PROJECT REPORT

SectionC_G7_Tech_layoffs

PRESENTED BY:

-Anshuman Mehta(2401010082)

-Rashmi Anand(2401010374)

-Nitanshu Goyal(2401010314)

-Sankalp(2401010415)

-Akhil(2401020084)

-Puneet Takhar()

Sector: Corporate Workforce Analytics

Mapping Layoff Intensity & Workforce Stability in the Technology Sector (2020–2025)

Submitted to: Newton School Of Technology

Executive Summary

Problem:

From 2020–2025, the tech sector faced repeated layoffs due to over-expansion, funding slowdowns, and economic uncertainty.

These cuts were concentrated in specific industries, stages, and regions—showing structural instability, not random events. The impact included talent loss, operational disruption, and weakened investor confidence.

This project identifies where layoff intensity is highest and uncovers risk patterns to help leaders build more stable, data-driven workforce strategies

Instead of reacting to layoffs, the goal is to help leaders anticipate risk and design more resilient growth models.

Approach :

- Collected Kaggle dataset (**5,501 records**) on tech layoffs (2020–2025).
- **Cleaned and standardized** data in Google Sheets.
- Created **KPIs** and analyzed trends using **pivot tables and charts** (industry, stage, region, time).
- Calculated risk multipliers and severity ratios.
- Built an executive **dashboard** and proposed data-driven workforce stability **solutions**.

Key Insights:

- **6.3M**+ jobs lost in tech (2020–2025).
- Avg. layoff intensity: **4.68**% per company.
- FinTech highest intensity: **4.98**%.
- **Late-stage & mature** firms drove most absolute layoffs (scale correction).
- **U.S.** leads total layoffs.
- **Peak** in **2021**, decline in 2022–23 (funding winter).
- **Small** firms **1.23x** more vulnerable than large firms.
- ~**20%** firms faced high/severe cuts.

Key Recommendations

- Implement stage-adjusted hiring policies for late-stage firms
- Develop funding-cycle risk buffers
- Diversify geographic workforce concentration
- Improve early warning indicators for workforce correction
- Strengthen financial runway planning for small firms

Sector & Business Context

Sector Overview

The technology sector is characterized by rapid growth cycles, venture capital dependency, aggressive scaling, and innovation-driven competition. Workforce expansion often mirrors capital inflows.

Current Challenges

- Funding volatility (post-2021 correction)
- Interest rate hikes & macroeconomic pressure
- Over-hiring during expansion years
- Cost optimization pressure from investors

Why This Problem Was Chosen

- Understanding structural layoff patterns enables:
- Better workforce planning
- Capital allocation alignment
- Reduced operational shocks
- Sustainable growth strategies

Problem Statement & Objectives

Formal Problem Definition

To systematically analyze layoff trends in the technology sector (2020–2025) and identify structural patterns of workforce instability across industries, funding stages, regions, company size, and time periods. The objective is to move beyond surface-level observations and quantify where layoff intensity is disproportionately high, signaling deeper strategic or structural vulnerabilities.

Objectives

- Measure total layoff magnitude and proportional intensity across segments.
- Identify high-risk industries with recurring or severe workforce reductions.
- Assess funding-stage vulnerability (early vs. late vs. mature firms).
- Analyze geographic concentration of layoffs across major tech regions.
- Evaluate company size–based risk exposure and proportional impact.
- Detect time-based cycles and peak instability periods.

Success Criteria

- Well-defined and measurable KPI framework.
- Clean, standardized dataset supporting multi-dimensional analysis.
- Executive-level dashboard for clear interpretation.
- Insight-driven, decision-oriented workforce stability recommendations.

DATA DESCRIPTION

Source

Dataset: **Tech Layoffs 2020–2025**

Source: **Kaggle**

Link: https://www.kaggle.com/datasets/anshumanmehta/tech-layoffs-2020-25-dataset

Data Structure
- Format: **CSV**
- Rows: **5,501**
- Columns: **10**

Key Columns
1. Company
2. Industry
3. Country / Region
4. Stage (Funding Stage)
5. Total Laid Off
6. Percentage Laid Off
7. Date
8. Total Employees
9. Funds Raised
10. Department

Data Limitations
- Some missing funding-stage classifications
- Potential reporting bias
- Percentage inconsistencies
- No profitability data available

DATA CLEANING & PREPARATION

All cleaning executed in **Google Sheets.**

Missing Values Handling
- Replaced blank regions with "Unknown"
- Standardized stage categories
- Removed duplicate entries

Transformations
- Extracted Year from Date
- Created Layoff_Intensity_Category
- Created Company_Size_Category
- Standardized percentage formats

Assumptions
- Layoff percentage reflects proportional workforce reduction
- "Unknown" treated as separate category
- No external macroeconomic variables used

KPI & METRIC FRAMEWORK

1. Total Layoffs by Industry
Formula: SUM(Laid_Off)
 Purpose: Identify magnitude concentration

2. Layoff Intensity %
Formula: AVG(Percentage_Laid_Off)
 Purpose: Measure proportional workforce reduction

3. Layoffs by Funding Stage
Formula: SUM(Laid_Off) by Stage
 Purpose: Capital exposure analysis

4. Layoffs by Region
Formula: SUM(Laid_Off) by Country
 Purpose: Geographic concentration

5. Year-wise Trend
Formula: SUM(Laid_Off) by Year
 Purpose: Time-based volatility

6. Severe Companies %
Formula: (High + Severe) / Total Companies
 Purpose: Systemic risk measure

7. Risk Multiplier
Formula: Small Avg % / Large Avg %
 Purpose: Structural vulnerability comparison

EXPLORATORY DATA ANALYSIS

Trend Analysis
Peak layoffs in 2021; correction observed 2022–23.

Industry Comparison
FinTech shows highest proportional intensity.
Cloud & E-commerce contribute largest absolute numbers.

Funding Stage Analysis
Late-stage firms dominate absolute layoffs.

Geographic Distribution
US accounts for majority of layoffs.

Size-based Distribution
Small firms show higher average layoff intensity.

Advanced Analysis

Risk Segmentation
High & Severe categories represent ~20% of firms.

Scenario Interpretation
If funding contraction repeats, high-growth sectors may
again experience scale correction.

Structural Risk Pattern
Late-stage + US concentration + growth industries =
elevated vulnerability cluster.

DASHBOARD DESIGN

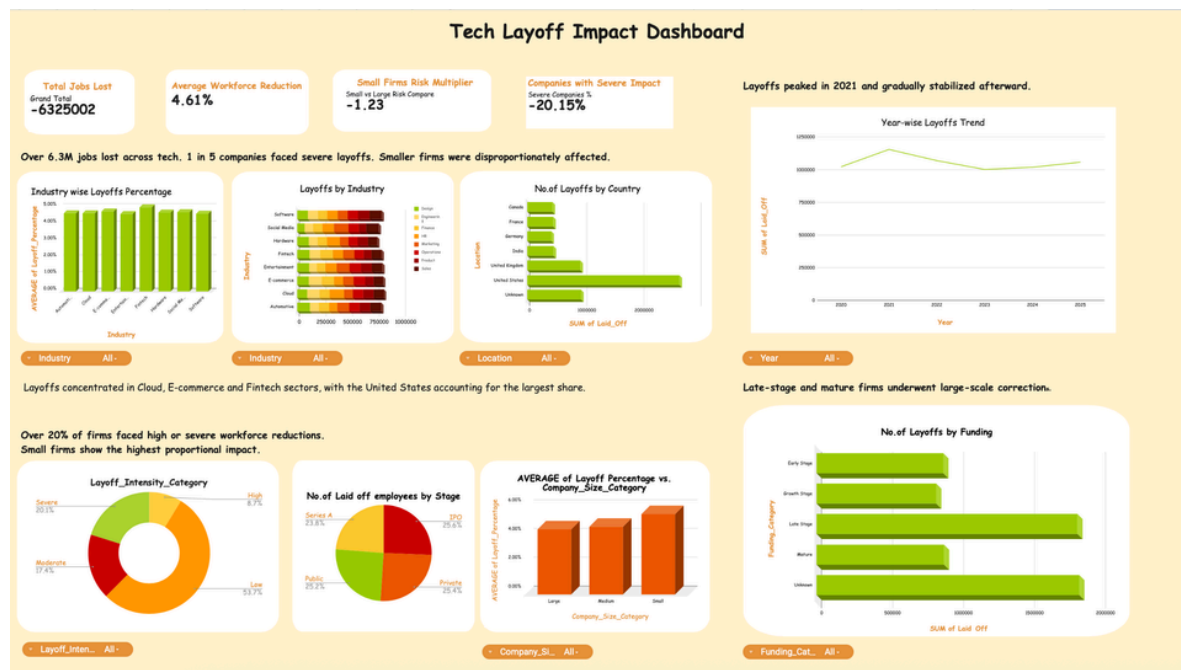Platform: Google Sheets

Objective
Executive-level visualization of workforce instability patterns

Structure
- KPI cards (Magnitude & Risk)
- Industry & Region distribution
- Funding stage exposure
- Year trend
- Severity breakdown

Interactive filters:
- Industry
- Stage
- Region
- Year

This dashboard provides a comprehensive analysis of technology sector layoffs, highlighting trends over time, industry-wise impact, geographic distribution, and firm-level severity to assess the overall workforce impact.

INSIGHTS SUMMARY

- Layoffs are structural and widespread, not isolated incidents.
- Workforce reductions reflect systemic correction, not temporary shocks.
- Growth-driven industries exhibit higher layoff intensity.
- FinTech and capital-heavy sectors show elevated volatility risk.
- Late-stage and mature firms are undergoing scale recalibration.
- Large absolute layoffs are driven by post-expansion correction cycles.
- The U.S. market shows geographic concentration risk.
- Mature tech ecosystems are more exposed to macro-economic shocks.
- Layoffs peaked in 2021 due to over-hiring during capital surplus.
- The 2022–23 funding winter triggered strategic cost rationalization.
- Workforce expansion cycles are tightly linked to funding availability cycles.
- Small firms show 1.23x higher proportional vulnerability.
- Early-stage instability amplifies risk during capital slowdowns.
- Approximately 20% of firms faced severe workforce reductions, signaling high stress zones.
- Layoff intensity varies significantly by industry, stage, and size, indicating targeted instability.
- Rapid scaling without sustainable revenue models increases future correction risk.
- Workforce planning lacks alignment with long-term capital resilience.

RECOMMENDATIONS

Implement stage-based hiring discipline
Align hiring strategy with company maturity and revenue stability. Late-stage firms should prioritize sustainable growth over aggressive expansion, while early-stage firms must scale cautiously based on funding visibility.

Integrate funding volatility indicators into HR planning
Incorporate capital inflow trends, burn rate, and funding cycle signals into workforce planning models to prevent over-hiring during capital surges and reactive layoffs during downturns.

Diversify regional workforce exposure
Reduce geographic concentration risk by expanding talent distribution across multiple regions, minimizing dependency on a single high-volatility market.

Strengthen cost-runway forecasting, especially for smaller firms
Improve financial scenario modeling to assess workforce sustainability under varying funding conditions. Small firms should maintain contingency buffers to reduce proportional vulnerability.

Develop predictive workforce monitoring dashboards
Build real-time dashboards integrating KPIs such as layoff intensity, burn rate, hiring velocity, and funding stage risk to enable early detection of instability patterns.

Adopt data-driven workforce planning frameworks
Transition from reactive downsizing decisions to structured, analytics-backed workforce strategies aligned with long-term resilience.

Each recommendation is directly aligned with identified risk concentration areas, ensuring that strategic actions address measurable structural vulnerabilities.

Impact Estimation

If these recommendations are systematically implemented, the following measurable outcomes are expected:

Reduce sudden layoffs by 10–15%
 Through disciplined hiring and funding-aligned workforce planning, companies can minimize reactive downsizing during capital slowdowns.

Improve capital efficiency
 Better alignment between hiring velocity and funding cycles will reduce burn inefficiencies and optimize cost-to-revenue ratios.

Reduce hiring–correction cost cycles
 Limiting aggressive over-expansion will decrease the financial and reputational costs associated with large-scale workforce corrections.

Lower operational disruption
 Stabilized workforce structures will protect productivity, preserve institutional knowledge, and reduce morale shocks during downturns.

Improve investor confidence
 Predictive workforce monitoring and disciplined expansion signal governance maturity, enhancing long-term investor trust.

Strengthen long-term organizational resilience
 Data-driven workforce planning will help firms navigate funding volatility with reduced structural instability.

Overall, the framework shifts organizations from reactive layoff cycles to proactive, stability-oriented workforce strategy.

Limitations

Absence of profitability and revenue data
 The dataset does not include company-level financial metrics such as revenue, profit margins, or burn rate. As a result, workforce reductions cannot be directly linked to financial performance or operational sustainability.

No macroeconomic variables included
 External factors such as interest rates, inflation, GDP growth, or global economic shocks are not incorporated. This limits the ability to quantify how broader economic conditions influenced layoff intensity.

Observational dataset structure
 The analysis is based purely on reported layoff records without controlled experimental conditions. Findings identify patterns and correlations but not direct cause–effect relationships.

Causality cannot be inferred
 While structural trends and risk concentrations are identified, the dataset does not allow definitive conclusions about why specific layoffs occurred. Strategic decisions, management factors, or sector-specific dynamics may also contribute beyond the available variables.

These limitations suggest that results should be interpreted as pattern-based insights rather than definitive causal explanations.

Future Scope

Integrate funding round data
 Adding detailed funding timelines and round sizes would help directly link capital inflows to hiring and layoff cycles.

Incorporate revenue and profitability metrics
 Including financial performance data would enable deeper analysis of workforce sustainability and operational efficiency.

Develop predictive ML models
 Machine learning models can forecast layoff risk based on industry, stage, size, and funding signals for proactive workforce planning.

Include macroeconomic indicators
 Integrating variables like interest rates, inflation, and GDP trends would improve understanding of external economic impact on workforce stability.

Conclusion

This study demonstrates that tech layoffs between 2020–2025 were **not chaotic shocks**, but **structured correction cycles** driven by funding **volatility, growth over-expansion, and strategic recalibration.** Workforce instability is clearly concentrated across specific industries, **funding stages, geographies, and company sizes,** revealing measurable risk patterns rather than random disruption.

By transforming raw layoff records into **intensity metrics, risk multipliers, and executive dashboards,** this project shifts the conversation from **reactive downsizing** to predictive workforce strategy.

The dashboard serves as a **strategic decision engine**, empowering leaders to **anticipate instability, align hiring with capital cycles,** and build resilient, capital-efficient growth models.

Ultimately, this project is not just about analyzing layoffs, it is about redesigning workforce strategy for long-term structural stability in the technology sector.

Appendix A: Data Dictionary

Column Name	Description	Data Type
Company	Name of company	Text
Industry	Industry category (Cloud, FinTech,	Text
Country / Region	Country where company is based	Text
Stage	Funding stage (Early, Growth,	Text
Total Laid Off	Number of employees laid off	Numeric
Percentage Laid Off	% of workforce laid off	Percentage
Date	Layoff announcement	Date
Year	Extracted year from date	Numeric
Total Employees	Total workforce before layoff	Numeric
Funds Raised	Total funding raised	Text/Numeric

Appendix B: Data Cleaning Log

All cleaning executed in Google Sheets.
Steps Performed:
- Standardized column names
- Removed duplicate records
- Converted Percentage column to numeric format
- Extracted Year from Date

Formula:
=YEAR(Date)
Created Layoff_Intensity_Category
Logic:
Low
Moderate
High
Severe
Created Company_Size_Category based on Total Employees
Standardized country naming (USA → United States)

FULL LOG DOCUMENT:
https://docs.google.com/document/d/1N9a_BbkOH_lD1n
UWI9WWSiFqJJwUp5gGgxwjbNoq-S8/edit?tab=t.0

CONTRIBUTION MATRIX

This section documents the contribution of each team member across all project stages.
All claims are verifiable through Google Sheets version history and working files.

Team Member	Dataset & Sourcing	Data Cleaning	KPI & Analysis	Dashboard Development	Report Writing	PPT Preparation	Overall Role
Anshuman	Dataset coordination & validation	Cleaning support	KPI framework support	Industry visuals support	Problem framing input	PPT structure guidance	**Project Lead**
Nitanshu	Primary dataset sourcing	Major cleaning execution	Funding & trend KPI calculations	Trend charts support	Data section writing	Analysis slides	**Dashboard Lead**
Rashmi	Dataset review	Category creation & cleaning support	KPI support & risk metric inputs	Dashboard UI & structuring	Major report writing	Led PPT design & finalization	**PPT & Quality Lead**
Sankalp	Dataset validation support	Category standardization	Pivot tables & statistical checks	Layout support	EDA writing	Insight slides & content	**Analysis Lead**
Akhil	Sourcing discussion support	Cleaning validation check	Growth % validation	Dashboard layout & filter testing	Advanced analysis inputs	Formatting support	**Strategy Lead**
Puneet		Final review support		Dashboard Review		Presentation rehearsal support	**Reviewer**

Declaration: We confirm that the above contribution details are accurate and verifiable through version history and submitted artifacts.

Team Signature Block: Name 1: Anshuman Mehta
Name 2: Nitanshu Goyal
Name 3: Rashmi Anand
Name 4: Sankalp
Name 5: Akhil
Name 6: Puneet Thakar