eMoksha
A DATA SCIENCE COMPANY

A Practical Handbook- Predicting Lead Time for Steel Distribution

Chapter 1

Understanding Lead Time in Steel Distribution

Key Concepts

Definition: Time taken from placing an order to receiving steel.

Components of Lead Time

- **Mill/Supplier production**
- **Transit**
- **Warehouse receipt**

Why It Matters:

- Short lead times can improve cashflow
- Profit
- Outpace competition and lower inventory cost

Chapter 2

Data Requirements for Lead Time Prediction

What Data to Collect

1 Order Data:
- Order placement date and time.
- Delivery date.
- Order quantities.

2 Transit Data:
- Shipping methods
- Days to delivery per shipper

3 Supplier Data:
- Average delivery time per supplier
- Delivery times across suppliers

Reality Check

- Do you track days from order to delivery for all suppliers?
- Is your customer order, supplier order and shipment data connected?
- Are you recording the cause of delays (e.g., shipper vs. supplier)?

Chapter 3

How to Predict and Optimize Lead Time

Approach

1

Usinge AI algorithms to predict supplier lead times based on historical and real-time data.

2

Implement continuous feedback loops to refine predictions.

Key Models for Lead Time Prediction

1. Linear Regression:
- Best to use when 1-2 suppliers/mills and few independent factors involved such as transit time to ship steel

2. Time Series Analysis (ARIMA):
- Best to use when repeating patterns in lead time
  Example: Delays experienced during high-demand months

3. Random Forest/Gradient Boosting:
- Best to use when multiple suppliers and complexity involved such as weather disruptions

4. Monte Carlo Simulation:
- Best to quantify multiple scenarios such as worst case vs best-case lead time scenarios and impact on business

Chapter 4 Tools for Lead Time Prediction

Data Collection Tools

1. Steel ERP system, QuickBooks tailored for small steel distributors.
2. Warehouse Management Systems

Analytics and Modeling Tools

1. Excel for Basic Modeling:

- Ideal for small businesses starting out.
- Add-ins: Solver for optimization and trend analysis.

2. Python/R for Advanced Predictive Models:

- Libraries:
  - Statsmodels for ARIMA /time series.

3. Cloud-Based AI Tools:

- Google AutoML, AWS Forecaster

Chapter5 Steps for Implementation

1. Gather and aggregate order, supply, and transit data.
2. Select the best-fit predictive model for your business.
3. Choose a tool based on available expertise.
4. Develop, train, and test the model for lead time prediction.
5. Compare results to real-world data and refine the model.

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