Supply Chain Management Cheatsheet

A comprehensive guide to Supply Chain Management, covering key concepts, processes, strategies, and technologies. This cheatsheet provides a quick reference for professionals and students in the field, offering insights into optimizing supply chain performance and efficiency.

Fundamentals of Supply Chain Management

Core Concepts

Supply Chain: The network of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer.

Supply Chain Management (SCM): The coordination and management of all activities within a supply chain to maximize efficiency, value, and customer satisfaction.

Key Objectives of SCM:

- Reduce costs
- Improve customer service
- Enhance efficiency
- Increase profitability

Upstream vs. Downstream: Upstream includes suppliers and their suppliers. Downstream includes distributors and customers.

Bullwhip Effect: Demand variability increases as you move up the supply chain from customer to suppliers.

Key SCM Processes

Planning:	Demand forecasting, capacity planning, and inventory management.
Sourcing:	Selecting suppliers, negotiating contracts, and managing supplier relationships.
Making:	Production scheduling, manufacturing operations, and quality control.
Delivering:	Order management, transportation, and distribution.
Returning:	Managing product returns, reverse logistics, and waste disposal.
Enabling:	Supporting processes such as finance, IT, and HR.

SCM Goals

- **Efficiency:** Minimizing costs and waste across the supply chain.
- **Effectiveness:** Meeting customer needs and delivering value.
- **Responsiveness:** Adapting quickly to changes in demand and market conditions.
- **Resilience:** Recovering quickly from disruptions and maintaining continuity.

Inventory Management

Inventory Control Techniques

ABC Analysis:	Categorizing inventory items into A, B, and C categories based on their value and consumption. A items require the most attention.
Economic Order Quantity (EOQ):	Determining the optimal order quantity to minimize total inventory costs, including ordering and holding costs. `EOQ = sqrt((2DS)/H)` where D = annual demand, S = ordering cost, H = holding cost.
Just-in-Time (JIT):	A system where materials arrive just as they are needed for production, minimizing inventory holding costs.
Vendor-Managed Inventory (VMI):	Suppliers manage the inventory levels at the customer's location, ensuring optimal stock levels.
Safety Stock:	Extra inventory held to protect against unexpected demand fluctuations or supply disruptions.

Inventory Metrics

Inventory Turnover: Measures how many times inventory is sold and replaced over a period. `Inventory Turnover = Cost of Goods Sold / Average Inventory`

Days of Supply: Indicates how many days of demand can be met with current inventory. `Days of Supply = Inventory / (Annual Demand / 365)`

Fill Rate: Percentage of customer demand met from available inventory. A higher fill rate indicates better customer service.

Inventory Holding Cost: The costs associated with storing and maintaining inventory, including warehousing, insurance, and obsolescence.

Inventory Challenges

- **Excess Inventory:** Leads to higher holding costs and potential obsolescence.
- **Stockouts:** Results in lost sales and dissatisfied customers.
- **Inaccurate Forecasting:** Causes imbalances in inventory levels.
- **Supply Chain Disruptions:** Affects the availability of inventory.

Logistics and Transportation

Transportation Modes

Truck:	Flexible, widely used for short to medium distances. High accessibility.
Rail:	Cost-effective for long distances and large volumes. Limited accessibility.
Air:	Fastest mode, suitable for high-value, time-sensitive goods. Expensive.
Water:	Lowest cost per unit for large volumes and long distances. Slow and limited accessibility.
Pipeline:	Used for transporting liquids and gases. Continuous flow and low operating costs.

Logistics Activities

Warehousing: Storing and managing inventory in warehouses. Includes receiving, storing, and shipping goods.

Transportation Management: Planning, optimizing, and executing the movement of goods. Includes route planning, carrier selection, and shipment tracking.

Order Fulfillment: Processing and fulfilling customer orders. Includes order receipt, picking, packing, and shipping.

Reverse Logistics: Managing the flow of returned goods. Includes returns processing, repair, and disposal.

Transportation Strategies

Consolidation: Combining multiple small shipments into a larger shipment to reduce transportation costs.

Cross-Docking: Transferring goods directly from incoming trucks to outgoing trucks, minimizing warehousing time.

Third-Party Logistics (3PL): Outsourcing logistics activities to specialized providers. Offers expertise and economies of scale.

Intermodal Transportation: Using multiple modes of transportation to move goods. Combines the benefits of different modes.

Supply Chain Technologies

Key Technologies

Enterprise Resource Planning (ERP):	Integrated software systems that manage all aspects of a business, including supply chain, finance, and HR.
Supply Chain Management (SCM) Software:	Specialized software for planning, executing, and controlling supply chain activities. Includes demand planning, inventory management, and transportation management modules.
Warehouse Management System (WMS):	Software for managing warehouse operations. Includes receiving, put-away, picking, and shipping functionalities.
Transportation Management System (TMS):	Software for managing transportation activities. Includes route planning, carrier selection, and shipment tracking.
Blockchain:	A decentralized, secure, and transparent ledger for tracking and verifying transactions. Enhances supply chain visibility and traceability.

Advanced Technologies

Internet of Things (IoT): Connecting devices and sensors to collect and exchange data. Enables real-time monitoring of inventory, equipment, and shipments.

Artificial Intelligence (AI): Using algorithms to analyze data and make decisions. Improves demand forecasting, optimizes routes, and automates tasks.

Machine Learning (ML): A subset of AI that enables systems to learn from data without explicit programming. Enhances predictive capabilities and improves decision-making.

Robotics and Automation: Using robots and automated systems to perform tasks in warehouses and factories. Increases efficiency and reduces labor costs.

Benefits of Technology

- **Improved Visibility:** Real-time tracking of inventory and shipments.
- **Increased Efficiency:** Automation of tasks and optimization of processes.
- **Reduced Costs:** Lower inventory holding costs and transportation expenses.
- **Enhanced Decision-Making:** Data-driven insights for better planning and execution.