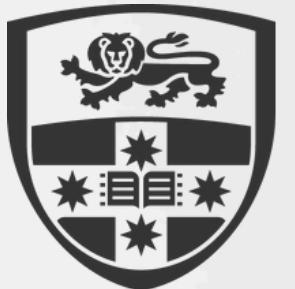


**Sanghyun (Sam) Kim**

1st October 2025



**SUDATA**  
SYDNEY UNIVERSITY DATA SOCIETY



# **SUDATA x SUBAA**

# **DATATHON**

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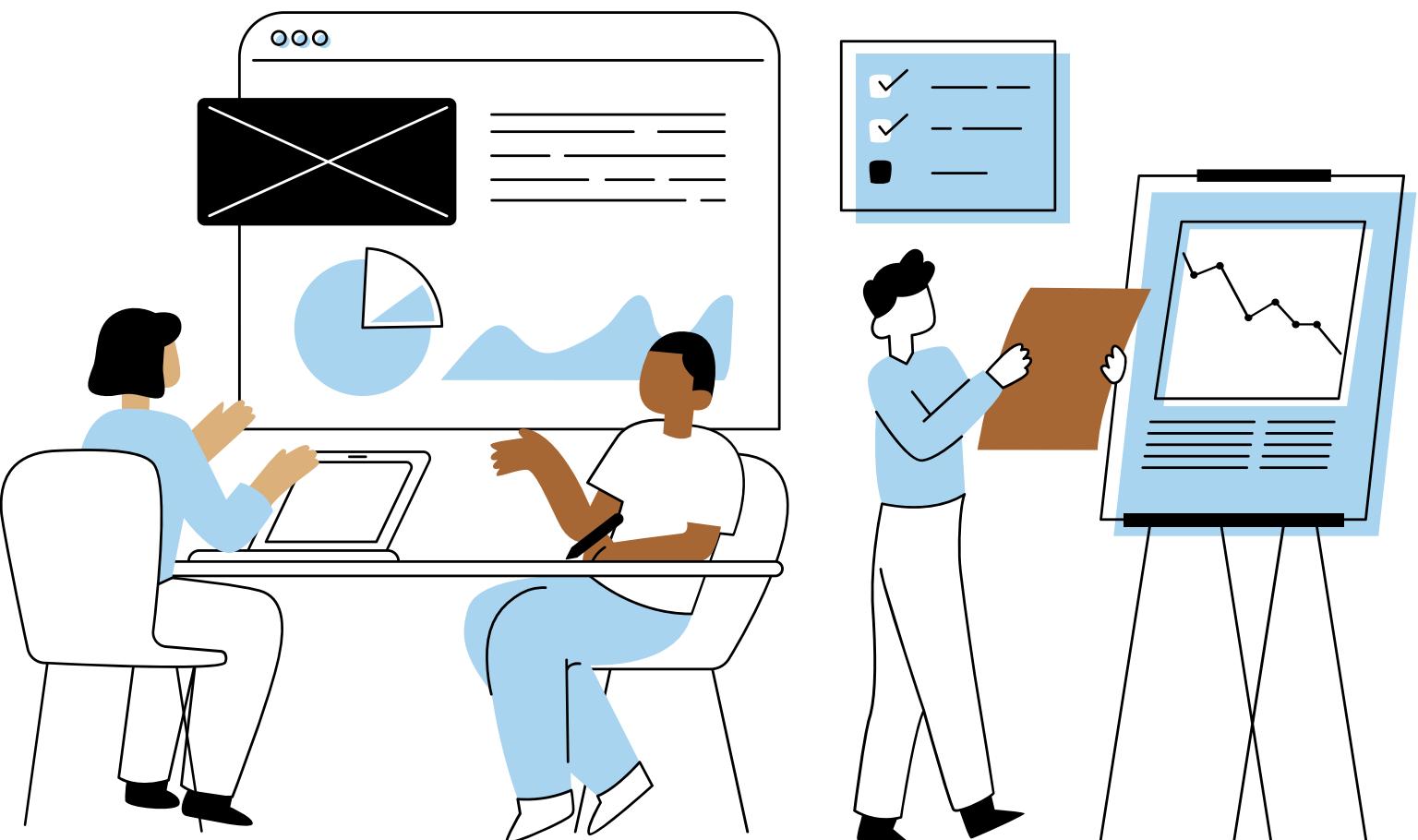
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# Acknowledgement of Country

We acknowledge the Traditional Custodians of the lands on which we meet today, the Gadigal people. We also pay our respects to the Elders both past and present and extend that respect to other Aboriginal and Torres Strait Islanders who are present here today.

# Who am I?

- An enthusiastic **Statistics** and **Data Science** major
- **Data-driven** decision making matters!
- Currently doing a PhD in Business Analytics: **Forecast Reconciliation**



# About the Datathon

## Theme

Optimising strategies to reduce costs in supply chain management and improve logistics efficiency

## Goal

Teams will analyse a dataset provided to identify insights and propose actionable strategies

## Data

Supply chain shipment and pricing data, including variables around delivery schedules, shipment modes, vendors, and costs

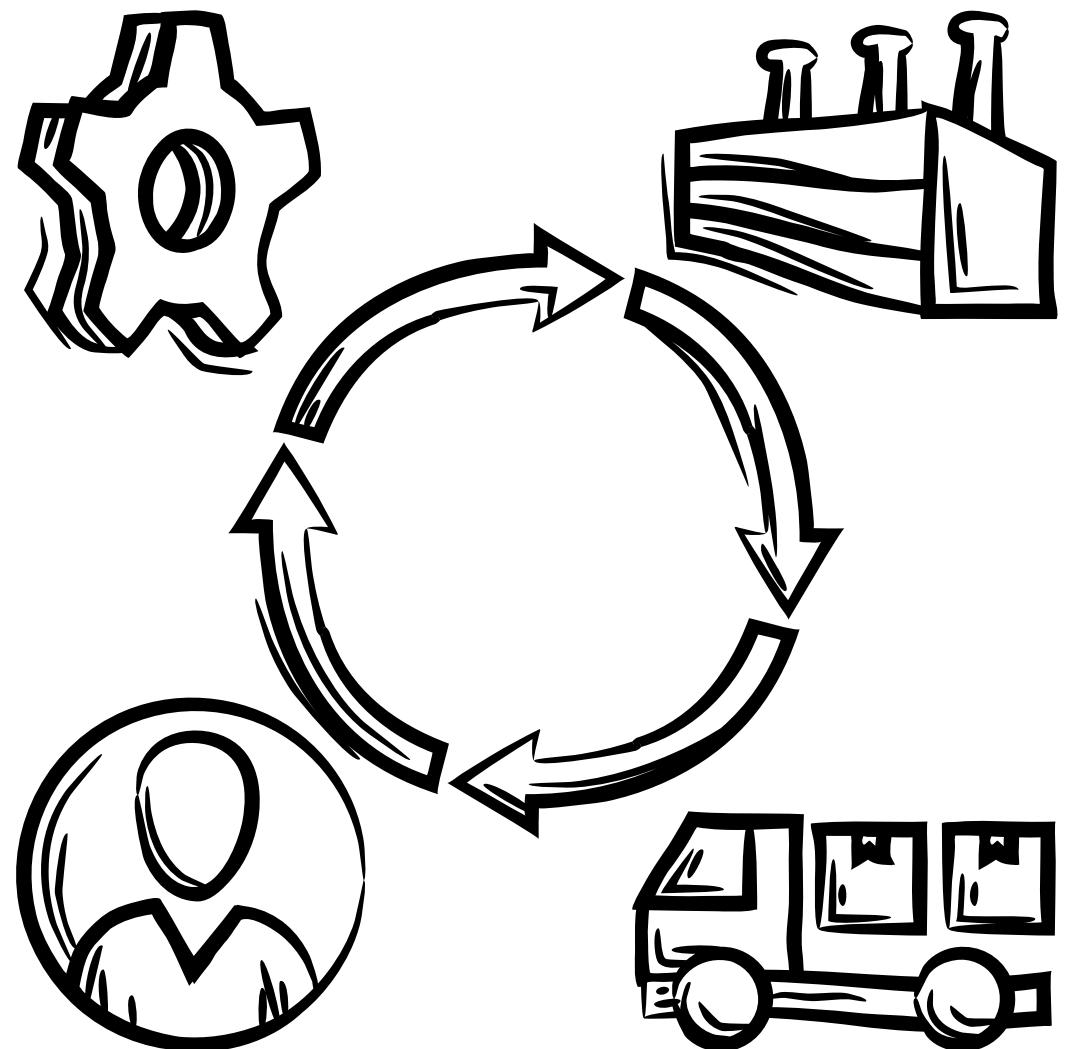


# Supply Chain Management (SCM)

Managing all activities involved in

- **Sourcing**
- **Producing**
- **Delivering**

**It covers the entire journey of a product/service!**



# Key Components of SCM

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## 1. Operational Strategy

Plans **what to produce**,  
**how much** and **when**

based on demand  
forecasts and available  
resources

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Manages **warehousing**, **inventory**, and **transportation** to deliver products to customers

## 5. Returns

Handles **product returns**, **recycling** and **disposal**

# Supply Chain Analytics

Data is everywhere along the chain!

We use data and analytics **to optimise supply chain decisions**



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## Descriptive

What happened?

Sales trends

Delivery delays



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## Predictive

What will happen?  
Demand forecasting  
Risk prediction



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We use data and analytics **to optimise supply chain decisions**

## Descriptive

What happened?  
Sales trends  
Delivery delays

## Predictive

What will happen?  
Demand forecasting  
Risk prediction

## Prescriptive

What should we do?  
Production scheduling



# Supply Chain and Forecasting

---

Supply chain analytics is about **forecasting**

- Inventory decision
- Production scheduling
- Logistics planning

# Supply Chain and Forecasting

Supply chain analytics is about **forecasting**

- Inventory decision
- Production scheduling
- Logistics planning

Real-world examples

- Amazon forecasting millions of packages daily (<https://aws.amazon.com/forecast/>)
- Apple's use of big data to enhance supply chain transparency ( <https://doi.org/10.54254/2754-1169/2025.19806>)



# Forecasting Challenges

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Forecasts are often made **at different levels separately**

- Customer demand forecasts made at store, region, and national level
- Component demand (e.g., batteries) vs Final product demand (e.g., smartphones)

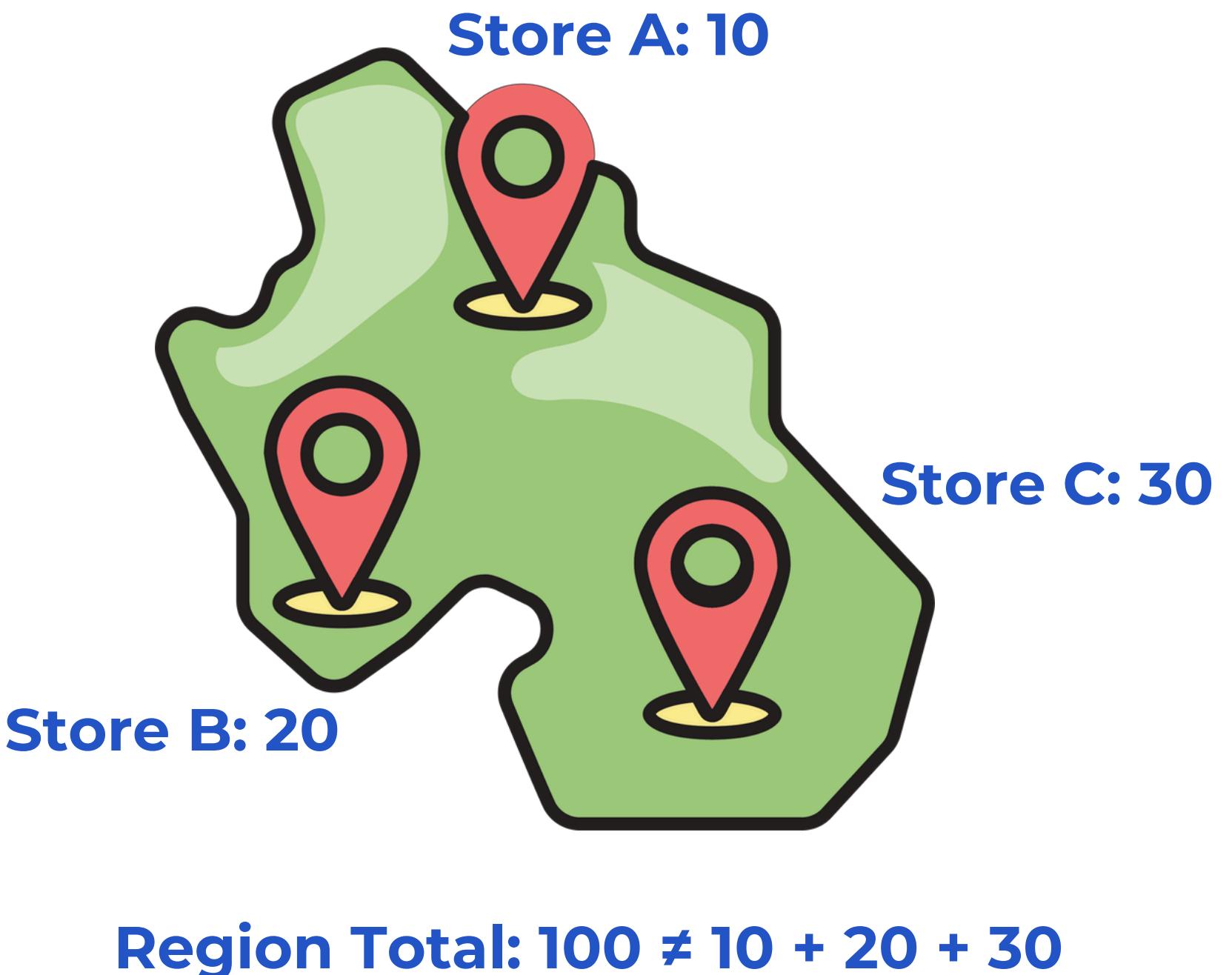
**Independent forecasts won't add up!**  
→ **Incoherent forecasts**

# Forecasting Challenges

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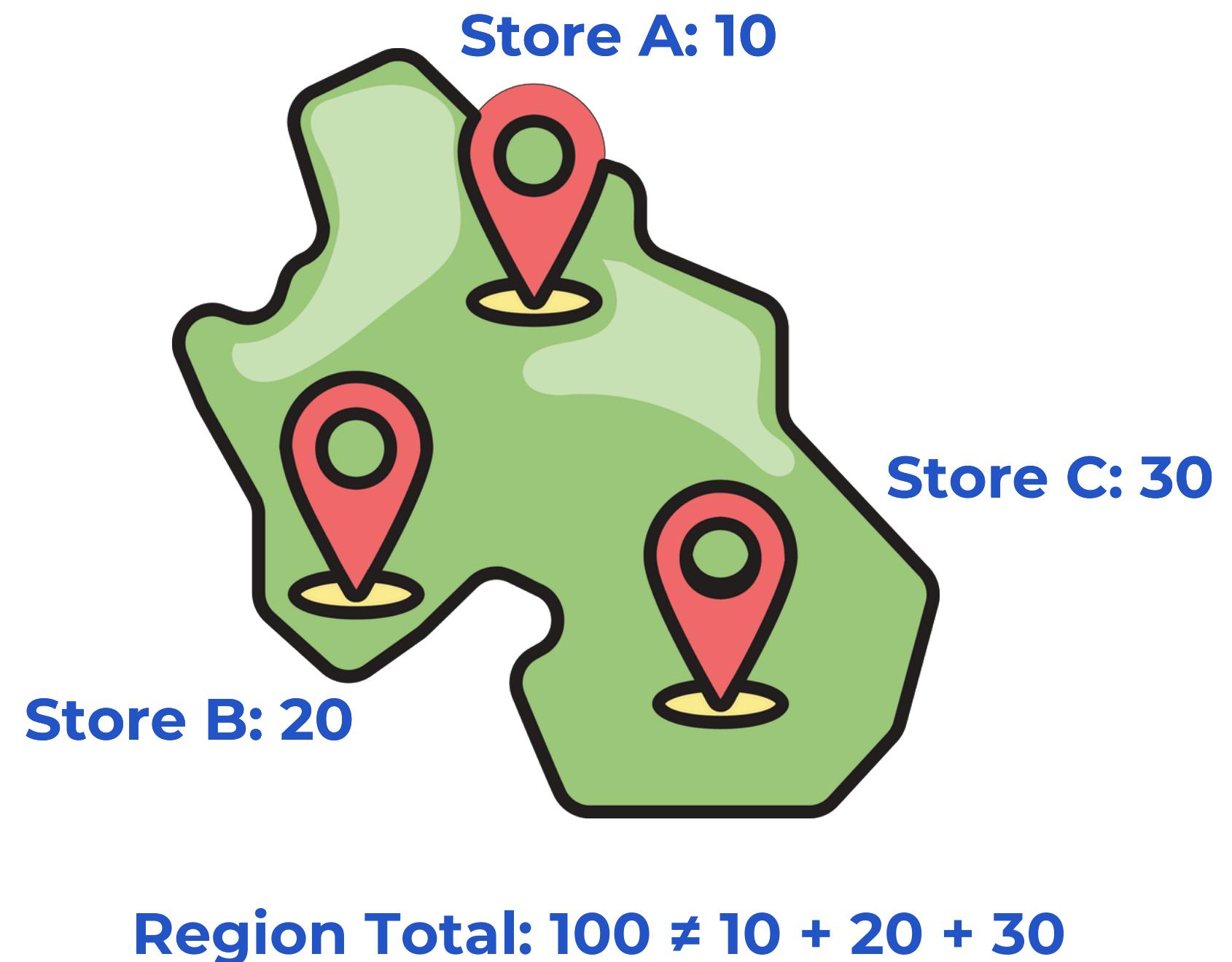
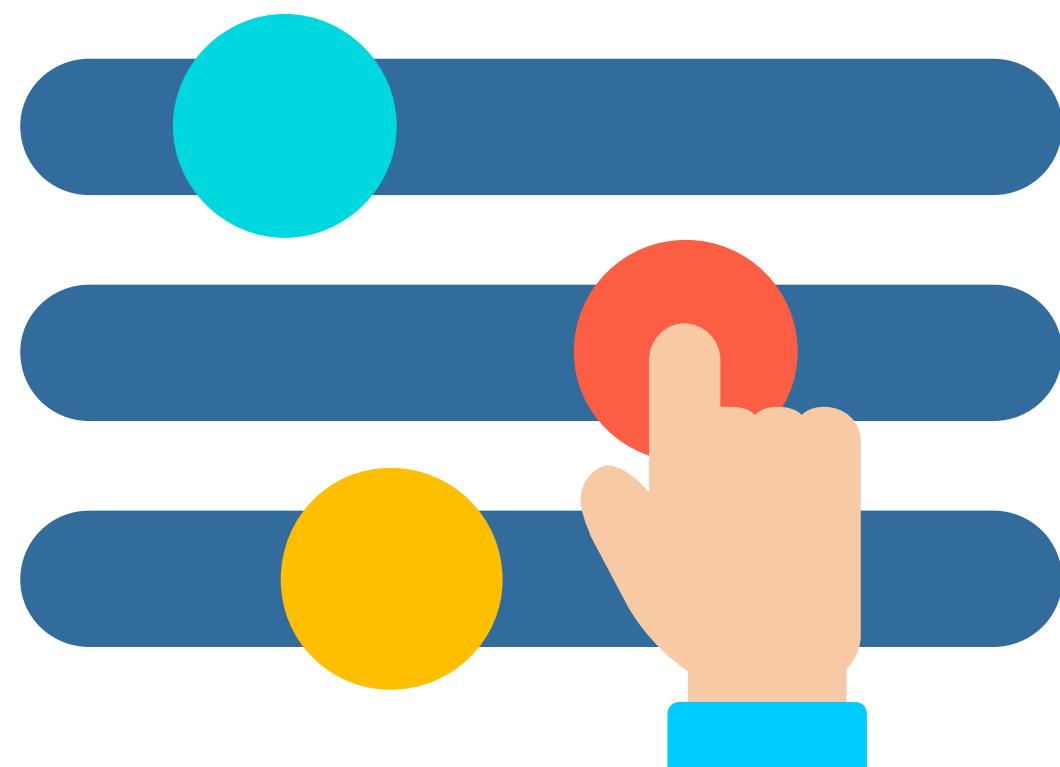
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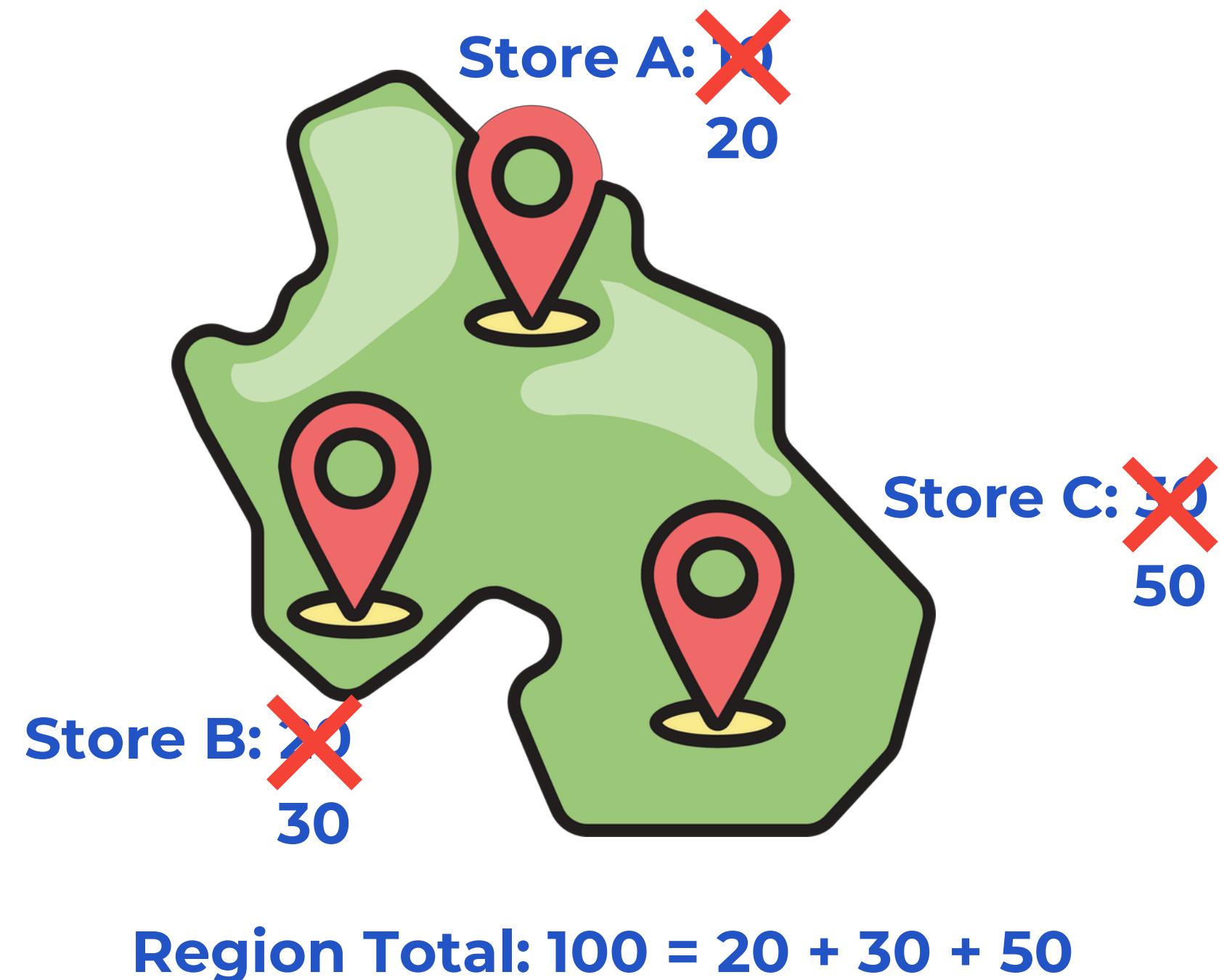
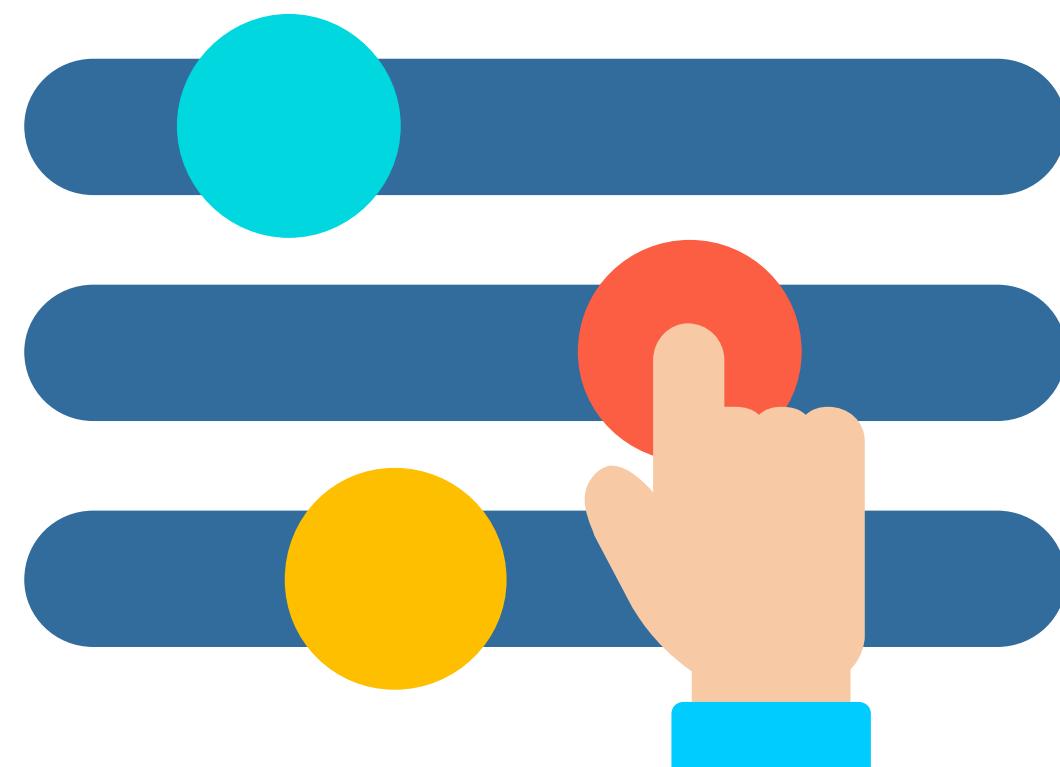
# Forecast Reconciliation

Statistical technique that **adjusts forecasts** to make them consistent across levels



# Forecast Reconciliation

Statistical technique that **adjusts forecasts** to make them consistent across levels



# SCM with Forecast Reconciliation

## Inventory planning

**Coherent stock  
at warehouse**

## Manufacturing

**Component  
forecasts match  
finished goods  
demand**

## Logistics

**Truckloads  
match regional  
demand**

# SCM with Forecast Reconciliation

Inventory planning

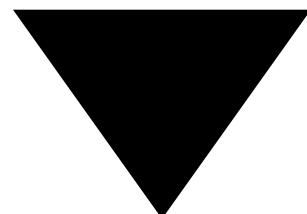
Coherent stock  
at warehouse

Manufacturing

Component  
forecasts match  
finished goods  
demand

Logistics

Truckloads  
match regional  
demand



**Reduces waste and costs, and improves services!**

# SCM with Forecast Reconciliation

## Forecast reconciliation for vaccine supply chain optimization

Bhanu Angam<sup>a</sup>, Alessandro Beretta<sup>b</sup>, Eli De Poorter<sup>a</sup>, Matthieu Duvinage<sup>b</sup> and Daniel Peralta<sup>a;\*</sup>

<sup>a</sup>IDLab, Department of Information Technology, Ghent University - imec, Technologiepark 126, 9052 Gent,  
Belgium

<sup>b</sup>GSK, Avenue Fleming, 20, 1300 Wavre - Belgium

ORCiD ID: Eli De Poorter <https://orcid.org/0000-0002-0214-5751>,  
Daniel Peralta <https://orcid.org/0000-0002-7544-8411>

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<sup>a</sup>IDLab, Department of Information  
<sup>b</sup>GSK,  
ORCID ID: Eli  
Daniel P

A Comprehensive Forecasting Framework based on  
Multi-Stage Hierarchical Forecasting Reconciliation  
and Adjustment

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kuangchih.lee@walmart.com

# Trade-off



## Coherence

Makes bottom-level forecasts add up to upper-level forecasts

## Accuracy

Reconciled forecasts may decrease forecast accuracy

# Coherent & Accurate Forecasts

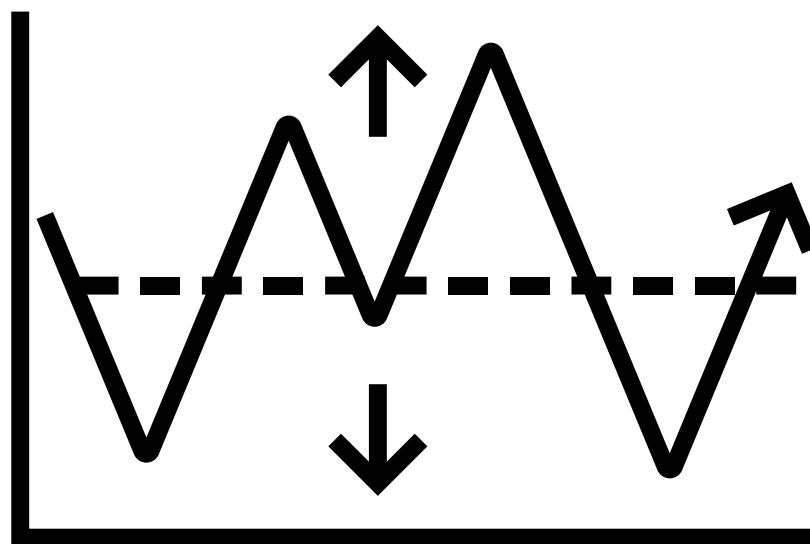
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Coherence is not the end of the story!

# Coherent & Accurate Forecasts

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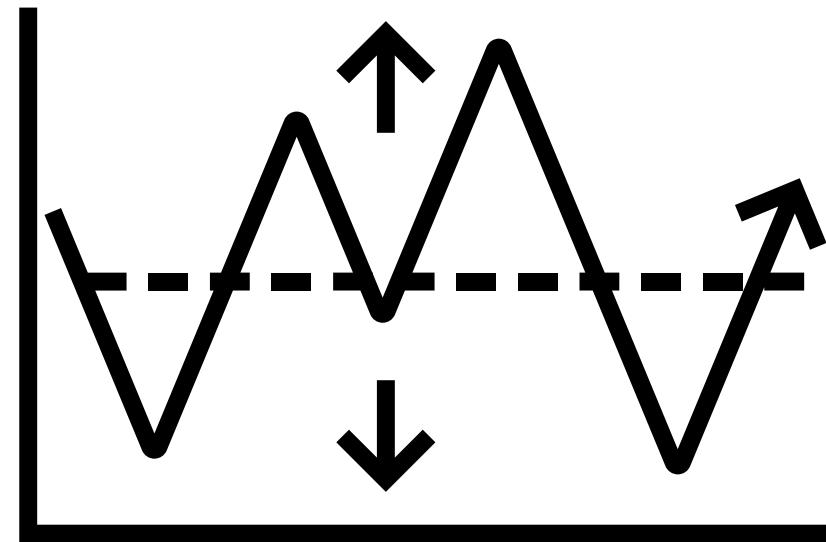
Data



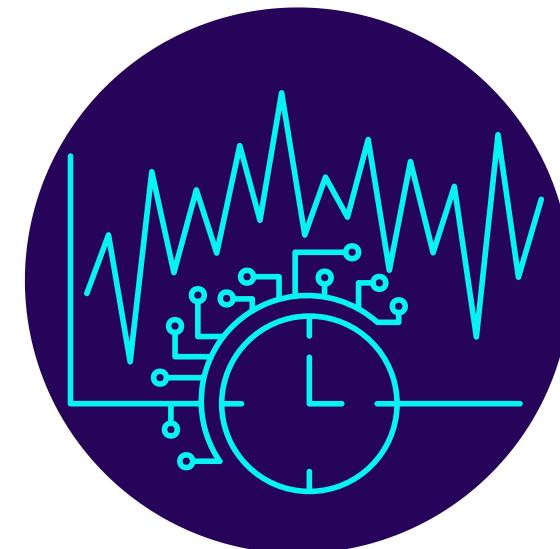
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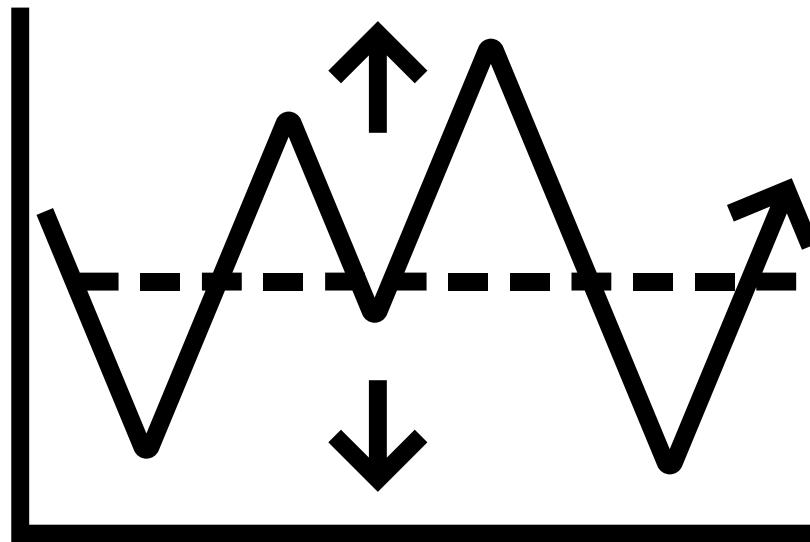
Base forecasts



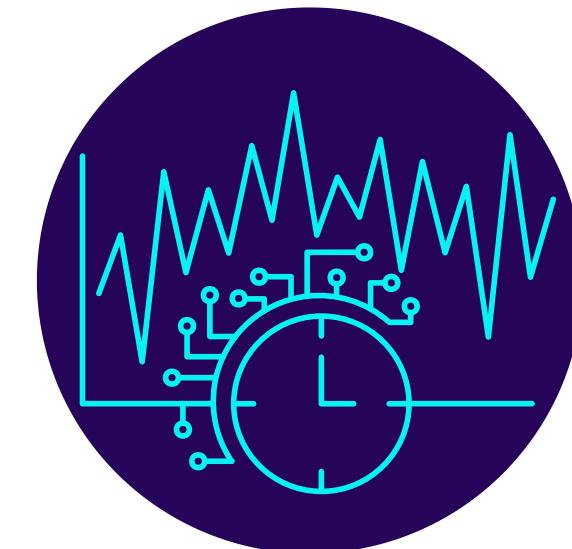
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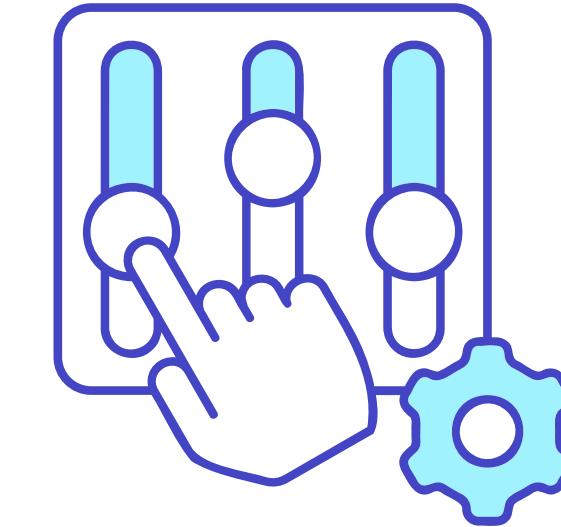
Data



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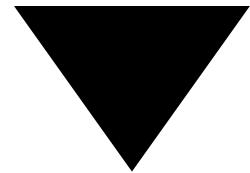
Reconciliation method



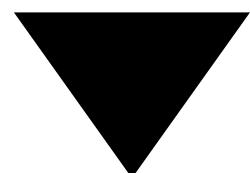
# Summary

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Data is everywhere along the supply chain



Coherent + Accurate forecasts



Efficient supply chain management

# Your Role as Data Scientists

## Forecaster

Turn messy data into useful forecasts  
Apply reconciliation, optimisation and ML

## Data-driven decision maker

Build models that companies rely on for  
million-dollar decisions



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**Data scientists make supply chains efficient & resilient!**

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# Q & A

# Thank You

Good luck for the Datathon!



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