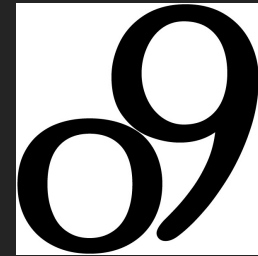


# Supply Chain Risk Management – T- Mobile

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**NATURAL DISRUPTION**  
↳ Storm disruption



**HUMAN DISRUPTION**  
↳ worker or strike



**DISRUPTION**



**TRANSPORTATION**  
↳ RoadBlock

**Objective:** Enhance supply chain resilience through risk management using real-time data and simulations.

- **Key Focus Areas:** Risk identification through **Resilinc API**.
- Simulated impact analysis at SKU, supplier, and location levels.
- Multi-tier supply network visibility (up to tier 5).
- Alternative SKU and supplier resolution.
- Month-over-month resiliency tracking.

# Data Flow and Event Management

Events Data pulled from 3<sup>rd</sup> party API to T-Mobile Dashboard

Categorized by

- SKU
- Supplier
- Location

Evaluate Risk Type

- Simulate potential
- Disruption/Natural/Transport

Resolution Path

- Alternative SKU
- Supplier substitution
- On-hand inventory check

T

Search

Risk Management

Events

SKUs Impac...

Historical Ev...

All : Event ID  
1859 selected

All : Location  
115 selected

All : SKU  
2577 selected

All : Status  
3 selected

All : Severity  
4 selected

All : Event Creation...  
366 selected

CurrentWorkingView  
1 selected

Events

Showing 58 rows of data.

Download Filters Layout

	Type	Event ID	Title	Description	Modifie	Suppliers Impacted	Locations...	Suppliers Confirmed Impact	SKUs...	Severity
	Extreme Weat...	23499202	Torrential Rains Cause Disruptions ...	According to The Indian Express, ...	08-Jul-2	3	1	0	12	Medium
	Port Disruption	23518057	Port and Dock Workers Call for a N...	According to Maritime Gateway, ...	08-Jul-2	5	7	0	38	Medium
	Cyber Attack	23558458	Nokia Faces Data Breach Allegatio...	According to The Cyber Express, ...	10-Jul-2	1	6	0	76	Medium
	Hurricane/Typ...	23489781	Fourteenth Update: Hurricane Beryl...	Update 14: According to the Wea...	12-Jul-2	8	7	0	178	High
	Extreme Weat...	23612123	Heavy Monsoon Rains Cause Floo...	According to The Economic Time...	14-Jul-2	5	1	0	21	Medium
		23642396	Rainfall Warning in Henan, Shando...	According to CGTN, heavy rainfal...	16-Jul-2	5	5	0	22	Medium
	Business Sale	23699375	CommScope to Sell its Mobile Net...	According to Nasdaq, CommSco...	18-Jul-2	2	13	0	164	Medium

Event Details

Showing 384 rows of data, filtered by Hurricane/Typhoon, 23489781.

Download Filters Layout

SKU	Open SA	Open ASN	FGI Entry
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# Event Dashboard for Real-Time Insights

- **Dashboard Features:** Displays current major threats.
- Highlights SKU-level disruptions.
- Focus areas identified for planners.

- **Planner Actions:** Immediate risk resolution recommendations.
- Option to simulate future threats.

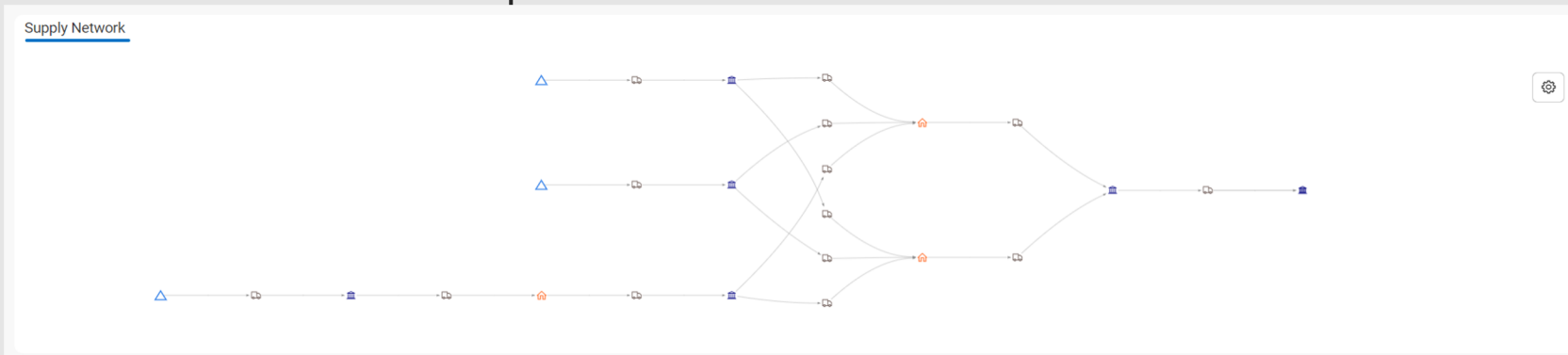
# Risk Simulation and Resolution

- **Simulation Process:** Planners simulate threats by selecting:
  - SKU
  - Supplier
  - Location
- Model generates forecasts on potential impact duration.

- **Resolution Path:** Cross-check with on-hand supply.
- Identify alternate sources or SKUs.

# Multi-Tier Supplier Visibility

- **Key Features:** Visual representation of suppliers up to **tier 5**.
- Tracks material flow across regions.
- **Value to Client:** Improved upstream supply chain resilience.
- Early detection of potential weak links.



# Results and Impact

- **Outcomes:** 20% reduction in supply chain disruptions.
- Improved visibility across 90% of clients' supply chain.
- 15% faster response to emerging risks.

- **Value to client:** Increased supply chain resilience.
- Optimized inventory and minimized redundant orders.

# Tesla Spare Parts Consolidation

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Submitted as a part of the  
Application

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# Problem Statement

## Challenges in Spare Parts Inventory

- **Non-standardized Entries** – Inconsistent formats hinder part identification.
- **Diverse Descriptions** – Multiple descriptions create confusion and redundancy.
- **Duplicate Parts** – Increased inventory without clear differentiation.
- **Lack of Clustering** – Similar parts not grouped, causing unnecessary reordering.



# Objectives

## DATA ANALYSIS



### Part description

Standardizing the part description using vendor's list and websites



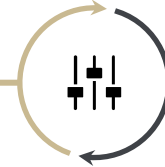
### Clustering

Clustering consumption and ROP of parts based upon description



### Forecast

Creating a strategy to forecast ROP based upon lead time and consumption.



## WEB APP



### Web scraping

Develop a software with web scraping functionalities for the primary suppliers.



### Similarity match

Develop a software to construct similarity match. Apply NLP model



### Search interface

Web app that allows search capability of parts



# Solution Approach and Methodology

**Manual Analysis:** Grouped parts into 43 categories (motors, sensors, cables, etc.).

**Web Scraping:** Collected part details from supplier websites.

**VBA Userform:** Standardized new part descriptions during entry.

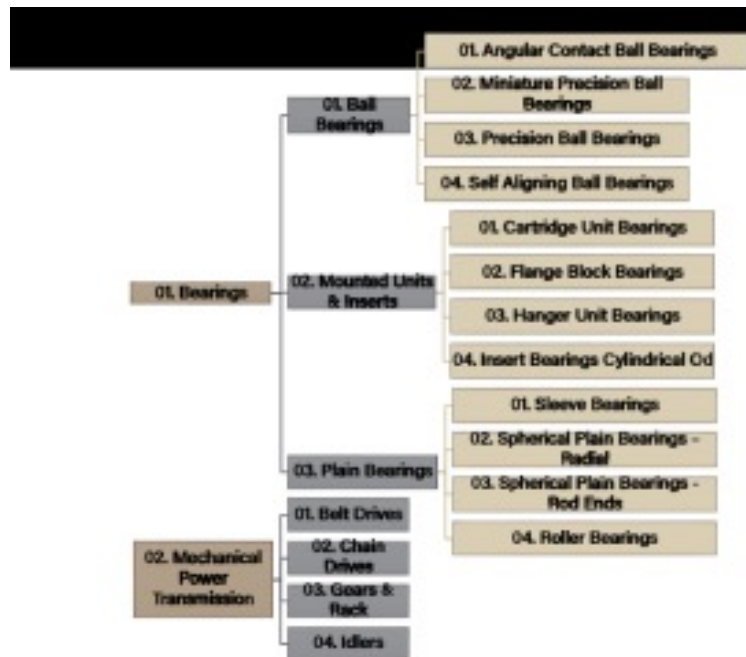


Figure 1. Waterfall method for the standardization of parts descriptions

A screenshot of a VBA Userform titled 'New Part Request Form'. The form contains several input fields and dropdown menus. The 'Reason of purchase' dropdown is set to 'LTD' and 'Critical spare'. The 'Manufacturer ID #' field is empty. The 'Manufacturer' dropdown is set to '80/20 ABB Inc.'. The 'Category' dropdown is set to 'Bearings' and 'Mechanical Power Transm'. The 'Subcategory' dropdown is set to 'Ball Bearings' and 'Mounted Units & Inserts'. The 'Type' dropdown is set to 'Angular Contact Ball Bear' and 'Miniature Precision Ball B'. The 'Unit of Measure' dropdown is set to 'Each' and 'Box'. The 'Line ID' field is empty. The 'Machine code' field is empty. The 'Quantity/Unit' field is empty. There are 'Submit' and 'Cancel' buttons at the bottom right.

Figure 2. VBA Userform for the new part creating request



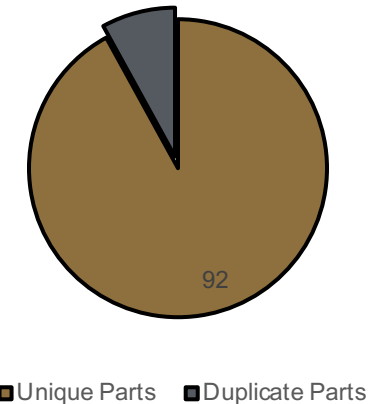
# Results and Cost Savings

- ✓ 51,623 SKUs were analyzed, and 690,187 parts were reviewed.
- ✓ Identified 11,291 duplicate descriptions condensed to **3442** unique parts.
- ✓ Potential savings of **\$6.82 million** from part rationalization.
- ✓ Redundant parts identified: 8% of total inventory.

Categories	Subcategories	Quantity of Parts
Bearings	Ball Bearings -	142
	Plain Bearings -	4
	Roller Bearings -	17
	Blank -	233
	Electrical Products Sensors -	1053
	Switches -	326
	Wiring And Connectors -	1443
	Mechanical Power Transmission Belt Drives -	221
	Sealing Devices O-Rings And V-Rings -	3
Total general -		3442

Flag	Type description	Total of Parts ID	Total parts in Stock	Total Inventory cost
Redundant	Ball Bearings	74	545	\$20,836.14
	Bearings	115	922	\$38,735.12
	Bracket Switch	6	25	\$62.50
	Disconnect Switch	29	148	\$32,450.74
	Feedback Cable	2	6	\$544.32
	Fiber Sensing	1	5	\$920.00
	Inductive Sensor	30	82	\$4,705.30
	Laser Sensor	8	21	\$7,306.80
	Limit Switch	13	38	\$3,434.16
	Mounted Units & Inserts	12	118	\$3,187.58
	Photo Eye Sensor	1	3	\$315.00
	Position Selector Switch	4	12	\$599.38
	Power Cable	13	27	\$2,428.80
	Pressure Switch	19	67	\$7,642.46
	Proximity Switch	17	66	\$5,348.12
	Roller Bearings	2	4	\$3,852.00
	Safety Switch	7	7	\$2,127.11
	Sensors	213	762	\$125,031.83
	Servo Cable	9	15	\$7,913.23
	Temperature Sensor	10	17	\$3,935.08
	Ultrasonic Sensor	6	25	\$7,457.86
	Switches	7	17	\$12,227.56
	Wiring And Connectors	94	510	\$19,005.31
Total Redundant		692	3442	\$310,066.39

Percentage of Duplicate Parts in Inventory



# Future Scope

- ✓ **Global Standardization Across Gigafactories** – Implement uniform part descriptions and inventory processes to improve supply chain consistency.
- ✓ **Automated Part Clustering and Similarity Detection**—Leverage AI to identify duplicate SKUs automatically, optimizing inventory levels and reducing excess stock across the supply chain.
- ✓ **Real-time Inventory Visibility** – Implement IoT-enabled tracking for spare parts to provide live updates on part movement, enabling planners to proactively manage shortages.
- ✓ **Supplier Collaboration Platform** – Develop a cloud-based portal for suppliers to update part availability and status, ensuring streamlined communication and reducing supply disruptions.

