Long Term Decisions	strategic, competitive -network configuration -supply chain model -outsourcing -vertical integration (become own supplier)
Medium Term Decisions	Tactical, planning -lean -Sales & operations planning -inventory management
Short Term Decisions	Operational, execution -people -equipment -product
Operations and Supply Chain Management	focuses on how to develop capabilities to design, produce, and deliver products and services in a competitive market
Capabilities that Drive Performance	-products & service features -costs -quality -time to market -ability to innovate
Supply Chain Processes	-plan -source -make -deliver -return -engage
Consequences of Poor Supply Chain	-loss of productivity -customer complaints -Increased costs

	-loss of revenue -damage to brand
Top 5 Challenges	-hiring qualified workers -customer demands for lower costs/pricing -customer demands for faster response times -increasing competitive intensity, rising customer expectations -forecasting
Efficient Supply Chain	cost focus -high capacity -high turns -reduce lead time if it doesn't increase cost -select cost and quality -low cost modes
Responsive Supply Chain	speed focus -low capacity -safety stock; excess inventory -reduce lead time aggressively -select speed -fast/speedy modes
Functional Products	-low demand uncertainty -more predictable/stable demand -long product life -low inventory cost -low profit margins -low product variety & higher volume -low stockout & obsolescence cost -need efficient supply chain
Innovative Products	

	-high demand uncertainty -difficult to forecast/variable demand -short product life -high inventory cost -high profit margins -high product variety & lower volume -high stockout & obsolescence cost -need responsive supply chain
Centralized Advantages	-low total inventory -low safety stock (pooling effect) -availability -increased shipment volumes -low complexity/coordination -high scope for standardization of practices -low total cost
Centralized Disadvantages	-increased shipping distances & costs -increased transportation costs -low responsiveness
When is centralized strategy more appropriate?	-stable/predictable environment -low velocity -higher product availability -few delivery points -low cost per weight -high volume -low distribution complexity *efficient supply chain*
When is decentralized strategy more appropriate?	- high demand uncertainty -high velocity -need to reduce lead times -many points of sale

	-high cost per weight -high delivery responsiveness -more delivery customization *responsive supply chain*
Outsourcing	obtaining of any resource or process external to the company
Why should you outsource?	-reduce and control costs -increase flexibility & speed -decrease lead times -increase innovation capability -focus on core capabilities -gain access to world class capabilities -free internal resources for other purposes -insufficient resources are available internally -share risks with a partner company
Offshoring	obtaining of any resource or process external to the company and across the ocean ex. customer service in India for company
Offshoring Factors	-innovation/technical capability -quality -capacity -lead time -delivery -cost//price -dependability -supply chain capability -location
Drivers of Globalization	-political & macroeconomic -technology

	-market -cost
Market Drivers	-increased foreign competition at home - lower volume -growth in foreign demand, global presence as competitive threat -shorter product life cycles - global scale to recoup high R&D costs -faster response & customization - being close to customers -presence in state-of-the-art markets
Technology Drivers	-global locations to ensure critical supply -global location to access skills and technology -global location of R&D facilities - being close to customers/markets -technology driven joint ventures
Political & Macroeconomic Drivers	-exchange rate fluctuations -regional trade pacts/agreements -imposition of non-tariff barriers -political climate/stability, government regulations, etc.
Cost Drivers	-lower comparative cost factors -falling communication, coordination, and material movement costs -economies of scale -cost and risk sharing in joint ventures
5 Principles of Lean	1. Identify Value 2. Value Stream Map 3. Create Flow (5S) 4. Establish Pull (Kanban) 5. Seek Perfection (Kaizen)
Philosophy of Lean	Eliminate waste

Kanban	a manual system that signals the need for parts or materials
Kaizen	continuous improvement
Push System	every worker maximizes own output, making as many products as possible -material & information flow from RM supplier to customer
Pull System	production line is controlled by the last operation; kanban cards control WIP -information flows from customer to RM supplier
Production Planning Inputs	-RM availability -market demand -economic conditions -external capacity -competitors' behavior -activities required for production -inventory levels -current workforce -current physical capacity
Internal Strategies	-hire and fire -temporary workers -overtime/reduced hours -subcontracting -excess inventory -large backlogs -change production rates
External Strategies	-price change -promotions -advertising -"bundled" or "packaged" offerings

	-turn down orders -pre orders/reservations
Inventory	the raw material, component parts, work in process, or finished goods that are held at a location in the supply chain
Benefits of Inventory	-hedge against uncertain demand -hedge against uncertain supply -economies of scale -smoothing of production
Costs of Inventory	-holding costs -obsolescence -spoilage -rework -shrinkage -opportunity costs
Inventory Questions	How much should we order? When should we order more?
Total Cost	ordering cost + inventory cost
Ordering Cost	Number of Orders per Year x Cost Per Order =(D/Q) x S
Inventory Cost	Average Inventory x Holding Cost Per Year =(Q/2) x H
Economic Order Quantity (Q*)	-where holding costs = ordering cost -total costs is at a minimum =sqrt(2SD/H)
Reorder Point (ROP)	average daily demand x lead time
Inventory Policy	

	-monitor inventory level -when the inventory drops to ROP, place an order for Q* more
Bullwhip Effect	magnification of orders as we move upstream in a supply chain from the customer
Causes of Bullwhip Effect	-price fluctuations (placing items on sale) -order batching -shortage gaming -forecast inaccuracies
Solutions to Bullwhip Effect	-increase information sharing of data through the supply chain -reduce order costs (reduces desire to order in larger batches) -eliminate discounts and promotions (reduce "artificial" demand)
Newsvendor Model	a single-period inventory control model that aims to define optimal order quantities so as to minimize expected overstock costs -GOAL: maximize expected profit -ex. perishable goods & short selling season
Underage Cost	opportunity cost of underestimating demand =price - cost
Overage Cost	cost of overestimating demand =cost - salvage value
Critical Fractile	probability of not selling P(D<Q) =underage cost/(underage cost + overage cost)
Decrease Q	-increase cost of lost sales -decrease cost due to unsolde items

Increase Q	-decrease cost of lost sales -increase cost due to unsold items
Forecasting	prediction of future events used for planning purposes
Patterns of Demand	-trends -seasonality -cyclical elements -autocorrelation -random variation (always)
Qualitative	rely on subjective opinions from one or more experts
Quantitative	rely on data and analytical techniques ex. time series, casual relationships, simulation
Time Series	models that predict future demand based on past history trends
Casual Relationships	models that use statistical techniques to establish relationships between various items and demand ex. linear regression
Simulation	models that can incorporate some randomness and non-linear effects
Moving Average Time Series	uses the last n periods in order to predict demand in period t+1 -the most accurate prediction of future demand is a simple (linear) combination of past demand
Exponential Smoothing	the prediction of the future depends mostly on the most recent observation and on the error for the latest forecast -uses less storage space for data -extremely accurate -easy to understand -little calculation complexity
Alpha	

smoothing constant - denotes the importance of the past error	
If alpha is low...	there is little reaction to difference
If alpha is high...	there is a lot of reaction to differences
Bias	when a consistent mistake is made
Random	errors that are not explained by the model being used
Forecast Accuracy	Error = Actual - Forecast
Positive E means...	the forecast was too low F < A
Negative E means...	the forecast was too high F > A
RSFE	sum(A-F)
MFE	RSFE/N
MAD	sum(absolute(A-F))/N
Tracking Signal	measure of how often our estimations have been above or below the actual value; used to decide when to re-evaluate the model RSFE/MAD -Positive TS, the actual values are above the forecasted values -Negative TS, the actual values are below the forecasted values If TS < -4 or TS > 4, INVESTIGATE!