CSCP CERTIFIED SUPPLY CHAIN PROFESSIONAL

MODULE 3: SOURCING PRODUCTS AND SERVICES

SECTION A: ALIGNING SOURCING TO DEMAND

APICS

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Section A Introduction

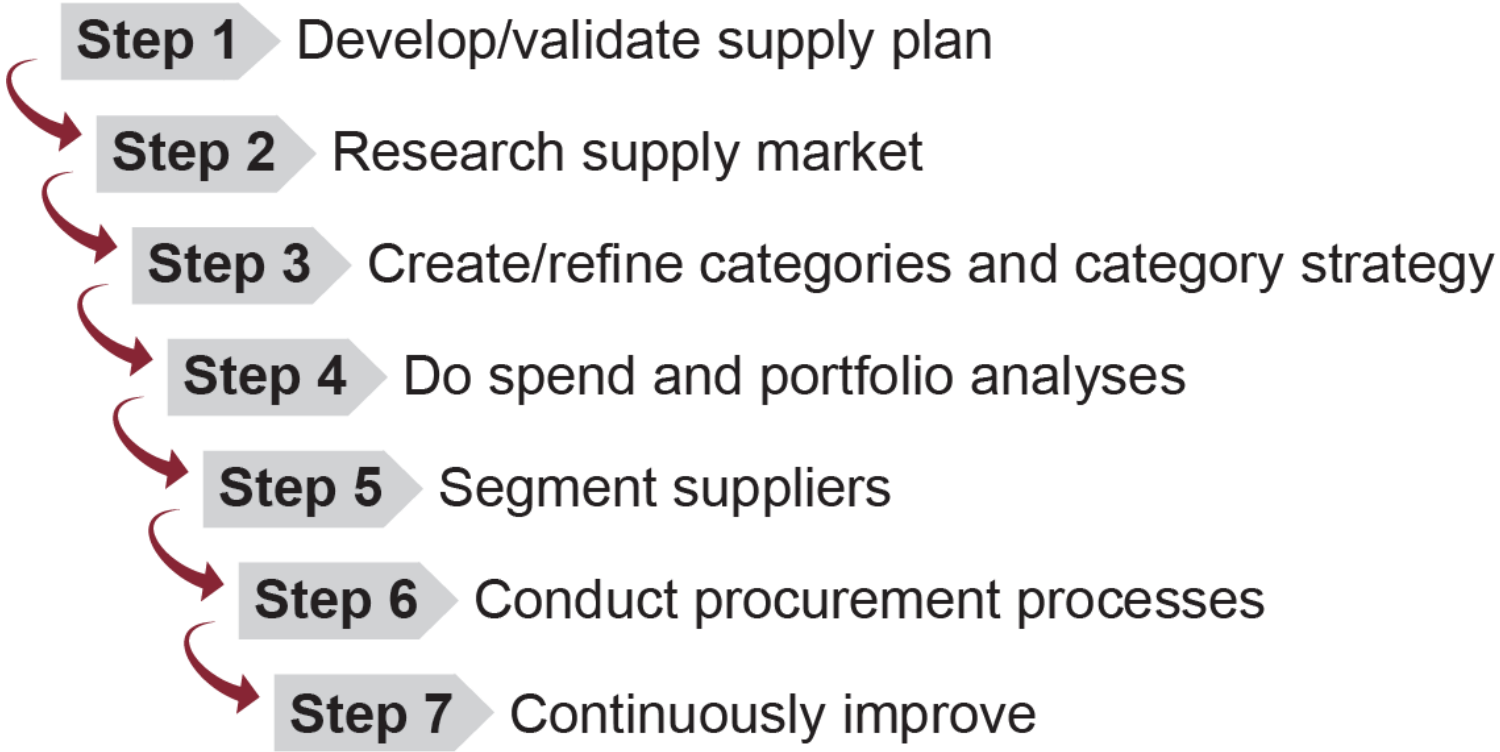
Section A Key Processes:

- Aligning sourcing activities to demand
  - Perform make-or-buy analysis.
    - Manufacturing capabilities
    - Core competencies
    - Total cost of ownership (TCO)
  - Define sourcing requirements and timing.

Section A Topics:

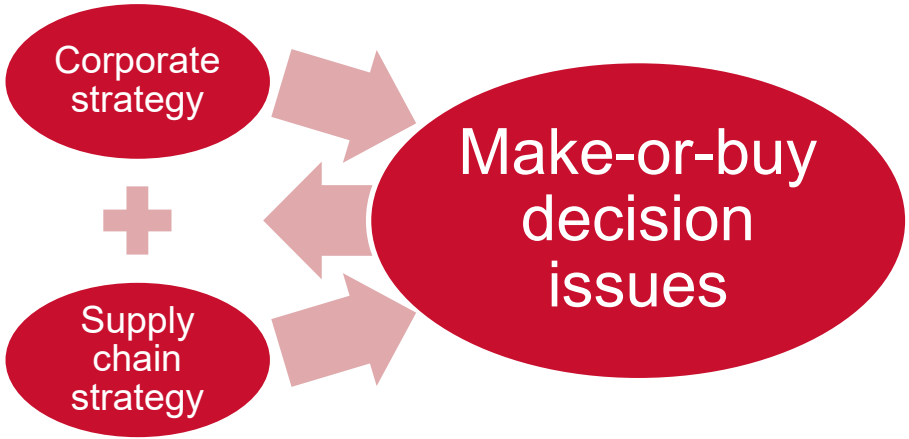
- Topic 1: Make-Versus-Buy, Outsourcing, and Offshoring
- Topic 2: Sourcing Requirements and Total Costs

Sourcing Process



Make-versus-Buy Analysis

- *Is the activity a core competency?*
- *What are the consequences of losing skills or knowledge?*
- *What is the landed cost or TCO?*



Make/Buy: Is Activity a Core Competency?

1. Does the organization already have the core competency? (Opinions may differ.)
2. Does the market need it?
3. What is the relationship between market need and enterprise capability?
4. Develop core competency to meet market need or outsource?

Benefits of Contracting Out

- Economies of scale
- Risk reduction
- Increased capital available for investment
- Clearer focus
- Access to new technologies
- Faster development cycle times

Offshoring: Cost Cutting and More…

Offshore	Insource or locally outsource
Market growth	Offshoring complexity (e.g., culture)
Additional sourcing options	Less organizational maturity; less TQM emphasis
Streamlining and efficiency	Risks (e.g., supply failure)

Comparing Manufacturing/Assembly Sites

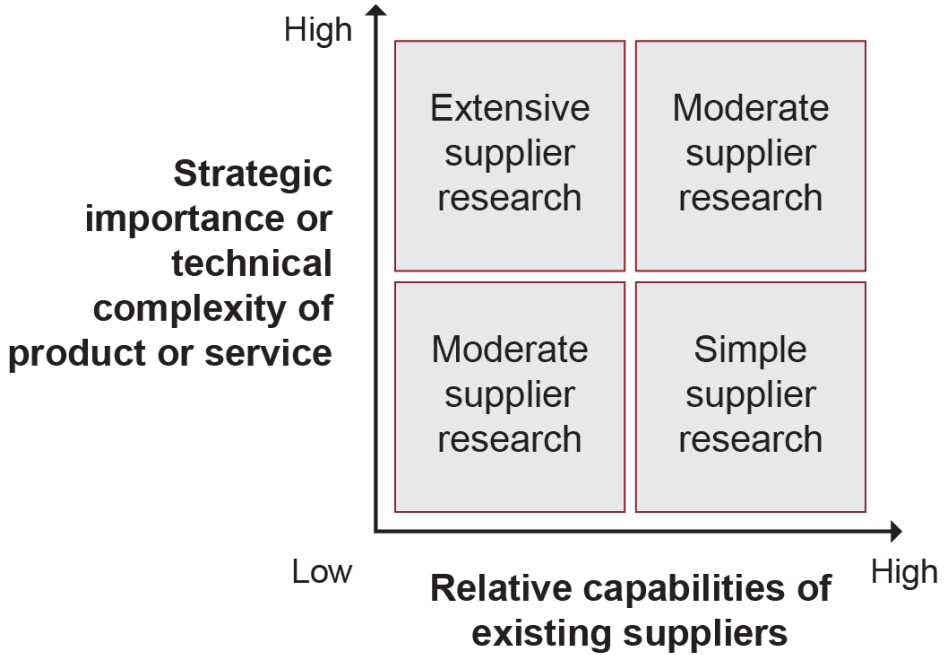
Advantages	Risks
▪ Low labor rates ▪ Lower material costs ▪ Lower benefits costs ▪ Favorable duty rates ▪ Lower taxes ▪ Smaller capital investment (if assets are transferred to foreign country)	▪ Time zone costs/disruptions ▪ Worse transport costs/lead times ▪ Relationship management costs ▪ Political risks/instability ▪ Currency hedging ▪ Environmental/reverse logistics ▪ Safety stock, warehousing, or in-transit costs ▪ Damage, theft insurance

Source: APICS, Advanced Supply Chain Management

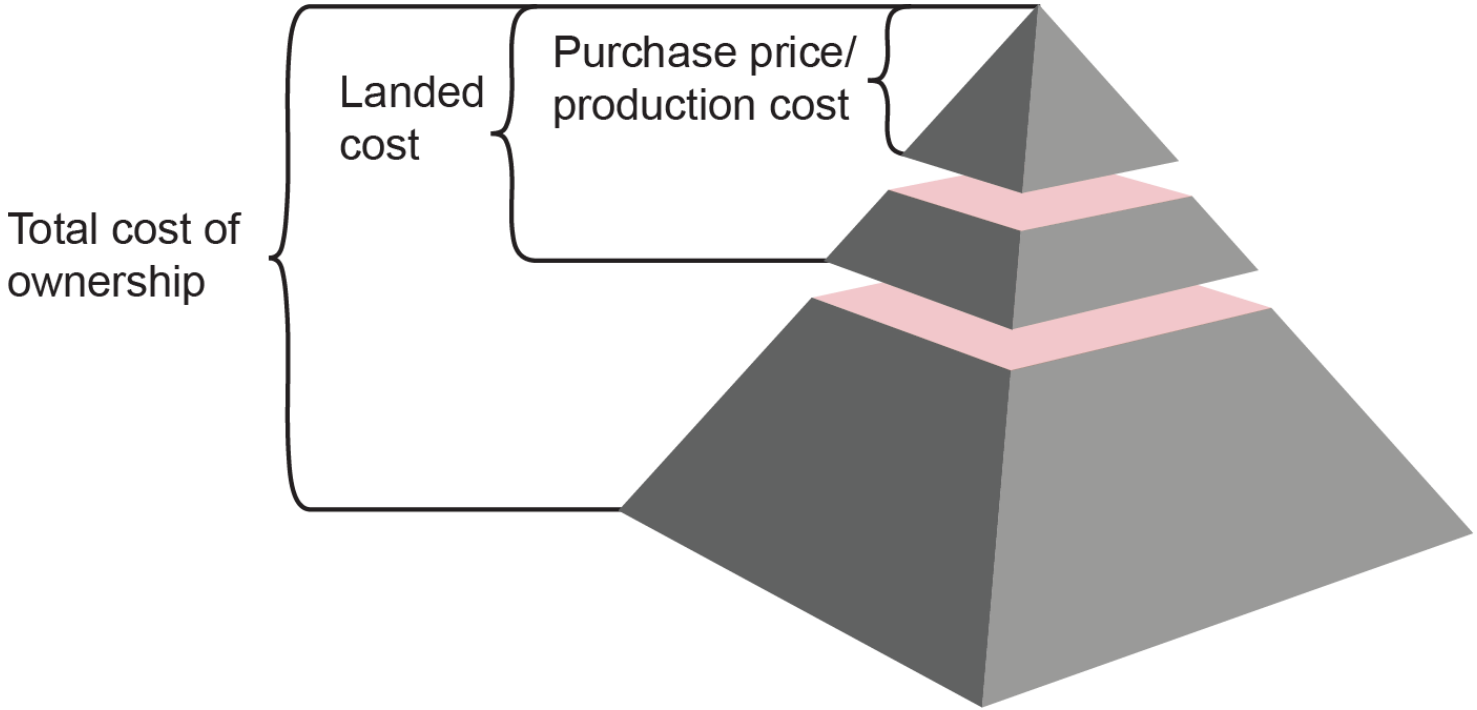
Sourcing Requirements and Timing

Sourcing and timing requirement categories:

- Cost and target price
- Quality culture, product quality
- Delivery performance
- Lead time
- Available capacity
- Design/collaboration ability
- Time to market
- Sustainability

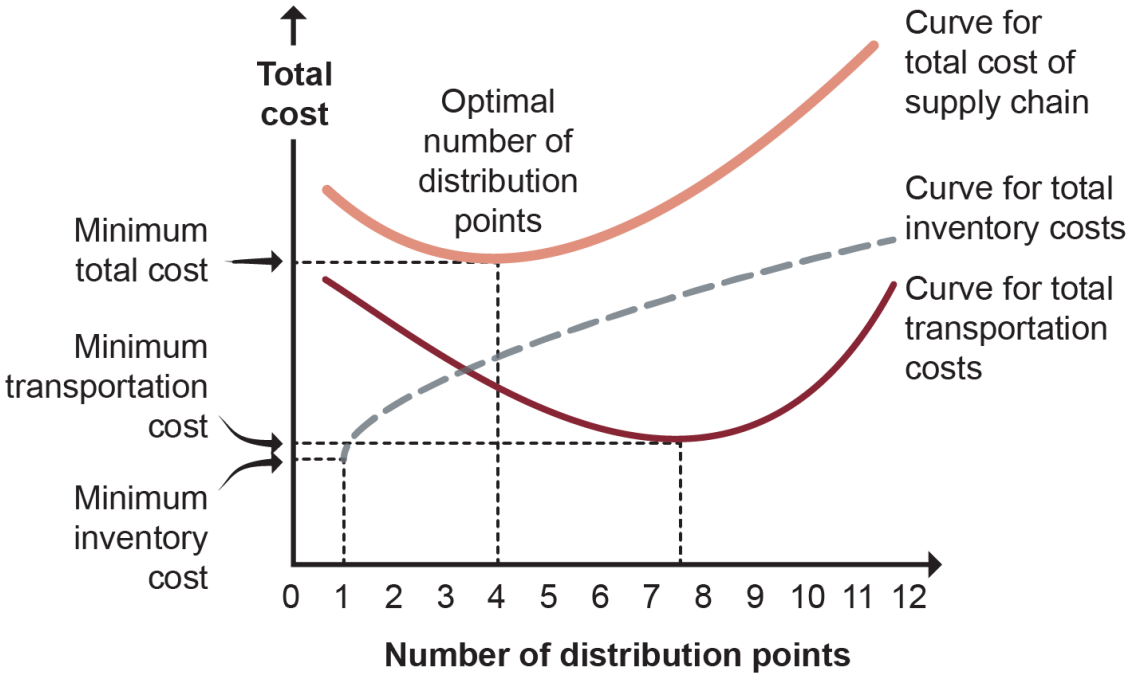


Relationship Between Cost Terminology



Total Cost of Ownership (TCO)

- Main insight: Acquisition cost is often a very small portion of TCO.
- Reassess incremental costs over time.
- Costs to include:
  - Landed costs
  - Process change costs
  - Ongoing costs
- Should-cost estimate



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SECTION B: CATEGORY STRATEGY FOR SOURCING

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Section B Introduction

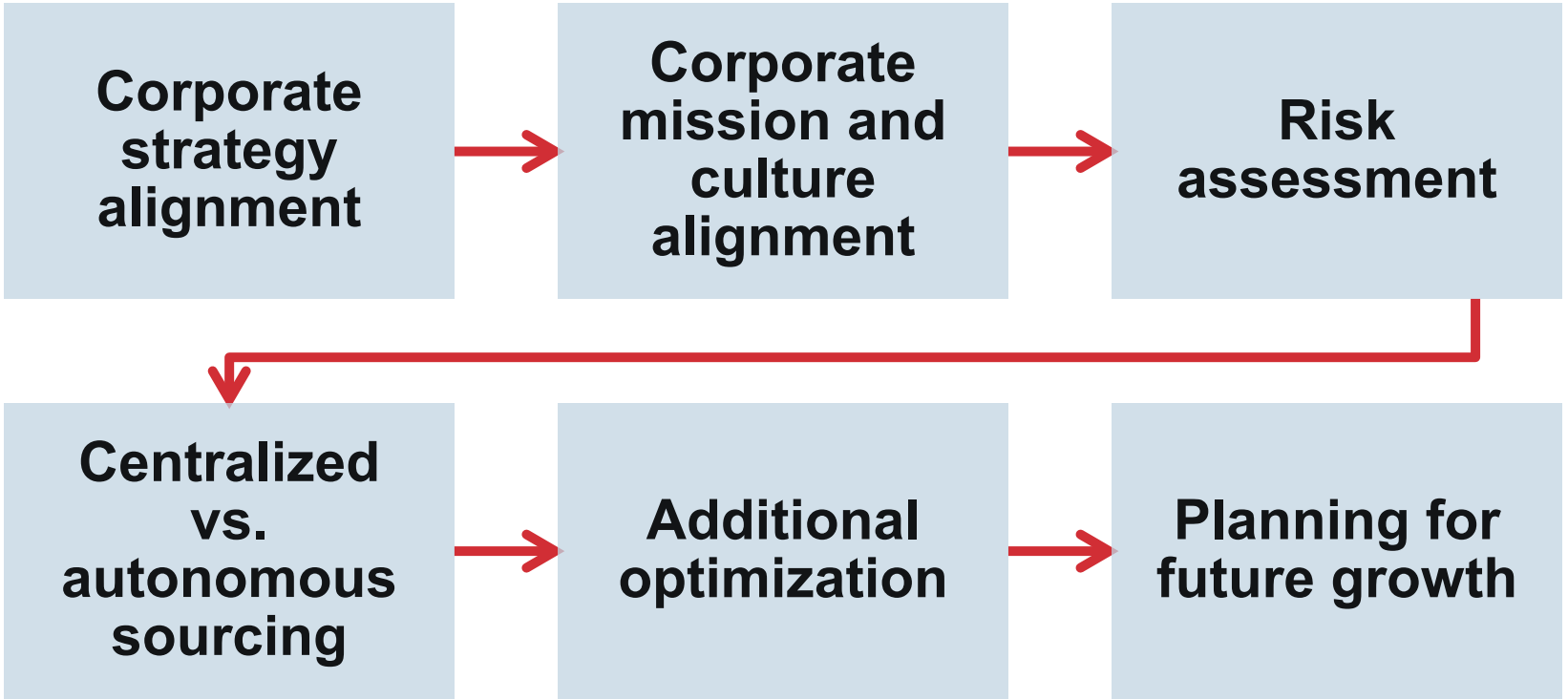
Section B Key Processes:

- Manage categories for sourcing of products and services.
  - Create segmented sourcing strategy.
  - Conduct supply base analysis.
  - Identify savings opportunities.
  - Rationalize or right-size supply base.

Section B Topics:

- Topic 1: Supply Plans, Categories, and Segmentation
- Topic 2: Supply Base Analysis and Right-Sizing

Supply Plan Validation and Refinement



Categories and Category Strategy

Sourcing Categories

- Organization-specific group of purchased goods/services
- Should enable better supplier management and purchasing spend
- Segment suppliers for optimum relationship levels

Category Strategy

- Category manager
- Classifying categories by
  - Total spend
  - Number of suppliers
- Portfolio analysis: how much you need supplier
- Supplier segmentation: how much they need you

Strategic Importance and Related Factors

Supplier factors

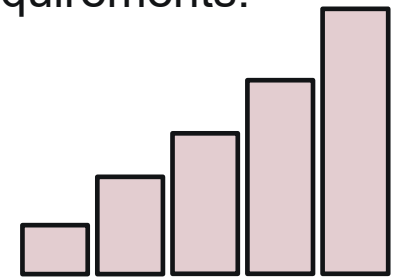
- Cost
- Quality
- Delivery reliability
- Precision
- Flexibility

Product/service factors

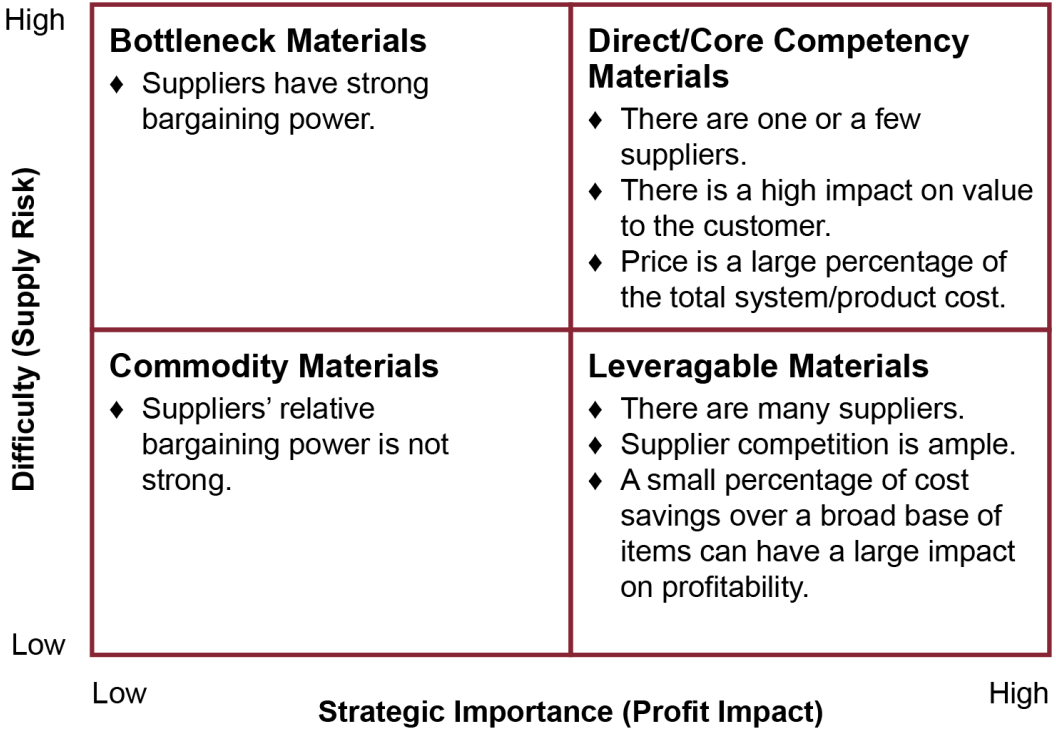
- Strategic importance
- Difficulty
  - Complexity
  - Number of suppliers
  - Uncertainty

Collaboration intensity

Intensity of collaboration should account for supplier and product/service requirements.

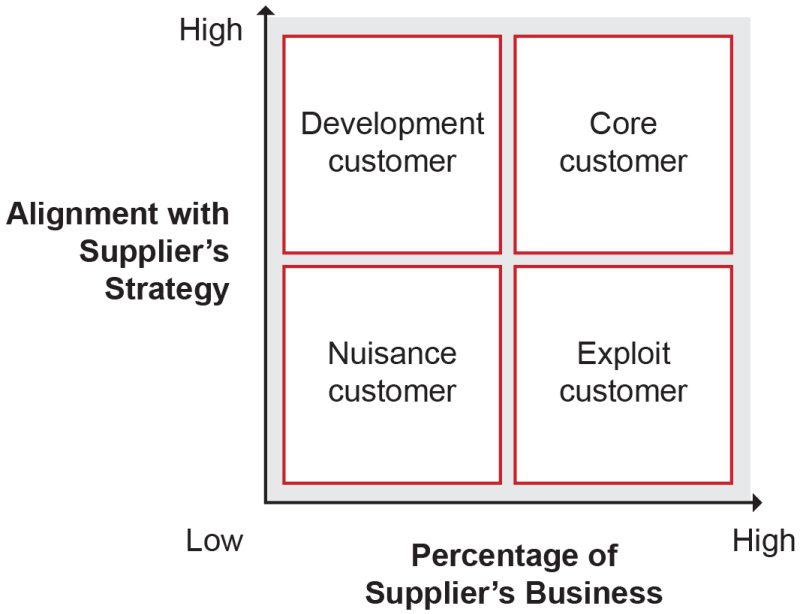


Portfolio Analysis

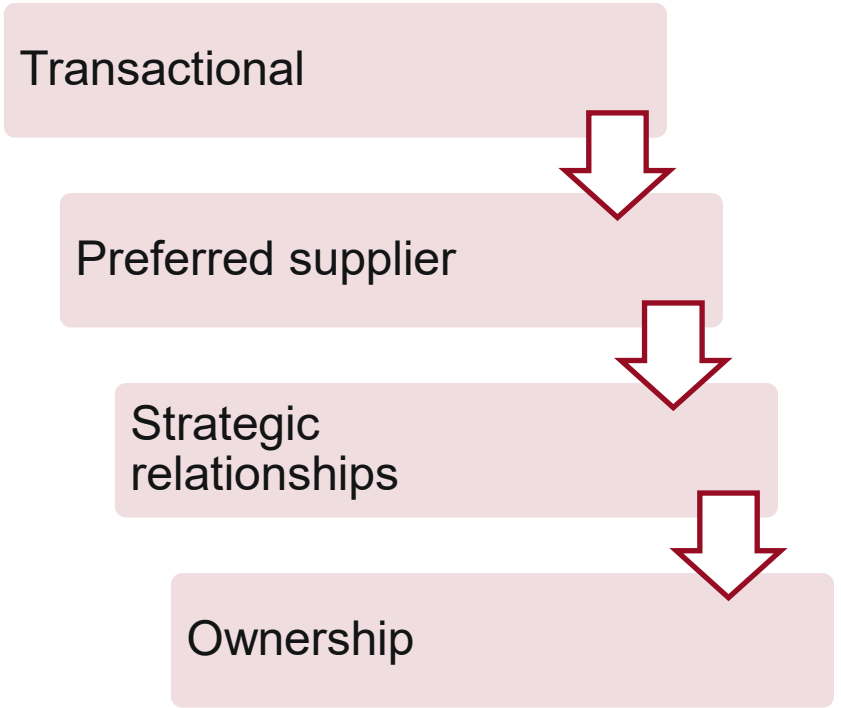


Source: Adapted from *Designing and Managing the Supply Chain, third edition, Simchi-Levi et al.*

Segmented Sourcing Strategy



Source: Adapted from Monczka, et al., *Purchasing and Supply Chain Management*, 7th ed., which cites Aberdeen Group.

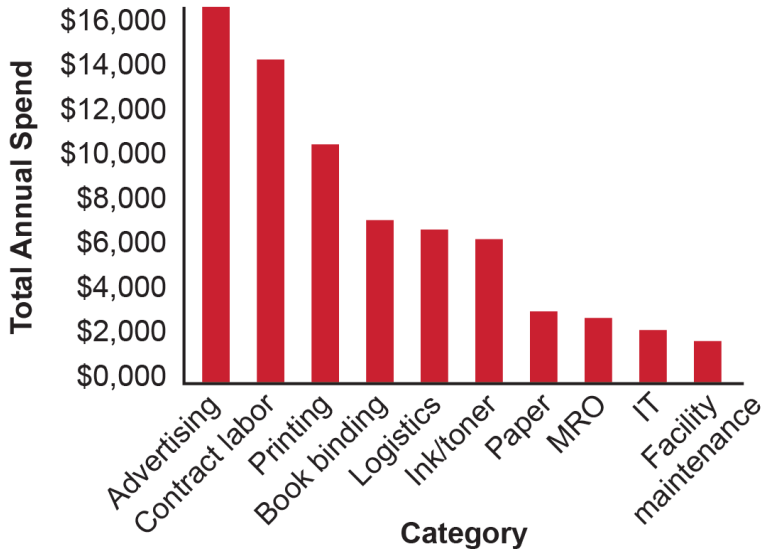


Relationship Types

Relationship	Characteristics				
	Proximity	**Visibility**	**Competitor Interaction**	**Communication**	**Culture**
Transactional	Arm's length	Purchase requirements	Significant	Computerized	Not an issue
Preferred: Ongoing	Medium term	Some sharing	Some	Designated contact points	Aware
Strategic: Partnership	Longer term	Full sharing	Limited	Department interaction	Aware + adaptive
Strategic: Collaboration/ strategic alliance	Long-term relationship	Sharing + partners' plans as own	Limited or none	Extensive, high trust, licensing	Merging
Ownership: Mergers/ acquisitions	Ownership	Internal, commonly held information	None	Varies	One culture

Supply Base Analysis

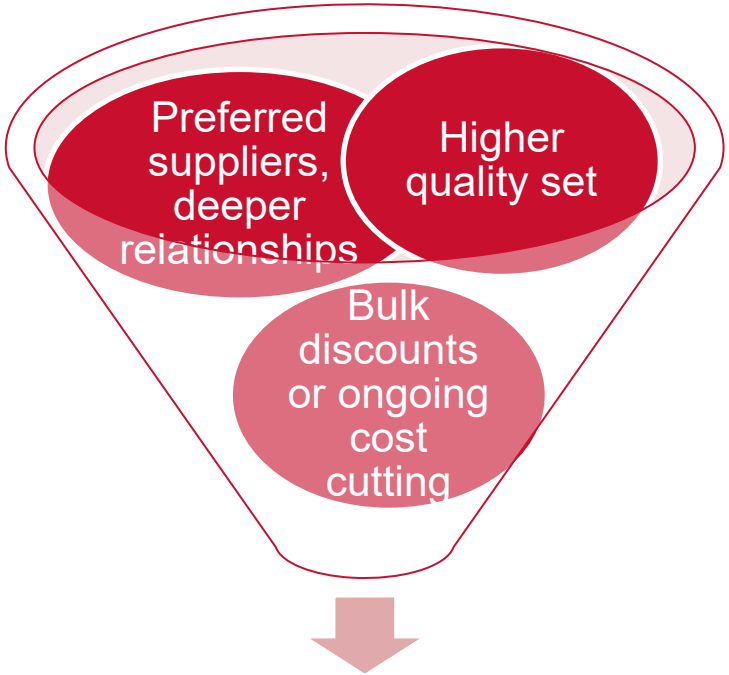
Spend Analysis



Market Research

- Forecast projected demand per category.
- Translate demand per end item into component demand.
- Review existing suppliers.
- Interviews are effective.
- Get corroboration on external market and local assumptions.

Supply Base Right-Sizing



- Pareto by category spend
- Rigid requirements
- Triage: unacceptable, minimum, and world class
- Competency staircase

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SECTION C:
PRODUCT DESIGN INFLUENCE

APICS

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Section C Introduction

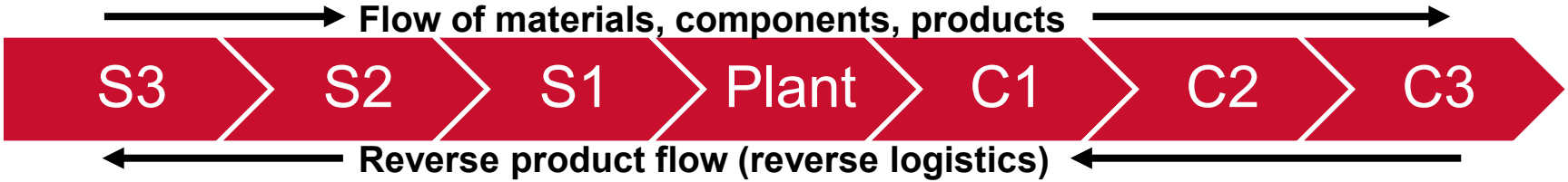
Section C Key Process:

- Influence product designs (for manufacturability, sustainability, transportation, or warehousing)

Section C Topics

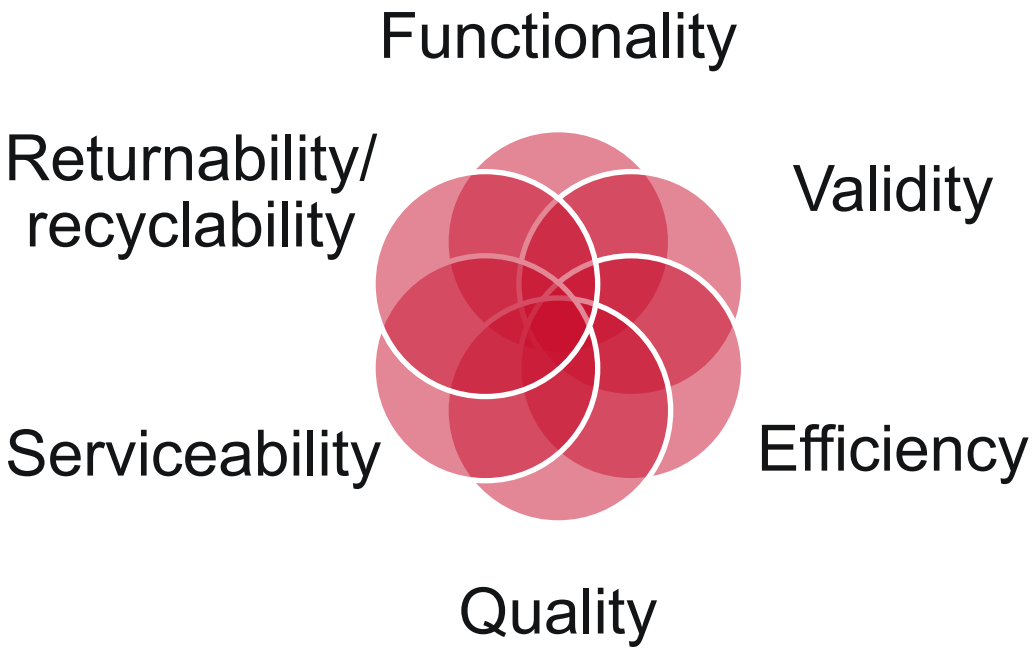
- Topic 1: Product Design
- Topic 2: Quality, Customization, and Sustainability

Impact of Product Design Choices…



On supply	On manufacture and assembly	On logistics	On sale, service, use, returns, etc.
• What raw materials? • How to source materials?	• How many components? • How difficult/when to transform or assemble? • How costly (machines, labor)?	• How difficult/costly to transport and store?	• How reliable or easy to use, service, recycle, or reuse?

Begin with the End in Mind: Great Value has…



Traditional Over-the-Wall vs. Collaborative Design

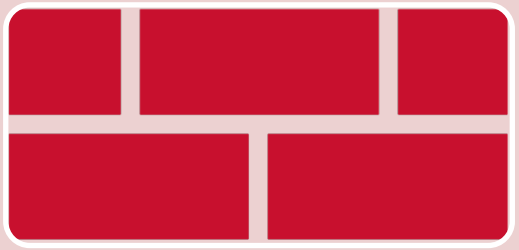
Over-the-Wall Design

- Marketing sends customer requirements to engineering.
- Engineering: full-features.
- Purchasing: unaffordable parts.
- Production: costly changes.
- Rework.
- Logistics finally gets design, but SC/packaging too costly.

Collaborative Design

- Design team:
  - Starts inclusive (engineers, functions, SC partners).
  - Considers from raw material to final life cycle stage, estimating cost differentials.
- Given approval by all functions and partners, purchasing and production start detailed design.

Design and Development Collaboration

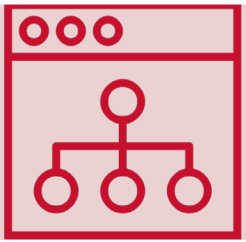


Over-the-wall approach

- Supplier/ customer plays no role in design.

Informal collaboration

- Conversations or informal consultation with suppliers/ customers.



Formal collaboration

- VOC.
- Regular formal input.
- Supplier designs subcomponent.

Implementing Collaboration and Its Benefits

Implementing Design Collaboration	Benefits of Design Collaboration
1. Proof of concept. 2. Formalize concepts. 3. Formalize processes. 4. Prioritize opportunities based on best value to encourage adoption.	▪ Fewer cost overruns ▪ New and improved approaches to design ▪ Improved customer satisfaction ▪ Improved efficiency (faster to market) ▪ Higher product quality for the price

Design Methods

Broad-based methods ♦ Design for supply chain ♦ Design for logistics ♦ Design for X (DFX)	**Quality** ♦ Design for quality ♦ Design for six sigma ♦ Quality function deployment (QFD)
Standardization and modularization ♦ Modular design ♦ Component commonality ♦ Universality	**Customization** ♦ Postponement ♦ Mass customization ♦ Glocalization
Simplification ♦ Concurrent engineering ♦ Design for manufacture and assembly (DFMA) ♦ Design for service	**Sustainability** ♦ Design for the environment ♦ Design for reverse logistics ♦ Design for remanufacture

Design for Logistics: Design SC and Product Concurrently

Benefits	Examples	Tradeoffs
▪ ↓ cost = ↑ profit margins. ▪ Warehouses store more goods, reducing capacity pressures. ▪ Master carton for restocking. ▪ Retailers can sell from pallet.	▪ Minimize transport and storage costs: efficient packaging for fast loading/unloading and high density per pallet. ▪ Minimize manufacture and assembly time. ▪ Maximize standardization.	▪ Slow-moving goods not wanted in larger quantities. ▪ Standard box sizes may conflict. ▪ Cube out vs. weigh out balance.

Modular Design (Modularization): Family Shares Components

Benefits	Examples	Tradeoffs
▪ Lower design cost for product family. ▪ Production streamlining. ▪ Expanded customer base. ▪ More efficient logistics.	▪ RAM modules for computers. ▪ Modular bookshelves. ▪ *Á la carte* menu.	▪ Higher cost per product (lower for family). ▪ Possible reduction of fit, finish.

Component Commonality (Standardization): Replace Similar Parts With Standard Part

Benefits	Example	Tradeoffs
▪ Lower cost for bulk purchase of identical parts. ▪ Production streamlining. ▪ Simpler, cheaper storage.	▪ Replace multiple bolt sizes with one size.	▪ Cost of product modifications. ▪ Loss of design flexibility. ▪ Possible reduction in quality.

Universality (Standardization): One Product, Multiple Markets

Benefits	Examples	Tradeoffs
▪ Increased sales volume. ▪ Reduced cost of design, manufacturing compared to market-specific products.	"One size fits all" and "unisex" clothing. Cars, trucks with option packages for different market segments.	▪ Potential loss of sales in each particular market. ▪ Loss of customer loyalty.

Concurrent Engineering (Simplification): Engineers and Other Stakeholders Contribute

Benefits	Example	Tradeoff
▪ Design collaboration. ▪ Parallel rather than sequential. ▪ Virtual design meetings.	▪ Shorten/simplify design.	▪ Newer methodologies exist.

DFMA (Evolution of Concurrent Engineering): Manufacturing Involved Early for Ease of Production

Benefits	Examples	Tradeoff
▪ Less confusion, complexity, variability, wait/setup time, and training. ▪ Enforced by standards/policies. ▪ Standardizes parts. ▪ Helps lean, modular, mass customization. ▪ Software automates.	▪ Component tolerances. ▪ Fewer parts. ▪ Less part handling. ▪ Concurrent steps. ▪ Assembly obvious/easy. ▪ Simplify assembly steps. ▪ Design in easy testing.	▪ Could be at odds with customer desires if features are omitted.

Design for Service: Simplification for After-Sale Service

Benefits	Examples	Tradeoff
▪ Lower total cost of ownership. ▪ Extends to logistics (replacement parts source of profitability).	▪ Serviceability/maintain ability affects customer satisfaction. ▪ Faster replacement of filters, etc., lowers lifetime cost.	▪ Conflict with other design goals.

Design for Quality: Market Needs, Performance, Aesthetics, and Cost

Benefits	Examples	Tradeoff
▪ Fewer defects = less waste, satisfied customers. ▪ Can compete on quality.	▪ Goals for exceptional quality.	▪ Initial expense/benefits hidden.

Quality Function Deployment (QFD): Eliminate Gap Between Customer Wants and Product Capabilities

Benefits	Examples	Tradeoff
▪ Improves customer service. ▪ Shows interactions between product features for prioritization when some conflict.	▪ Design, operations, and support philosophy. ▪ Compares against competitor features.	▪ Complex methodology.

Postponement (Customization): Assembly or Packaging at Last Possible SC Location

Benefits	Examples	Tradeoffs
▪ Counters bullwhip effect. ▪ Less in-transit inventory, insurance, and handling costs and more cash flow. ▪ Locally source locally needed materials.	▪ Example of push-pull strategy (start generic). ▪ Production starts based on aggregate forecasts. ▪ Differentiation based on actual demand signals.	▪ Process, equipment, product, and packaging redesign costs. ▪ May increase costs if there are few product varieties.

Mass Customization: Large Volume and Variety at Low Production Cost and Custom Output Using Postponement

Benefits	Examples	Tradeoffs
▪ Economies of scale. ▪ More efficient, expert assemblers. ▪ Higher sales (more markets/segments). ▪ Lower inventory costs.	▪ Modular design. ▪ HP's assembly of printers at distributor, not factory.	▪ Investment costs for new equipment, training, quality. ▪ Possible friction with distributors over added tasks.

Design for Environment: Health, Safety, Environment

Benefits	Examples	Tradeoffs
▪ Fits SC emphasis on total life cycle. ▪ Better reputation. ▪ Less liability/legal costs. ▪ Marketable environmental friendliness.	▪ Provision for reuse or recycling. ▪ Reduced energy consumption. ▪ Avoidance or mitigation of hazmat. ▪ Use lighter/fewer components.	▪ Increased manufacturing costs and higher sales price. ▪ Reduced safety or longevity from less weight/preservatives.

Design for Reverse Logistics: Return, Repair, Replacement, and Recycling Efficiency

Benefits	Examples	Tradeoff
▪ Loyalty from ease of process. ▪ Lower cost of returns. ▪ Feedback for designs.	▪ Package to reduce common user errors/frustrations. ▪ Box for shipping plus return.	▪ Underestimate complexity.

Design for Remanufacture: Component Reuse in Other Products

Benefits	Examples	Tradeoff
▪ Low materials and resource cost. ▪ Cost savings for consumer. ▪ Environmental law conformance.	▪ Associated with green manufacturing. ▪ Caterpillar's customer-focused replacement of heavy equipment parts.	▪ Cash tied up in inventory longer.

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SECTION D: SUPPLIER SELECTION, CONTRACTING, AND USE

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Section D Introduction

Section D Key Processes:

- Evaluate and select suppliers.
  - Qualifications, evaluation
    - Value-added services
  - Contract pricing, delivery, terms and conditions
- Manage purchase orders.
  - Purchase orders
  - Reconcile and approve invoice.
  - Track, expedite, de-expedite
  - Sourcing automation

Section D Topics:

- Topic 1: Supplier Evaluation and Selection
- Topic 2: Contracts
- Topic 3: Purchase Orders

Functions of Purchasing

Supplier relationship management makes collaboration easier.

- Competitive expectation
- Increases role complexity

1. Supplier selection
2. Negotiation
3. Order placement
4. Supplier follow-up
5. Supplier performance measurement and control
6. Value analysis
7. Evaluation of new materials and processes

Supplier Selection

	Supplier's perspective	Buyer's perspective
Traditional thinking	• Highest profit margin • Disregard customer needs • Short-term transactions	• Lowest price • Disregard supplier impact • Short-term transactions
Supply chain thinking	• Strategic view of sourcing • Long-term success of all partners in SC • Cooperatively established: ✓ Pricing ✓ Discounts ✓ Delivery timing • Ongoing relationships or alliances • Total cost of ownership and reputation effects	

Total Cost of Ownership

- Consider lead time differentials

CPC # PO332932 Description: 3/8″ Copper Tubing Type M, 10′ long

Suppliers	A (Brazil)	B (Korea)	C (China)	D (U.S.A)
Landed costs				
Price per unit	USD 9.800	USD 9.600	USD 8.200	USD 11.200
Inbound transportation	1.200	1.600	1.650	0.211
Total landed costs	11.000	11.200	9.85	11.411
Life-cycle costs				
Contracting	0.200	0.200	0.200	0.200
Business unit purchasing	1.488	0.880	0.990	0.790
Logistics administration	2.120	2.570	2.100	1.110
Receiving	0.027	0.032	0.054	0.012
Inspection	0.050	0.070	0.110	0.080
Cost of internal quality	0.430	0.540	0.520	0.780
Inventory carrying	1.200	1.600	1.650	0.08
Accounts payable	0.050	0.050	0.050	0.050
Exchange rate factor	0.057	2.000	0.003	0.000
Outbound transportation	0.100	0.100	0.100	0.100
Waste disposal	0.054	0.054	0.054	0.054
Cost of external quality	0.068	0.064	0.062	0.080
Total LCC	5.844	8.160	5.893	3.336
TCO (Landed + LCC)	USD 16.844	USD 19.360	USD 15.743	USD 14.747

Supplier Corporate Social Responsibility (CSR)

- Organization, its employees, and suppliers hold selves accountable for:
  - Consumer health and safety
  - Employee health and safety
  - Environmental sustainability
  - Maintainability
  - Employment policy
  - Community reinvestment and use of local goods and services.
- Legal review is needed to ensure compliance with related laws and regulations in each jurisdiction.

Negotiations

Hard negotiators (win/lose)

- Adversary to be beaten.
- Take position, demand concessions, give none.
- Threaten or mislead.

Soft negotiators (lose/win)

- Value agreement too much.
- Disclose bottom line.
- Accept one-sided agreements/ concessions.

Principled negotiation principles

- Negotiations should:
  - Solve underlying issues.
  - Preserve relationships.
  - Result in enduring, fair agreements.

Principled negotiation process

- Interest-based bargaining:
  - Separate the people from problem.
  - Focus on interests, not positions.
  - Invent options for mutual gain.
  - Insist on objective criteria.

Contract Performance

Contract Deployment

- Navigate legal.
- Communicate with winner.
- Do internal buyer agreements.
- Database entry.
- Order-to-pay procedures.
- Train, validate users/suppliers.
- Use transaction management.
- Audit invoices.

Compliance Management

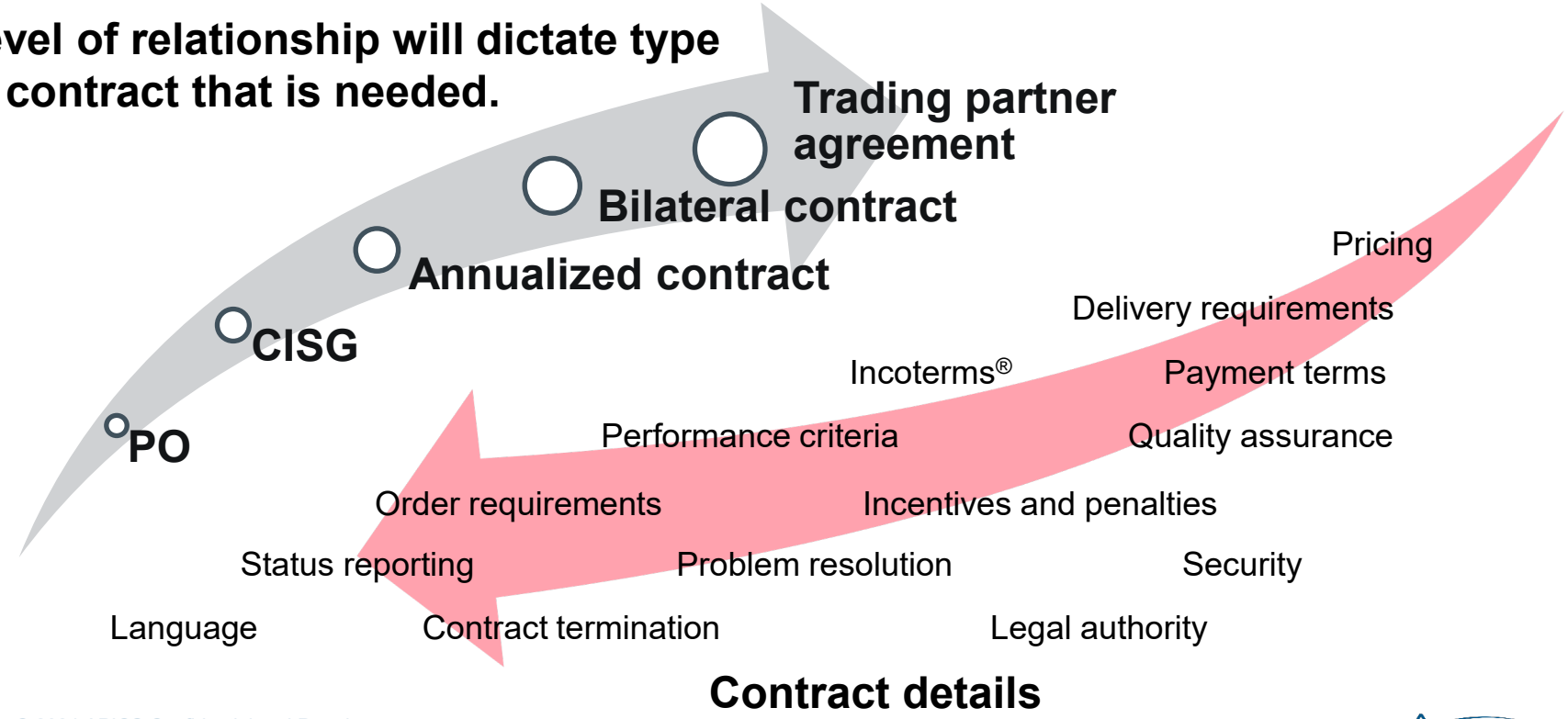
- Preferred supplier compliance vs. off-contract.
- Report findings.
- Monitor supplier KPIs.
- Audit supplier pricing.
- Monitor contract expirations, renewals, and discount use.
- Continually improve.
- Establish baselines.

Measuring Supplier Success/Avoiding Pitfalls

- Establish clear performance expectations.
- Measure against performance expectations regularly.
- Maintain ultimate responsibility.
- Coordinate activities of multiple suppliers and share learning.
- Maintain an exit strategy.

Contract Types and Details

Level of relationship will dictate type of contract that is needed.



Payment Terms

Trade credit or open account are offered only to trading partners with good credit records and healthy financials.

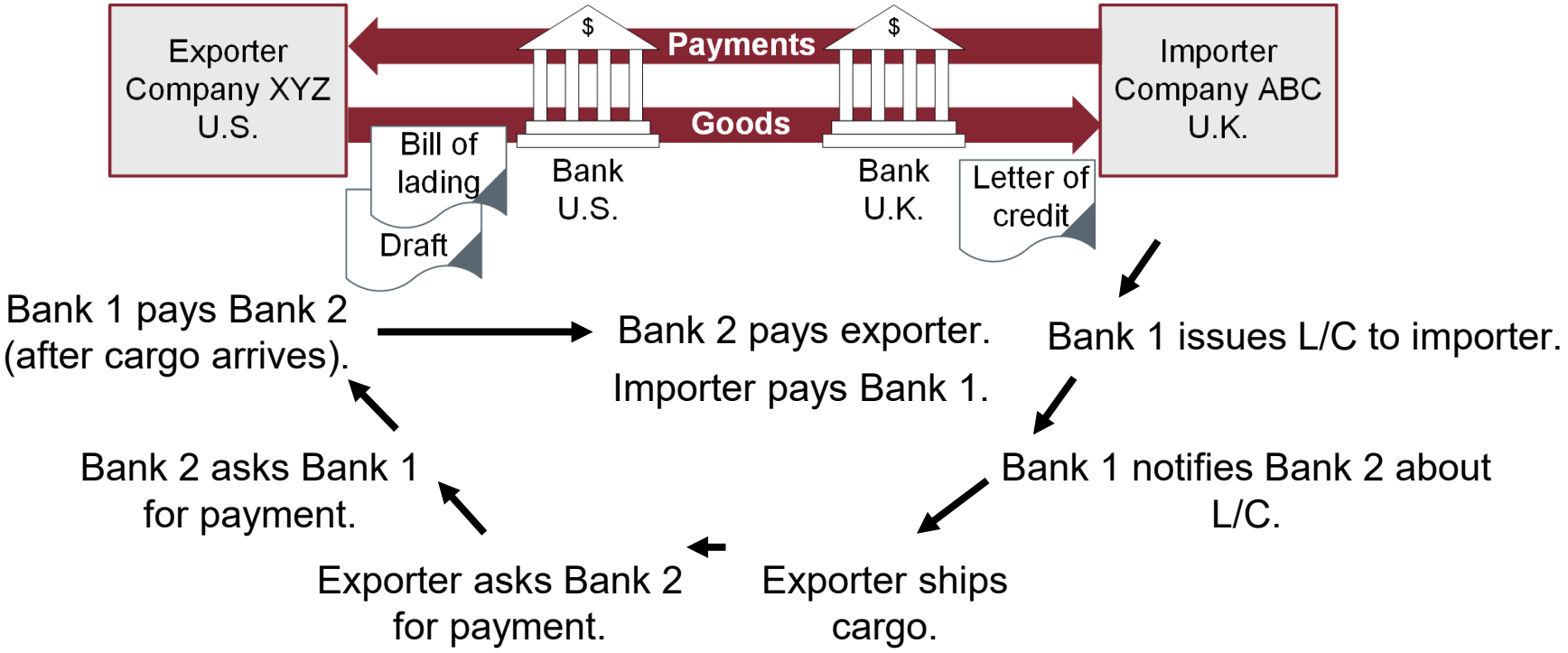
Trade credit

- Sale of goods or services in which payment is not due right away.
- Gives the buyer time to convert the good or service into revenue themselves before making payment.

Open account

- Buyer has a credit limit with the organization or a bank.
- Buyer can make orders or write drafts up to the limit to pay for goods or services on receipt or on a deferred basis.

Letters of Credit (L/C)



Currency Issues

Futures

- **Party agrees to buy/sell fixed amount of currency at fixed price on fixed date.**
- **Traded on organized exchanges to minimize counterparty risk.**

Placing Orders

Purchase orders

- Initial or one-time
- All terms and conditions
- Functional areas informed of stage

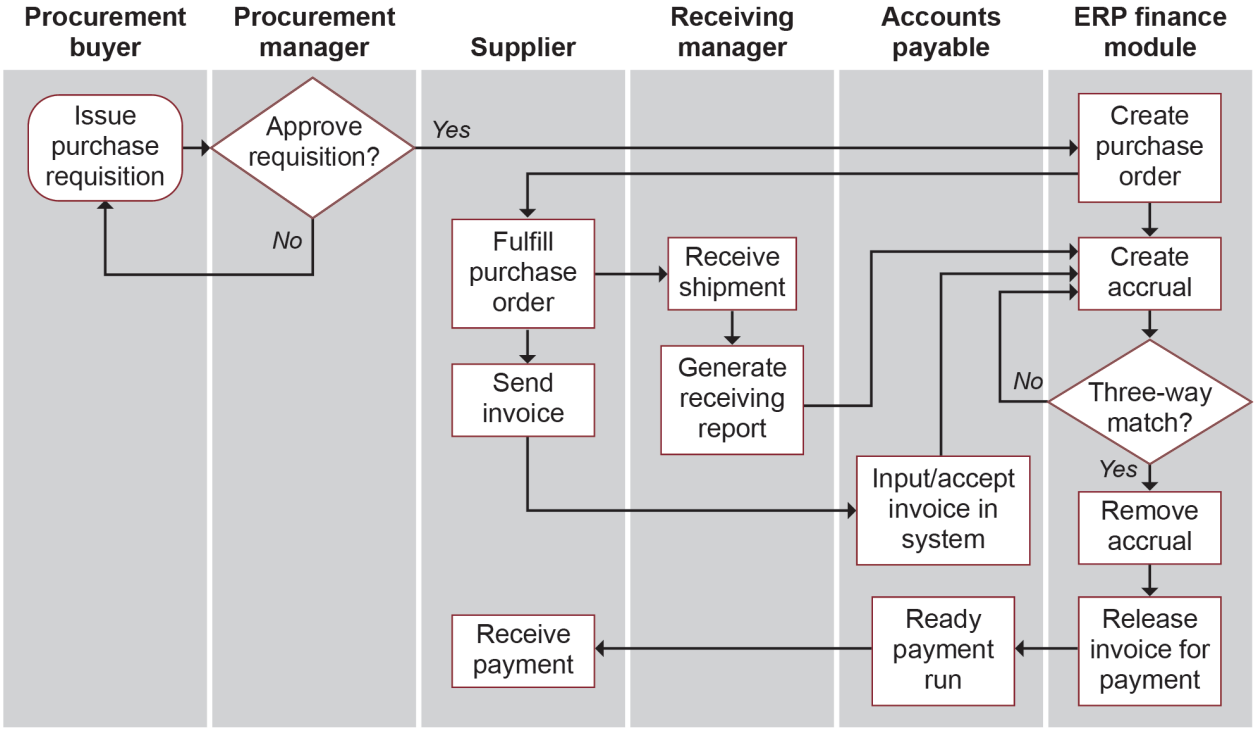
Blanket POs

- Long-term commitment, short-term releases
- Master terms and conditions
- Discounts, lead times, quality

E-Procurement

- Auctions
- Reverse auctions
- Exchanges
- Portals

Reconciling and Approving Invoices



Order Tracking (Internal)

Functional Area	Tracking Needs
Purchasing	Primary tracker of open order status and exceptions.
Sales	Notify customers of potential delays/issues.
Accounts payable	Forecast future accounts payable obligations.
Accounting	Accurate financial records.
Requesting functional area	Look up orders by order number, be informed of issues.
Receiving	Forecast inbound workload and space needs.
Traffic	Inbound inventory requirements to schedule carriers or internal fleets.

Expediting

To rush or chase production or purchase orders that are needed in less than the normal lead time

Application

- Any stage can be expedited (source and transform common)
- Should be very rare

Causes

- Inventory shortages
- Poor demand forecasting

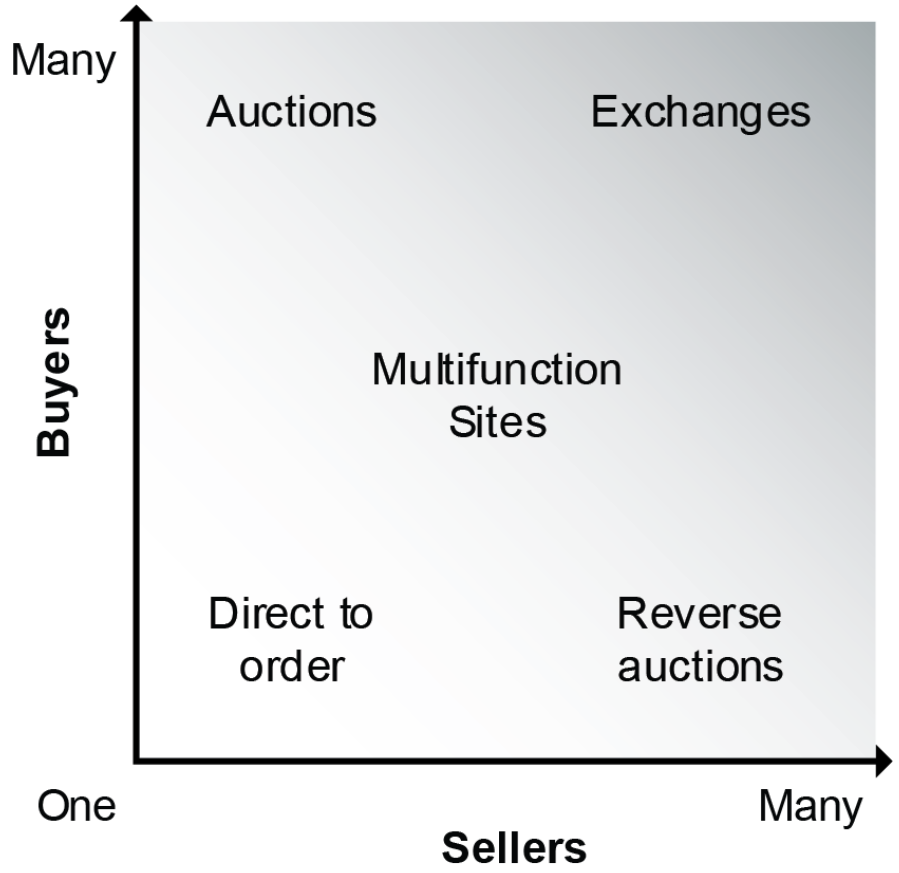
Expediting of Transportation

- Faster mode of transport
  - Overnight
  - Upgrading from ground to air
- Additional costs
  - Paid by shipper or customer depending on reason

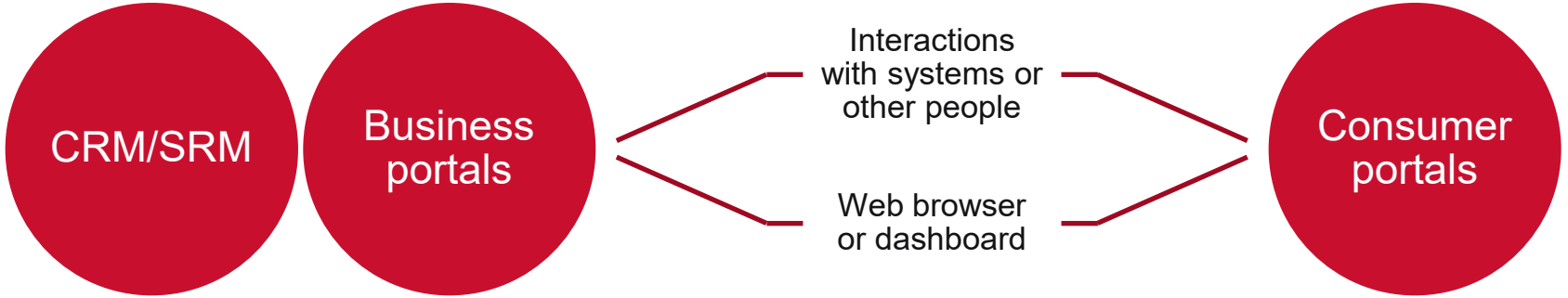
B2B Digital Transaction Models

Exchange types

- Independent
- Private
- Consortia
- Virtual



Portals



Multiservice websites

- E-mail
- Personalized home pages
- Online shopping and search
- News

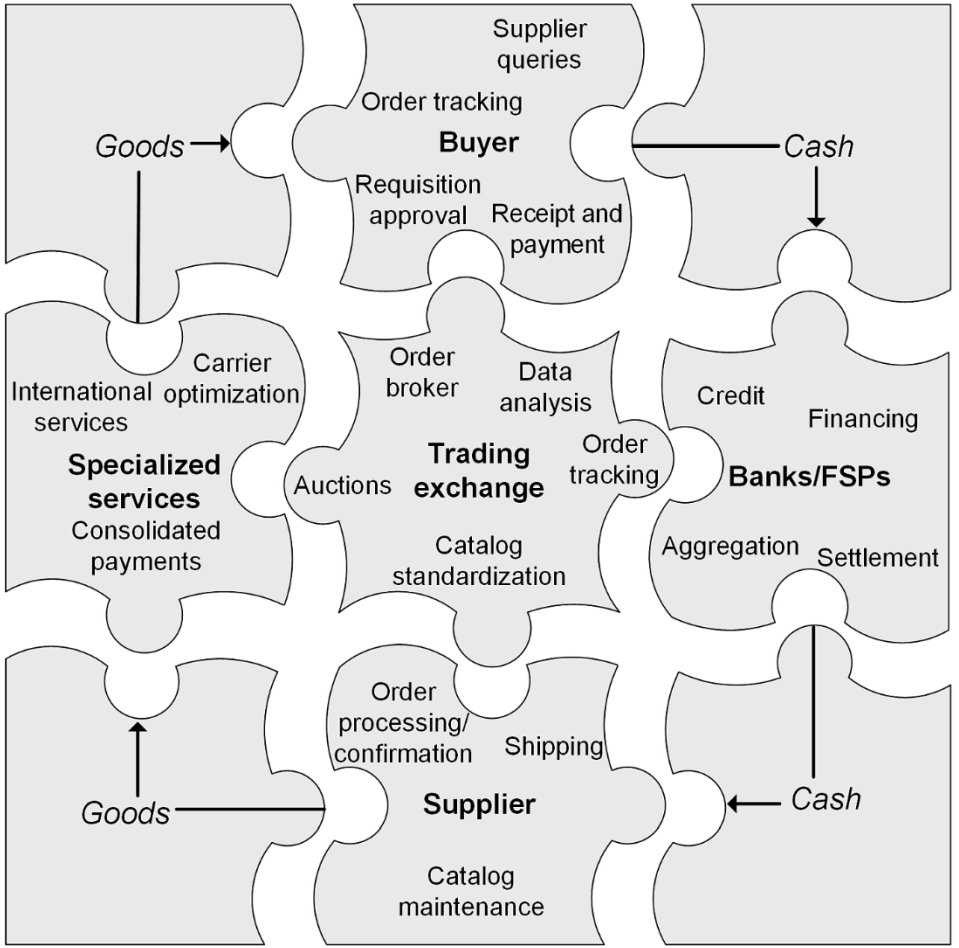
Intranets and extranets

- Authentication and security
- Read-only exceptions, forecasts, demand-pull signals
- Dynamically aggregate internal and external information

Topic 3: Purchase Orders

Trading Exchanges

- Hub for multiple parties
- No individual interfaces needed



Auctions

- *Classic or forward auctions*
- *Reverse auctions*
- *Dutch auctions*
- *Demand management auctions*
- *Stock-market style auctions*

Dutch auction named after Dutch tulip auctions. Dutch auctions are used for U.S. Treasury securities.

Trade Exchange Benefits and Risks

Benefits for Buyers	Risks for Buyers
▪ Purchasing agreement control ▪ Standard product specifications ▪ Lower administrative, transportation, logistics, and unit costs ▪ Faster time-to-market ▪ Catalog accuracy	▪ Lower-quality goods ▪ Nonconformance ▪ Product rework/returns ▪ Long-term loss of suppliers and fewer skilled suppliers ▪ Ruining years of relationship building

Trade Exchange Benefits and Risks

Benefits for Suppliers

- Automatic connections
- Wider market, all inventory
- Faster order to cash
- Better future bidding
- Cheaper transactions, transportation, and logistics
- Less replenishment lead time
- Supply/demand collaboration

Risks for Suppliers

- Reduction in revenue/ unprofitable margins
- Option contracts consume capacity
- Fewer internal investments
- Business continuity risk
- Buyers use seller's information to buy elsewhere
- Exchange integration costs