Definitions

Supply Chain Management: design, planning, execution, control, and monitoring of supply chain activities - five key supply chain activities: **Plan, Source, Make, Deliver, Return** - with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally.

Supplier management: Selecting, monitoring, and evaluating suppliers to ensure they meet the organization's requirements.

Inventory management: Overseeing the flow of goods and ensuring that the organization has the right amount of inventory at the right time.

Demand planning: Forecasting customer demand for products and services.

Logistics management: Managing the flow of goods from the point of origin to the point of consumption.

Transportation management: Managing the movement of goods from one location to another, including shipping and receiving.

Warehouse management: Overseeing the storage and movement of goods within a warehouse.

Definitions (cont)

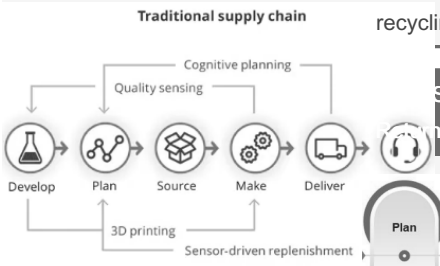
Order fulfillment: Processing and delivering customer orders.

Reverse logistics: Managing the return of goods from customers.

Performance measurement: Tracking and measuring key performance indicators (KPIs) to evaluate the effectiveness of supply chain operations.

Risk management: Identifying and mitigating risks that could impact supply chain operations.

SCM



Plan-source-make-deliver-return framework

Plan: Developing a strategy for the supply chain, determining the demand for products and services, and planning production and inventory levels accordingly.

Source: Identifying and selecting suppliers, negotiating contracts, and managing the procurement of raw materials, goods, and services.

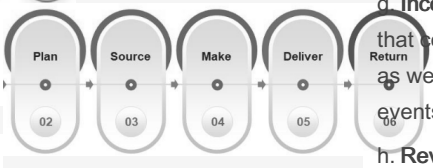
Plan-source-make-deliver-return framework (cont)

Make: Transforming raw materials into finished products or services, managing production schedules, and ensuring quality control.

Deliver: Managing the logistics of getting products or services to customers, including transportation, warehousing, and distribution.

Return: Managing the reverse logistics process for returning goods from customers, including handling returns, repairs, and recycling.

Source, Make, Deliver,



1. Demand planning and forecasting

a. **Collect data:** Collect historical sales data, customer orders, and any other relevant data on demand for the product or service.

b. **Cleanse data:** to remove any anomalies, outliers, or errors that could skew the forecast.

c. **Analyze data:** using statistical techniques such as regression analysis or time series analysis to identify trends, seasonality, and other patterns in the data.

1. Demand planning and forecasting (cont)

d. **Determine key demand drivers:** for the product or service, such as changes in customer preferences, economic conditions, or competitor activity.

e. **Develop forecasting models:** based on the data analysis and demand drivers. Use a combination of quantitative and qualitative forecasting techniques to produce the most accurate forecast possible.

f. **Validate forecasting models:** by comparing the forecasted demand to actual demand over a period of time. Adjust the models as necessary to improve accuracy.

g. **Incorporate external factors:** that could impact demand, such as weather patterns, political events, or natural disasters.

h. **Review and update forecasting models regularly:** to ensure they remain accurate over time. Factors such as changes in the market, customer preferences, or economic conditions could impact demand and require adjustments to the models.

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S&OP

	Old	New
Goal	"Determine what we can and will build"	"Define the capability to build what we should build"
Forecast	Treated as true, planned as if it were the actual demand	Only used to configure the supply chain
KPIs	Striving towards OEE based on forecast, resulting in reluctance to make changes based on actual demands - often at high cost	Holistic incentive schemes incorporating KPIs, maximizing benefit for the company and not for one singular area
Result	Master Production Schedule (MPS - how much to produce and when) - determines exactly what should happen in the operation	Configuration - conditions the supply chain to cope with what will happen in the operation
Replenishment orders	They are the result of the process and become effective as planned immediately after the plan is released	They are not the result of the process anymore and are generated when actual demand arises
Fosters a robust operational planning	Typically not	Yes (as the supply chain can and will adapt to actual demands being higher or lower than planned)

2. Source Management

Supplier Evaluation and Selection: Source management begins with evaluating potential suppliers and selecting those that align with the organization's requirements. This involves assessing factors such as supplier capabilities, financial stability, quality standards, capacity, track record, and adherence to social and environmental responsibility. Supplier evaluation may also include site visits, audits, and performance assessments.

2. Source Management (cont)

Sourcing Strategies: Source management encompasses determining the optimal sourcing strategies for different categories of goods or services. This involves decisions regarding whether to source locally or globally, single or multiple suppliers, make-or-buy choices, and strategic partnerships. Sourcing strategies aim to balance factors such as cost, quality, lead time, risk mitigation, and responsiveness to customer demand.

2. Source Management (cont)

Supplier Relationship Management: Building strong relationships with suppliers is crucial for effective source management. It involves establishing clear expectations, communication channels, and performance metrics. Supplier relationship management includes activities such as contract negotiation, supplier development programs, collaboration initiatives, and joint improvement projects. Effective relationship management helps foster trust, collaboration, and continuous improvement throughout the supply chain.

2. Source Management (cont)

Supplier Performance Measurement: Source management involves measuring and monitoring supplier performance to ensure compliance with contractual agreements and quality standards. Key performance indicators (KPIs) may include metrics such as on-time delivery, product quality, lead time, responsiveness, cost, and customer satisfaction. Supplier performance measurement helps identify areas for improvement, manage risks, and drive supplier accountability.

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2. Source Management (cont)

Supplier Collaboration and Innovation: Source management encourages collaboration and innovation with suppliers to drive mutual benefits and value creation. Organizations can work closely with suppliers to identify cost-saving opportunities, process improvements, new product development, and joint innovation projects. Collaborative relationships foster knowledge sharing, technology transfer, and agility in responding to market changes.

2. Source Management (cont)

Supply Chain Risk Management: Source management also involves assessing and managing risks associated with suppliers and the supply chain. This includes identifying potential disruptions, developing contingency plans, diversifying the supplier base, and establishing risk mitigation strategies. Risk management aims to ensure continuity of supply, minimize disruptions, and enhance supply chain resilience.

2. Source Management (cont)

Ethical and Sustainable Sourcing: Source management increasingly focuses on ethical and sustainable sourcing practices. Organizations strive to ensure that suppliers adhere to social and environmental standards, including labor rights, fair trade practices, environmental regulations, and responsible sourcing of raw materials. Ethical sourcing practices help protect brand reputation, meet consumer expectations, and contribute to sustainable development goals.

2. Source Management (cont)

Supplier Performance Improvement: Source management involves collaborating with underperforming suppliers to improve their capabilities and performance. This may include providing training, sharing best practices, implementing corrective actions, and incentivizing continuous improvement initiatives. Supplier performance improvement aims to enhance overall supply chain performance and maintain a competitive advantage.

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3. Manufacturing or production management	
Production Planning and Scheduling:	Manufacturing management involves developing production plans and schedules that optimize resource utilization, minimize bottlenecks, and meet customer demand. It includes determining production quantities, sequencing orders, allocating resources (including manpower and machines), and considering factors such as lead times, capacity constraints, and inventory levels.

3. Manufacturing or production management (cont)	
Inventory Management:	Effective manufacturing management requires efficient inventory management practices. This involves optimizing inventory levels, implementing inventory control measures (e.g., just-in-time principles or lean manufacturing), managing reorder points, and ensuring adequate availability of raw materials, work-in-progress (WIP), and finished goods. Inventory management aims to minimize carrying costs, reduce stockouts, and balance production with demand.

3. Manufacturing or production management (cont)	
Production Process Optimization:	Manufacturing management focuses on continuously improving production processes to enhance efficiency, quality, and productivity. This includes analyzing and reengineering workflows, reducing cycle times, implementing automation or technology solutions, and employing lean manufacturing principles. Process optimization aims to eliminate waste, improve throughput, and achieve cost savings.

3. Manufacturing or production management (cont)	
Quality Management:	Ensuring product quality is a crucial aspect of manufacturing management. It involves establishing and maintaining quality standards, implementing quality control measures, conducting inspections, and performing tests throughout the production process. Quality management aims to identify and resolve quality issues promptly, minimize defects, and deliver products that meet or exceed customer expectations.

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3. Manufacturing or production management (cont)	
Maintenance and Equipment Management:	Manufacturing management includes the effective management of production equipment and maintenance activities. This involves regular equipment maintenance, implementing preventive maintenance schedules, managing repairs, and ensuring optimal equipment performance. Proper maintenance helps minimize downtime, enhance reliability, and extend the lifespan of machinery.

3. Manufacturing or production management (cont)	
Workforce Management:	Managing the manufacturing workforce is essential for efficient operations. Manufacturing management involves workforce planning, training, and development to ensure that the right skills are available when needed. It also includes tracking labor productivity, managing staffing levels, fostering a safe working environment, and promoting employee engagement. Workforce management aims to optimize labor utilization and enhance overall productivity.

3. Manufacturing or production management (cont)	
Continuous Improvement Initiatives:	Manufacturing management embraces a culture of continuous improvement. It involves implementing methodologies such as Six Sigma, Kaizen, or Total Productive Maintenance (TPM) to drive ongoing process improvement. These initiatives focus on identifying and eliminating waste, reducing variability, and enhancing overall operational performance.

3. Manufacturing or production management (cont)	
Integration with Supply Chain:	Manufacturing management works in close collaboration with other functions within the supply chain, such as procurement, logistics, and demand planning. It ensures seamless coordination and information flow across these functions to optimize production, inventory, and distribution activities. Effective integration supports efficient material flow, demand fulfillment, and overall supply chain optimization.

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4. Inventory management

a. **Determine inventory requirements:** for the project, including the desired inventory levels and the minimum order quantities.

b. **Identify inventory costs:** identify the costs associated with holding inventory, such as storage costs, handling costs, and the cost of capital tied up in the inventory.

c. **Classify inventory:** into categories based on their importance or value, such as high-value items, slow-moving items, or critical items.

d. **Set inventory policies:** including reorder points, safety stock levels, and lead times, based on the inventory requirements, costs, and classification.

e. **Monitor inventory levels:** regularly to ensure they are within the desired range. Use inventory tracking tools such as barcodes, RFID, or inventory management software to track inventory levels accurately.

f. **Implement inventory control measures:** such as just-in-time (JIT) inventory, vendor-managed inventory (VMI), or consignment inventory, to optimize inventory levels and minimize costs.

4. Inventory management (cont)

g. **Analyze inventory performance:** regularly to identify areas for improvement. Use key performance indicators (KPIs) such as inventory turnover, days inventory outstanding (DIO), or inventory accuracy to evaluate inventory performance.

h. **Optimize inventory management:** by continuously improving inventory policies, control measures, and processes based on the analysis of inventory performance.

Inventory Management



5. Logistics management

a. **Plan logistics requirements:** for the project, including transportation, warehousing, and distribution.

b. **Develop transportation plans:** based on the project requirements, including selecting carriers, modes of transportation, and routes.

c. **Manage transportation:** shipping and receiving, tracking shipments, and ensuring on-time delivery.

5. Logistics management (cont)

d. **Plan warehousing requirements:** selecting the appropriate warehouse locations, layouts, and storage methods.

e. **Manage warehouse operations:** receiving and storing goods, order picking, and shipping.

f. **Implement distribution strategies:** to ensure timely and cost-effective delivery of goods to customers, including cross-docking, direct shipment, or multi-stop delivery.

g. **Monitor logistics performance:** using key performance indicators (KPIs), such as on-time delivery, order accuracy, and transportation costs.

h. **Continuous improvement:** for all logistics processes, including transportation, warehousing, and distribution, based on the analysis of logistics performance.

Logistics



6. Transportation management

a. **Define transportation requirements:** mode of transportation, route, and delivery schedule.

6. Transportation management (cont)

b. **Identify and evaluate transportation providers:** carriers, brokers, or freight forwarders, based on their service offerings, pricing, and reliability.

c. **Negotiate transportation contracts:** rates, delivery schedules, and performance metrics.

d. **Plan transportation activities:** shipment scheduling, routing, and tracking.

e. **Monitor transportation performance:** using key performance indicators (KPIs), such as on-time delivery, transit time, and transportation costs.

f. **Address transportation issues:** such as delayed deliveries, damaged goods, or capacity constraints, through effective communication and problem-solving.

g. **Optimize transportation management:** by continuously improving transportation policies, processes, and technologies based on the analysis of transportation performance.

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Transportation Management



7. Warehouse management

a. **Define warehouse requirements:** storage capacity, location, layout, and material handling equipment.

b. **Plan warehouse operations:** receiving, put-away, picking, packing, and shipping.

c. **Develop inventory control procedures:** cycle counting, stock rotation, and replenishment.

d. **Implement safety and security measures:** fire prevention, hazard communication, and access control.

e. **Train warehouse personnel:** on the proper handling of goods, use of equipment, and safety procedures.

f. **Utilize warehouse management systems (WMS):** to optimize warehouse operations - inventory tracking, order processing, and shipping.

g. **Monitor warehouse performance:** using key performance indicators (KPIs), such as order accuracy, inventory accuracy, and warehouse productivity.

7. Warehouse management (cont)

h. **Continuous improvement:** warehouse processes, including layout, workflow, and inventory management, based on the analysis of warehouse performance.

WHM



8. Performance measurement

a. **Define key performance indicators (KPIs):** that align with the project goals and objectives, such as order lead time, perfect order rate, on-time delivery, inventory turnover, or supply chain cost as a percentage of sales.

b. **Collect data:** on the KPIs using a variety of sources, such as ERP systems, logistics management software, or manual record keeping.

8. Performance measurement (cont)

c. **Analyze performance:** by comparing the KPIs to established targets, benchmarks, or industry standards. Use data visualization tools to identify trends, patterns, and areas for improvement.

d. **Identify root causes:** of performance issues by conducting root cause analysis, such as fishbone diagrams or Pareto analysis.

e. **Develop improvement strategies:** based on the analysis of performance data and root causes. Use a variety of improvement methodologies, such as Six Sigma, Lean, or Kaizen.

f. **Implement improvement strategies:** by making changes to processes, policies, or technologies. Use project management tools to plan, execute, and monitor improvement initiatives.

g. **Monitor performance:** to ensure that improvements are sustained over time. Use statistical process control (SPC) techniques to identify deviations from the target and take corrective action.

h. **Continuous improvement:** by updating KPIs, data collection methods, or analysis techniques based on the evolving needs of the project.

Performance Management



9. Risk management

a. **Identify risks:** Identify risks that could impact the project, including internal risks, such as process failures or organizational changes, and external risks, such as natural disasters or supplier disruptions.

b. **Assess risks:** Assess risks based on their likelihood and impact on the project. Use risk assessment tools such as risk matrix or risk scoring to prioritize risks for mitigation.

c. **Develop risk management plan:** Develop a risk management plan that outlines the strategies, resources, and responsibilities for managing identified risks. Use risk management techniques such as avoidance, mitigation, transfer, or acceptance to manage risks.

d. **Implement risk management plan:** Implement the risk management plan by taking the necessary actions to mitigate or avoid identified risks. Use project management tools such as risk registers, issue logs, or contingency plans to track and monitor risk management activities.

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9. Risk management (cont)

e. **Monitor risks:** Monitor risks regularly to ensure that they are being managed effectively. Use risk indicators or early warning systems to identify new or emerging risks.

f. **Respond to risks:** Respond to risks by taking appropriate actions based on their likelihood and impact. Use risk response techniques such as contingency planning, crisis management, or business continuity planning to respond to risks.

g. **Review and update risk management plan:** Review and update the risk management plan regularly to ensure that it remains relevant and effective. Incorporate lessons learned from previous projects or risk management activities to improve the risk management process.

Risk Management



Top20 SCM KPIs and their formula

1. **On-time delivery (OTD) rate:** (Number of orders delivered on time / Total number of orders) x 100

2. **Perfect order rate (POR):** (Number of perfect orders / Total number of orders) x 100

3. **Inventory turnover ratio:** Cost of goods sold / Average inventory

4. **Days of inventory outstanding (DIO):** (Average inventory / Cost of goods sold) x 365

5. **Order lead time:** Date of order delivery - Date of order placement

6. **Cycle time:** Time taken to complete a process, from start to finish

7. **Supply chain response time (SCRT):** Time taken for a customer order to be fulfilled, from order placement to delivery

8. **Transportation cost per unit:** Total transportation costs / Total units shipped

9. **Warehouse capacity utilization:** (Total inventory / Warehouse capacity) x 100

10. **Order accuracy rate:** (Number of orders accurately filled / Total number of orders) x 100

11. **Gross margin return on investment (GMROI):** (Gross margin / Average inventory investment) x 100

Top20 SCM KPIs and their formula (cont)

12. **Cash-to-cash cycle time:** Time taken for cash invested in the supply chain to be recovered, from payment for materials to receipt of payment for goods sold

13. **Cost of goods sold (COGS):** Total cost of producing and delivering products or services

14. **Return on investment (ROI):** (Net profit / Total investment) x 100

15. **Manufacturing cycle time:** Time taken to manufacture a product, from raw materials to finished product

16. **Capacity utilization:** Actual output / Maximum output capacity

17. **Backorder rate:** (Number of orders on backorder / Total number of orders) x 100

18. **Shipment lead time:** Time taken for goods to be shipped, from loading to delivery

19. **Supplier lead time:** Time taken for suppliers to deliver goods or services, from order placement to delivery

20. **Customer service level (CSL):** (Number of orders delivered on time / Total number of orders) x 100

Formulas

- $Profit = Revenue - Total\ Cost$
- $Value\ of\ process = Customer's\ Willingness - to - pay - Tota$
- $\text{Productivity} = \frac{\text{Units of Output}}{\text{Total \$ of Input}}$
- $\text{Utilization} = \frac{\text{Capacity Used}}{\text{Total Available Capacity}}$
- $Little's\ Law (I = R \times T)$: Inventory (I)=Throughput (R)$\times$ Avg. l
- $\text{Avg. Cost} = \frac{Fixed\ Cost + Total\ Variable\ Cost}{Total\ Volume}$
- $Unit\ Contribution\ (profit\ Margin) = Price - Variable\ Cost$
- $\frac{\#\ of\ Unit\ Sold}{Average\ Inventory} = \text{Inventory Turns} = \frac{\$\$\$\ of\ Unit\ Sold}{Average\ Inventory\ in\ \$}$

30 best practices for SCM's project management

1. Define project scope, objectives, and deliverables clearly

2. Develop a project charter and obtain buy-in from stakeholders

3. Create a project plan and schedule using project management software

4. Assign roles and responsibilities to project team members

5. Establish communication protocols and a communication plan

6. Develop a risk management plan and a contingency plan

7. Establish a change management process

8. Conduct regular project status meetings and progress reviews

9. Use project management tools such as Gantt charts, critical path analysis, and work breakdown structures

10. Develop a budget and track project costs

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Cont.

11. Monitor project progress using key performance indicators (KPIs)
12. Establish a quality management process and monitor project quality
13. Ensure data accuracy and integrity through data validation and verification
14. Obtain stakeholder feedback and incorporate it into the project plan
15. Implement a continuous improvement process
16. Use standardized processes and procedures to improve consistency and efficiency
17. Conduct regular training and development for project team members
18. Establish performance metrics for project team members
19. Implement a project governance structure to ensure accountability and alignment
20. Establish vendor management procedures for managing external suppliers and vendors

Cont. (cont)

23. Establish project evaluation criteria to assess the success of the project
24. Use benchmarking to compare project performance to industry standards
25. Establish a project closure process to ensure all project deliverables are completed
26. Conduct a post-project review to evaluate project success and identify areas for improvement
27. Document all project activities and outcomes for future reference
28. Ensure compliance with relevant regulations and standards
29. Foster a culture of collaboration and teamwork among project team members
30. Establish a reward and recognition program to incentivize project team members and promote success.

Cont.

21. Leverage technology to streamline processes and improve efficiency
22. Conduct regular project risk assessments and take proactive measures to mitigate risks

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