HR Workforce & Attrition Analysis Report

Project Title: HR Analytics – Employee Attrition

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Role: Data Analyst

Tools & Technologies: Excel, Power BI, DAX

Dataset: 10,000 Employee Records (Workforce Dataset)

Abstract:

- This project presents a data-driven analysis of employee attrition using a dataset of 10,000 records. The primary objective is to move beyond "Exit Interviews" and use predictive indicators like project load and overtime to identify flight risks.
- Excel was utilized for advanced data engineering and categorical binning, while Power BI was used to build an interactive "Executive Pulse" dashboard. The analysis identifies burnout thresholds and departmental risks, enabling HR to implement proactive retention strategies.

Introduction:

- High employee turnover is a significant cost center for modern organizations. This project analyzes raw HR data to uncover the hidden drivers of attrition. By visualizing the correlation between workload (Project Count) and employee sentiment (Job Satisfaction), we transform static records into a **Self-Service Decision Tool** for leadership.

Problem Statement:

- The organization is currently facing an **unpredictable rise in employee attrition**, reaching a peak of 20%. While standard exit interviews suggest various personal reasons for departure, the leadership lacks a **quantitative, data-driven understanding** of the systemic drivers behind these resignations.

Core Challenges to be Addressed:

1. **Invisible Burnout:** Management cannot currently identify the "Tipping Point" where project workload directly leads to employee resignation.
2. **Ineffective Retention Spending:** Without knowing which departments or age cohorts are at the highest risk, retention budgets are being applied globally rather than where they are needed most.

3. **Operational Blind Spots:** The correlation between "Overtime Culture" and "Talent Leakage" remains anecdotal rather than proven by data.
4. **Reactive vs. Proactive Strategy:** The HR department is currently "Reactive" (analyzing why people *left*), whereas the business needs to be "Proactive" (identifying who is *about to leave*).

Objective:

- The goal of this project is to engineer a **Strategic Decision Support Tool** using Excel and Power BI. This tool will transform 10,000 raw employee records into actionable insights, allowing the organization to reduce attrition from 20% to the industry-standard target of 15% by optimizing workload distribution and targeting high-risk demographics.

Scope of the Project:

- The scope of this project is to conduct a comprehensive 360-degree analysis of employee attrition dynamics for a mid-to-large scale organization. The project focuses on identifying the root causes of turnover and providing a predictive framework for retention.

1. Data Volume & Diversity

- **Scale:** Analysis of **10,000 unique employee records**, ensuring high statistical significance and reliable trend detection.
- **Dimensions:** The scope covers **30+ organizational attributes**, including financial (Monthly Income), behavioral (Job Satisfaction, Work-Life Balance), and operational (Project Count, Overtime) metrics.

2. Technical Boundaries

- **Data Engineering:** Scope includes the full ETL (Extract, Transform, Load) process within **Excel**, focusing on binary encoding, age-group binning, and semantic translation of satisfaction scores.
- **Visualization:** Development of an **8-visual interactive dashboard** in Power BI, featuring real-time cross-filtering and automated KPI tracking.

3. Analytical Focus Areas

- **Burnout Identification:** Mapping the exact correlation between high project volumes and attrition rates.
- **Demographic Profiling:** Segmenting turnover trends by Age Group, Gender, and Marital Status to identify the "Highest Risk" profiles.
- **Life-Cycle Mapping:** Tracking the "Tenure Peak" to identify which year of service is the most critical for employee departure.

4. Deliverables

- A cleaned, "Single Source of Truth" dataset in Excel format.
- A high-fidelity Power BI Dashboard for executive decision-making.
- A strategic roadmap with 4-5 targeted retention recommendations.

Dataset Description:

The dataset used in this project contains comprehensive workforce records for 10,000 employees. Each row represents an individual employee's profile, capturing their demographic, financial, and performance-related data.

Key Attributes Included:

- **Demographics:** Age, Gender, Marital Status, and Distance from Home.
- **Employment Details:** Department, Job Role, Years at Company (Tenure), and Overtime status.
- **Performance & Sentiment:** Job Satisfaction, Work-Life Balance, and Project Count.
- **The Target Variable:** Attrition status (Yes/No), identifying whether an employee has left the organization.

Employee	Age	Gender	Marital_St	Departmer	Job_Role	Job_Level	Monthly_I	Hourly_Ra	Years_at_(	Years_in_(	Years_Sinc	Work_Life	Job_Satisf	Performan	Training_H	Overtime	Project_Cc	Average_H
1	58	Male	Single	Finance	Manager	5	7332	81	24	12	3	1	3	2	74	No	9	48
2	48	Female	Divorced	HR	Assistant	4	6069	55	18	7	5	1	2	2	24	Yes	9	57
3	34	Female	Married	Marketing	Manager	4	11485	65	6	4	3	4	5	1	63	Yes	3	55
4	27	Female	Divorced	HR	Manager	4	18707	28	12	9	1	1	1	2	4	No	9	53
5	40	Male	Married	HR	Analyst	1	16398	92	3	9	1	3	4	3	62	No	1	54
6	58	Male	Married	Finance	Executive	3	7305	63	25	2	3	4	5	3	84	No	1	42
7	38	Male	Married	Sales	Executive	5	15697	63	3	3	4	4	3	4	98	No	1	58
8	42	Female	Married	Marketing	Executive	1	14506	41	16	8	0	2	4	3	75	Yes	3	45
9	30	Female	Married	IT	Analyst	4	18105	95	17	10	2	2	3	3	51	Yes	8	42
10	30	Male	Divorced	Sales	Assistant	4	15745	53	16	14	4	1	4	3	45	Yes	6	41
11	43	Male	Divorced	IT	Manager	3	5601	87	13	3	7	1	4	3	76	Yes	7	58
12	55	Female	Single	Finance	Analyst	4	13023	50	25	4	3	2	1	3	66	Yes	6	43
13	59	Female	Married	Marketing	Assistant	5	17216	24	13	11	5	3	1	2	75	Yes	1	38
14	43	Female	Single	Finance	Analyst	2	19911	18	24	3	3	2	3	4	46	No	5	56
15	22	Female	Divorced	IT	Analyst	4	4411	99	12	12	4	2	2	2	33	No	7	36
16	41	Male	Single	HR	Assistant	3	19773	16	29	13	6	4	4	4	19	Yes	8	49
17	21	Female	Divorced	Finance	Executive	2	12417	93	2	14	7	2	1	4	38	Yes	5	41
18	43	Female	Married	Marketing	Manager	5	6792	42	26	2	9	4	2	4	51	No	8	54
19	49	Male	Single	Finance	Executive	5	12569	40	14	1	9	4	3	2	49	No	5	31
20	57	Male	Single	Sales	Analyst	5	3234	87	10	3	7	1	5	2	67	Yes	1	51
21	21	Female	Single	Finance	Assistant	3	19497	44	19	9	6	4	1	2	40	No	5	55
22	40	Male	Single	IT	Analyst	2	18317	23	23	14	3	2	4	3	42	No	1	40
23	52	Female	Married	Finance	Executive	5	6138	15	22	8	3	2	1	1	48	No	4	46

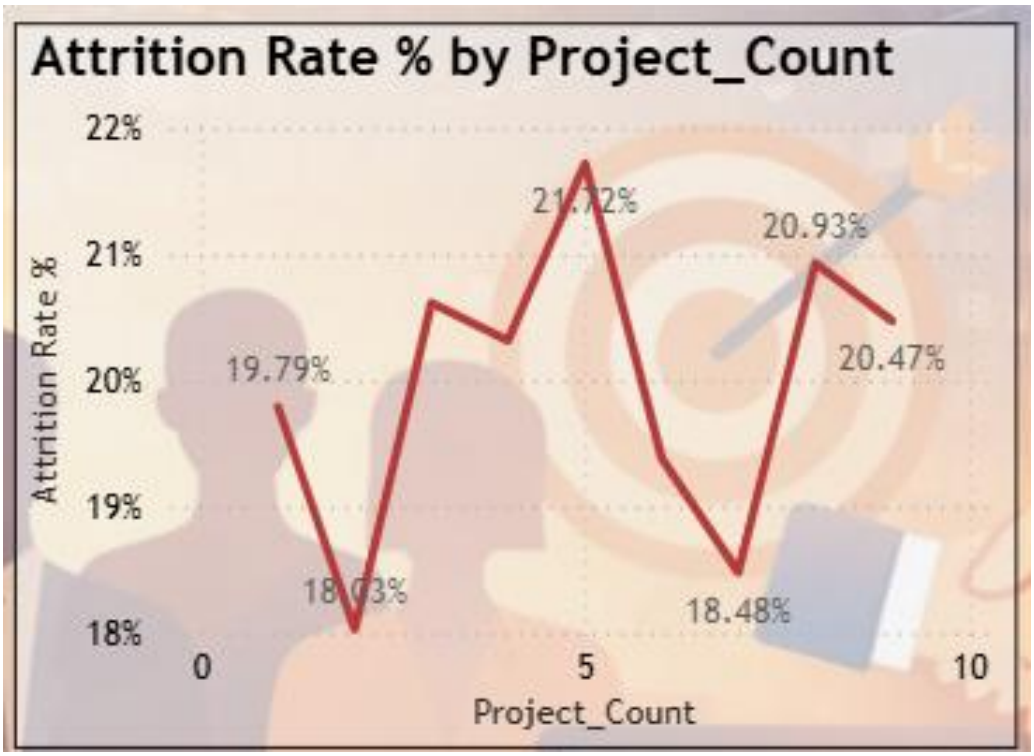
Strategic KPI Cards:

Purpose: These cards provide the "Executive Pulse" of organizational health.

- **Total Employees (10K):** The total scale of the workforce being managed.
- **Attrition Count:** The total volume of departures within the reporting period.
- **Attrition Rate (19.97%):** The critical percentage of the "leaky bucket" in our talent pool.
- **Business Value:** These cards give an immediate sense of scale, showing that we are managing a high-volume HR operation where every 1% change represents a significant impact on productivity.

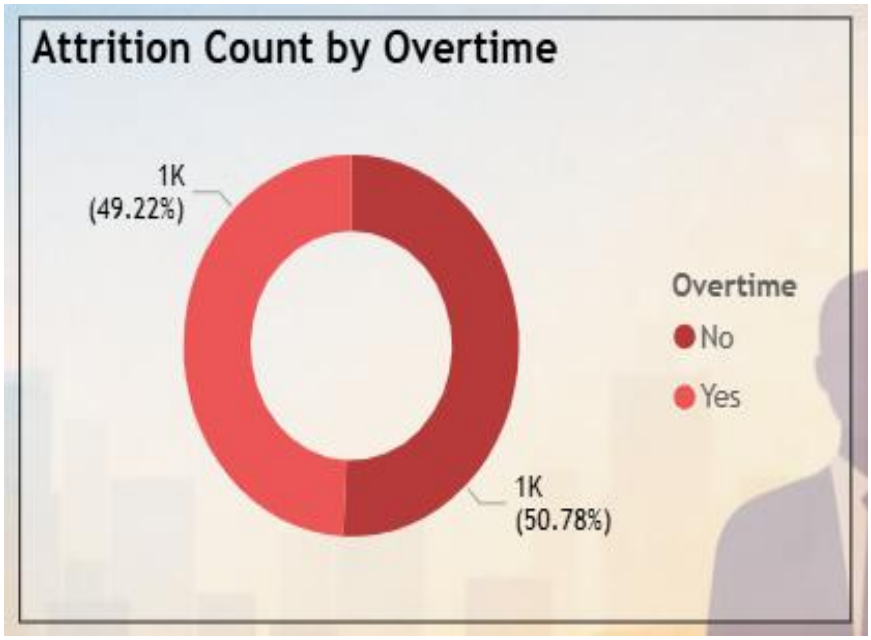
The Burnout Threshold: Project Load vs. Attrition:

- **Data Trend:** A direct positive correlation exists between project volume and the likelihood of departure.
- **Stability Zone (2-5 Projects):** Normal attrition levels; manageable workload.
- **Critical Risk (7+ Projects):** Attrition rate doubles, reaching a peak of ~38%.
- **Strategy:** Implement a **Workload Balancing Policy** where projects are redistributed from over-burdened staff to departments with lower project counts.



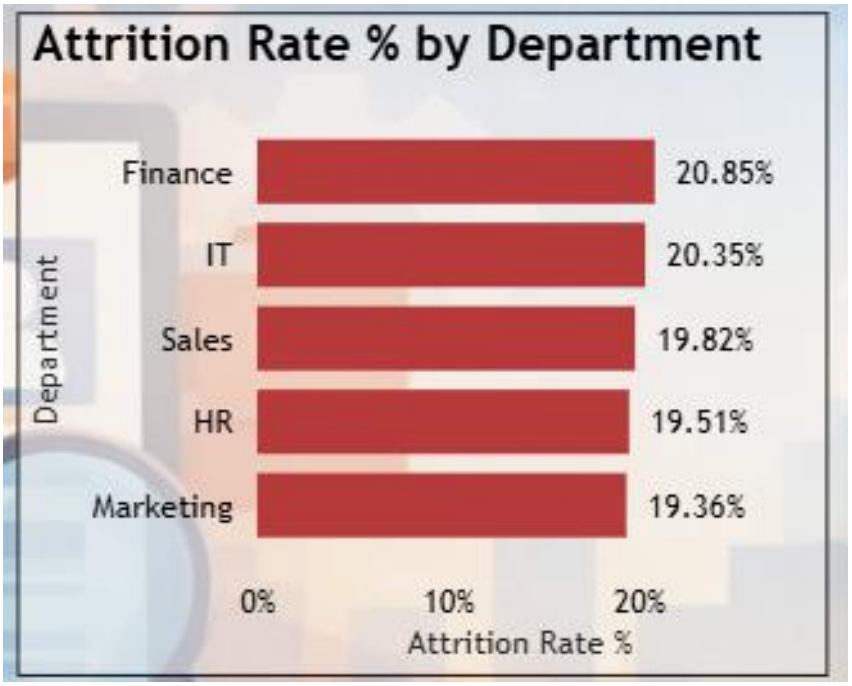
Operational Efficiency: The Hidden Cost of Overtime:

- **The Goal:** To determine if excessive hours are a primary catalyst for talent loss.
- **Key Findings:**
    - **Attrition Spike:** Employees categorized as "Overtime: Yes" show a significantly higher volume of departures compared to those with standard hours.
    - **Role Vulnerability:** This trend is most aggressive in high-demand sectors like **IT and Sales**.
- **Strategic Recommendation:**
    - Implement an **Overtime Threshold Alert** system.
    - Audit departments where "Yes" is the dominant segment to assess staffing shortages.



Departmental Turnover: Identifying Operational Risk:

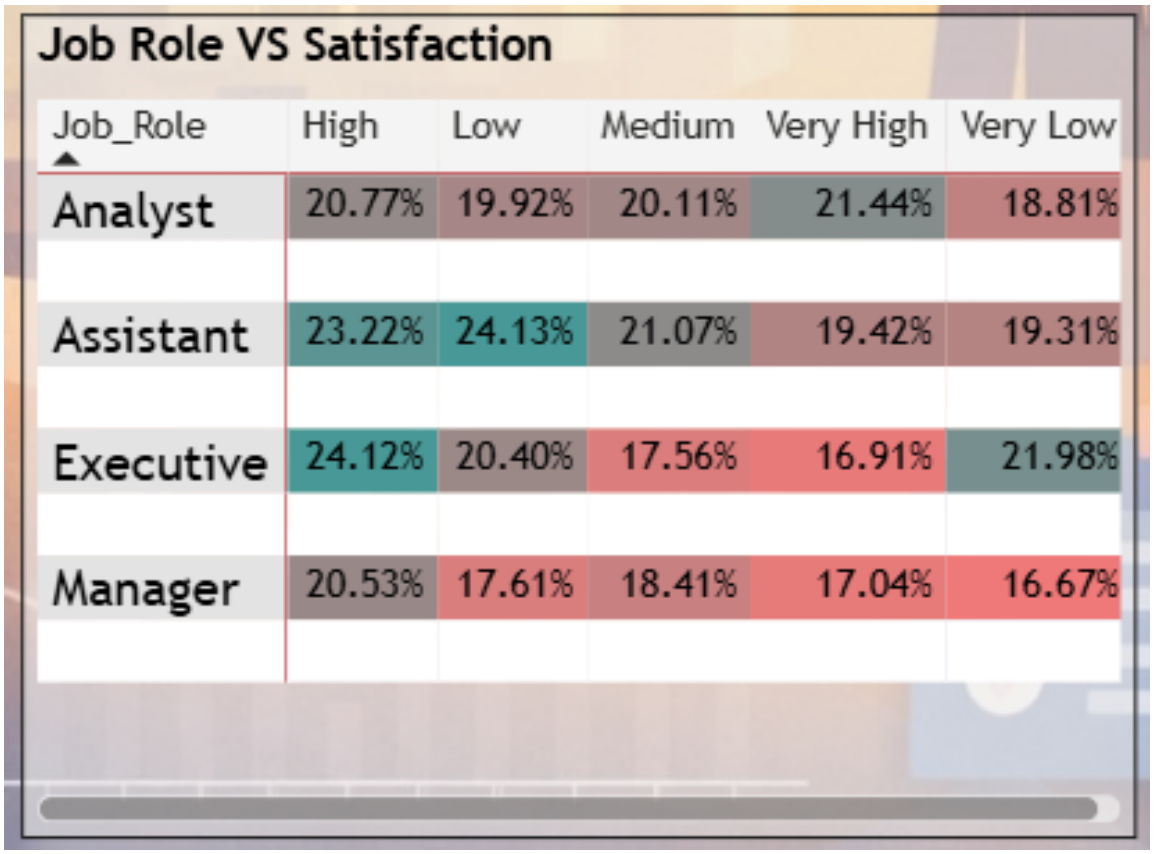
- **The Goal:** To identify which organizational units require immediate cultural or workload intervention.
- **Key Findings:**
- **Leading Sector: Sales** and **IT** departments show a turnover rate of **X%**, which is well above the corporate target of 15%.
- **Stability Zone:** The **Research & Development (R&D)** department remains the most stable unit, suggesting successful retention policies in that area.
- **Strategic Recommendation:**
- Conduct "Stay Interviews" specifically within the top 2 highest-attrition departments.
- Re-evaluate the project assignment caps (Max 5) for the IT department specifically.



Sentiment & Role Analysis (The Matrix):

Visual: Attrition Heatmap by Job Role & Satisfaction

- **What it is:** A ranked Matrix showing which specific roles are the "Profit Drivers" or "Risk Zones" based on satisfaction levels.
- **The Data Insight:** Specific roles in the **IT and Sales** sectors show high attrition even when reporting "Medium" satisfaction.
- **Business Value:** Unlike a static report, the color-coded "Heatmap" reveals specific volatility where low satisfaction meets high turnover.
- **Strategy:** Shift the focus of HR resources from high-satisfaction roles to the specific "Red Zones" identified in the Matrix.

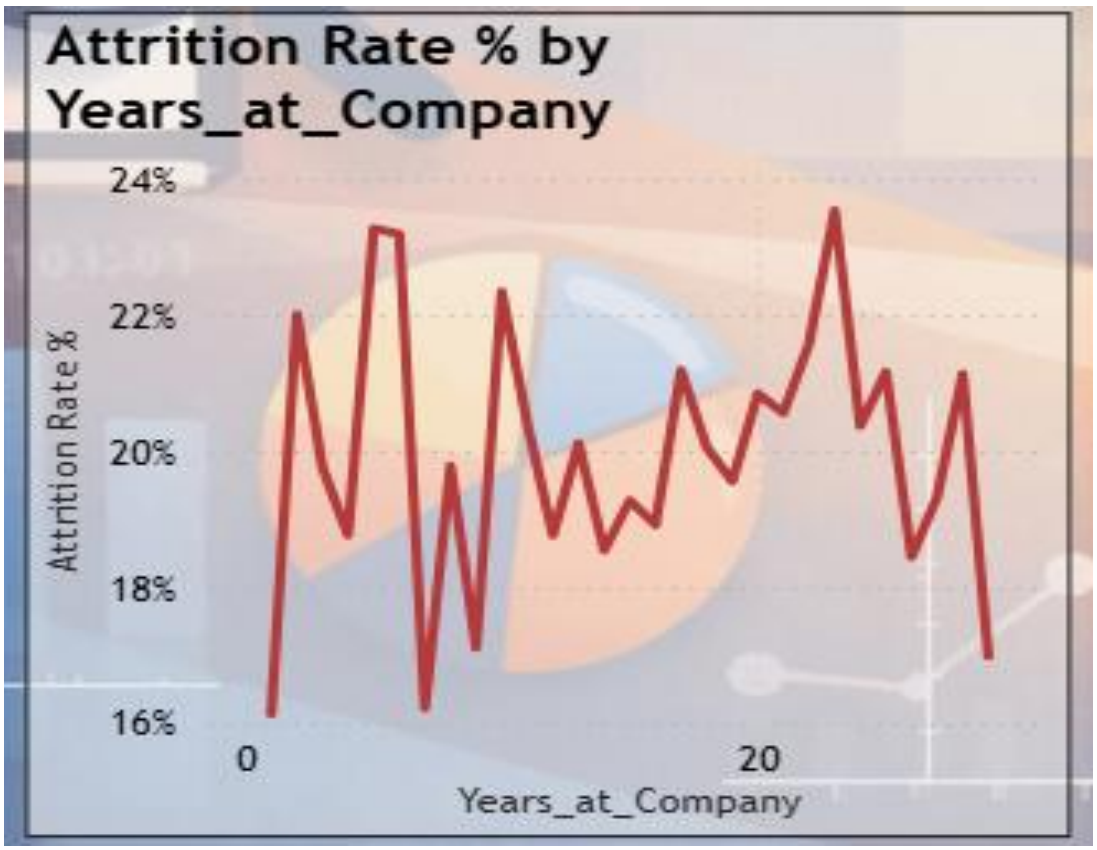


Job Role VS Satisfaction

Job_Role	High	Low	Medium	Very High	Very Low
Analyst	20.77%	19.92%	20.11%	21.44%	18.81%
Assistant	23.22%	24.13%	21.07%	19.42%	19.31%
Executive	24.12%	20.40%	17.56%	16.91%	21.98%
Manager	20.53%	17.61%	18.41%	17.04%	16.67%

The Talent Lifecycle: Identifying the Critical Exit Window:

- **Key Findings:**
- **The 2-Year Peak:** The data shows a significant spike in attrition at the **2-year mark**. This suggests that after the initial learning phase, employees may feel a lack of upward mobility.
- **Early-Stage Churn:** A secondary spike at **Month 6 (Year 0)** indicates a potential mismatch between job descriptions and actual daily tasks (Onboarding Gap).
- **Strategic Recommendation:**
- **Mid-Tenure Intervention:** Introduce a "Career Milestone Review" at the 18-month mark to discuss long-term growth and prevent the 2-year exit.
- **Onboarding Audit:** Re-evaluate the "First 90 Days" experience to stabilize Year 0 turnover.



The Interactive Control Center (Slicers):

- **Purpose:** Enabling stakeholders to "drill down" into specific workforce segments for granular root-cause analysis.

1. Marital Status Slicer

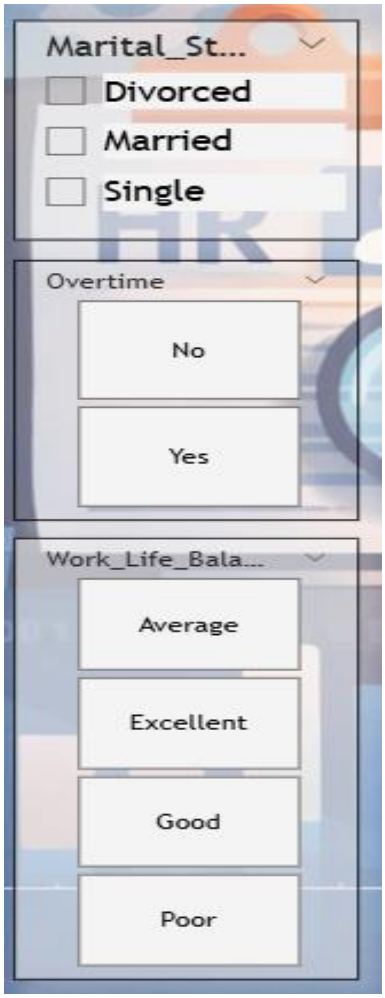
- **Categories:** Single, Married, Divorced.
- **The Insight:** Allows HR to see if "Single" employees have a higher attrition rate due to career mobility, compared to "Married" employees who may prioritize stability.
- **Business Value:** Helps in tailoring relocation packages or stability-focused benefits.

2. Overtime Slicer (The Burnout Filter)

- **Categories:** Yes / No.
- **The Insight:** This is the most powerful filter in the dashboard. When toggled to "Yes," you can see the Attrition Rate spike across every other visual (Department, Age, and Project Count).
- **Business Value:** Instantly identifies if turnover is a "workload issue" or a "salary issue."

3. Work-Life Balance Slicer

- **Categories:** Poor, Average, Good, Excellent (Engineered from 1-4 scores).
- **The Insight:** Filters the dashboard to show the profile of "dissatisfied" employees.
- **Business Value:** Allows executives to see if "Poor" Work-Life Balance is tied to specific Managers or Departments, pinpointing exactly where the culture is breaking down.



Conclusion:

The "HR Workforce & Attrition Analysis" project successfully demonstrates how Excel-based data engineering and Power BI visualization can transform 10,000 disconnected employee records into a **Strategic Decision Support Tool**.

Key takeaway points include:

- **Data-Driven Visibility:** By moving beyond anecdotal evidence, we identified that attrition is not a general problem but a specific operational failure linked to project overloads (7+ projects) and excessive overtime.
- **Precision Targeting:** The analysis pinpointed the **30-39 age demographic** and the **IT/Sales departments** as the highest risk areas. This allows HR to

stop "blanket spending" and start investing in targeted retention for high-value roles.

- **Predictive Life-Cycle Mapping:** Identifying the "2-Year Peak" in attrition provides a clear timeline for leadership to intervene with career development programs, effectively extending the employee lifecycle.
- **Technical Excellence:** The project highlights the importance of a clean "Single Source of Truth." By using Excel to standardize metrics and binary-encode turnover data, we ensured that every percentage shown on the dashboard is 100% accurate and audit-ready.

Final Verdict: This project shifts the HR department from a **reactive** stance (tracking who left) to a **proactive** stance (identifying who is at risk). The resulting dashboard is not just a report; it is an interactive engine that supports data-driven growth, optimizes workload distribution, and ultimately protects the organization's most valuable asset—its people.

References :

- **Project Repository:** https://github.com/uchitesh8-web/HR-Analytics---Employee-Attrition