Global Tech Workforce Trends Analysis (2020-2024)

1. Project Overview and Objective

This project focuses on analysing technology-sector layoffs globally from 2020 to 2024. It involves cleaning and transforming raw layoff data using Excel and Power Query, followed by creating an interactive Power BI dashboard.

The objective is to-

- Analyse global layoff trends: Study worldwide tech layoff patterns from 2020–2024, focusing on total companies affected, employees laid off, and year-wise layoff intensity.
- Evaluate pre- and post-layoff workforce size: Assess how company headcount changed before and after layoffs, using metrics like pre-layoff size, post-layoff size, and percentage reduction across firms.
- Understand geographic impact: Examine how layoffs vary by continent, country, and region, identifying hotspots and recovery patterns over time.
- Compare industry and company performance: Compare layoff volumes and impact rates across tech industry segments and major companies, highlighting the top contributors to total layoffs.
- Visualize insights with interactive dashboards: Build interactive Power BI reports that allow users to filter by year, geography, industry, and company to explore trends, impacts, and recovery in an intuitive way.

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2. Data Sources

- **Source Description and Timeline:** Data sourced from the **Worldwide Tech Employment Trends dataset** available on **OpenDataBay**, covering global technology sector layoffs from **2020 to 2024**.
- **Domain**: Human Resources (HR)

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3. Problem Statement

- To analyze global technology sector layoffs from 2020 to 2024 to identify key workforce reduction trends.
- To assess layoffs across different tech industries and company funding stages to uncover sector-specific vulnerabilities.

- To study geographic patterns of layoffs and workforce recovery by continent and country for regional insights.
- To evaluate changes in company workforce sizes before and after layoffs for impact quantification.
- To develop an interactive dashboard enabling exploration of employment dynamics for strategic HR and business decisions.

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4. Attribute (Column /Features) Details:

Attribute Name	Data Type	Description
No.	Integer	Unique identifier for each layoff event.
Company	Categorical	Name of the tech company reporting the layoffs.
Location HQ	Categorical	City (and sometimes region) of the company headquarters.
USState	Categorical	U.S. state for companies based in the United States.
Country	Categorical	Country where the company headquarters is located.
Continent	Categorical	Continent corresponding to the company headquarters.
LaidOff	Numeric	Number of employees laid off in the event.
Date layoffs	Date / DateTime	Date on which the layoff occurred or was announced.
Percentage	Numeric	Layoff size as a percentage of total company workforce.
Company Size Before Layoff	Numeric	Total number of employees before the layoff.
Company Size After Layoff	Numeric	Total number of employees after the layoff.
Industry	Categorical	Tech industry segment (e.g., Retail, Transportation, Consumer).
Stage	Categorical	Company funding or lifecycle stage (e.g., Seed, Series C, Post-IPO).
Money Raised in millions	Numeric	Total funding raised by the company in millions of USD.

Year	Date	Year extracted from the layoff date for trend analysis.

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5. Tools & Technologies

- **Excel:** Data cleaning, transformation.
- **Power BI:** Data modelling, DAX calculations, visualization, and interactive dashboard creation.

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6. Data Pre-Processing (Excel / Power Query)

- **Data Collection:** Gathered layoff data from the Worldwide Tech Employment Trends dataset covering 2020 to 2024.
- **Data Cleaning:** Removed duplicates, handled missing or null values, standardized date and numeric formats, and renamed columns for clarity.
- **Data Transformation:** Created calculated columns such as Year, and normalized categorical fields like Industry and Stage.
- **Filtering & Sorting:** Filtered for relevant tech layoffs and sorted data chronologically to maintain consistency.
- **Data Integration:** Combined and harmonized raw datasets into a single unified table ready for Power BI analysis and visualization.
- **Fact and Dimension Tables:** Conceptually organized data into fact tables for layoff events and dimension tables for company, geography, industry, and time to optimize data modelling.

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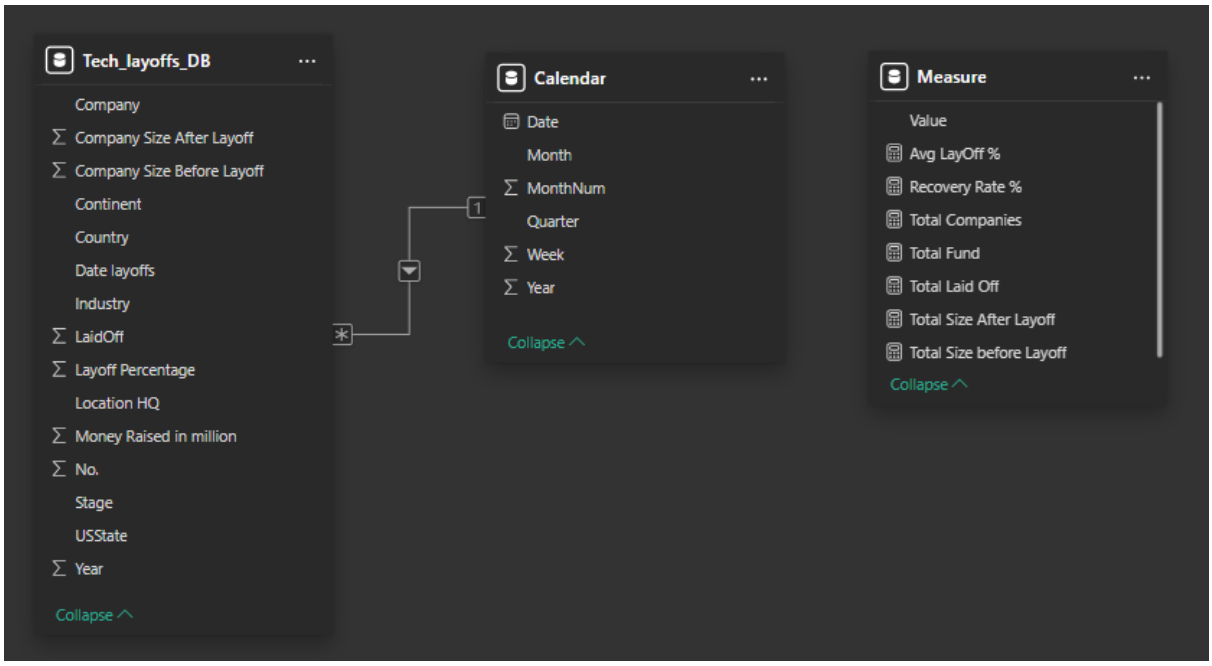
7. Data Modelling and DAX (Power BI)

Data Model: Implemented a flat-table design where all layoff event details, including company, industry, geography, and time attributes, are stored in a single consolidated table. Complemented this with a separate measures table to centralize key DAX calculations, simplifying model management while still enabling efficient analysis and interactive Power BI reporting.



- **Calculated Columns & DAX Measures:**

  Total Laid Off – sum of employees laid off across all events.

  Total Companies – distinct count of companies in the dataset.

  Avg Layoff % – average of the layoff percentage field.

  Total Size before Layoff – total headcount before layoffs.

  Total Size After Layoff – total headcount after layoffs.

  Total Fund – sum of money raised (in millions) for selected companies.

  Recovery Rate % – ratio of total size after layoff to total size before layoff, expressed as a percentage.

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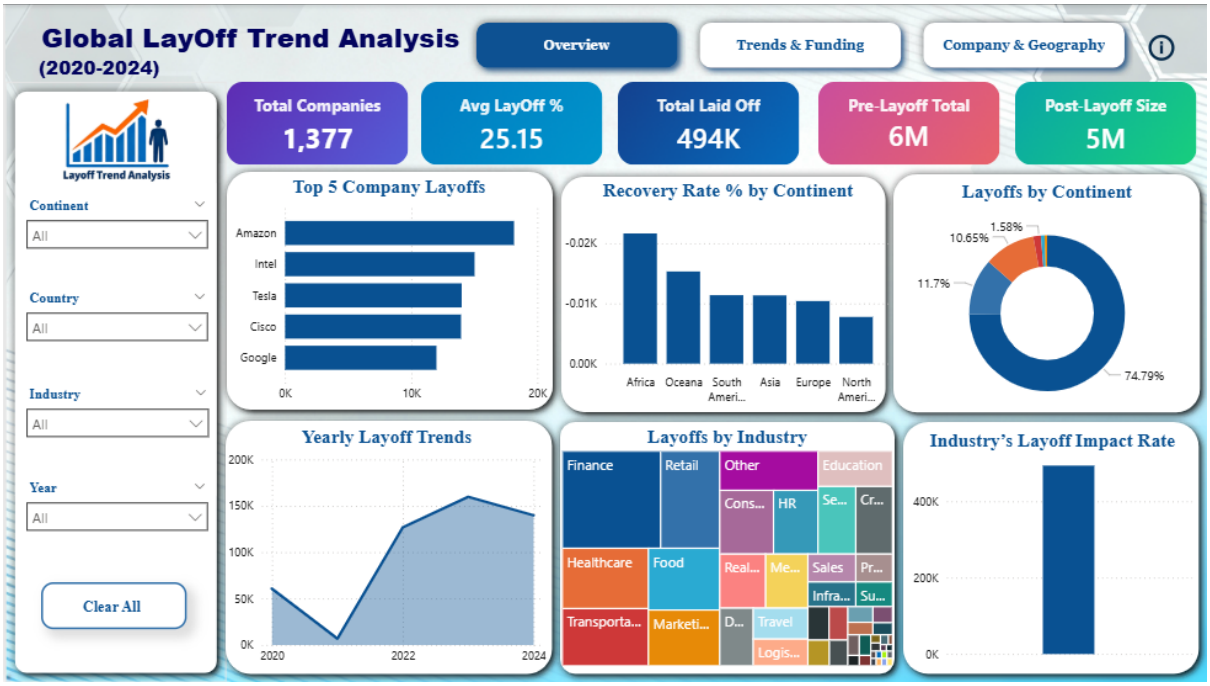
8. Analysis and Visualizations (Power BI)

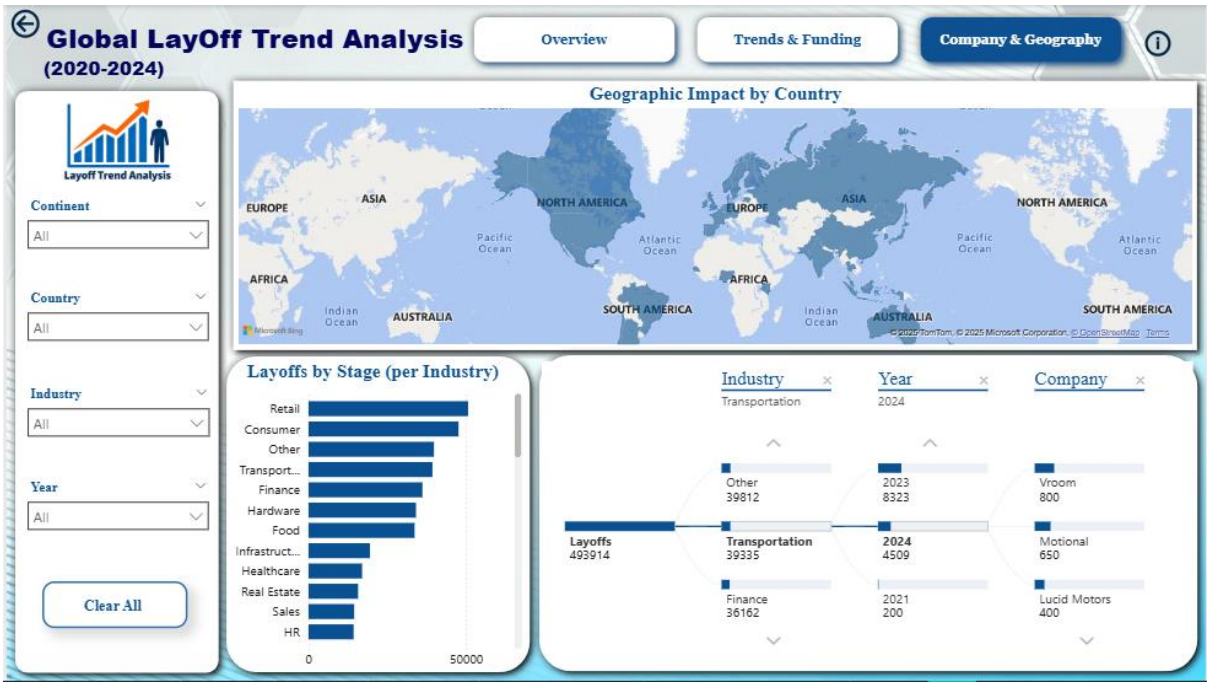
Dashboard Features:

- Developed multiple visualizations aligned with the problem statement including bar charts, line charts, pie charts, tree maps, KPI cards, and tables to clearly communicate layoff insights.
- Designed the report with interactive features such as filters, and slicers for granular data exploration.
- Incorporated bookmarks for intuitive navigation, and ensured all visuals have clear titles and labels to enhance readability.
- Created a consolidated dashboard with overview, trends & funding, and geographic & company insights pages for comprehensive analysis.

Highlights:

- Layoff Trends – Bar and line charts showing layoff volumes over time and recovery rates by continent.
- Industry Impact – Tree maps depicting layoffs by industry and funding stage segmentation.
- Geographic Distribution – Map visualization highlighting layoffs impact by country and region.
- Company Level Details – Tables and bar charts identifying top companies by layoffs and workforce changes.
- Key Metrics – KPI cards summarizing total layoffs, total companies affected, average layoff percentages, and funding raised.





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9. Insights & Conclusions

Key Findings:

- **Descriptive:** The analysis reveals that layoffs were concentrated in specific industries such as Finance, Retail, and Healthcare, with North America bearing the largest impact geographically. Average layoff percentages hovered around 25%, and major companies like Amazon and Intel led in layoff counts.
- **Diagnostic:** Industry and funding stage segmentations indicate that late-stage and post-IPO companies experienced significant layoffs, possibly reflecting market corrections. Geographical recovery rates suggest uneven economic resilience across continents.

    - **Predictive:** The upward trend in layoffs in certain sectors during recent years highlights potential risk areas for employment instability moving forward, especially if funding inflows decline.
    - **Prescriptive:** Businesses and HR strategists should focus on monitoring sectors with high layoff frequency and explore workforce flexibility, while investors might weigh funding allocations considering sector sensitivity.
- **Performance Insights**
    - Technology sectors such as Finance and Retail experienced higher layoff volumes, impacting workforce distribution.
    - Layoff trends peaked in recent years, with recovery or growth varying by continent.
    - Larger firms showed measurable workforce reductions with implications for industry employment trends.
    - Funding trends correlate with layoff severity, suggesting capital availability influences workforce decisions.
    - Interactive dashboards enable ongoing monitoring of tech employment dynamics for informed decision-making.

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10. Conclusions

The integration of Excel and Power BI enabled a comprehensive analysis of technology sector layoffs from 2020 to 2024. Key findings include significant layoffs concentrated in industries like Finance and Retail, and uneven recovery rates across continents. This project transformed complex layoff data into clear, actionable insights on workforce trends, company impact, and funding correlations. The interactive Power BI dashboards provide decision-makers with a user-friendly tool to monitor and respond to evolving employment dynamics in the tech industry.