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CERTIFIED IN LOGISTICS,
TRANSPORTATION AND DISTRIBUTION

MODULE 9:
LOGISTICS FRAMEWORK, METRICS, NETWORK DESIGN, TRANSFORMATION, AND IMPROVEMENT

APICS

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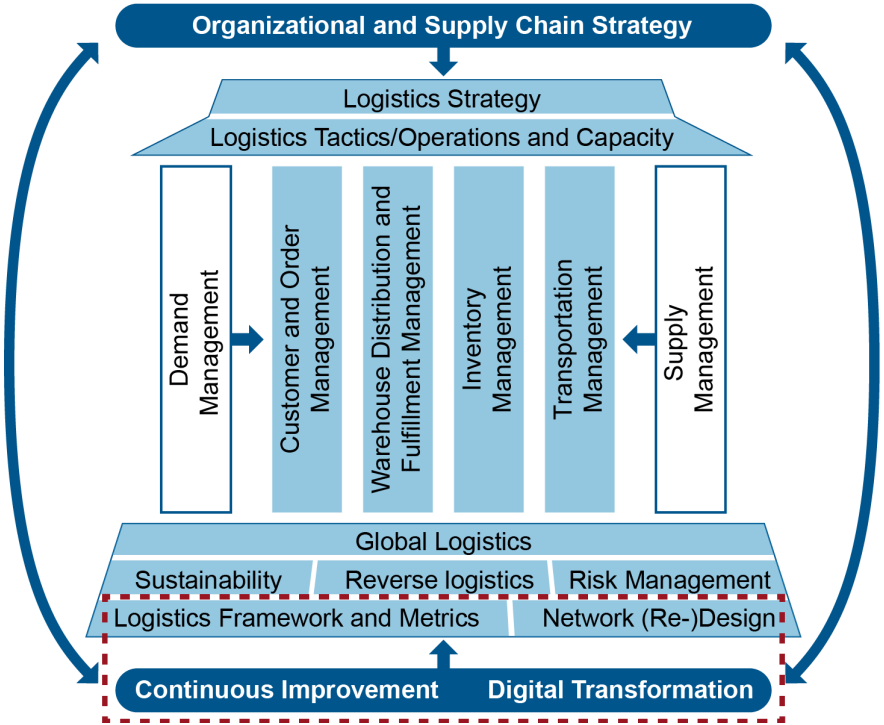
Module 9 Overview



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MODULE 9, SECTION A: DESIGN THE LOGISTICS FRAMEWORK

APICS

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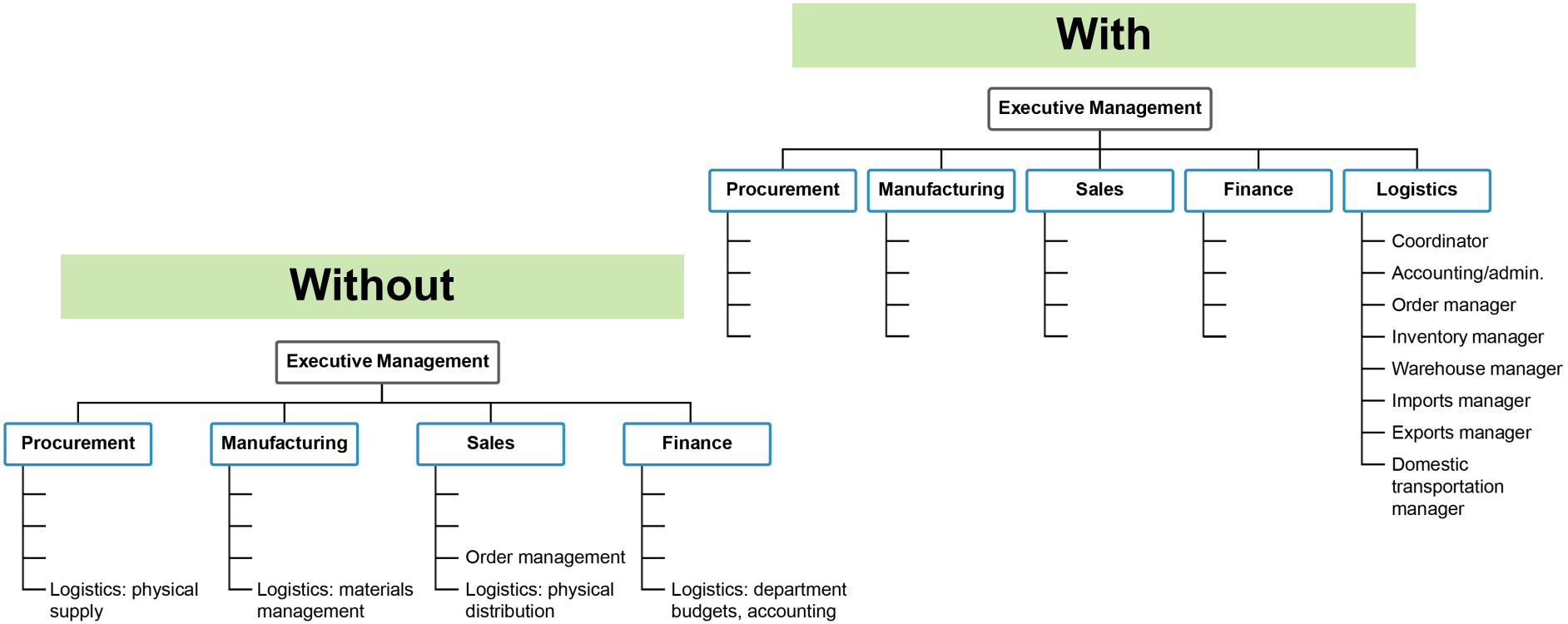
Synchronize Supply Chain and Organizational Design

Transformation of Structures, People, and Processes

1. Create the rationale and urgency for supply chain transformation.
   - Get executive support, form planning team, define problems
2. Prepare for supply chain transformation.
   - Scan the market, specify business drivers, optimize systems
3. Execute the supply chain transformation.
   - Synchronize systems, processes, people, external partners
4. Review the supply chain transformation.

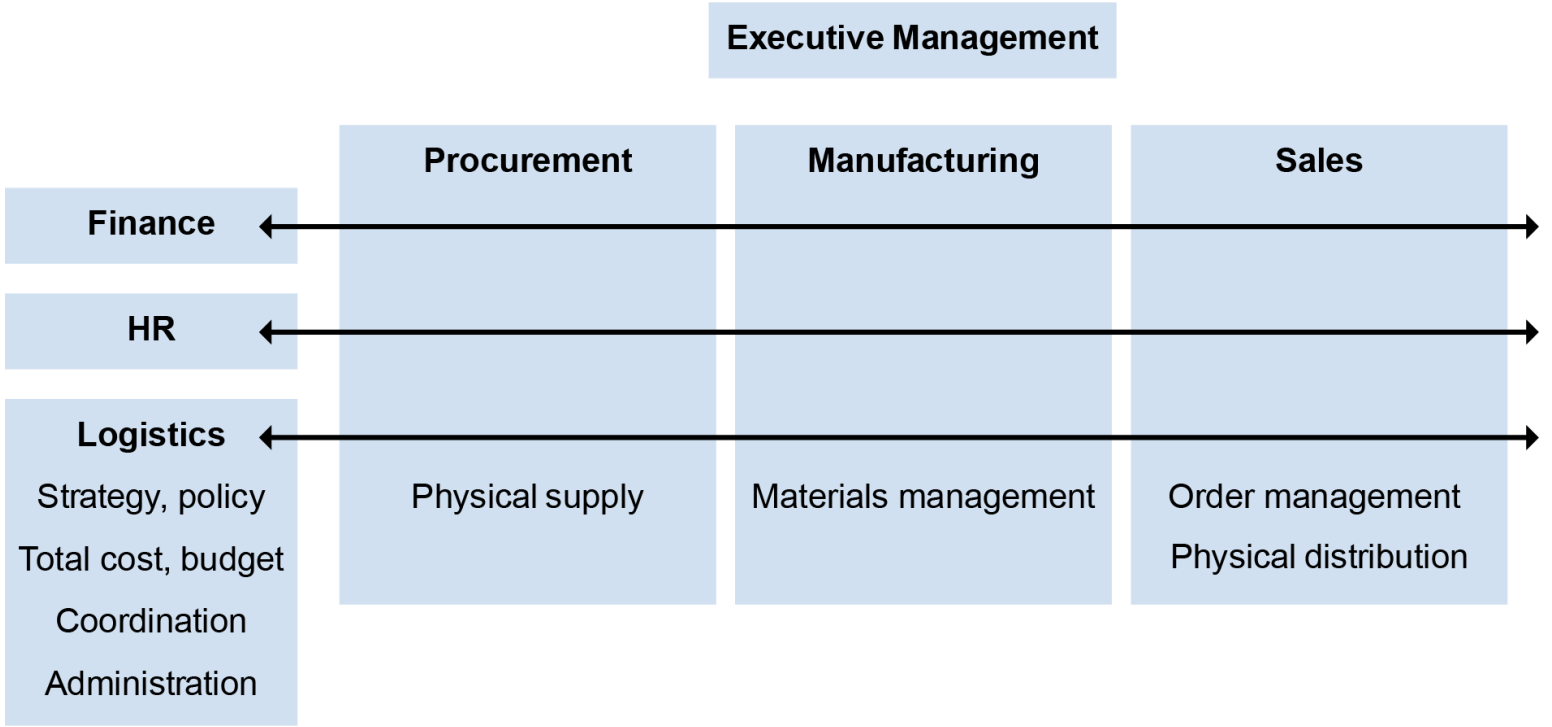
Synchronize Supply Chain and Organizational Design

Functional Structure without and with Logistics Area



Synchronize Supply Chain and Organizational Design

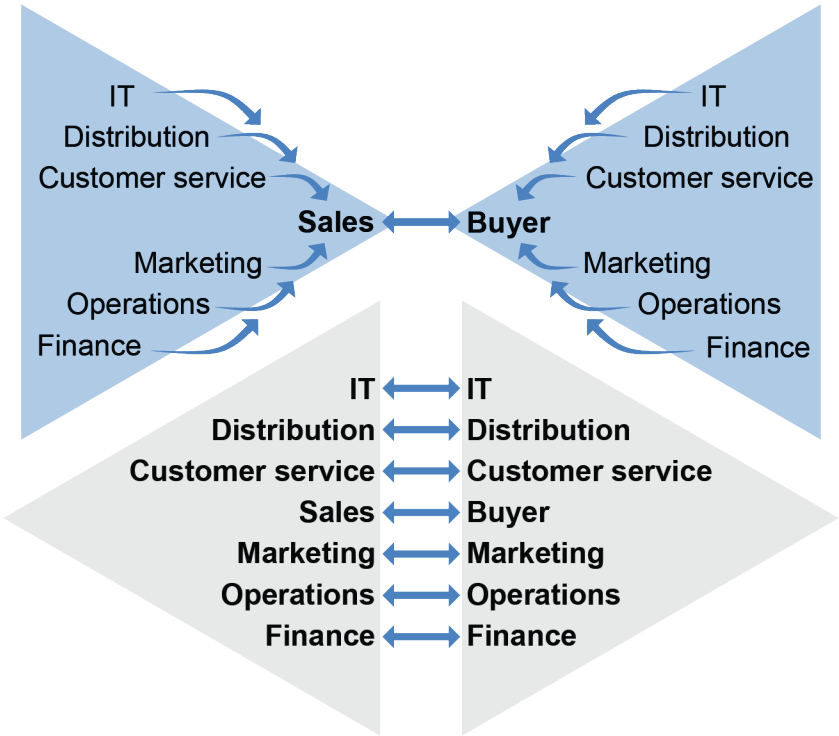
Matrix Structure with Logistics as Cross-Functional Area



Synchronize Supply Chain and Organizational Design

From Transactional to Linked Relationships

- Transactional
- Linked



Source: *The Practice of Supply Chain Management,* Terry P. Harrision, Hau L. Lee, and John J. Neale, editors.

Synchronize Supply Chain and Organizational Design

Operating Arrangements: Models

Echelon

- Warehouse specialization area
- Get all right subassemblies to point of use efficiently

Direct

- Focus on having fewest warehouses.

Combined

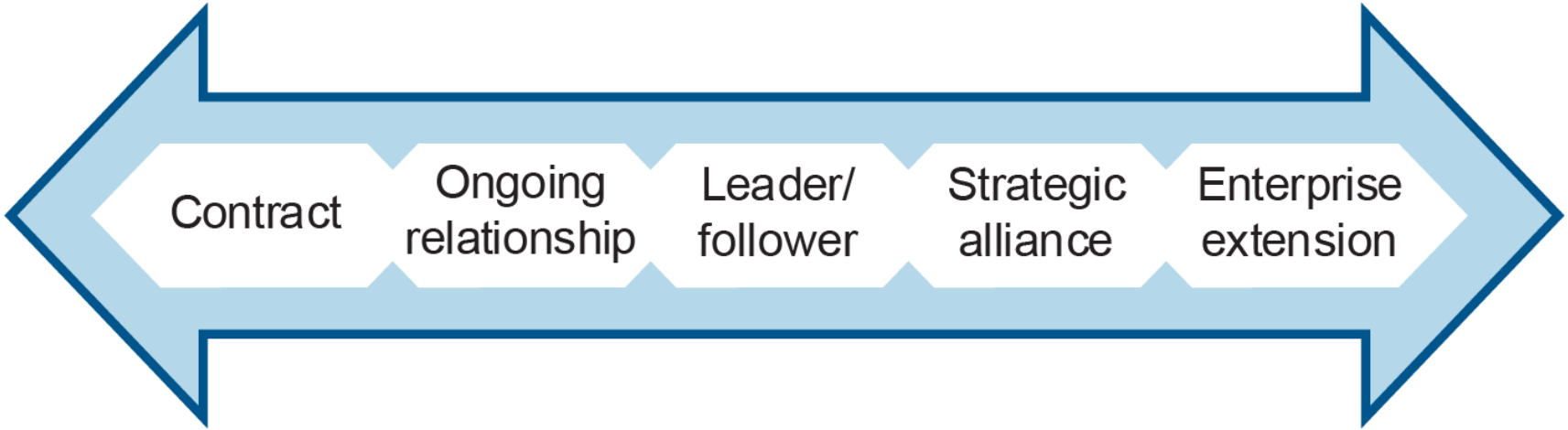
- Focus on postponing movement as long as possible.

Flexible

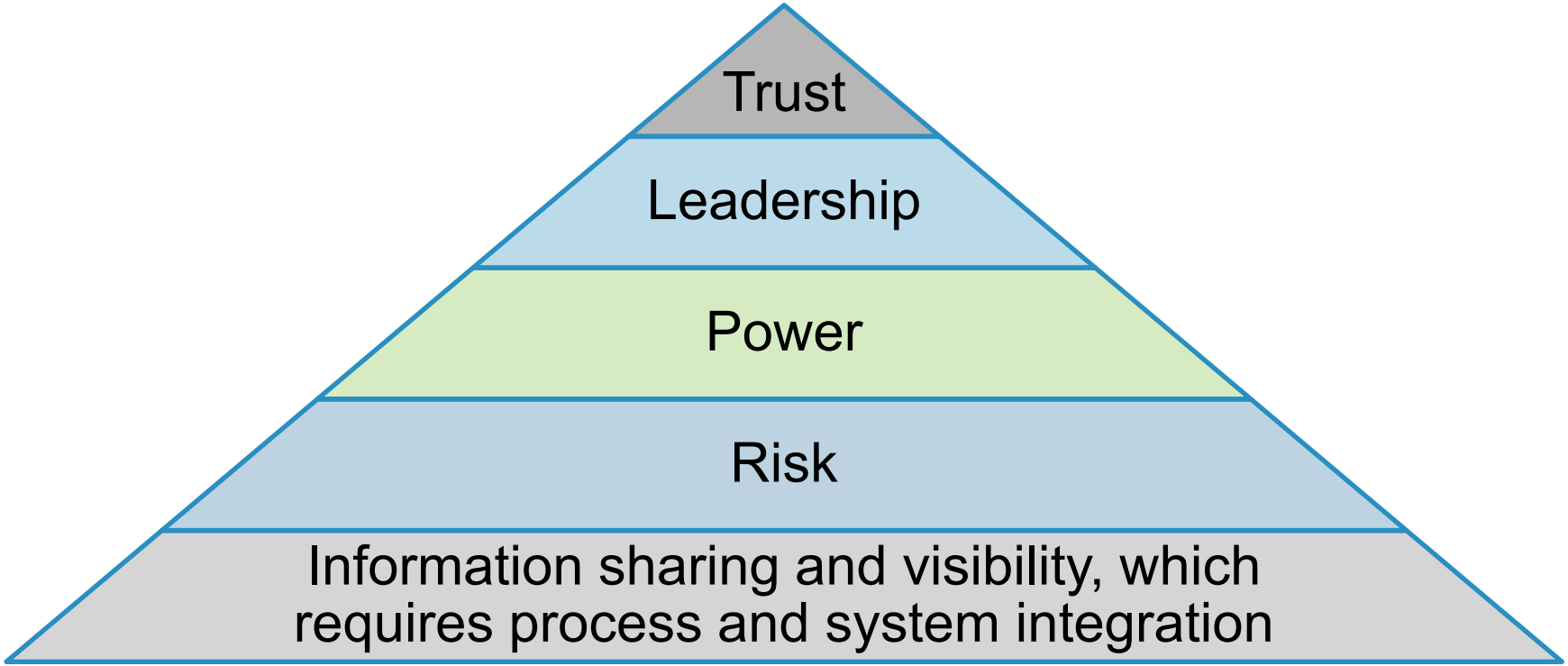
- Customer service level: fulfill from further as needed.
- Cross-docking

Relationships Types Fall on a Spectrum

From arm's length… to collaboration or integration.



Developing Relationships



Recognize Logistics Relationships and Interdependencies

Initiating, Maintaining, and Terminating Relationships

- New and deepening relationships are at critical points.
- Invest time in analysis and project planning.
  - Less risk of failure
  - More benefits
- Maintain exit plan. Reasons for termination:
  - Unprofitable cost pressure
  - Failure to remedy service issues
  - Difference of opinions
  - Become competitors

Recognize Logistics Relationships and Interdependencies

Types of Collaboration

Horizontal collaboration

- Relationships between competitors or organizations doing parts of a process in parallel or sequence
- Shared logistics services through LSPs

Vertical collaboration

- Quick response (QR)
- Efficient consumer response (ECR)
- Collaborative planning, forecasting, and replenishment (CPFR®)
- Vendor-managed inventory (VMI)
- Demand-driven methodology (DDM)

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MODULE 9, SECTION B: COORDINATE STRATEGIC PERFORMANCE MANAGEMENT

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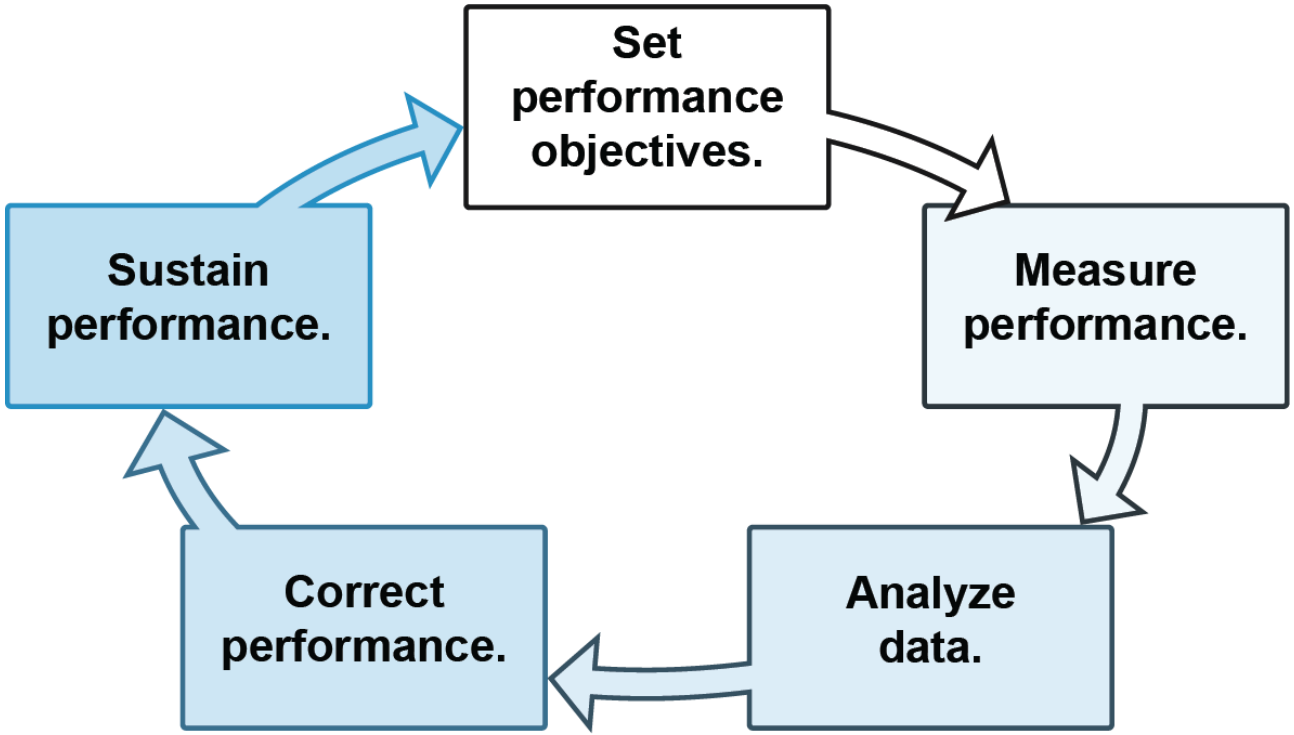
Uses of Performance Management

- Monitoring
- Controlling
- Directing

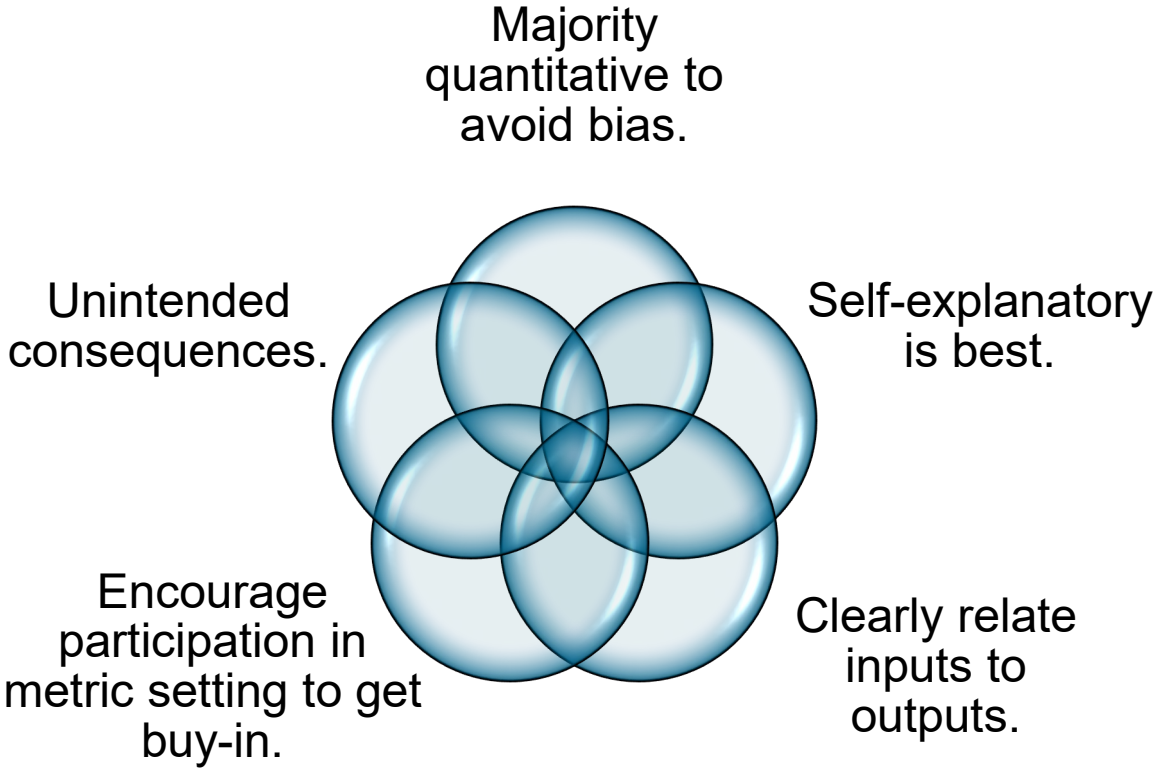
Performance Management Process



Other Ways to View Performance Objectives

Critical success factors	Value drivers	KPIs
▪ Results, actions, and processes that drive perceived value ▪ Focus is on customer	▪ Vital few metrics ▪ Link to organizational strategic goals ▪ Functional areas jointly determine ▪ Answer question: Am I focusing on my customer's needs?	▪ Measure attainment

Effective Metrics



Setting Performance Targets

Performance targets are set to equal or exceed a standard.

Sources for standards:

- Historical standards
- Predetermined or public standards
- Work sampling
- Regression: effect of variables on time or cost

Measuring and Analyzing Performance

Validity and value of data are improved by standardization measures.

- Measure at same time points.
- Measure under similar conditions.
- Use tools for collection consistency and to enable drill-down.

Measuring and Analyzing Performance: Tools

Audit checklists

Balanced scorecards

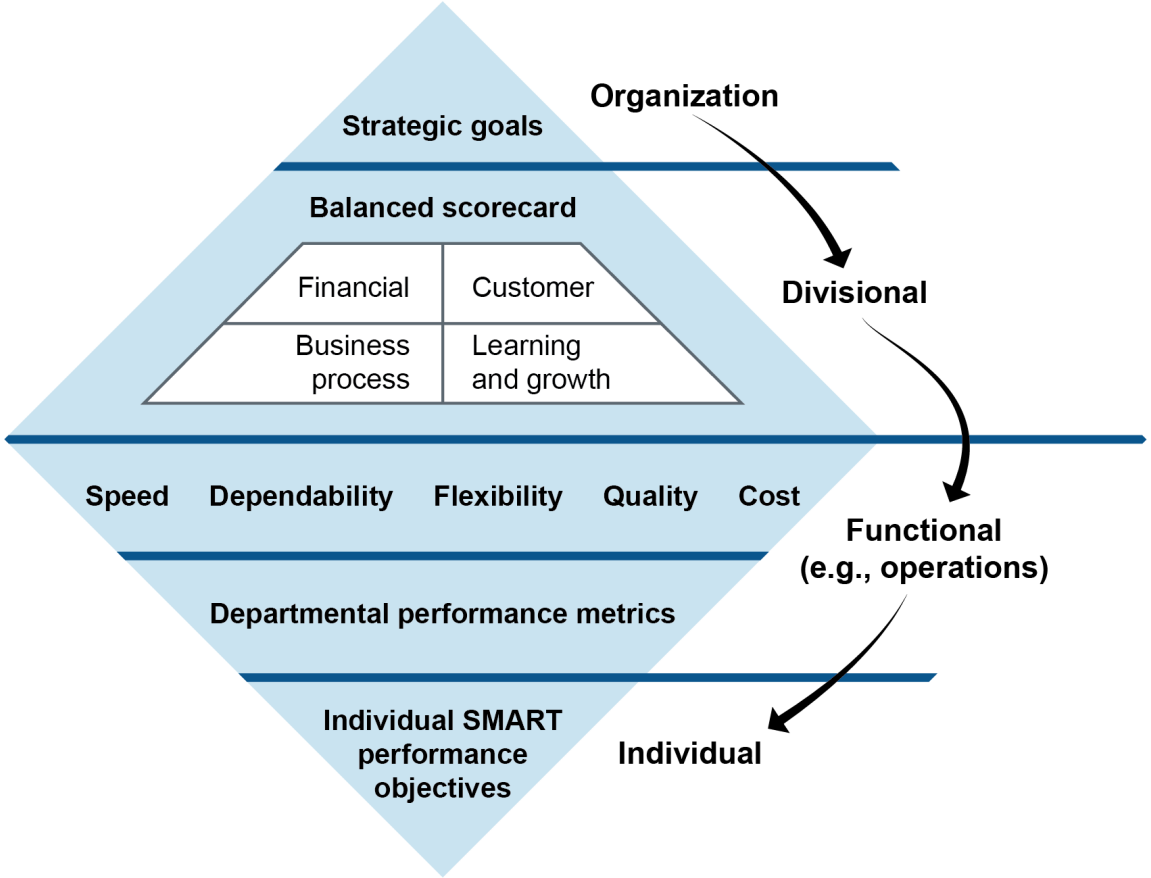
Dashboards

Key Performance Indicators (KPIs) and KPI Trees

- Measure only what is important.
- Avoid contradictory KPIs.
- Leading/lagging indicators, diagnostic metrics.
- KPI tree: Series of KPIs linked to be
  - Summary at higher levels: Contribution to shareholder value
  - More specific at lower levels: Root causes

Set Key Performance Indicators (KPIs)

Integrated Measurement Model

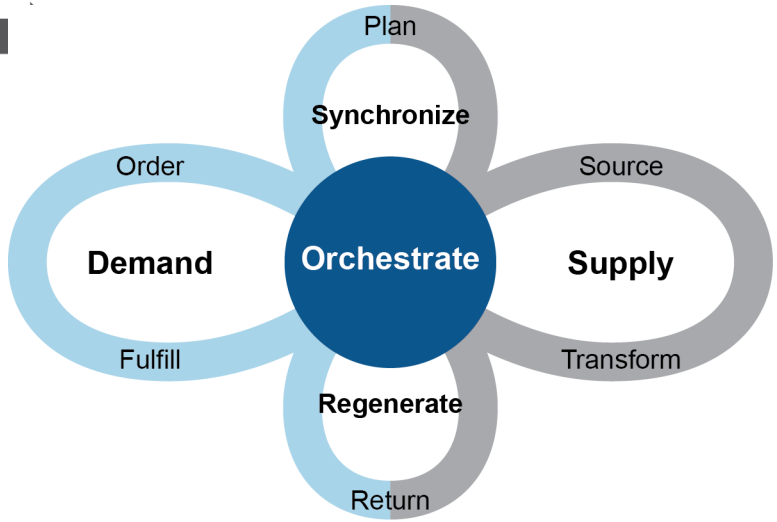


Consider SCOR DS and Digital Capabilities Models

SCOR DS

Source: ASCM, "Introduction to Supply Chain Management Using SCOR." Available from SCOR-DS website. Used with permission.

- Moving beyond linear supply chain depictions to supply networks
- Never-ending flow of processes with no artificial starts or ends
- scor.ascm.org



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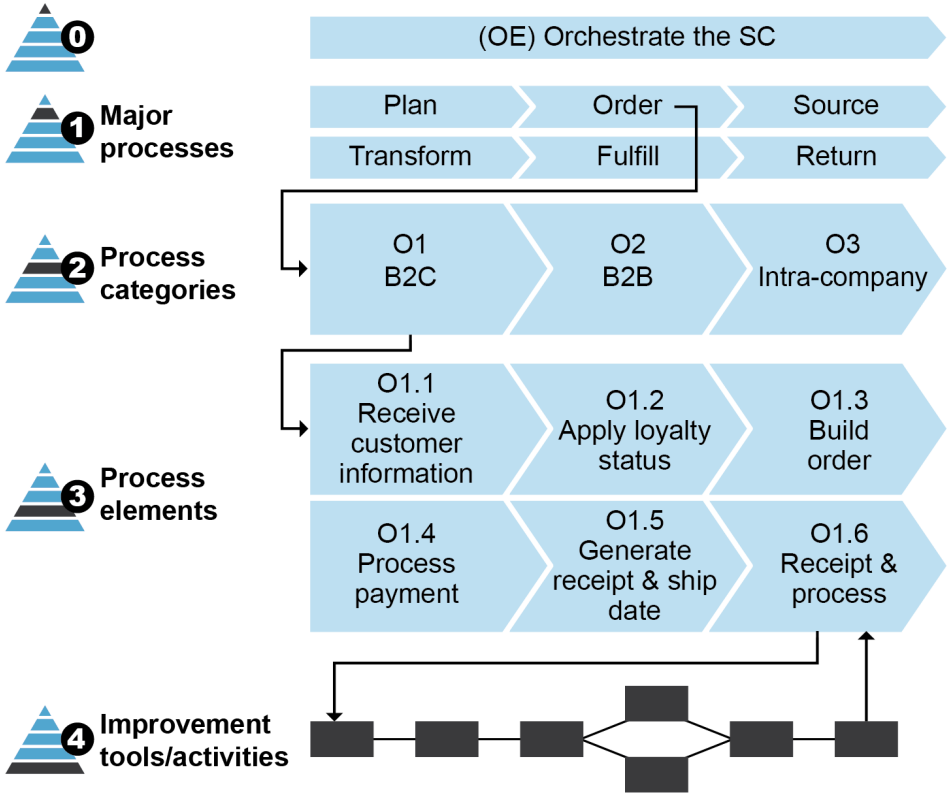
Consider SCOR DS and Digital Capabilities Models

SCOR DS Hierarchical Process Model

- Performance: levels 1 to 3 in KPI tree
- Level 4 is specified by organization but linked to higher levels



Defines the operations strategy; process capabilities are set.

Defines the configuration of individual processes. The ability to execute is set. Focus is on process, inputs/outputs, skills, performance, best practices, and capabilities.

Use of kaizen, lean, TQM, six sigma, benchmarking.

Source: SCOR DS. Copyright ASCM. Used with permission.

Consider SCOR DS and Digital Capabilities Models

SCOR DS Four Major Sections

Performance attributes	Processes	People	Practices

• Resilience
  • Reliability
  • Responsiveness
  • Agility
• Economic
  • Cost
  • Profit
  • Assets
• Sustainability
  • Environmental
  • Social
	• Management process standard descriptions
	• States
	  • As-is
	  • What-if
	  • To-be
		• Standard definitions
		  • Skills
		  • Experiences
		  • Training
		• Competency levels
			• Unique way to configure process
			• Pillars
			  • Analytics and technology
			  • Process
			  • Organization

Consider SCOR DS and Digital Capabilities Models

SCOR DS Resilience Performance Attributes

Performance Attribute	Definition
Reliability (RL)	"The ability to perform tasks as expected. Reliability focuses on the predictability of the outcome of a process. Typical metrics for the Reliability attribute include delivering a product on time, in the right quantity, and at the right quality level."
Responsiveness (RS)	"The speed at which tasks are performed and the speed at which a supply chain provides products to the customer. Examples include cycle-time metrics."
Agility (AG)	"The ability to respond to external influences and marketplace changes to gain or maintain a competitive advantage."

Consider SCOR DS and Digital Capabilities Models

SCOR DS Economic Performance Attributes

Performance Attribute	Definition
Costs (CO)	"The cost of operating the supply chain processes. This includes labor costs, material costs, and management and transportation costs."
Profit (PR)	"The Profit attribute describes the financial benefit realized when the revenue generated from the business activity exceeds the expenses, costs, and taxes involved in sustaining the activity."
Assets (AM)	"The ability to efficiently utilize assets. Assets' strategies in a supply chain include inventory reduction and insourcing rather than outsourcing."

Consider SCOR DS and Digital Capabilities Models

SCOR DS Sustainability Performance Attributes

Performance Attribute	Definition
Environmental (EV)	"The Environmental attribute describes the ability to operate the supply chain with minimal environmental impact, including materials, water, and energy."
Social (SC)	"The Social attribute describes the ability to operate the supply chain aligned with the organization's social values, including diversity and inclusion, and training metrics."

Consider SCOR DS and Digital Capabilities Models

SCOR DS Performance Metrics

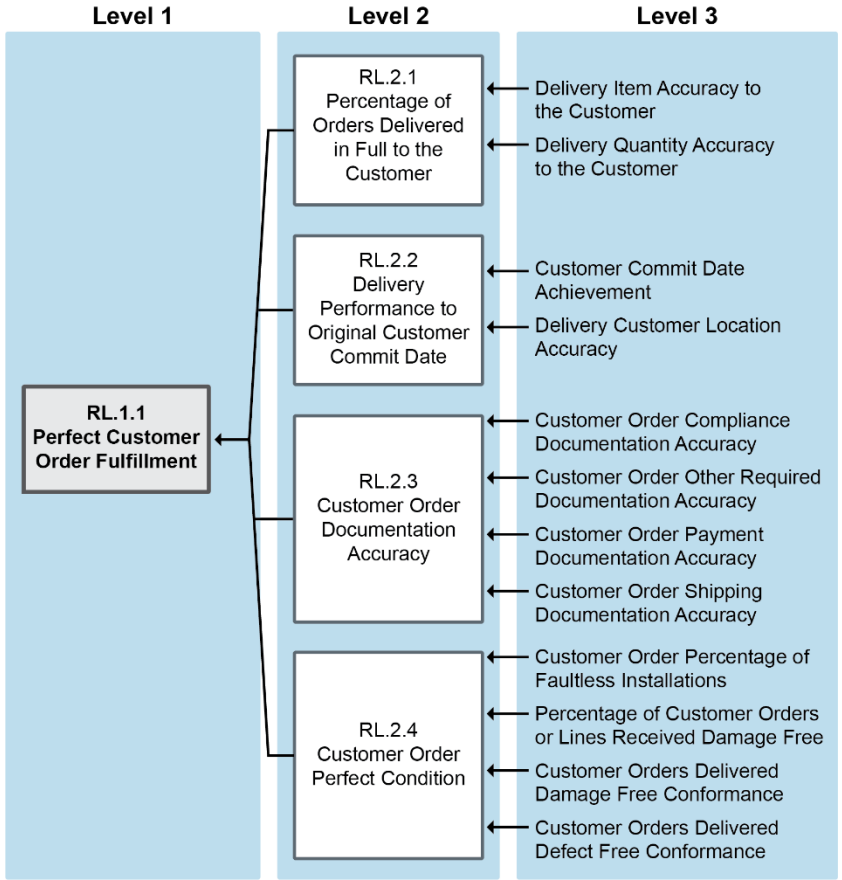
Resilience	Economic	Sustainability
Reliability • Perfect customer order fulfillment • Perfect supplier order fulfillment • Perfect return order fulfillment	Costs • Total supply chain management cost • Cost of goods sold	Environmental • Materials used • Energy consumed • Water consumed • Greenhouse gas (GHG) emissions • Waste generated
Responsiveness • Customer order fulfillment cycle time	Profit • Earnings before interest and taxes (EBIT) as a percent of revenue • Effective tax rate	
Agility • Supply chain agility (strategic or operational)	Assets • Cash-to-cash cycle time • Return on fixed assets • Return on working capital	Social • Diversity and inclusion • Wage level • Training

Consider SCOR DS and Digital Capabilities Models

SCOR DS KPI Trees

Perfect Customer Order Fulfillment =

$$\frac{\text{Total Perfect Orders}}{\text{Total Number of Orders}}$$



Consider SCOR DS and Digital Capabilities Models

Digital Capabilities Model for Supply Networks

Capability	Description	SCOR DS Linkages
Connected customer	Inspire at start of customer life cycle; service at the end.	Order, orchestrate
Product development	Do proactive product life-cycle management.	Orchestrate
Synchronized planning	Leverage human and process capabilities for planning efficiency.	Plan, orchestrate
Intelligent supply	Leverage technologies to reduce costs.	Source, orchestrate
Smart operations	Digital transformation for connectivity, agility, and proactivity.	Transform, orchestrate
Dynamic fulfillment	Add order fulfillment speed and agility.	Fulfill, return, orchestrate

Financial Performance Ratios

Strategic Profit Model Example 1

Net Profit Margin × Asset Turnover

$$ROA = \frac{\text{Net Profit}}{\text{Total Assets}} = \left(\frac{\text{Net Profit}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Total Assets}}\right)$$

	A	B	C	D	E	F	G	H	I	J
1									USD 1,000	Net Sales
2							USD 200	Gross Profit =	USD 800	- Cost of Goods Sold
3									USD 80	Variable Expenses
4					USD 60	Net Profit =	USD 140	- Total Expenses =	USD 60	+ Fixed Expenses
5			0.06	Net Profit Margin =	USD 1,000	Net Sales				
6	0.143	Return on Assets =							USD 180	Inventory
7			2.38	x Asset Turnover =	USD 1,000	Net Sales			USD 40	+ Accounts Receivable
8					USD 420	Total Assets =	USD 280	Current Assets =	USD 60	+ Other Current Assets
9							USD 140	+ Fixed Assets		
10										
11	0.143	Return on Assets =	USD 60	Net Profit						
12			USD 420	Total Assets						

Strategic Profit Model Example 2

Reduction in inventory, carrying cost, and net sales

	A	B	C	D	E	F	G	H	I	J
1									USD 990	Net Sales
2							USD 190	Gross Profit =	USD 800	- Cost of Goods Sold
3									USD 70	Variable Expenses
4					USD 60	Net Profit =	USD 130	- Total Expenses =	USD 60	+ Fixed Expenses
5			0.061	Net Profit Margin =	USD 990	Net Sales				
6	0.158	Return on Assets =							USD 140	Inventory
7			2.61	x Asset Turnover =	USD 990	Net Sales			USD 40	+ Accounts Receivable
8					USD 380	Total Assets =	USD 240	Current Assets =	USD 60	+ Other Current Assets
9							USD 140	+ Fixed Assets		

Benchmarking

- Competitive: Apples to apples
- Best-in-class: Inspire
- Process: Qualitative checklists
- Internal: Replicate local success

Benchmarking Tools: SCORmark example

- Versus competitors
  - Superior: >90%
  - Advantage: >70%
  - Parity: >50%
- Benchmark metrics readily available, e.g.,
  - SCORmark: Compare against 1,000 organizations and 2,000 supply chains.

Attribute	Metrics	Target Performance	Your Organization	Parity (50%)	Advantage (70%)	Superior (90%)	Gap to Target
Reliability	Perfect customer order fulfillment	Advantage	70%	X 77%	85%	93%	-15%
Responsiveness	Customer order fulfillment cycle time	Parity	6	9.1	7 X	4	3.1
Agility	Supply chain agility, strategic (days)	Parity	35	X 30	25	20	-5
Cost	Total supply chain management cost (% of revenue)	Advantage	8%	8.70% X	5%	2.40%	-3%
Profitability	EBIT (as a % of revenue)	Parity	16%	14%	X 17%	20%	2%
Assets	Cash-to-cash cycle time (days)	Superior	52	55.4 X	30.5	0	-52
Environmental	Waste generated (metric tons)	Parity	14.3	X 13.4	11.2	9.2	-0.9
Social	Training (hours per year)	Advantage	80	X 82.1	91.5	100.1	-11.5

X Your organization

Source: Adapted from SCOR-Professional Training. Used with permission. Values are for example only.

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MODULE 9, SECTION C: FACILITATE FACILITIES PLANNING AND NETWORK DESIGN

APICS

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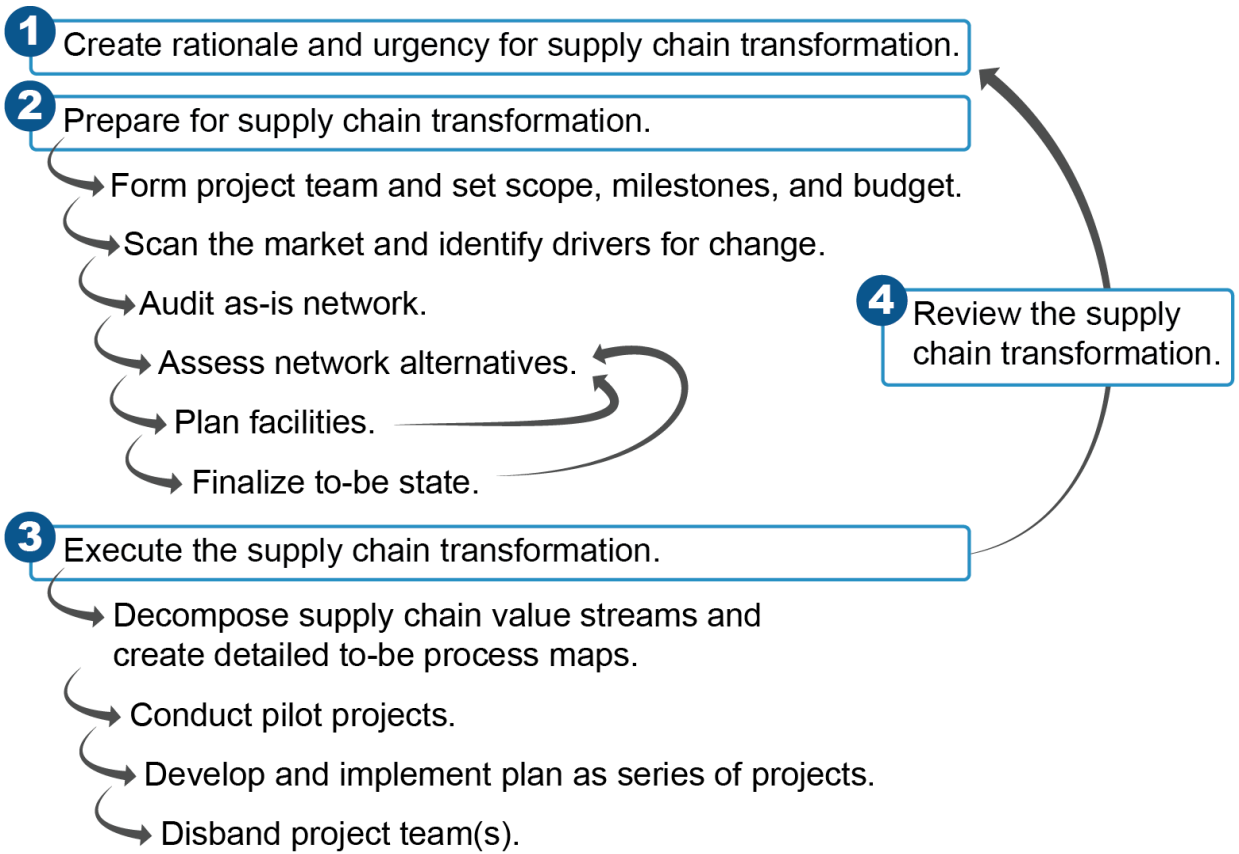
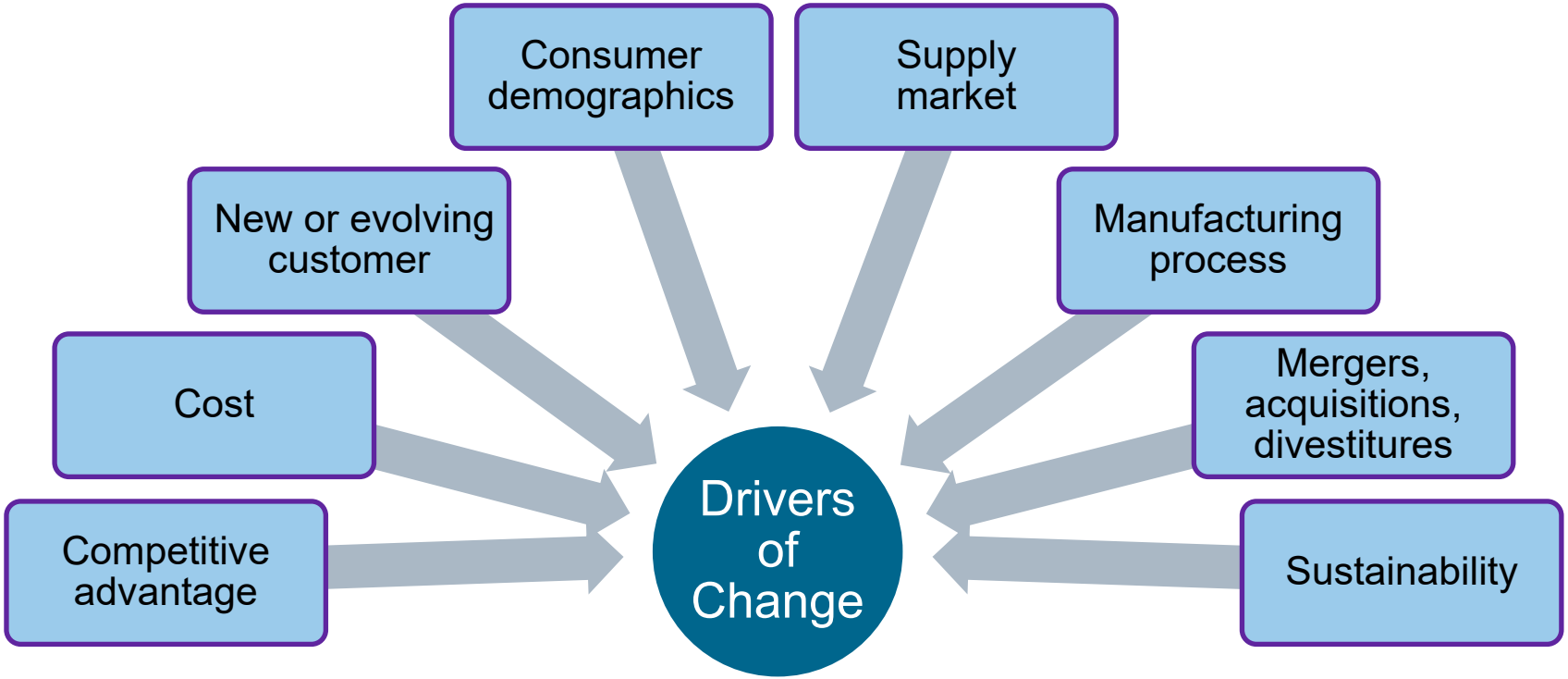
Design or Redesign a Logistics Network

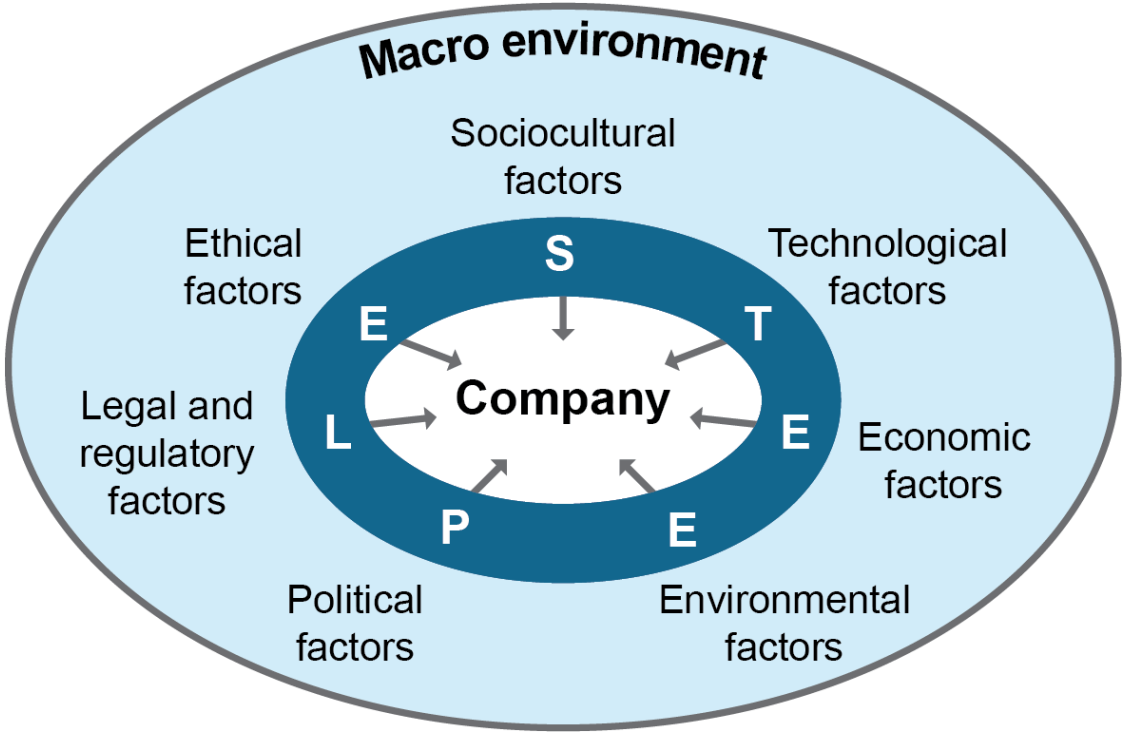
Design Process



Common Drivers of Change

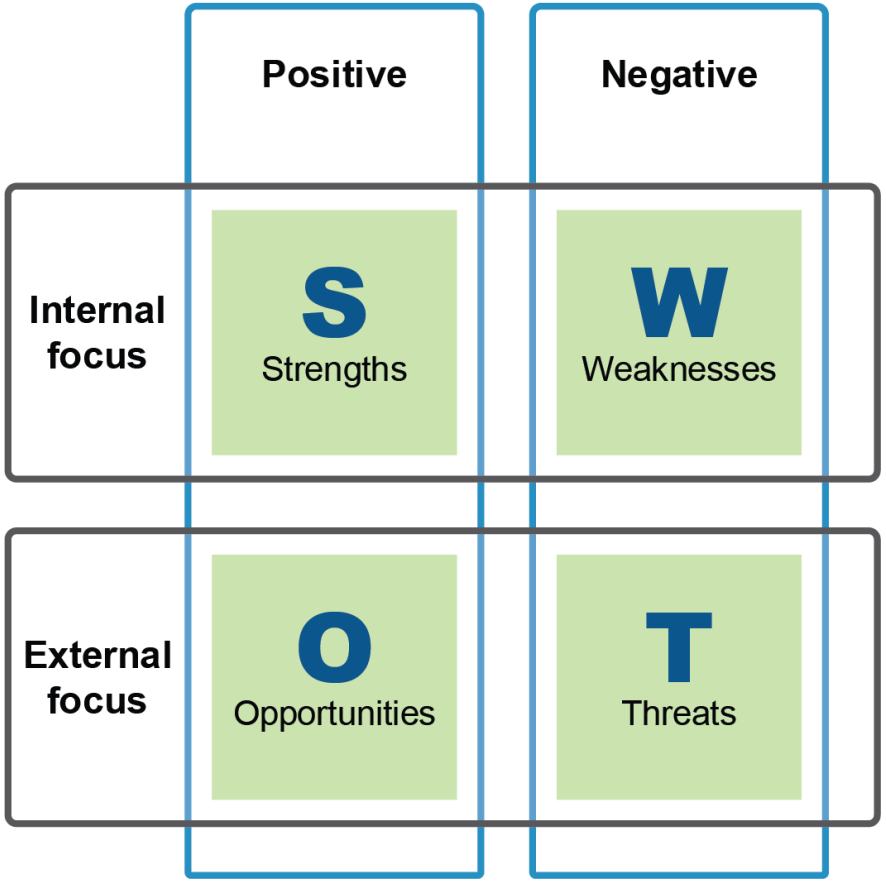


Scanning the Market: STEEPLE



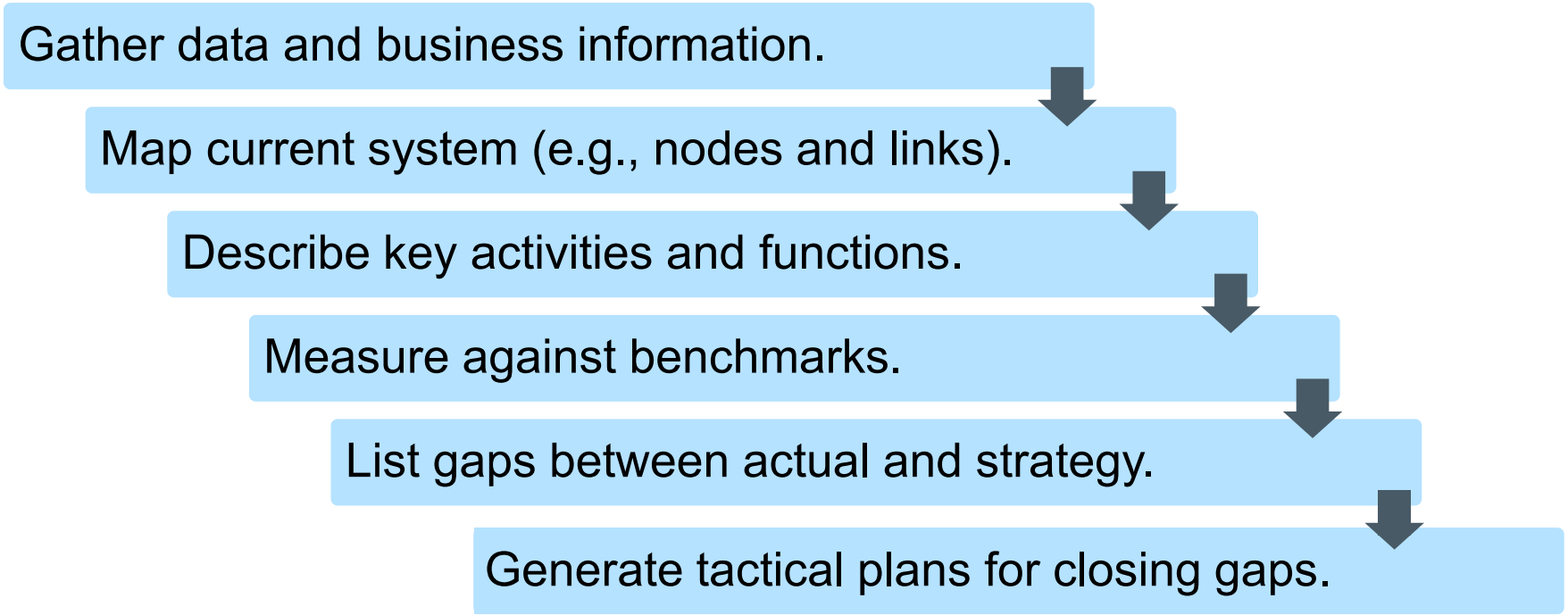
Design or Redesign a Logistics Network

SWOT



Design or Redesign a Logistics Network

As-Is Audit Steps



Design or Redesign a Logistics Network

As-Is and To-Be Maps

Evaluate Network and Transportation Requirements

Design Supply Chain Strategy with End in Mind

Low-cost	**Cost:** superior; **assets** and **reliability:** advantage; parity for rest
Customer with high demand variability	**Agility:** superior; **responsiveness** and **reliability:** advantage; **efficiency areas:** parity
Project-driven customers	**Reliability:** superior; **agility** and **responsiveness:** advantage; **efficiency areas:** parity
Customer-supplier long-term partnership	**Profit:** superior; **reliability** and (for example) **sustainability:** advantage; parity for rest
Customers needing innovative or emergency capacity	**Agility:** superior; **responsiveness** and **assets:** advantage; parity for rest

Evaluate Network and Transportation Requirements

Determine Servicing Expectations

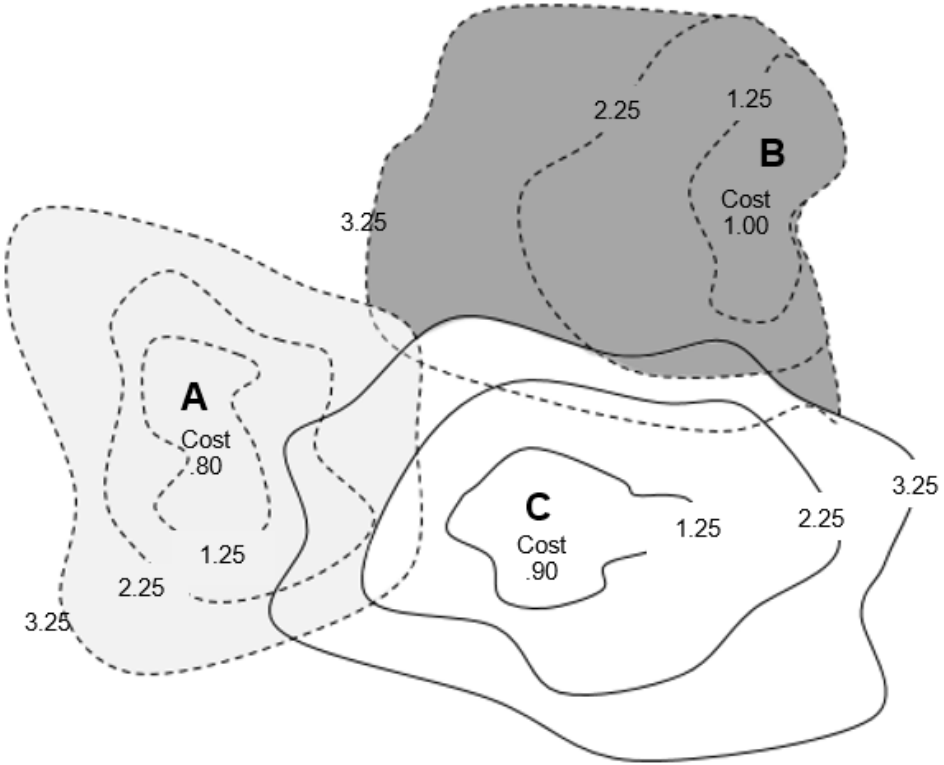
Why is information on customers' acceptable lead times or network servicing frequency so important to network design?

Answer:

Dictates number of distribution centers (DCs) that will be needed.

Evaluate Network and Transportation Requirements

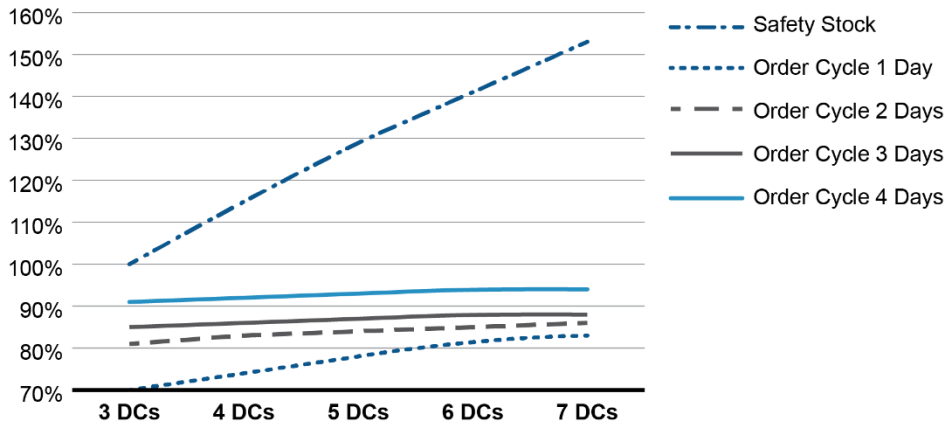
Economic Cost Map



Evaluate Network and Transportation Requirements

Sensitivity Analysis

Order Cycle Durations More Reliable with More DCs



Maister's Square Root Rule

- New Aggregate Safety Stock $= \sqrt{\frac{\text{Future Total DCs}}{\text{Existing DCs}}} \times$ Existing Aggregate Safety Stock
- From 3 to 4 DCs $= \sqrt{\frac{4}{3}} \times 100\% = 115\%$

Transportation Requirements Analysis

Average shipments per period. Inputs:

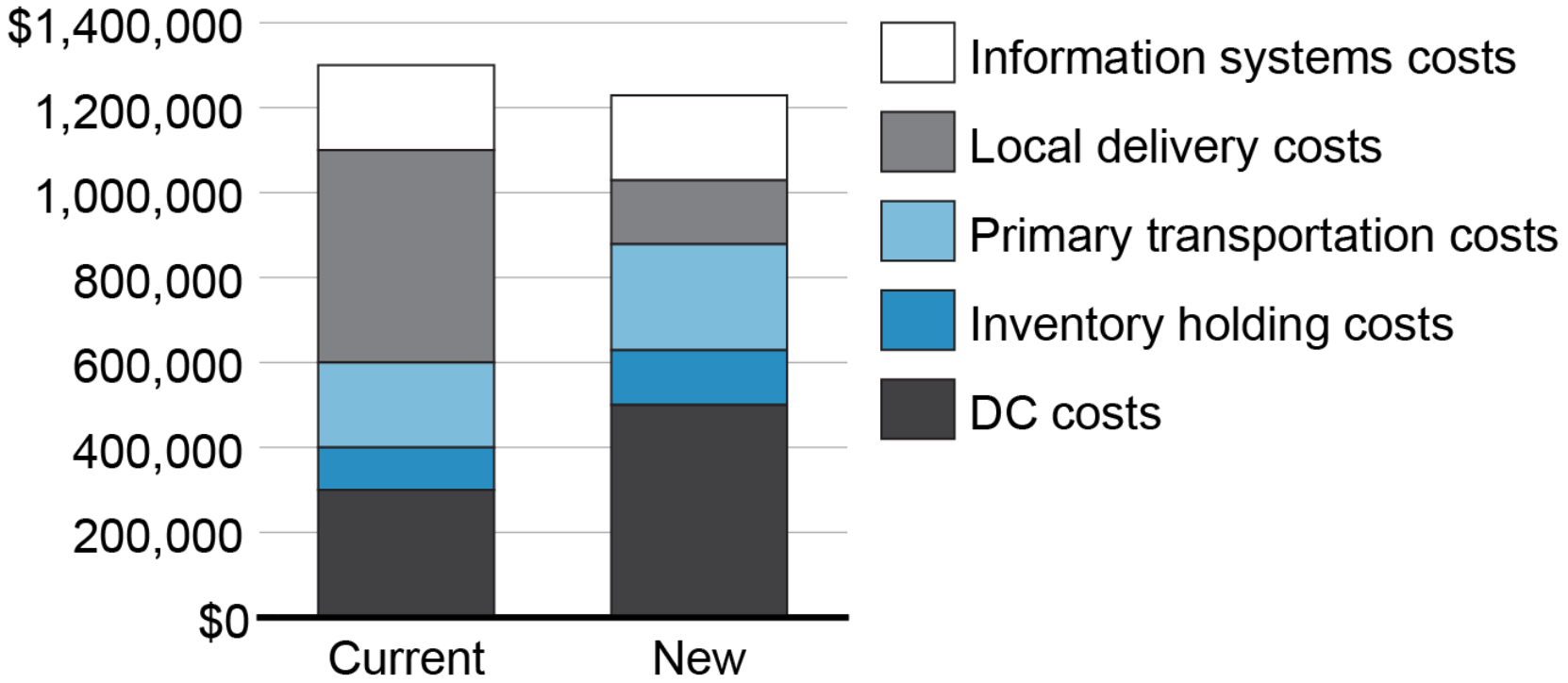
- Product family demand forecast
- Sales and marketing commitments

Aggregate network transportation requirements. Can break down:

- Requirements per mode with average rates
- Estimated proportion of full and partial loads
- Primary transportation and local delivery segments
- Lane volumes

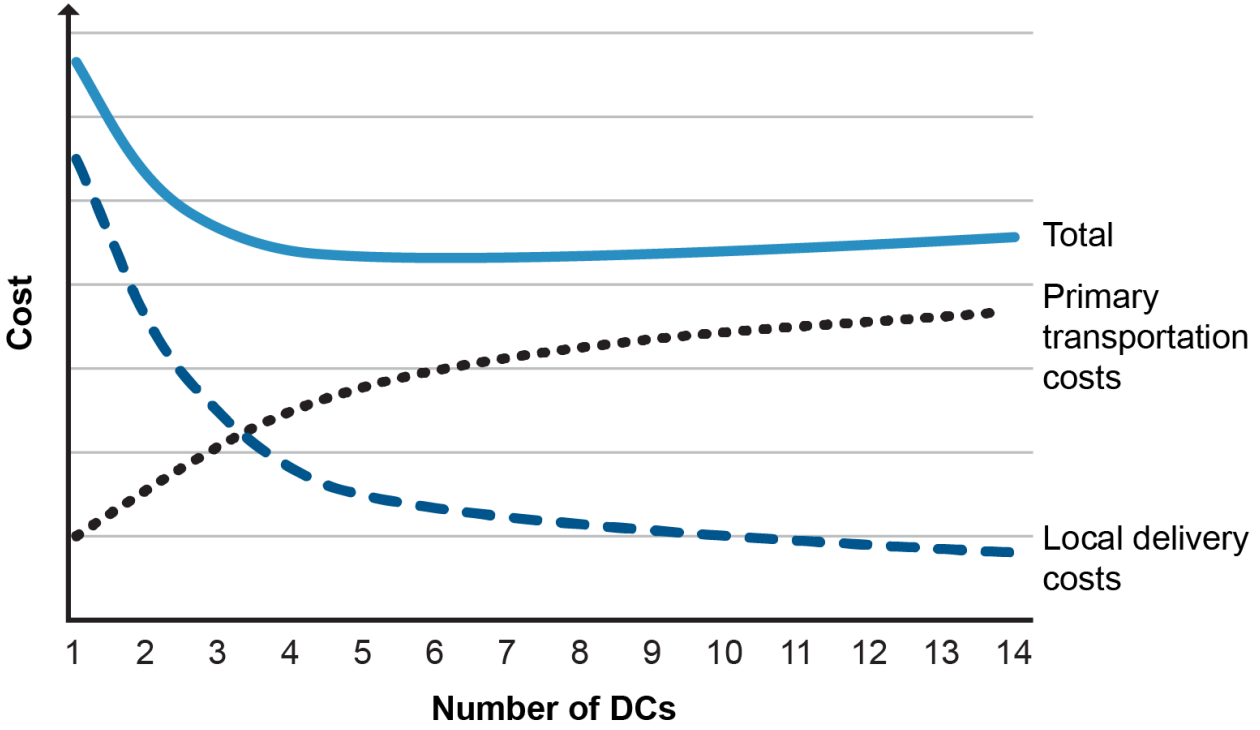
Evaluate Network and Transportation Requirements

Tradeoff Analysis



Evaluate Network and Transportation Requirements

Tradeoffs



Impact of DC Locations on Inventory Levels

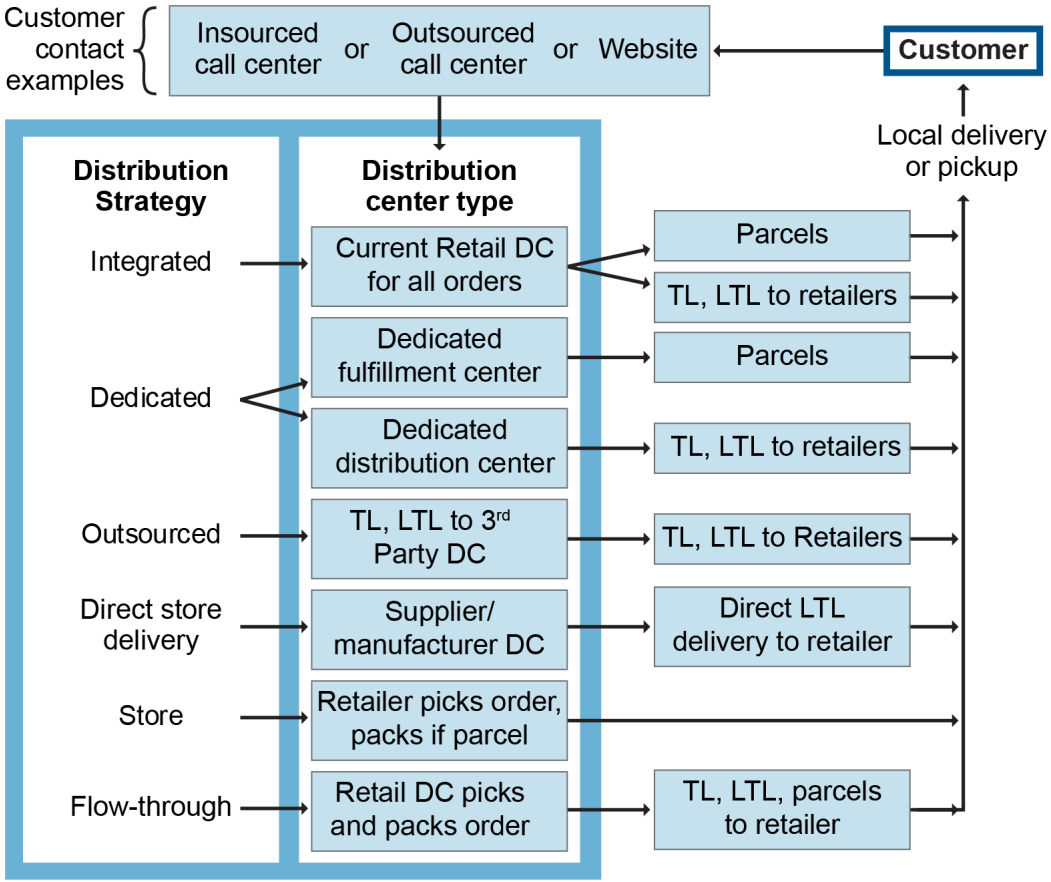
- Adding locations doesn't impact cycle stock.
- Safety stock rises, but rate slows.
  - Shorter outbound order cycle time, less variability, less need for safety stock.
- Less in-transit inventory.
- Increased inbound order cycle time and in-transit time.
- Average Aggregate Inventory =

$$\sum_{i=1}^{n} \frac{\text{Order Quantity}_i}{2} + \text{Safety Stock}_i + \text{In-Transit Inventory}_i$$

Evaluate Facility Requirements

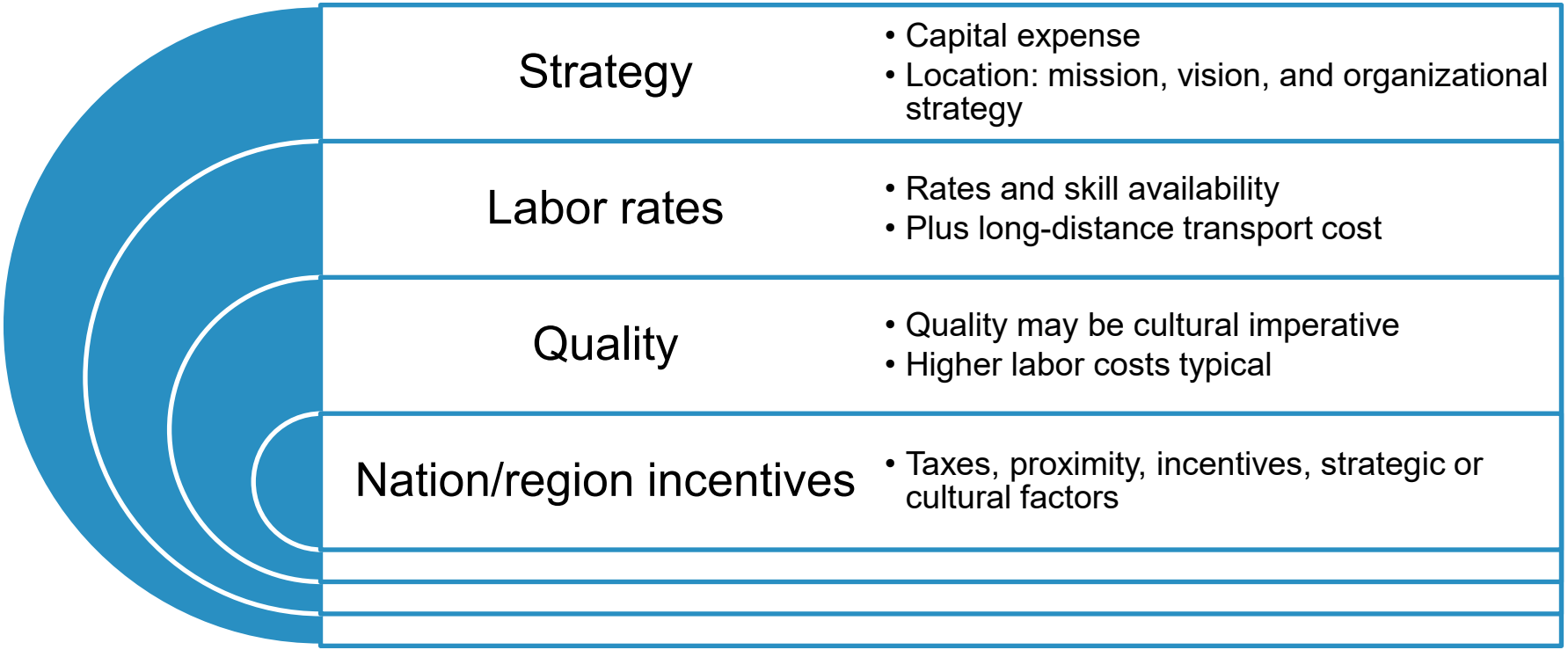
Types of Distribution Strategies, Distribution Networks, and Order Fulfillment Channels

- Distribution strategy: general goals
- Distribution network: Implementation
- Order fulfillment channel: Specific routes



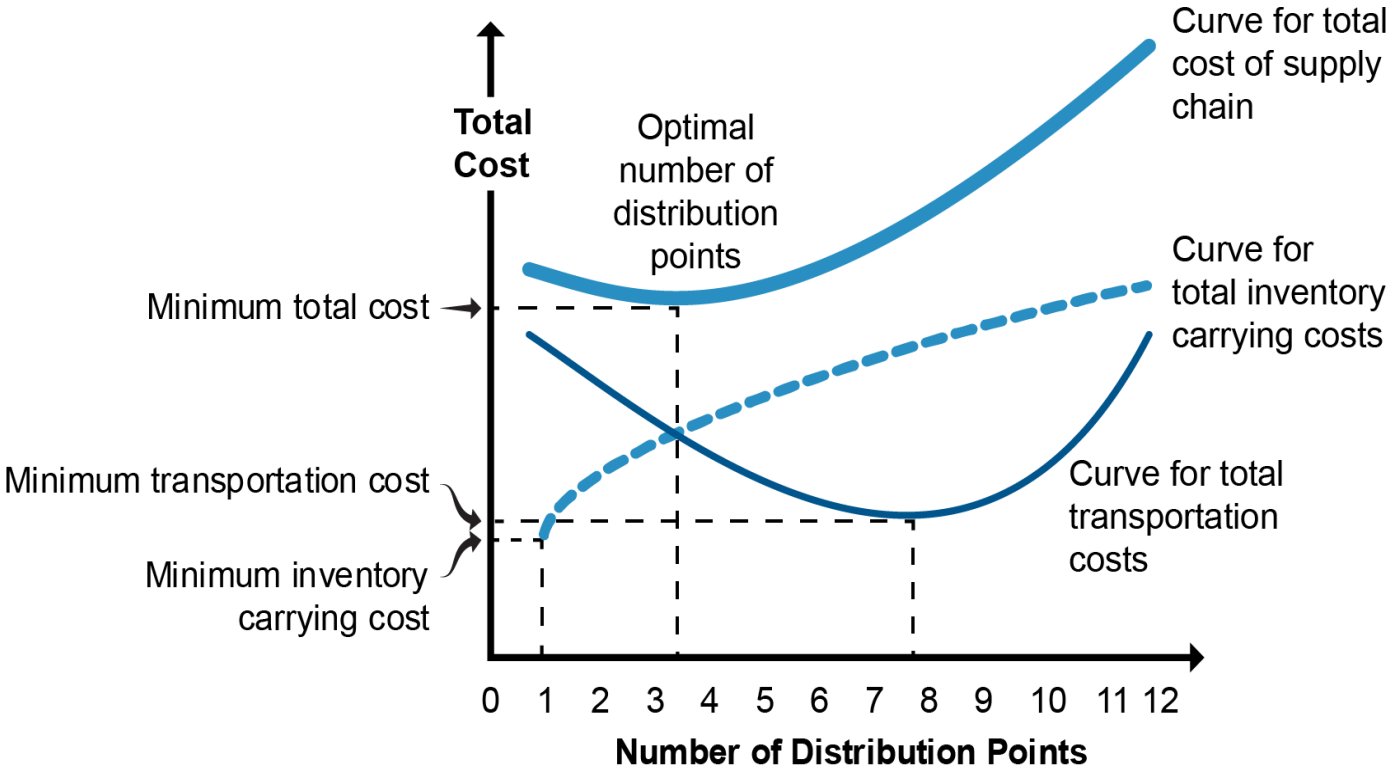
Evaluate Facility Requirements

Geographical Considerations and Factors



Make Facility Number, Type, and Location Decisions

Cost of Distribution Centers



Make Facility Number, Type, and Location Decisions

Deployment Considerations

Proximity

- Weight
- Fuel
- Average lead time
- Demographics

Specialty Types

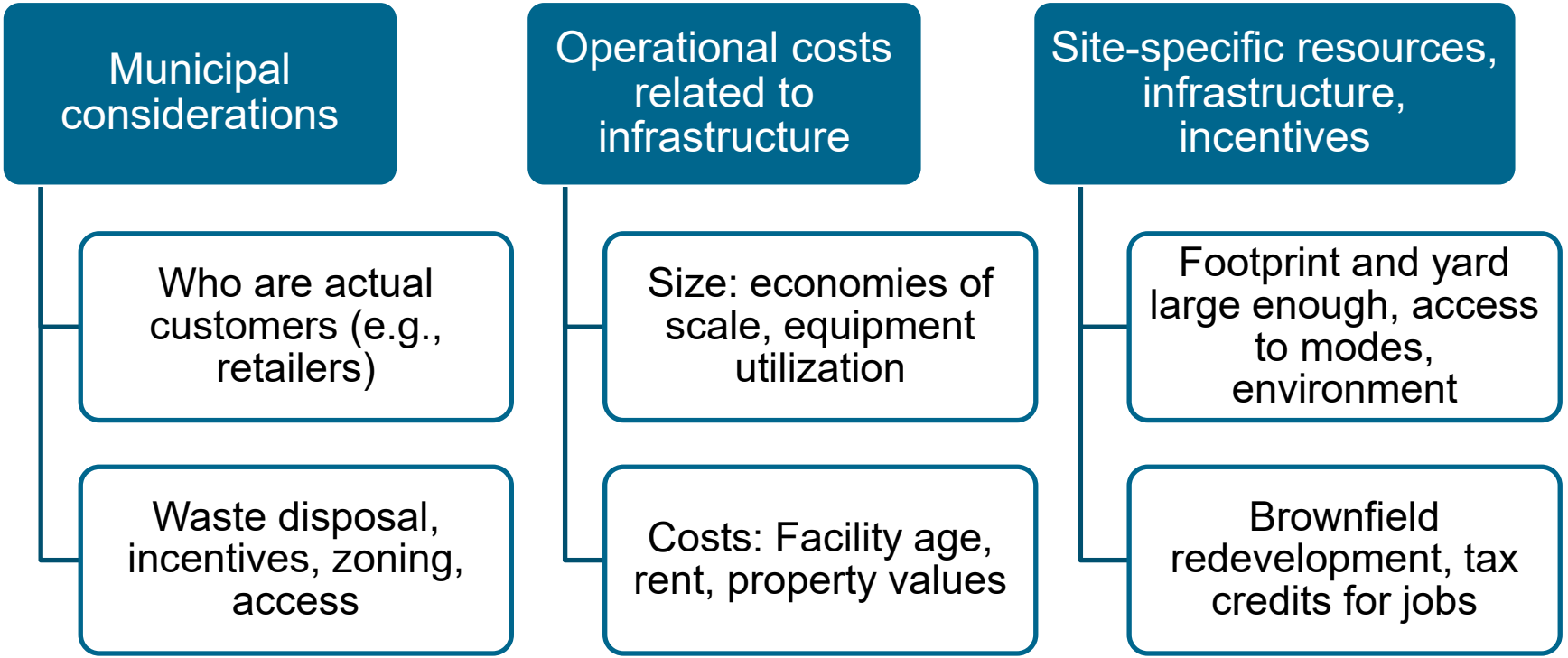
- Dangerous goods (hazmat)
- Reverse logistics
- Cold chain

Viable Alternatives

- E.g., cross-docking versus fulfillment, consolidation, or break-bulk
- Communications robust enough to cross dock?

Make Facility Number, Type, and Location Decisions

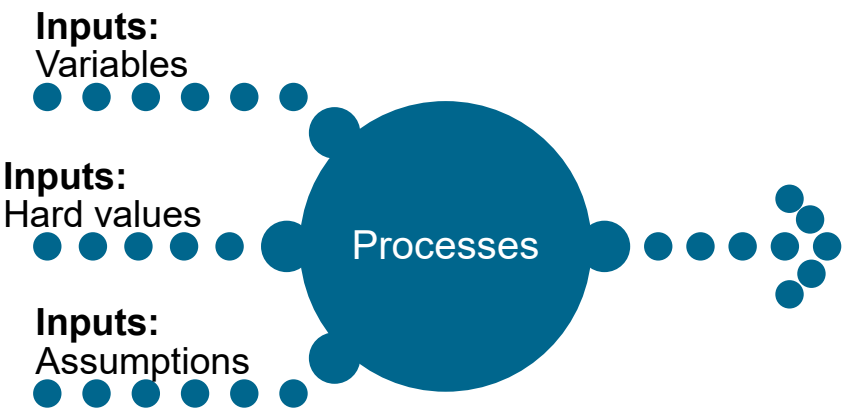
Site-Specific Considerations



Understand Different Network Modeling Approaches

Modeling Basics and Prerequisites

What is a model?



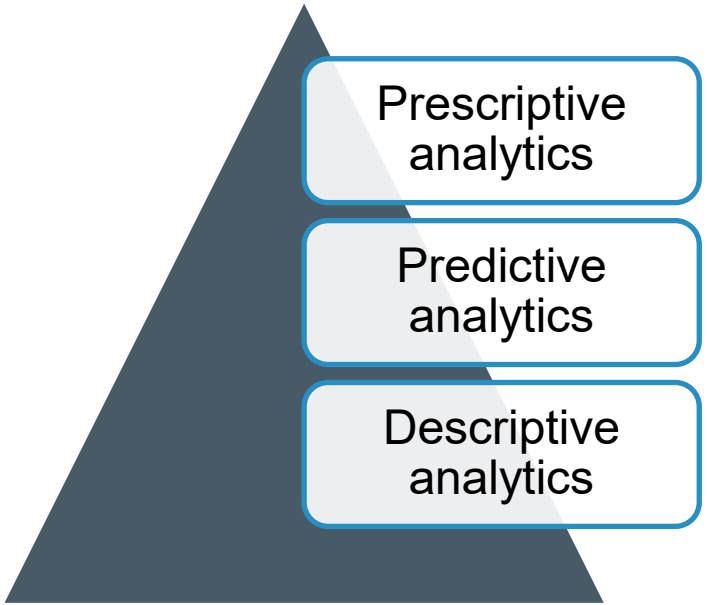
Prerequisites

- Data validation: automate
- Data integrity:
  - ALCOA (attributable, legible, contemporaneous, original, accurate)
  - GIGO
- Complexity and assumptions reviews
- Static or dynamic decision

Understand Different Network Modeling Approaches

Analytics and Heuristics

Analytics



Heuristics

- Problem solving
- Results or rules from experience or intuition (not optimization)
- Experiment to approximate
- Trade accuracy for speed
- Decision rules and math
- Examples:
  - Forecasting
  - Inventory levels
  - Staffing

Cost-Volume Analysis

- Total Cost = Fixed Cost + (Variable Cost × Volume)

What is the crossover point?

City	Fixed Costs	Variable Costs	Maximum Units	Total Cost at Maximum Units
Denver	$2,000,000	$615	26,000	$17,990,000
Seattle	$4,000,000	$385	26,000	$14,010,000
Los Angeles	$8,000,000	$115	26,000	$10,990,000

Cost-Volume Analysis Scenario

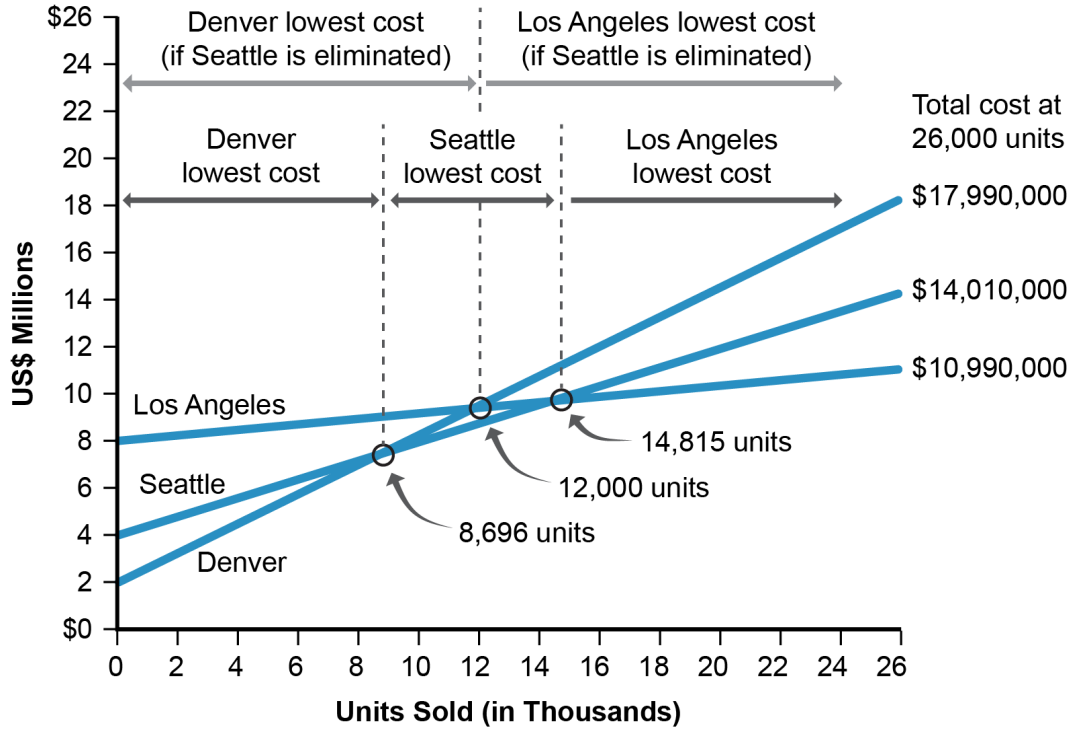
$$x = \frac{\text{Fixed Cost}_2 - \text{Fixed Cost}_1}{(\text{Variable Cost}_1 - \text{Variable Cost}_2)}$$

$$\text{Denver–Seattle Crossover Point} = \frac{\$4{,}000{,}000 - \$2{,}000{,}000}{(\$615/\text{Unit} - \$385/\text{Unit})} = \frac{\$2{,}000{,}000}{\$230/\text{Unit}} = 8{,}696 \text{ Units}$$

$$\text{Seattle–Los Angeles Crossover Point} = \frac{\$8{,}000{,}000 - \$4{,}000{,}000}{(\$385/\text{Unit} - \$115/\text{Unit})} = \frac{\$4{,}000{,}000}{\$270/\text{Unit}} = 14{,}815 \text{ Units}$$

$$\text{Denver–Los Angeles Crossover Point} = \frac{\$8{,}000{,}000 - \$2{,}000{,}000}{(\$615/\text{Unit} - \$115/\text{Unit})} = \frac{\$6{,}000{,}000}{\$500/\text{Unit}} = 12{,}000 \text{ Units}$$

Cost-Volume Analysis Graph



Understand Different Network Modeling Approaches

Other Modeling Methods

Weighted factor rating

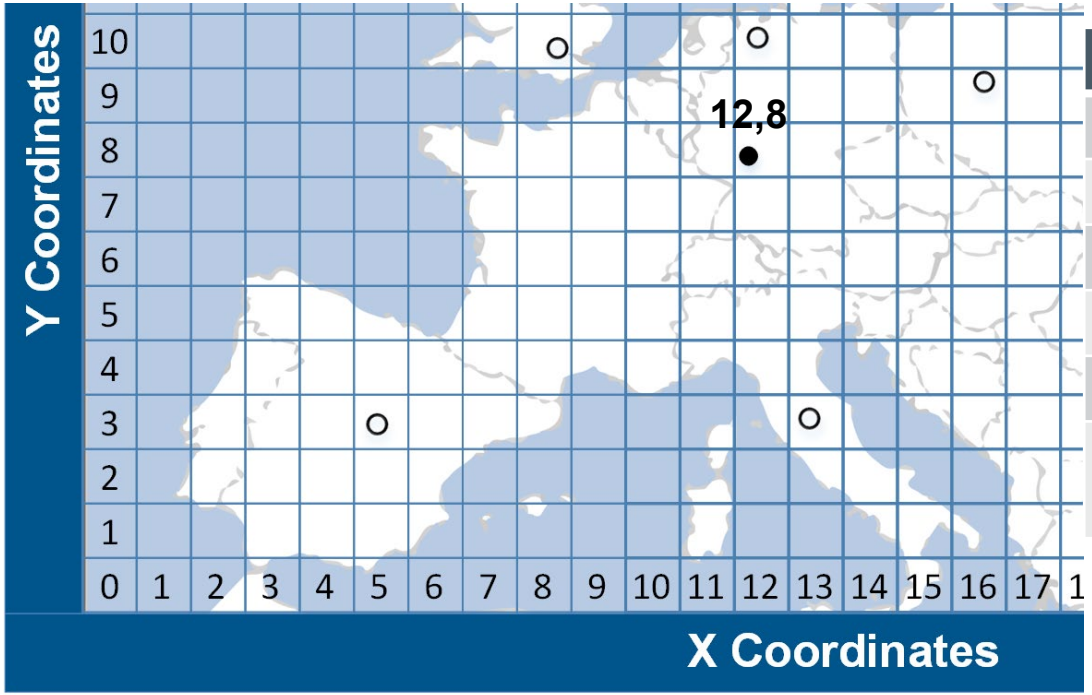
- Qualitative and quantitative
- Priority based on weight
- Weight × rating
- Find finalists and use other tools

Regression analysis

Independent variables predict dependent variable

Understand Different Network Modeling Approaches

Center-of-Gravity Map



Location	X	Y	Volume
London	8	10	8,000
Warsaw	16	9	9,000
Madrid	5	3	4,000
Hamburg	12	10	11,000
Rome	13	3	6,000
Center of gravity	12	8	38,000

Sum of volumes

X: Sum of each (*x* coordinate × volume) ÷ sum of volumes

Y: Repeat for *y* coordinates

Understand Different Network Modeling Approaches

Optimization

- Seeks optimum result.
- Changing any variable yields different answer.
- Significant improvement over heuristics.
- Number of DCs, location, own or lease, make-or-buy, postponement.
- Can use worksheet tools for simple problems.
- ERP systems have network optimization modules.

Understand Different Network Modeling Approaches

Simulation

Sensitivity analysis	Scenario analysis	Monte Carlo simulation
One change	“What-if”	Min-max

Validate Network Design Performance

Forecasting, Benchmarking, and Financial Performance

Forecasting	▪ Long-term forecast→ Logistics capacity ▪ New markets, economic conditions
Benchmarking	▪ Best in class ▪ Same industry or same process
Financial Performance Evaluation	▪ Budget/project accounting variances ▪ Savings/revenue offset cost of funds?

Validate Network Design Performance

Analytics for Supply Chain (Re)Design

Attribute	Metrics	Target Performance	Your Organization	Parity (50%)	Advantage (70%)	Superior (90%)	Gap to Target
Reliability	Perfect customer order fulfillment	Advantage	70%	X 77%	85%	93%	-15%
Responsiveness	Customer order fulfillment cycle time	Parity	6	9.1	7 X	4	3.1
Agility	Supply chain agility, strategic (days)	Parity	35	X 30	25	20	-5
Cost	Total supply chain management cost (% of revenue)	Advantage	8%	8.70% X	5%	2.40%	-3%
Profitability	EBIT (as a % of revenue)	Parity	16%	14%	X 17%	20%	2%
Assets	Cash-to-cash cycle time (days)	Superior	52	55.4 X	30.5	0	-52
Environmental	Waste generated (metric tons)	Parity	14.3	X 13.4	11.2	9.2	-0.9
Social	Training (hours per year)	Advantage	80	X 82.1	91.5	100.1	-11.5

X Your organization

Source: Adapted from SCOR-Professional Training. Used with permission. Values are for example only.

CLTD

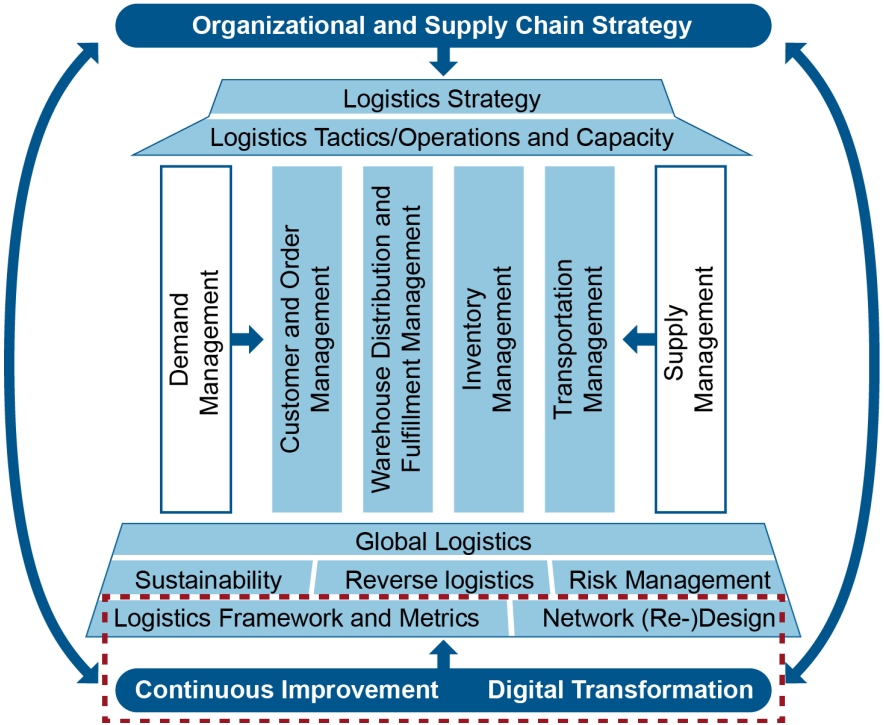
CERTIFIED IN LOGISTICS,
TRANSPORTATION AND DISTRIBUTION

MODULE 9, SECTION D:
COORDINATE DIGITAL TRANSFORMATION AND CONTINUOUS IMPROVEMENT

APICS

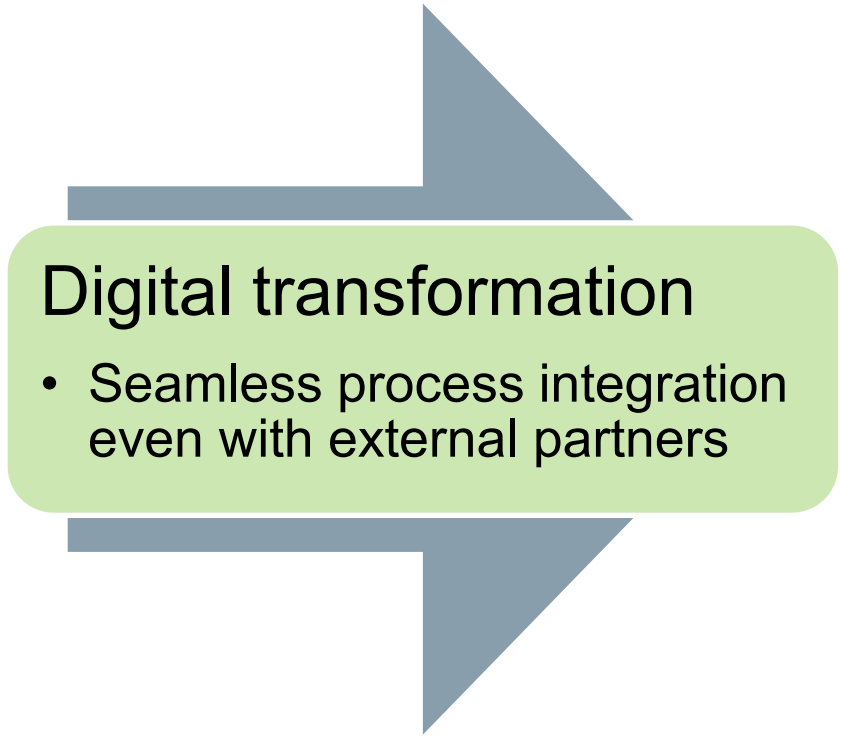
ascm

Digital Transformation and Reengineering



Digital Transformation and Reengineering

- Reengineering
  - Rethinking and redesign
  - Process emphasis
- Digitization: electronic version
- Digitalization: Adds efficient transaction
- Automation: Omits human intervention



Support Digital Transformation

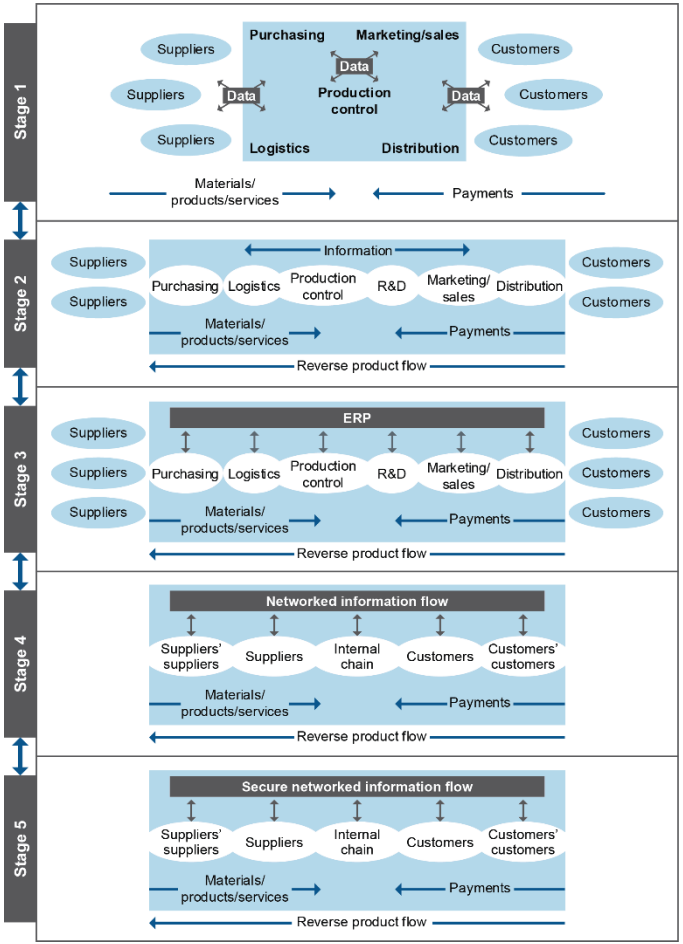
Fundamental Changes

- Outcomes not tasks.
- If use process: drive it.
- Capture data at source.
- Decision point where work done.
- Dispersed resources as if centralized.
- Sequential into parallel.
- Design for dominant flow.
- Postpone product.
- Resource pool to avoid suboptimization.
- No partner task duplication.
- Outsource non-core.

Support Digital Transformation

Supply Chain Maturity

- **Stage 1**—Multiple dysfunction
- **Stage 2**—Semifunctional enterprise
- **Stage 3**—Integrated enterprise
- **Stage 4**—Extended enterprise
- **Stage 5**—Orchestrated supply chain



Support Digital Transformation

Other Maturity Assessment Tools

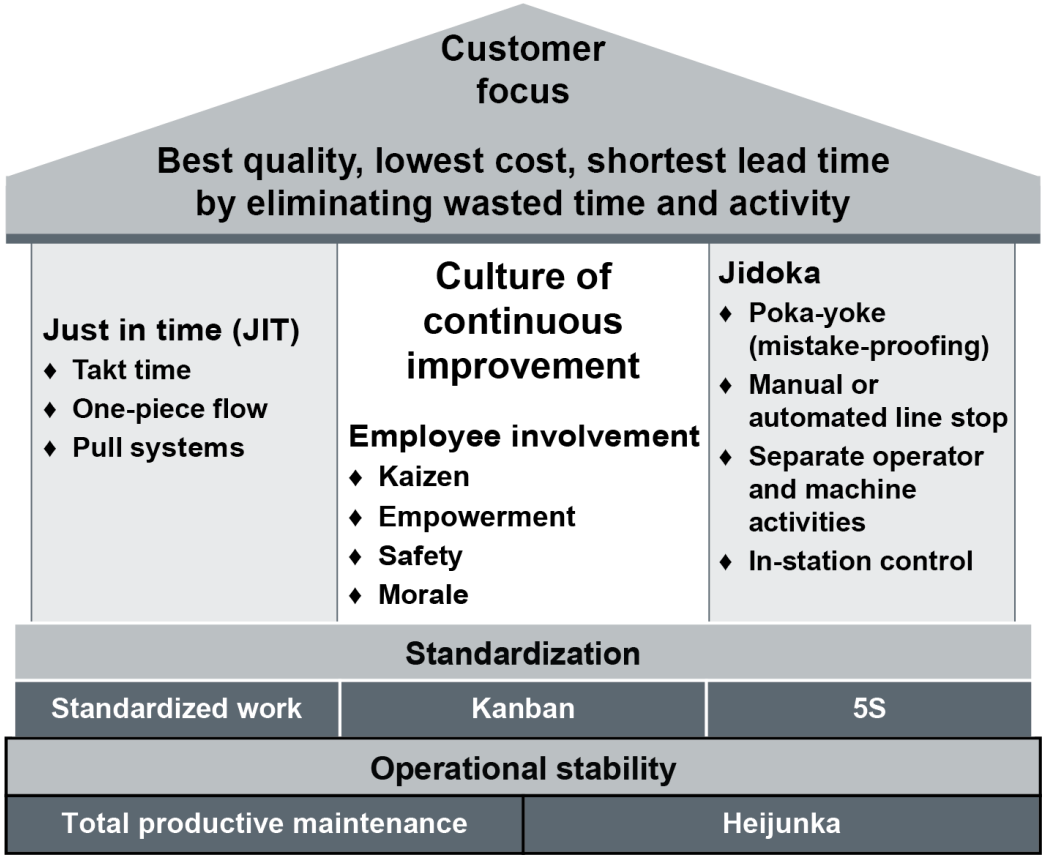
- PwCs maturity model for SCORmark
- Deloitte-TM Forum: customer, strategy, technology, operations, organization & customer
- Maturity models for specific industries
- DCM for Supply Networks
  - Connected customer
  - Product development
  - Synchronized planning
  - Intelligent supply
  - Smart operations
  - Dynamic fulfillment

Misalignment, Readiness, and Red Flags

Misalignment Areas	Assess Readiness	Identify Red Flags
▪ Unspoken disagreement ▪ Vague goals, financials ▪ No support or resource commitment ▪ Fragmented supply chain strategies ▪ No technology plan	▪ Culture plays strong role in ability to transform. ▪ Resistance to change ▪ Times of struggle ▪ Technology maturity ▪ People	▪ Decision-making bias ▪ Poorly training users ▪ Cultural issues

Explore Methodologies Requiring Digital Transformation

Lean



Lean Objectives

1. Make only products and services customers want.
2. Match production rate to demand rate.
3. Make with perfect quality.
4. Make with shortest possible lead times.
5. Include only features in demand, excluding the rest.
6. Keep labor, equipment, materials, and inventory in motion, with no waste or unnecessary movement.
7. Build learning and growth into each activity.

Explore Methodologies Requiring Digital Transformation

Lean's Eight Forms of Waste

Transportation

Excessive movement of people, things, information

Inventory

Storage of materials prior to demand signal

Motion

Unnecessary handling, walking, driving, bending, lifting, reaching, turning

Waiting

Idle time caused by lack of direction, instructions, information, parts, equipment

Overproduction

Make more than immediately required

Overprocessing

Higher-grade materials or tighter tolerances than required

Defects

Scrap, rework, erroneous documentation

Skills

Worker underutilization or empowerment beyond capabilities

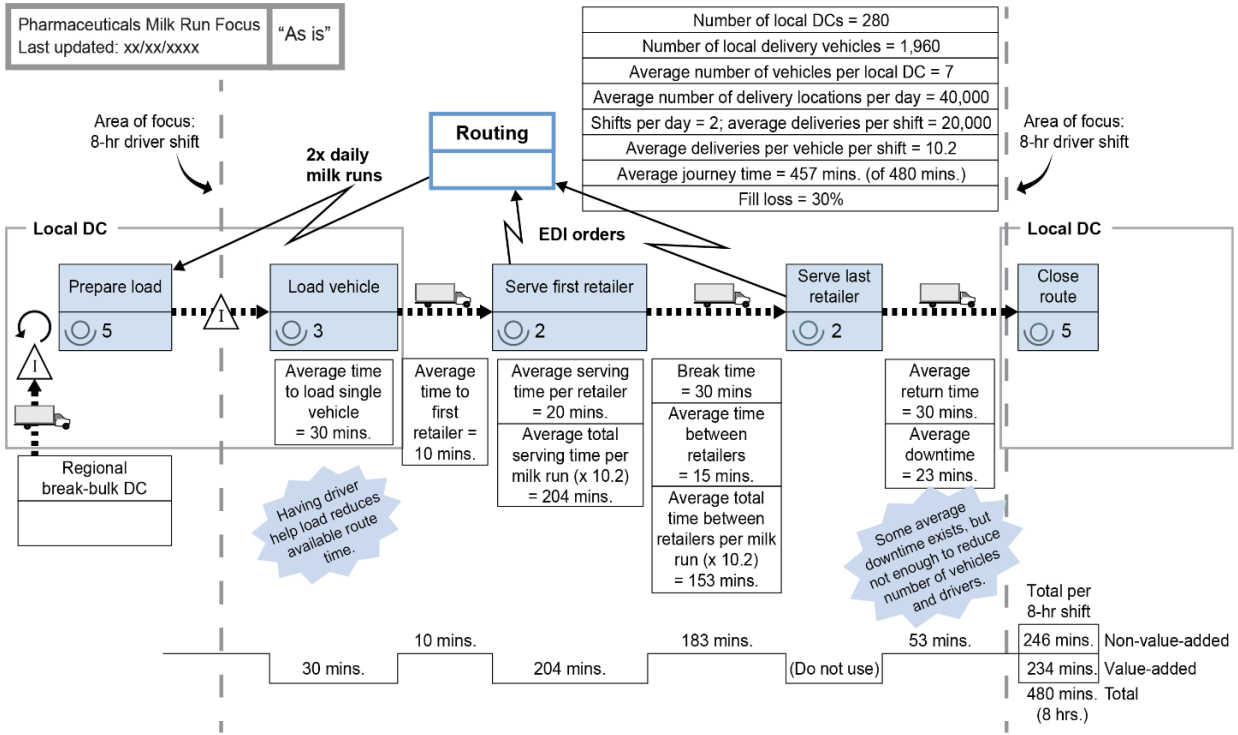
Lean Problem-Solving Approach to Waste

Look for waste and a cause-and-effect relationship in three major areas:

- Muda
  Activities that consume resources but create no customer value
- Mura
  Demand or activities that are inconsistent or uneven
- Muri
  Overburdening of workers or processes

Explore Methodologies Requiring Digital Transformation

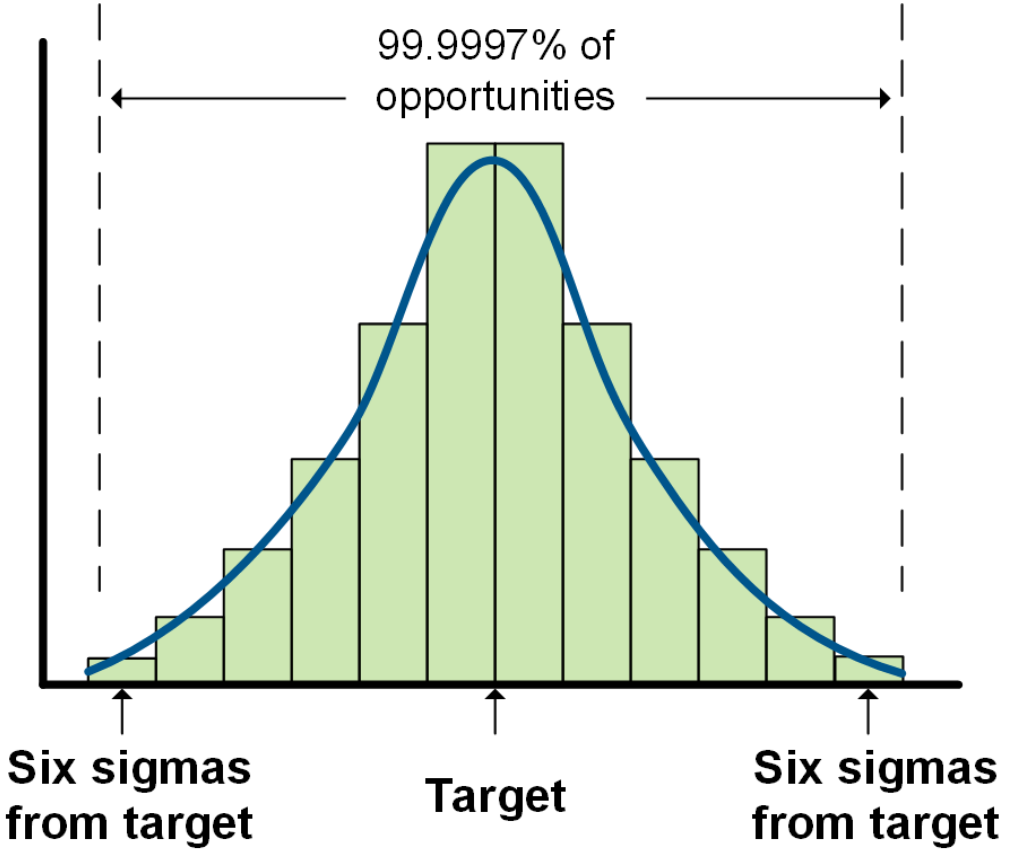
Lean Tool: Value Stream Mapping



Explore Methodologies Requiring Digital Transformation

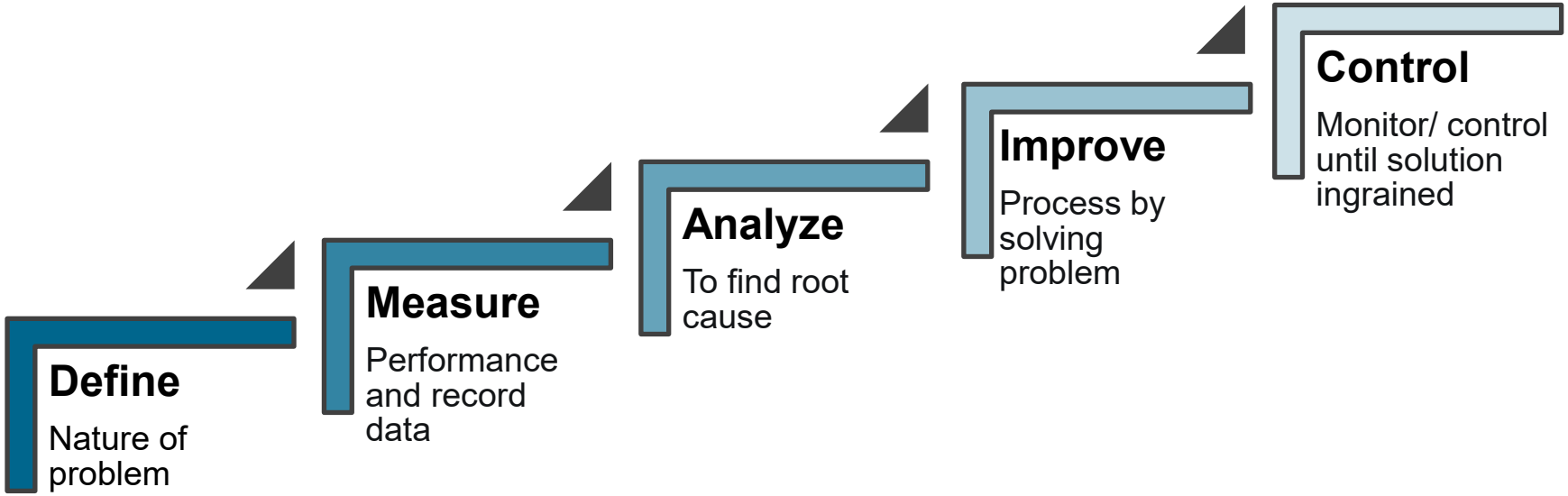
Six Sigma

Limit of 3.4 defects per million "opportunities"



Explore Methodologies Requiring Digital Transformation

DMAIC Process to Generate Lasting Results



Creating a Culture of Continuous Improvement

Continuous process improvement

- Incremental, regular improvements
- Expose, eliminate root causes of problems
- Small-step improvement
- Results in a week or two
- Part of ongoing operations

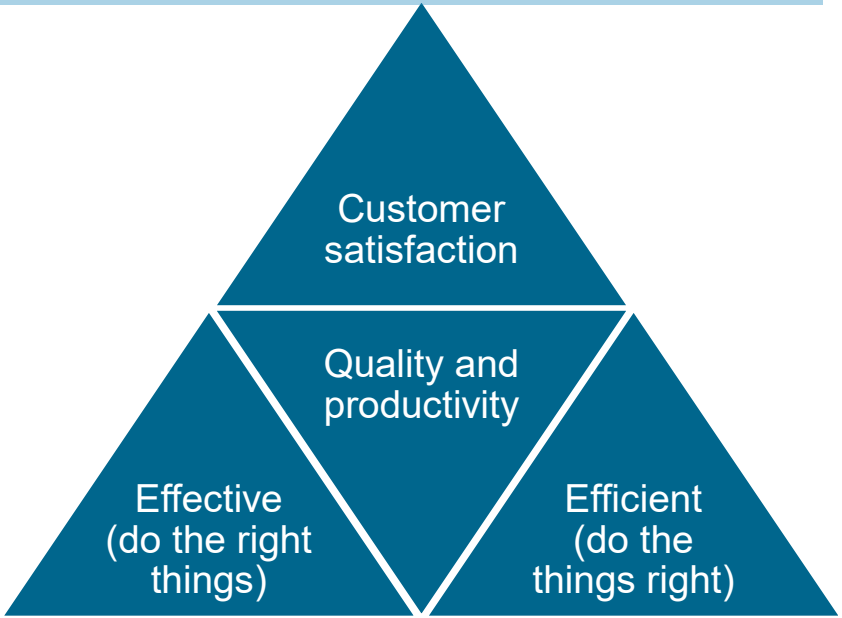
Continuous improvement culture

- Involves everyone
- Everyone empowered to eliminate waste
- Starts at top
- Replace hierarchy with learning/experimentation

Coordinate Continuous Improvement

Continuous Improvement Objectives/Cost of Poor Quality

Objectives



Cost of poor quality

"The costs associated with performing a task incorrectly and/or generating unacceptable output… include the costs of nonconformities, inefficient processes, and lost opportunities."

(ASCM Supply Chain Dictionary)

Continuous Process Improvement Steps

Plan-do-check-action (PDCA)

Continuous improvement cycle

- Determine process to improve.
- Gather as-is data.
- Analyze and make to-be.
- Select best alternative.
- Implement.
- Sustain.

Coordinate Continuous Improvement

Commonalities Among Continuous Improvement Methods

Ensuring employee involvement and empowerment	▪ Keep teams small, effective. ▪ Decisions, improving task, part of job. ▪ From “Do this” to “What do you think?”
Focusing on customer	▪ Customer ultimate definer of quality. ▪ Perceptions, willing to pay for. ▪ Internal customers, too.
Sustaining continuous improvement	▪ Small step is sustainable by design. ▪ Avoids being disruptive, exhausting. ▪ Always on to next problem.