techi	$2,24,796.52
Manufacturing	$2,16,041.56
Not Specified	$73,934.19
Retail	$2,45,339.06
Telecom	$2,61,296.16
Grand Total	**$27,12,071.40**

Build Visual Charts

- Convert key pivot tables into charts such as bar charts, column charts, pie charts, or line charts.
- Use chart types that best represent comparisons (e.g., bar chart for industries, column chart for job roles).
- Ensure axis labels, titles, and legends are clear and professional.
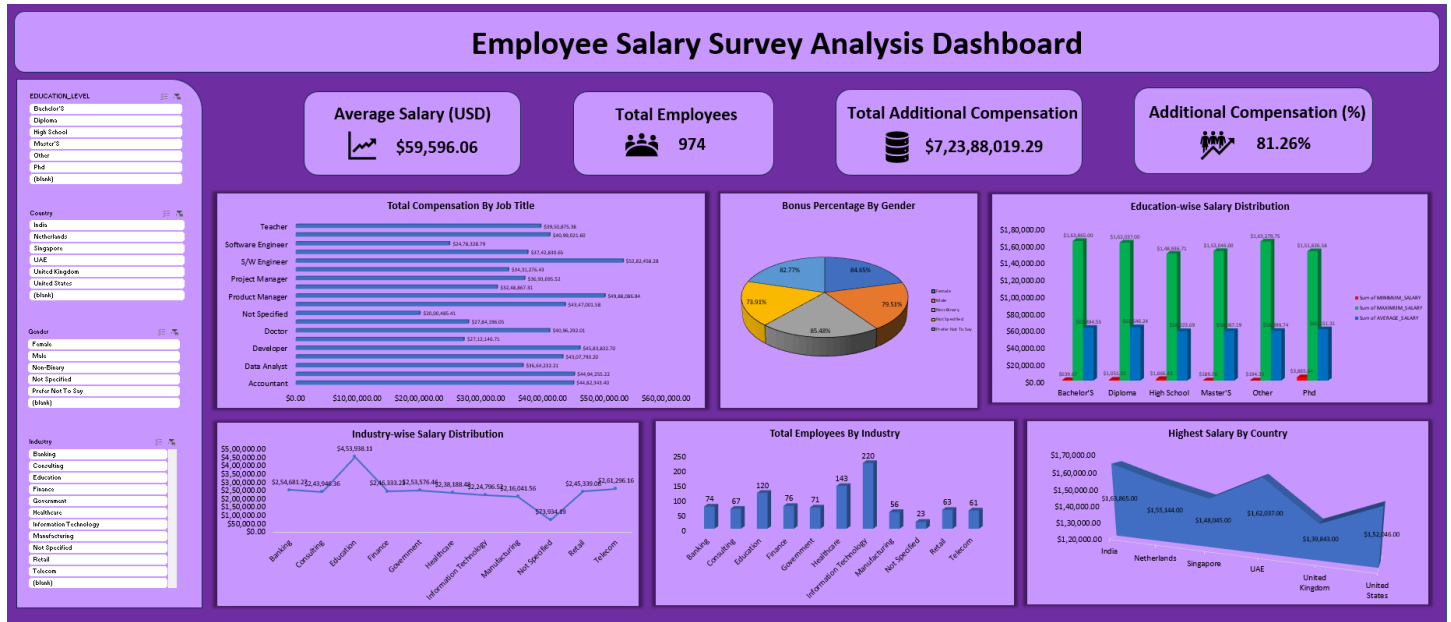
Create the Dashboard Sheet

- Add a new sheet named **Dashboard** to the Excel workbook.
- Arrange pivot charts and key tables in a clean, structured layout.
- Position visuals logically (i.e., high-level metrics at the top, detailed charts below).
- Maintain consistent formatting and color schemes across all visuals.

Added Interactivity

- Insert slicers for fields like Industry, Gender, Country, Job Title, or Education Level.
- Connect slicers to relevant pivot tables and charts for interactive filtering.
- Add timeline slicers for date fields if applicable (not mandatory for this dataset).

Final Formatting and Presentation

- Adjust chart sizes and alignment for a clean, polished look.
- Add titles, subtitles, and descriptive labels to improve readability.
- Ensure the dashboard presents insights in a visually appealing and user-friendly manner.

OVERALL INSIGHTS

The salary survey analysis provides a comprehensive view of how compensation differs across industries, job roles, education levels, experience, and regions. The findings reveal clear trends that help organizations understand workforce dynamics and make informed decisions about pay structures and equity.

- Higher education around $45k leads to better salary packages.
- Software Engineer attained high compensation around $52M comparing to all other Job Titles.
- The highest Salary achieved by India around $163k followed by UAE around $162k whereas the Lowest salary across countries is United Kingdom around $140k.
- Comparing to all other fields, Information Technology has the highest number of employees in the Industry.
- Non-Binary (85.48%) in Gender received highest bonus percentage followed by Female (84.65%).
- High-growth industries and specialized roles command premium salaries.
- Education and experience directly influence earning potential.
- Salary disparities exist across locations, with urban areas offering higher compensation.
- Insights from this analysis can guide fair pay practices, workforce planning, and strategic talent management.

CONCLUSION

This project successfully transformed an unstructured salary survey dataset into a reliable, analysis-ready resource through a complete data cleaning, database integration, and visualization workflow. By addressing missing values, inconsistencies, duplicates, and mixed currencies, the dataset was standardized and prepared for structured analysis in MySQL. The use of SQL queries enabled the extraction of valuable insights into salary trends across industries, education levels, experience, and geographic locations. Exporting query results into Excel and visualizing them through pivot tables and dashboards allowed for a clear, interactive presentation of findings.

The project demonstrates how data-driven techniques can uncover hidden patterns, support equitable pay analysis, and aid in workforce strategy decisions. Overall, it highlights the importance of clean data, effective querying, and professional visualization in delivering actionable insights that support human resource analytics, compensation benchmarking, and strategic decision-making in business environments.