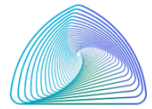**Kingdom of Saudi Arabia**
**Taibah University**
**College of Computer Science &**
**Engineering**
**Department of Artificial**
**Intelligence & Data Science**

جامعة طيبـــة
TAIBAH UNIVERSITY

# DS321 – Business Intelligence and Analytics
# Salary Insights Analysis

## Instructor: Dr. Eman Aljohani

**Joud Shadi Alahmadi || 4455449**
**Daniyah Abdulmannan Dawlat || 4455504**
**Eithar Shehabuddin Yanj || 4450113**
**Layan Hulayyil Aljuhani || 4456556**
**Manar Murdhi Aldosari || 4456086**

## Section: F02
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# Business Intelligence Proposal

**Domain:**

Human Resources and Workforce Analytics

**Business Problem Overview:**

Modern organizations can be a bit tricky, understanding workforce compensation is essential for retraining employees and ensuring fair pay practices. Lack of transparency in salary structures may lead to employee dissatisfaction and inequity in potential pay. Using Business Intelligence techniques helps analyze compensation data and uncover patterns related to experience, job titles, demographics and other factors.

**Project Objective:**

The objective of this project is to apply business intelligence methods and techniques to analyze workforce salary data; in order to identify key factors influencing employee compensation. Which then aims to support data-driven decision making in salary benchmarking, workforce planning and employee satisfaction and fairness.

**Business Question:**

How does professional experience and other factors impact salary levels across different workforce segments?

**Analysis & Methodology:**

The analysis methodologies used were descriptive and predictive, applied to explore and model the data using Python and Power BI.

**Dataset:**

link of the dataset

**Dashboard:**

link of the Dashboard

# Data Description:

The data used in this study was extracted from a survey published online querying people about their jobs and salaries.

The data consists of 10339 records and 18 columns.

The original dataset includes the following fields:

- timestamp: Timestamp
- age: How old are you?
- industry: What industry do you work in?
- job_title
- job_context: If your job title needs additional context, please clarify here:
- annual_salary: What is your annual salary?
- additional_comp: How much additional monetary compensation do you get, if any?
- currency: Please indicate the currency
- currency_other: If "Other," please indicate the currency here:
- income_context: If your income needs additional context, please provide it here:
- work_country: What country do you work in?
- work_state: If you're in the U.S., what state do you work in?
- work_city: What city do you work in?
- years_experience_total: How many years of professional work experience do you have?
- years_experience_field: How many years of professional work experience do you have in your field?
- education_level: What is your highest level of education completed?
- gender: What is your gender?
- race: What is your race?

## Salary Insights Dashboard:

## 1. Targeted Performance Metrics (Targeted KPIs)

- **Average Total Salary Performance (Gauge Chart):**

Displays a value of **SAR 384.26K** within a target range reaching up to **SAR 768.52K.**

Used to monitor adherence to the allocated budget and prevent excessive labor costs.

- **Average Total Salary by Gender (Donut Chart):**

The **"man"** category holds the highest average at **SAR 473.53K (29.82%),** while **"woman"** receives an average of S**AR 354.23K (22.31%)**.

## 2. Visualizations Analysis

- **Salary vs. Bonus Structure by Industry (Stacked Column Chart):** Compares base pay and bonuses. **"Comp & Techn"** leads with the highest total compensation (approaching 1M) and a significant bonus-to-salary ratio.

- **Log Salary Distribution by Job Level (Line Chart):** Uses a logarithmic scale to show pay density across roles. Most employees peak at log values **5–6**, allowing for the detection of **Outliers** where pay does not align with the job level.

- **Total Employees by Job Level and Race (100% Stacked Bar Chart):** measuring **Diversity & Inclusion**. It tracks ethnic representation (e.g., Asian, Black, Hispanic, Middle E) from **Junior** to **Executive** ranks.

- **Average Total Salary by Country (Clustred Bar Chart):** Highlights geographic pay disparities. It compares markets like the **USA**, **Switzerland**, and **China** to align compensation with local market strength.

- **Average Total Salary by Years of Experience (Clustred Column Chart):** Visualizes the **"Experience"**. It shows how total pay scales as employees move through experience bins from **0.00** to **40.00 years**.

- **Average Total Salary by Country and Bonus Status (Azure Maps):** Maps global compensation strategies. It differentiates average pay for those who **"Has Bonus"** vs. **"No Bonus"** across different regions.

## 3. How these insights support Decision-Making

- **Financial Strategy Optimization:** By monitoring the **Average Total Salary Performance** against the target threshold of **SAR 768.52K**, managers can ensure labor costs remain within the approved budget. It also evaluates the incentive system's reach, as **54.2%** of employees receive bonuses.

- **Promoting Equity and Inclusion:** The dashboard provides data-driven insights to address the **Gender Pay Gap**, highlighting the disparity between men's average salary (**SAR 473.53K**) and women's (**SAR 354.23K**). Additionally, it tracks ethnic representation across **Job Levels** to ensure diversity in leadership roles.

- **Talent Management and Retention:** The **Average Total Salary by Years of Experience** chart helps managers align pay with tenure to retain senior talent. Furthermore, the **Log Salary Distribution** allows for the detection of **Outliers**, ensuring internal pay fairness across all job titles.

- **Global Expansion and Recruitment Support:** Managers can use the **Average Total Salary by Country** and **Map** data to set competitive and fair salaries when expanding into international markets like the **USA**, **Switzerland**, or **China**.

## Conclusion:

This project successfully analyzed the "Ask Manager Salary Survey" to explore and predict factors influencing salaries across different countries and industries. By combining descriptive analysis, predictive modeling, and visualization using tools like Python and Power BI, the study revealed that salaries are influenced by multiple factors, with country and job title being the most significant. The analysis also highlighted the importance of visualizations and dashboards, which aid data scientists in understanding the data and support decision makers in making informed choices. Overall, the project provides practical insights for students, employees, and organizations to compare, benchmark, and improve salary related decisions.

## References:

[Linear Regression Guide](#)

[Linear Regression Merics](#)

[Power BI Tutorials](#)

Data Mining1 (DS331)

Data Mining2 (DS332)

## Student Contribution:

Phase 1 (Problem Definition) - Eithar

Phase 2 (Data Acquisition & Preparation) - All group members contributed together equally

Phase 3 (Modeling & Analysis) - Joud + Daniyah

Phase 4 (Visualization & Decision Support) - Layan + Manar