DATA ANALYSIS PLAN

Enhancing supply chain resilience for CELESTICA INC.'S aerospace and defense segment

BAM 3135 - Capstone Project

GROUP "P" MEMBERS

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INTRODUCTION:

BUSINESS SCENARIO:

Celestica Inc., a major player in design, development and after production services worldwide is experiencing supply chain interruptions including manufacturing delays, geopolitical concerns, and customer complaints in aerospace and defense segment. These interruptions have a direct impact on revenue and profitability.

? PROBLEM STATEMENT

The challenge is to comprehensively understand the causes of these disruptions and develop proactive strategies to mitigate their negative impacts.
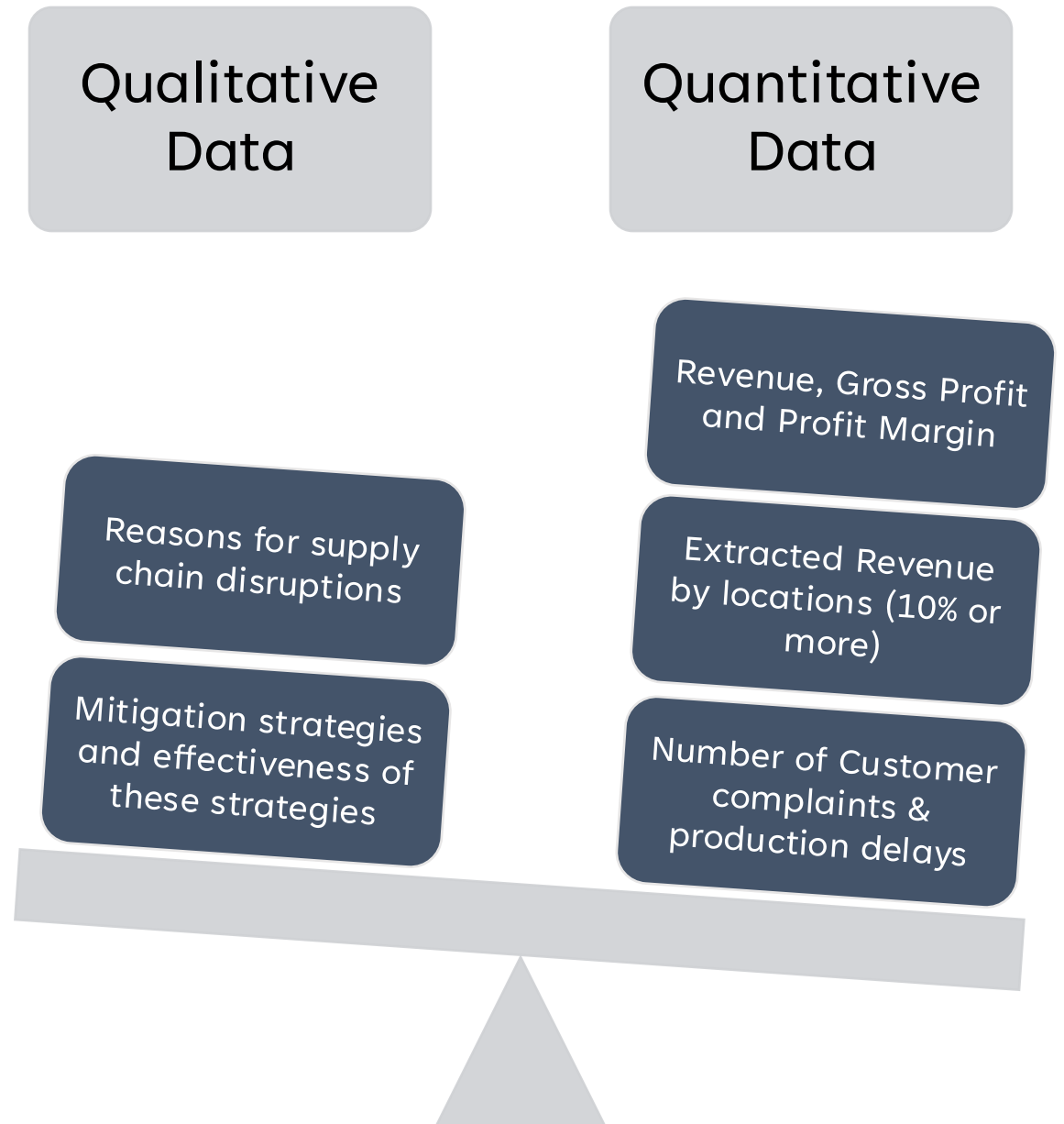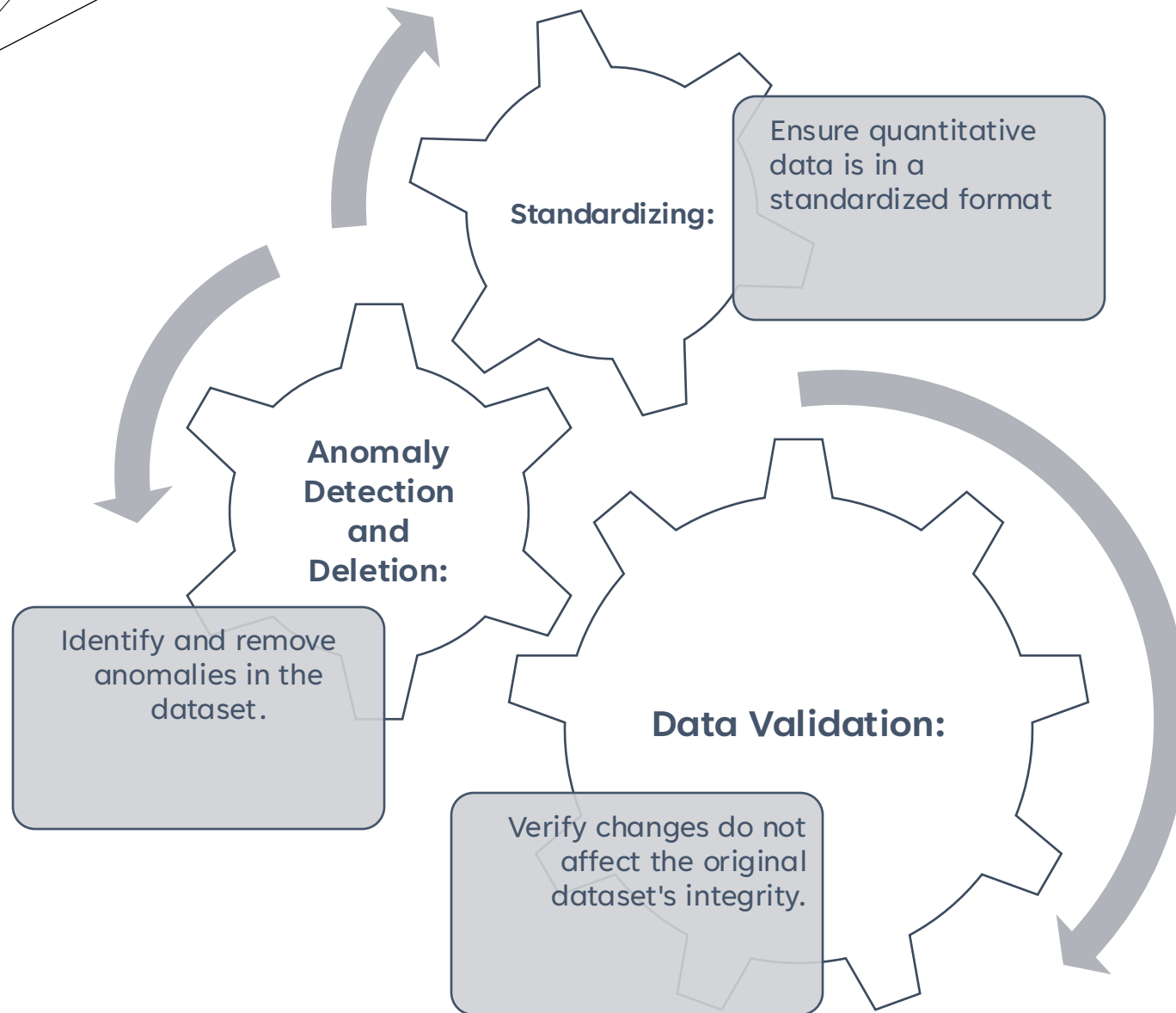
OBJECTIVE:

To analyze Celestica's supply chain data to uncover insights into disruptions affecting financial performance and propose strategic recommendations to enhance supply chain resilience and optimize operational efficiency.

DATA USED:

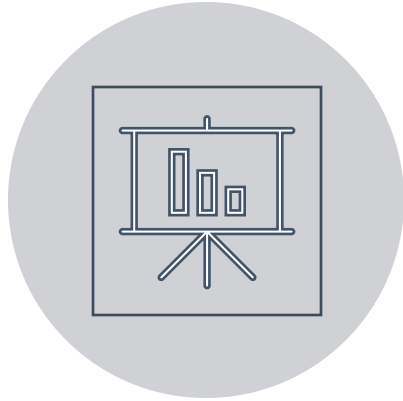DATA COLLECTION METHODS:

- Internal Sources:
    1. Company's annual reports
    2. Customer satisfaction survey records.
- External Sources:
    1. Public databases on global supply chain issues
   2. Internet articles.

Qualitative Data

Quantitative Data

Reasons for supply chain disruptions

Mitigation strategies and effectiveness of these strategies

Revenue, Gross Profit and Profit Margin

Extracted Revenue by locations (10% or more)

Number of Customer complaints & production delays

Standardizing:

Ensure quantitative data is in a standardized format

Anomaly Detection and Deletion:

Identify and remove anomalies in the dataset.

Data Validation:

Verify changes do not affect the original dataset's integrity.

DATA CLEANING AND PREPARATION STEPS:
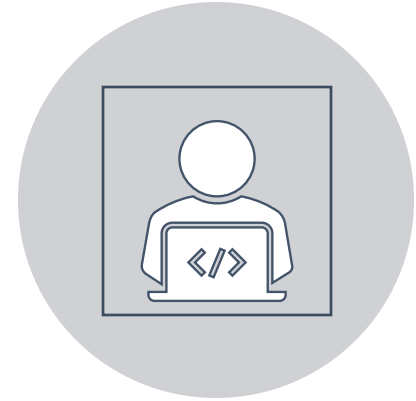
ANALYTICAL TECHNIQUES AND TOOLS:

DESCRIPTIVE ANALYTICS:

UNDERSTAND HISTORICAL DATA TO IDENTIFY PATTERNS OR TRENDS RELATED TO SUPPLY CHAIN DISRUPTIONS.
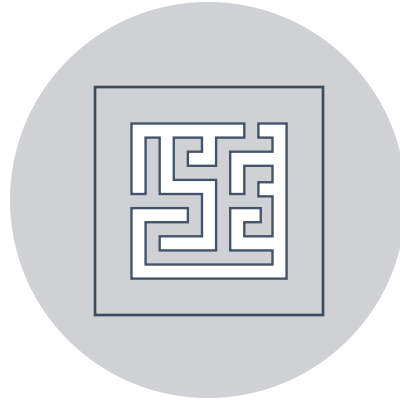
STATISTICAL TOOLS & CORRELATION:

CALCULATE AVERAGE ANNUAL TRENDS FOR GROSS PROFIT AND PROFIT MARGIN AND SUPPLY CHAIN DISRUPTION THROUGH CORRELATION ANALYSIS.
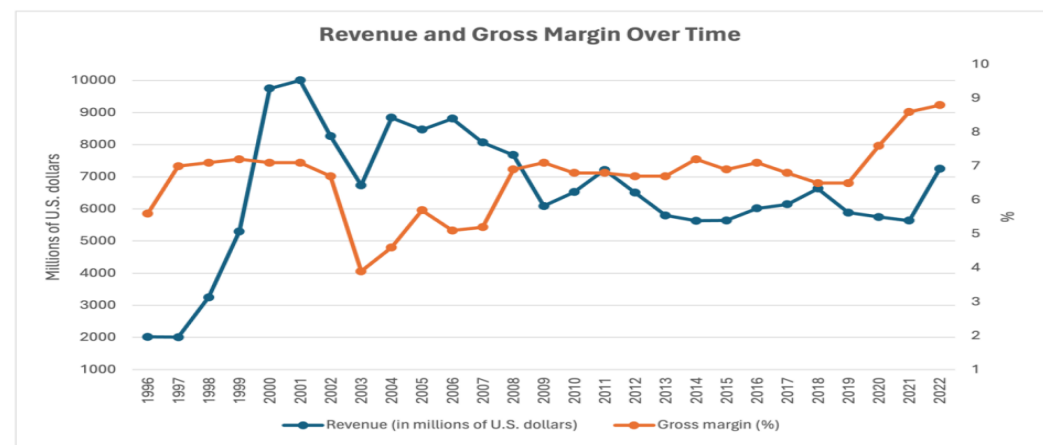
VISUALIZATION TECHNIQUES & SOFTWARE:

Employed for clear and intuitive representation of data patterns.

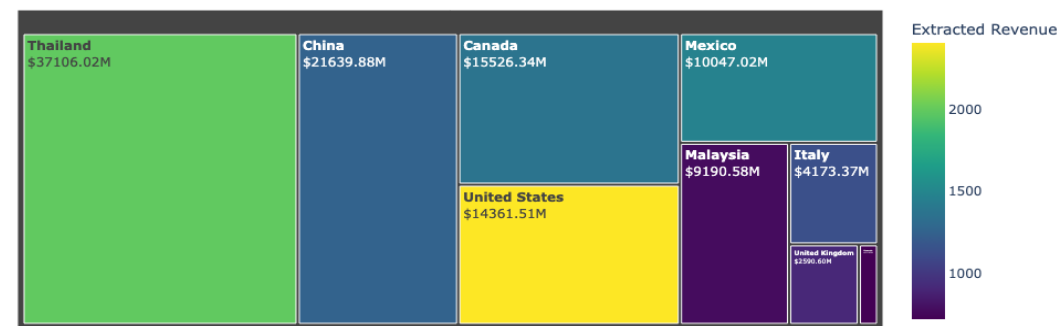Python for data manipulation and power BI for visualization.

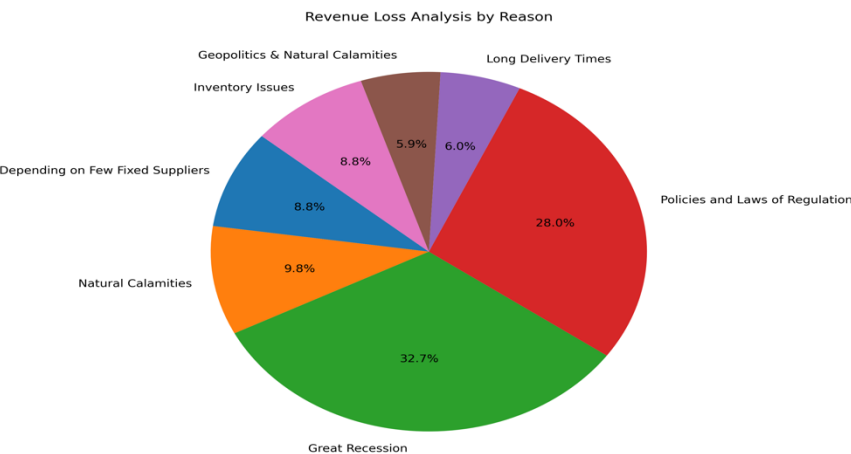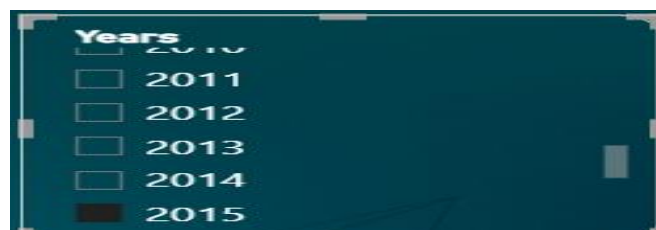# DATA VISUALIZATION:

TIME SERIES VISUALIZATIONS: Line plot

HIERARCHICAL VISUALIZATIONS: Tree Map
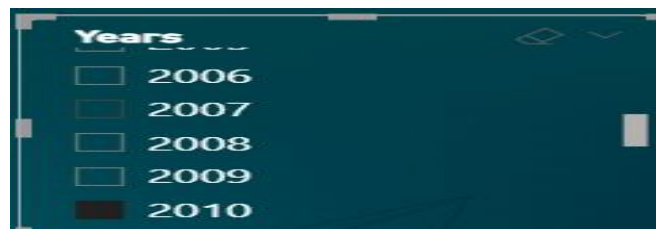

PROPORTIONAL VISUALIZATIONS:

Pie chart

KEY PERFORMANCE INDICATORS:

6567.3M Revenue (in millions of U.S.D)	**441.7M** Gross Profit (in millions of U.S.D) — 67.5%	**253.1M** Revenue Loss (in millions of U.S.D)

Years
- Select all
- 1996
- 1997
- 1998
- 1999
- 2000

8271.6M Revenue (in millions of U.S.D)	**555.8M** Gross Profit (in millions of U.S.D) — 67%	**98.3M** Revenue Loss (in millions of U.S.D)

Years
- ☐ 1998
- ☐ 1999
- ☐ 2000
- ☐ 2001
- ☐ 2002

6526.1M Revenue (in millions of U.S.D)	**443.3M** Gross Profit (in millions of U.S.D) — 68%	**(Blank)** Revenue Loss (in millions of U.S.D)

Years
- ☐ 2006
- ☐ 2007
- ☐ 2008
- ☐ 2009
- ☐ 2010

5639.2M Revenue (in millions of U.S.D)	**391.1M** Gross Profit (in millions of U.S.D) — 69%	**184.7M** Revenue Loss (in millions of U.S.D)

Years
- ☐ 2011
- ☐ 2012
- ☐ 2013
- ☐ 2014
- ☐ 2015
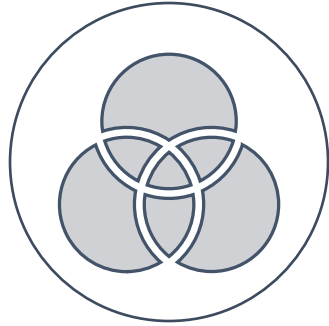
INTERPRETATION STRATEGY:

CORRELATION ANALYSIS:

Understanding the relationships between revenue loss, customer complaints, and production delays and other supply chain disruptions.

TREND ANALYSIS:

Identifying patterns to forecast future disruptions.

FRAMEWORKS:

Statistical frameworks to interpret data accurately.

EXPECTED OUTCOMES:

Identification of Key Disruptors Factors:	Financial Impact Insights
• Production Delays • Geopolitical Tensions • Supplier Reliability Issues • Natural Disasters	• Revenue Loss • Profit Margins

LIMITATIONS AND VALIDATION:

LIMITATIONS:

- Data Quality Issues: Inaccuracies or incomplete data can affect analysis outcomes.

- Potential Biases: Subjectivity in data collection or reporting can skew results.

- External Factors: Uncontrollable elements like economic shifts or natural disasters impacting supply chain performance.

VALIDATION:

Cross-Verification: Comparing findings with multiple data sources to ensure consistency.

Statistical Validation: Applying statistical tests to confirm the reliability of the results.

CONCLUSION:

In our upcoming project, we will examine Celestica's supply chain data to identify interruptions and their financial consequences, aiming to develop actionable insights and strategic suggestions for increasing resilience and efficiency. By leveraging internal and external data, as well as Exploratory Data Analysis (EDA) and visualization approaches, we will identify key disruptors and assess existing mitigation efforts. Our goal is to provide real strategies to improve Celestica's supply chain performance, enabling informed decision-making and long-term success.

REFERENCES:

https://www.celestica.com/

https://corporate.celestica.com/annual-reports?page=0

https://corporatefinanceinstitute.com/resources/data-science/correlation/#:~:text=Using%20a%20scatterplot%2C%20we%20can,values%20from%20%2D1%20to%201

https://www.cdc.gov/globalhealth/healthprotection/fetp/training_modules/9/creating-analysis-plan_pw_final_09242013.pdf