1. **Introduction and Objectives**

With the data cleaning phase completed in the cleaning and preprocessing data previous, we going to update our visualization data within Power BI. Our objective is to give business insights and provide data-driven predictions for stakeholders. This will be achieved through an analysis of five visualizations with **“IBM Blue”** tone color (HEX code #001F5C):

* Chart 1: Impact of Overtime on Employee Attrition Rate
* Chart 2: Employee Attrition Rate Across Different Job Roles
* Chart 3: Relationship Between Job Satisfaction and Attrition
* Chart 4: Attrition Rate by Years At Company
* Chart 5: Attrition Rate by Department and Job Satisfaction

To enable this analysis, we will first set up three important DAX (Data Analysis Expressions) measures in Power BI: Total Attrition Count, Total Employees Count, and Attrition Rate. The strategic application of these DAX measures is important for a many reasons:

* Firstly, they provide dynamic calculation and context awareness, which means that our attrition rate will automatically adjust to reflect specific segments, such as different departments, within any visual.
* Secondly, these measures ensure reusability, allowing for consistent application across all report visuals while eliminating redundant logic.
* Finally, they provide centralized logic and maintainability, requiring only one modification to calculation definitions to update all related visuals.

1. **Chart Visualization and Clarification**

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**Chart 1: Impact of Overtime on Employee Attrition Rate**

This group bar chart visually compares how likely workers having the ability to leave the company based on whether they work overtime. The visualization aims to highlight whether extended working hours are significantly associated with higher employee turnover by displaying attrition rates (typically as percentages) for two distinct groups - those who work overtime and those who do not. The central idea is to determine whether overtime is a significant factor driving employee turnover, resulting in a review of workload management, staffing levels, or overtime compensation.

**Feature:**

* Chart Title: "Impact of Overtime on Employee Attrition Rate"
* X-axis Label: "Works overtime"
* Y-axis Label: "Percentage of employees"
* Data labels on bars showing the exact percentage for attrition.
* **Why this visualization?** This chart can clearly highlights one of the most significant factors is overtime. A grouped bar chart clearly contrasts the attrition rates between employees who work overtime and those who don't.
* **How it helps address the business problem and support decision-making:** It underscores the severity of the overtime issue. If the bar for "Overtime: Yes" indicating attrition is raised, it provides compelling evidence for management to investigate overtime policies, workload distribution, and possibly hire more employees. This helps to inform resource allocation decisions and work policy reviews.

**Chart 2: Attrition Rate by Job Role**

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**Chart 2: Employee Attrition Rate Across Different Job Roles**

This visualization identifies specific job roles within the organization that have notably high or low rates of employee attrition. It provides for us a clearly comparison of attrition rates for various positions (e.g., Sales Executive, Research Scientist, Lab Technician). The basic idea is to identify roles that are 'at-risk' or, conversely, roles with high retention, and then conduct targeted investigations into role-specific factors such as job design, stress levels, career pathing, or management that influence an employee's decision to stay or leave.

**Feature:**

* Chart Title: "Employee Attrition Rate Across Different Job Roles"
* Y-axis Label: "Job role"
* X-axis Label: "Attrition rate (%)"
* Data labels on each bar showing the exact attrition percentage.
* **Why this visualization?** A horizontal bar chart is useful for comparing rates across multiple categories, particularly if the category names (Job Roles) are long. It clearly distinguishes between high- and low-risk roles.
* **How it helps address the business problem and support decision-making:** This chart can point out correctly which job roles are experiencing the highest turnover. This can help the HR and departmental managers to focus their investigative efforts and apply many retention strategies (e.g., exit interview analysis, targeted surveys, role redesign) on the most affected roles like Sales Representatives.

**Chart 3: Job Satisfaction vs. Attrition**

A graph of a graph showing the relationship between job satisfaction and attrition

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**Chart 3: Relationship Between Job Satisfaction and Attrition**

This chart shows the relationship between employees' self-reported job satisfaction levels and their attrition status (drop out or not).It assisted in categorizing employees based on their satisfaction scores (1 for low, 2 for medium, 3 for high, and 4 for extremely high), and then displaying the number or percentage of attrited vs non-attrited employees within each category. The central idea is to show how workplace contentment affects loyalty, specifically whether lower job satisfaction is a strong predictor of an employee's likelihood to leave, emphasizing the importance of initiatives aimed at improving employee morale and engagement.

**Feature:**

* Chart Title: "Relationship Between Job Satisfaction and Attrition"
* X-axis Label: "Job satisfaction level"
* Y-axis Label: "Number of employees (or % within satisfaction level)"
* Data labels to show counts/percentages.
* **Why this visualization?** This chart allows us to see clearly the relationship between a key satisfaction metric and attrition. A stacked bar chart can display the percentage of attrited employees for each satisfaction level, whereas a grouped bar chart can compare absolute numbers.
* **How it helps address the business problem and support decision-making:** If there is a clear trend (for example, a higher proportion of attrition at lower satisfaction levels), it emphasizes the importance of initiatives to improve job satisfaction. This can help guide investments in employee engagement programs, workplace improvements, and manager training aimed at increasing morale.

**Chart 4: Attrition Rate by Age Group**

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**Chart 4: Attrition Rate by Years At Company**

This line graph describes how employee attrition rates trend based on an employee's tenure, measured in years spent at the company. By plotting the attrition rate against the number of year of employee that work for the company on the x-axis, the chart reveals patterns in retention over the employee lifecycle. The central idea is to understand the relationship between employee loyalty, represented by tenure, and the propensity to leave.

**Feature:**

* Chart Title: " Attrition Rate by Years At Company "
* X-axis Label: "Years at company"
* Y-axis Label: "Attrition rate (%)"
* Data labels to show counts/percentages.
* **Why this visualization?** A line chart is selected here because it can illustrates the trends and sequential changes across an ordered numerical variable like "years at company".It enables us to easily visualize the progression of attrition risk as employee tenure increases, highlighting periods of increased or decreased vulnerability that would otherwise be obscured by summarizing data into broader categories or using static comparisons.
* **How it helps address the business problem and support decision-making:** This chart addresses the business challenge of retaining employees throughout their tenure by determining when they are most likely to leave. The significant increase in attrition among newly hired employees highlights the need to evaluate and potentially improve onboarding processes, early role integration programs, and initial expectation management.

**Chart 5: Attrition Rate by Department and Job Satisfaction**

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**Chart 5: Attrition Rate by Department and Job Satisfaction**

This heatmap illustrates how employee attrition rates vary based on the employee's department and their reported job satisfaction level. By displaying departments along the rows and job satisfaction scores (1=Low, 4=Very High), with cell color intensity representing the attrition rate (darker which mean a higher rates), the visualization points out specific combinations experiencing higher turnover.

**Feature:**

* Chart Title: Attrition Rate by Department and Job Satisfaction
* Row Axis Label (Vertical Axis): Department
* Column Axis Label (Horizontal Axis): Job satisfaction level (on a scale 1 to 4)
* Cell Value / Color Intensity Legend: Attrition rate (%)
* **Why this visualization?** A heatmap with a matrix and conditional formatting was chosen because it can continuously display the intensity of a measure (attrition rate) across two distinct categorical dimensions.
* **How it helps address the business problem and support decision-making:** This visualization directly addresses the issue by highlighting the areas where dissatisfaction is most strongly associated with attrition (for example, level 1 satisfaction across all departments, particularly in Sales and HR, as indicated by the darker shading).

1. **Conclusion**

This visual analysis has highlighted key drivers of employee attrition, giving us a chance to assume accurate predictions and gain a deeper understanding of turnover trends. These insights should empower stakeholders to implement targeted, data-informed strategies to enhance employee retention and overall organizational stability.