# Layoffs Analysis Project

**1.Problem Statement:**

This analysis aims to identify the industries most affected by layoffs and examine layoff trends over time. By analyzing the number and percentage of layoffs across industries, we will determine which sectors faced the highest job losses. Additionally, we will track layoffs over time to uncover potential patterns, such as seasonal trends or economic downturn effects. These insights will help understand workforce reductions and their impact on different industries.

**2.Executive Summary:**

This study analyzes industry-wide layoffs to identify the sectors most affected and the trends shaping workforce reductions. The analysis explores the impact of total layoffs, percentage-based layoffs, and funding levels to assess whether financial backing influences layoff decisions. The study finds that **the Consumer, Retail, and Finance industries** faced the highest number of layoffs, while **Aerospace and Education** experienced the highest percentage-based reductions.

Furthermore, major corporations, including **Google, Meta, and Amazon**, executed large-scale layoffs despite their substantial funding, highlighting **economic downturns and corporate restructuring as key factors**. The analysis also identifies a peak in layoffs between **late 2022 and early 2023**, coinciding with **global financial instability and cost-cutting measures**. By understanding these trends, businesses and policymakers can develop strategies to mitigate future layoffs and create resilient workforce solutions.

**3.Metric Identification & Explanation:**

To support this analysis, the following key metrics were examined:

1️ **Total Layoffs by Industry:** This metric identifies which industries experienced the highest number of job losses, providing a broad understanding of sector-specific vulnerabilities.

2️ **Layoff Percentage by Industry:** Instead of just looking at raw layoff numbers, this metric determines the proportion of the workforce laid off, highlighting sectors with severe employment contractions.

3️ **Funding vs. Layoffs:** This metric explores whether companies with higher financial backing laid off more employees. By comparing total layoffs with funds raised, the study investigates if financial stability influences workforce reductions.

4️ **Rolling Layoffs Over Time:** To track historical trends, this metric analyzes cumulative layoffs per month, identifying peak layoff periods and assessing how layoffs correlate with economic fluctuations.

5️ **Companies with 100% Layoffs:** This metric examines firms that completely shut down, shedding light on startups and businesses unable to sustain operations during economic downturns.

**Data cleaning:**

**To ensure data accuracy, SQL was used to clean the dataset by:**

* **Removing duplicate entries and null values**
* **Standardizing company names and industry classifications**
* **Converting date formats and filtering irrelevant records**
* **Handling missing values in layoff counts using median imputation**

**Explanation of Data Cleaning Queries:**

1. **Removing Duplicate Values:**

**Query:**

with duplicate as (select \*,ctid,row\_number() over(partition by company,location,industry,total\_laid\_off,percentage\_laid\_off,date,stage,country,funds\_raised\_millions)

as rank

from layoffs)

delete from layoffs

where ctid in (select ctid from duplicate where rank>1);

* + A Common Table Expression (CTE) is used to assign a rank to each row based on duplicate values.
  + The row\_number() function helps identify duplicate rows based on company, location, industry, and other fields.
  + Only rows where rank > 1 are deleted to retain a single occurrence of each duplicate entry.

1. **Standardizing Format (Trimming White Spaces):**

**Query:** --standarizing format--triming white space--

select company,trim(company) from layoffs;

update layoffs set company=trim(company);

* + TRIM(company) removes leading and trailing white spaces from the company column.
  + The UPDATE statement applies the trimmed values to the dataset**.**

1. **Standardizing Industry Names:**

**Query:**

--updating the value where industry name is different although meaning is same --

select distinct(industry) from layoffs order by 1;

select \* from layoffs where industry like 'Crypto%';

update layoffs

set industry='Crypto'

where industry like '%Crypto%';

--now all the values of crypto industry are labbeled in one form which is crypto insted of crypto currency etc so on --

* + DISTINCT industry helps identify variations in industry names.
  + Entries like "Crypto Currency" and "Crypto-Related" are standardized to "Crypto" using the UPDATE statement with a LIKE condition.

1. **Standardizing Location Data:**

**Query:** **--** now we are doing same for locations --

select distinct(location) from layoffs order by 1;

--the most values are unique as far i can say--

--lets do the same for countries--

select distinct(country) from layoffs order by 1 ;

--here united states is repeating two times differently so we will update the value in one form--

select distinct(country),trim(trailing '.' from country) as trimmed from layoffs order by 1 ;

update layoffs

set country=trim(trailing '.' from country)

where country like '%United States%';

select distinct(country) from layoffs;

* + DISTINCT(location) checks for inconsistencies in location data.
  + Since most values are unique, no major cleaning is needed
  + DISTINCT(country) helps detect variations like "United States" and "United States."
  + TRIM(trailing '.' from country) ensures uniform formatting by removing trailing dots.

1. **Changing Date Column to Date Format:**

**Query:**

--here we change the date column to date format--

SET datestyle TO MDY;

ALTER TABLE layoffs

ALTER COLUMN date TYPE DATE USING date::DATE;

* + SET datestyle TO MDY; ensures PostgreSQL recognizes the date format as Month-Day-Year.
  + ALTER COLUMN date TYPE DATE USING date::DATE; converts the date column from text to an actual date type.

1. **Handling Null Values in the Industry Column:**

**Query:** --now we are updating or removing the null values --

select \* from layoffs where industry is null or industry ='';

select \* from layoffs where company='Airbnb';

--lets add the value of industry where the the same company has value for industry--

select \* from layoffs t1 join layoffs t2 on t1.company=t2.company

where (t1.industry is null or t1.industry = '') and t2.industry is not null;

--here we are updating the blanlk space with null to review what we we can fill in the null value--

update layoffs

set industry=null

where industry = '';

--here by using self join , i have used the relevent rows to fill the industry value --

UPDATE layoffs t1

SET industry = t2.industry

FROM layoffs t2

WHERE t1.industry IS NULL

AND t1.industry = t2.industry

AND t2.industry IS NOT NULL;

* + Identifies missing values in industry using WHERE industry IS NULL OR industry = ''.
  + Uses self-join (JOIN on the same table) to find missing industry values for companies that already have an industry in another row.
  + Updates missing industry values using the UPDATE statement.

1. **Manually Assigning Industry to Specific Companies:**

**Query:**

UPDATE layoffs t1

SET industry='Travel'

where company='Airbnb' and location ='SF Bay Area';

update layoffs

set industry='Transportation'

where company='Carvana' and location = 'Phoenix';

set industry='Consumer'

where company='Juul' and location = 'SF Bay Area';

* + Assigns "Travel" to Airbnb based on its known industry.
  + Assigns "Transportation" to Carvana and "Consumer" to Juul using specific conditions.

1. **Handling Records Where Both total\_laid\_off and percentage\_laid\_off Are Null:**

**Query:**

select \* from layoffs where company='Bally''s Interactive';

--this company has just one value so there is no way to replace its industry--

--now we want to ensure those values where two main values are null--

select \* from layoffs where total\_laid\_off is null and percentage\_laid\_off is null;

--now because there is no alternative than deleting the values which are null-

delete from layoffs where total\_laid\_off is null and percentage\_laid\_off is null;

* + Identifies rows where both key metrics are missing.
  + Since these values cannot be inferred, the affected rows are deleted.

1. **Final Null Check:**

**Query:**

--lets ensure if there any null value is there in whole table --

SELECT \*

FROM layoffs

WHERE company IS NULL

OR location IS NULL

OR industry IS NULL

OR total\_laid\_off IS NULL

OR percentage\_laid\_off IS NULL

OR date IS NULL

OR stage IS NULL

OR country IS NULL

OR funds\_raised\_millions IS NULL;

* **A final query ensures there are no remaining null values in any column.**

**.Data presentation and eda with queries:**

1. Industries with the Highest Total Layoffs—

SELECT industry, SUM(total\_laid\_off) AS total\_layoffs FROM layoffs WHERE total\_laid\_off IS NOT NULL GROUP BY industry ORDER BY total\_layoffs DESC LIMIT 10;

A graph with blue and white bars

AI-generated content may be incorrect.

**Observation from the Chart:**

* The Consumer and Retail industries have experienced the highest number of layoffs.
* Industries like Healthcare and Food are in the middle.
* Hardware and Travel have the lowest layoffs among the top 10.

**2.** **average percentage layoffs by industry**

SELECT industry, AVG(percentage\_laid\_off) AS avg\_layoff\_percentage FROM layoffs WHERE percentage\_laid\_off IS NOT NULL GROUP BY industry ORDER BY avg\_layoff\_percentage DESC LIMIT 5;

A blue bar graph with text

AI-generated content may be incorrect.

**Observation from the Chart:**

* The Aerospace industry has the highest layoff percentage, indicating a major impact despite possibly fewer total layoffs.
* Education, Travel, and Recruiting industries also show significant layoff percentages.
* The Food industry, while lower in total layoffs, also has a notable layoff percentage.

This chart highlights the severity of layoffs relative to the workforce size

3. **layoffs by** **company and industry :**

SELECT company, industry, total\_laid\_off, date FROM layoffs WHERE total\_laid\_off IS NOT NULL ORDER BY total\_laid\_off DESC LIMIT 10;

**Observation from the Chart:**

* **Meta**, **Google**, and **Amazon** are the top companies with massive layoffs in the **Consumer** and **Retail sectors**.
* **Salesforce** from the **Sales industry** and **Microsoft** from the **Other category** also had significant layoffs.
* **Booking.com** from the **Travel sector** had layoffs earlier compared to others.

This chart helps identify **which companies contributed the most to layoffs** within each industry and the **timeline of major layoffs.**

**4. Countries Most Affected by Layoffs--**

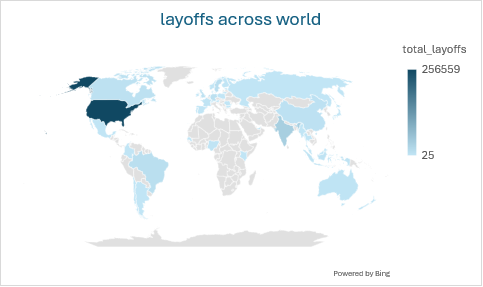
SELECT country, SUM(total\_laid\_off) AS total\_layoffs

FROM layoffs

WHERE total\_laid\_off IS NOT NULL

GROUP BY country

ORDER BY total\_layoffs DESC



**Observation from the Chart:**  
This world map visualizes the total number of layoffs by country. The darker the shade of blue, the higher the number of layoffs. The United States appears to have the highest number of layoffs, followed by some European and Asian countries, while many regions have relatively low or no recorded layoffs.

**5.** **Which Companies Had 1 (100% of Their Workforce Laid Off)?--**

SELECT company, industry, total\_laid\_off, percentage\_laid\_off, date

FROM layoffs

WHERE percentage\_laid\_off = 1 and total\_laid\_off is not null

ORDER BY date DESC;

**Observation from the Chart:**

This bar chart displays companies that have laid off their entire workforce (100% layoffs). Among them, Katerra had the highest number of layoffs, significantly surpassing others. Other companies such as SummerBio and Jump also had substantial layoffs but at a lower scale compared to Katerra.

**6.** **Ranking Industries by Layoffs Per Year--**

WITH Industry\_Year AS

(

SELECT industry, EXTRACT(YEAR FROM date) AS year,

SUM(total\_laid\_off) AS total\_layoffs

FROM layoffs

WHERE total\_laid\_off IS NOT NULL

GROUP BY industry, year

)

, Industry\_Year\_Rank AS (

SELECT industry, year, total\_layoffs,

DENSE\_RANK() OVER (PARTITION BY year ORDER BY total\_layoffs DESC) AS ranking

FROM Industry\_Year

)

SELECT industry, year, total\_layoffs, ranking

FROM Industry\_Year\_Rank

WHERE ranking <= 3

AND year IS NOT NULL

ORDER BY year ASC, total\_layoffs DESC;

**Observation from the Chart:**

This bar chart presents layoffs across industries for specific years. In 2020, the transportation and travel industries were among the most affected, each recording nearly 15,000 layoffs. The finance sector also faced significant layoffs, while in 2021, the consumer industry experienced comparatively fewer job losses.

**Key Findings:**

The analysis highlights that **Consumer, Retail, and Finance industries experienced the highest number of layoffs**, while **Aerospace and Education sectors faced the highest layoff percentages relative to their workforce size**. Additionally, **well-funded tech giants like Meta, Google, and Amazon accounted for a significant portion of layoffs**, reflecting the **tech sector's vulnerability during economic downturns**. The **rolling layoffs trend peaked between late 2022 and early 2023**, indicating the **impact of global recession and cost-cutting measures across various industries**.

**Insights:**

The data reveals that **industries with higher workforce dependency and operational costs were more prone to mass layoffs during economic downturns**. **Companies that scaled aggressively during expansion phases laid off employees to manage costs**, while **smaller startups that failed to sustain revenue faced complete workforce reductions**. Furthermore, **layoff patterns varied across industries, with tech and finance peaking during recession periods, while healthcare and real estate layoffs were influenced by industry-specific challenges**. These insights provide a **comprehensive understanding of workforce reductions and the economic factors driving them across different sectors**.

**Recommendations & Solutions:**

1️ **For Companies & HR Teams:**

* Implement **hiring strategies based on sustainable growth**, avoiding over-hiring during boom cycles.
* Shift focus from **mass layoffs** to **gradual workforce optimization** (contract workers, upskilling programs).
* **Diversify hiring locations** to leverage global talent pools and minimize risks.

**2 For Recruiters & Hiring Managers:**

* Focus on industries showing **consistent growth** (e.g., healthcare tech, AI, cybersecurity) rather than those prone to economic swings.
* Use **historical layoff trends** to predict hiring slowdowns and adjust job placement efforts.

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3 **For High Layoff Percentage Sectors (Aerospace & Education):**

* Develop **contingency plans for economic downturns and market shifts**.
* Encourage **government-backed support programs for affected industries** to minimize job losses.

**4 For Recruiters & Hiring Managers:**

* Focus on industries showing **consistent growth** (e.g., healthcare tech, AI, cybersecurity) rather than those prone to economic swings.
* Use **historical layoff trends** to predict hiring slowdowns and adjust job placement efforts.

5 **For Government & Policymakers:**

* Introduce **layoff protection policies** and **mental health support programs for affected employees**.
* Encourage **retraining programs** for affected employees to transition into **emerging industries**.
* Promote **investment in emerging industries** to create new job opportunities.
* Encourage **collaboration between educational institutions and industries** for future-ready skill development.

**Conclusion:**

The findings confirm that layoffs **were not solely industry-dependent but rather influenced by economic conditions, corporate restructuring, and funding mismanagement**. **Tech and finance sectors**, despite their high funding, experienced substantial layoffs, while **Aerospace and Education sectors** suffered from disproportionately high workforce reductions. Additionally, **layoff trends peaked between late 2022 and early 2023**, suggesting that economic downturns played a critical role.

Understanding these trends is crucial for companies aiming to implement **sustainable hiring practices**, **strategic workforce planning**, and **financial risk management**. Future studies can further explore **post-layoff employment recovery rates** and **the long-term impact of layoffs on industry growth**. **Conclusion & Future Work**

Layoff trends provide valuable insights into economic cycles, workforce planning, and hiring strategies. As industries evolve, future research can explore **how layoffs impact long-term employee retention, job market recovery, and AI-driven hiring trends**. By leveraging this data, companies and job seekers can make informed decisions to navigate economic shifts more effectively.

**References:**

Layoffs.fyi. (2024). **Layoff Tracker Dataset**. <https://layoffs.fyi>

Bureau of Labor Statistics. (2024). **Employment Trends Report**. <https://www.bls.gov>