Purchasing & Inventory Management

"Supply Chain Process Automation for Small Business"

Participant Manual & Workbook

October 5, 2012

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Disclaimer

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Introduction to Supply Chain Management

Supply Chain Management Definition and Principles

What is Supply Chain Management?
"Supply Chain Management is the delivery of enhanced customer and economic value by managing the flow of physical goods and associated information, from the point of sourcing to the point of consumption."
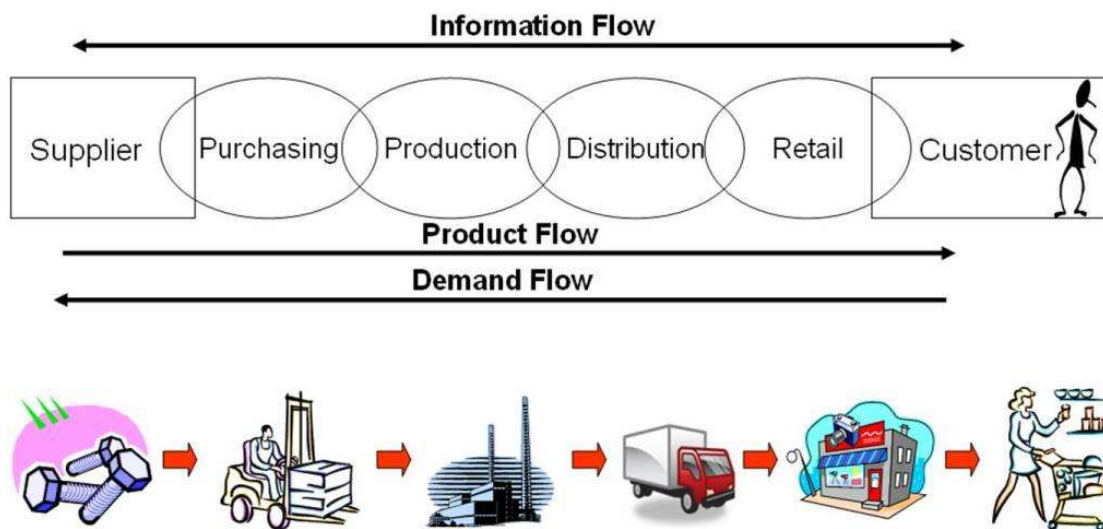
What is the Goal of Supply Chain Management?
From the definition and the above diagram there are a few key observations that can be made regarding supply chain management:

[1] Supply Chains are always optimized for the End Customer which maximizes economic value for the entire Supply Chain.
The performance of the supply chain is always evaluated in terms of its performance for the end consumer. Consequently, the performance of various business entities in the supply chain is subordinate to the needs of the end consumer. This means that a premium will be placed on the cooperation between the various business entities in the supply chain.

[2] The flow of information can be as important to supply chain performance as the product flow.
For every Supply Chain, there is a flow of goods towards the end consumer and a flow of product demand that flows away from the end consumer. There is also a flow of information

containing the inventory levels and location of finished goods and raw materials throughout every location in the supply chain that is shared among the trading partners.

Supply Chain Management Motto:
"Deliver the right product at the right price to the customer at the right place and time."

The customer's buying criteria can include price, place and time, with each parameter having different weighting depending on circumstances. For example, if time and location are the most important criteria for a given purchase, the customer is willing to pay a price premium to receive the item they want in the place and time that they want it.

Supply Chain Management Key Principles
In practicing Supply Chain Management, a few key principles will be used to lower cost and improve service to the end customer:

[1] Trade Information for Inventory
Information regarding end consumer demand and inventory levels throughout the supply chain will enable safety stocks of excess inventory to be kept to a minimum throughout the supply chain, reducing inventory carrying costs for every business entity in the supply chain. Also, by partnering with supply chain trading partners (buyers and suppliers), companies can achieve greater efficiencies, reducing costs and improving customer service throughout the supply chain.

[2] Implement Electronic Transactions
Electronic notifications and transactions between trading partners in the supply chain will decrease the need for manual data entry, reducing transactional costs, improving data quality and accelerating the business cycle.

[3] Deploy Automation Technologies
Automation technologies such as barcodes and Radio Frequency Identification (RFID) tags decrease the need for manual data entry, reducing transactional costs and improving data quality.

Supply Chain Management Examples

Innovative Inventory: Nordstrom.com
In September 2009, Nordstrom made inventory from all 115 regular stores available online. Website shoppers can now reserve items for pickup at the retail location or have it shipped directly to them.

"Nordstrom Links Online Inventory to Real World" by Stephanie Clifford, The New York Times, August 23, 2010
http://www.nytimes.com/2010/08/24/business/24shop.html

Performance Improvement since the change:
* Same-store Sales up 8.0% (11 months since the change) versus down 11.9% (11 months prior to the change)
* Percentage of Customers who bought merchandise after searching for an item doubled
* Close-out Items sold for full price on the Website versus taking a large markdown in the Store
* Multichannel Shoppers (Website, catalog, retail store, etc.) spend four times on average what a single channel shopper does.

Value of Supply Chain Management
"The typical differentiators for a consumer product are price and quality. Supply Chain Management changes the rules to deliver other value in exchange for a premium price."

What are some value added services for which customer are willing to pay a premium?
* Time (Want/Need it Now!)
* Financing or Payment Terms
* Vendor Managed Inventory
* What are some others?

EXERCISE: Make a List of Value Added Services
Please make a list of the value added services for which your customers might be willing to pay a premium. (See Appendix A for some potential answers to this "Value Added Services" Exercise)

_____
_____
_____
_____
_____
_____
_____
_____
_____

Measuring Supply Chain Management Performance

Supply Chain Performance Measurement

Supply Chain performance is measured in four categories: responsiveness, flexibility, cost and asset utilization. Below is an example of seven parameters that would specify Supply Chain performance across these four categories, although depending on circumstances other parameters could be used to measure Supply Chain Performance:

Delivery Performance to Request Date (percentage)

Delivery Performance to Request Date is the percentage of orders that are completely fulfilled on or before the customer's requested date.

Order Fulfillment Lead-Time (days)

Order Fulfillment Lead-Time is the number of calendar days from when an order is received until it is shipped complete.

Upside Production Flexibility (days)

The Upside Production Flexibility is the time in days required to obtain labor, materials, or manufacturing capacity to be able to respond to an unexpected and sustained 20% increase in demand.

Total Supply Chain Costs (percentage)

The total supply chain cost as a percent of revenue, including order management costs, materials, inventory management, financing, planning and information technology (IT) costs.

Inventory Days of Supply (days)

Inventory Days of Supply is the average inventory level divided by the cost of one day's sales. Normally, this should be calculated using the average of five periods of inventory relative to the daily rate of sales.

CALCULATION: Inventory Days of Supply = [Average Gross Inventory] / [Cost of Goods Sold / 365]

Cash to Cash Cycle Time (days)

The Cash to Cash Cycle Time is the time required for cash to flow back into a company from sales, after it has been spent on raw materials.

CALCULATION: Cash to cash Cycle Time = Total Inventory Days of Supply + Days of Sales Outstanding - Average Payment Period for Material

Net Asset Turns

Net Asset Turns are the number of times net assets are replenished in the annual sales cycle. It is a measure of how quickly assets are used to generate sales.

CALCULATION: Net Asset Turns = Total Product Revenue / Total Net Assets

Supply Chain Benchmark Scorecard

Metric	Median (Middle 20%)	Best-in-Class (Top 20%)
Delivery to Request (percentage)	87.9%	96.5%
Order Fulfillment Lead-Time (days)	6.6 days	1.5 days
Upside Production Flexibility (days)	45.0 days	4.0 days
Total Supply Chain Costs (percentage)	12.6%	6.1%
Inventory Days of Supply (days)	56.9 days	14.2 days
Cash to Cash Cycle Time (days)	53.7 days	9.5 days
Net Asset Turns	1.4	5.4

SCM Performance Example

QUESTION: What is the difference in financial performance between a company with an average Supply Chain (i.e. Middle 20% performance as defined by PMG) versus a company with best-in-class Supply Chain (i.e. Top 20% performance as defined by PMG).

ANSWER: Let's calculate the Total Supply Chain Cost for Hewlett-Packard Company at the Best-in-class rate of 6.1% and the Median rate of 12.6%.

Hewlett-Packard Company (HPQ)
* Total Annual Revenue: $126.0 Billion (Period Ending: October 31, 2010)
* Annual Supply Chain Performance Savings: $8.190 Billion (Net Savings from having Best-in-Class Supply Chain Performance versus industry Median Performance)

	Total Supply Chain Cost (% of Revenue)	HP Projected Supply Chain Costs
Median SCM Performance	12.6%	$15.876 Billion
Best-in-Class SCM Performance	6.1%	$7.686 Billion
Net Difference: Best-in-Class versus Median	6.5%	$8.190 Billion

Electronic Documents

EXAMPLE: Retailer Orders Items for His Store

The following example lays out the sequence of activities and communications involved in the process of a fictitious retailer (Robert Retailer) submitting a fulfillment order for his store to his supplier (Sally Supplier) and then receiving this order into inventory at his store.

Electronic Transactions
The Story of Bob and Sally
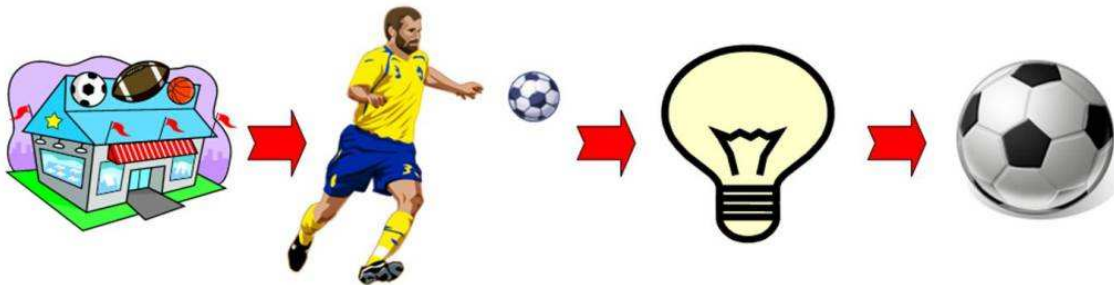
• Robert Retailer owns a sporting goods store in Small Town, California.
• One night while playing soccer on his men's league team, Robert realizes that he needs to stock up on Soccer Balls since the World Cup will be starting next month.

STEP 1: Retailer Orders Items for His Store
STEP 2: The Suppler Confirms the Retailer's Order

The Purchase Order

Robert Retailer → Electronic Purchase Order → Sally Supplier
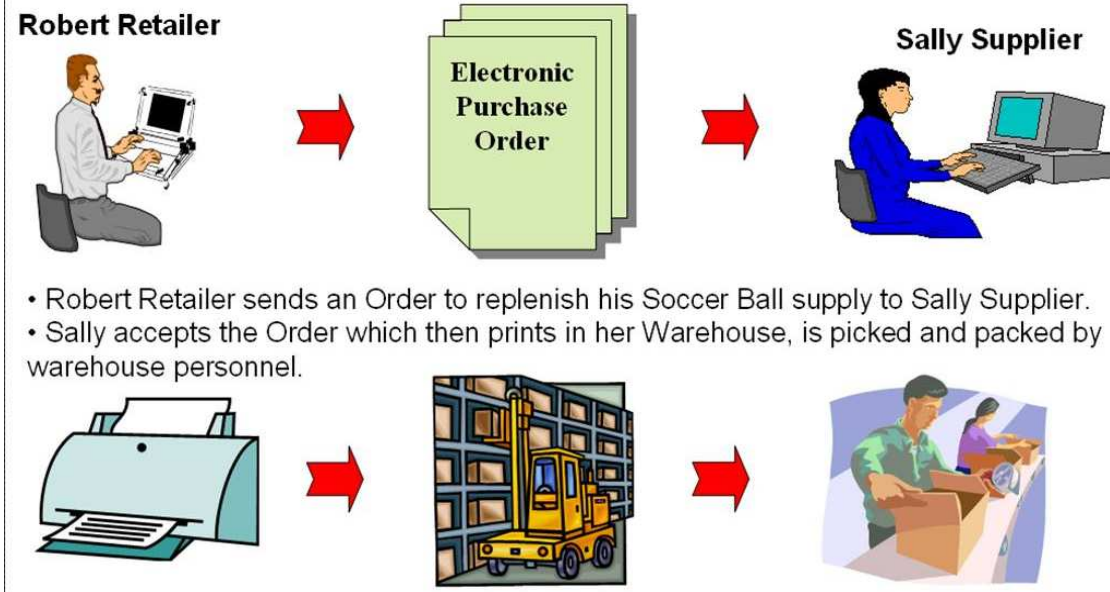
• Robert Retailer sends an Order to replenish his Soccer Ball supply to Sally Supplier.
• Sally accepts the Order which then prints in her Warehouse, is picked and packed by warehouse personnel.

STEP 3: The Supplier ships the order to the Retailer

Electronic Transactions (continued)
The Shipping Notice

Sally Supplier   **Electronic Shipping Notice**   **Robert Retailer**

• Once the Warehouse personnel have finished filling Robert's Order, Sally ships the order, which automatically generates a shipping label and sends an Electronic Shipping Notice to Robert.
• While the Shipment is in-transit, Robert can check the status of the Order Online.

Robert Retailer
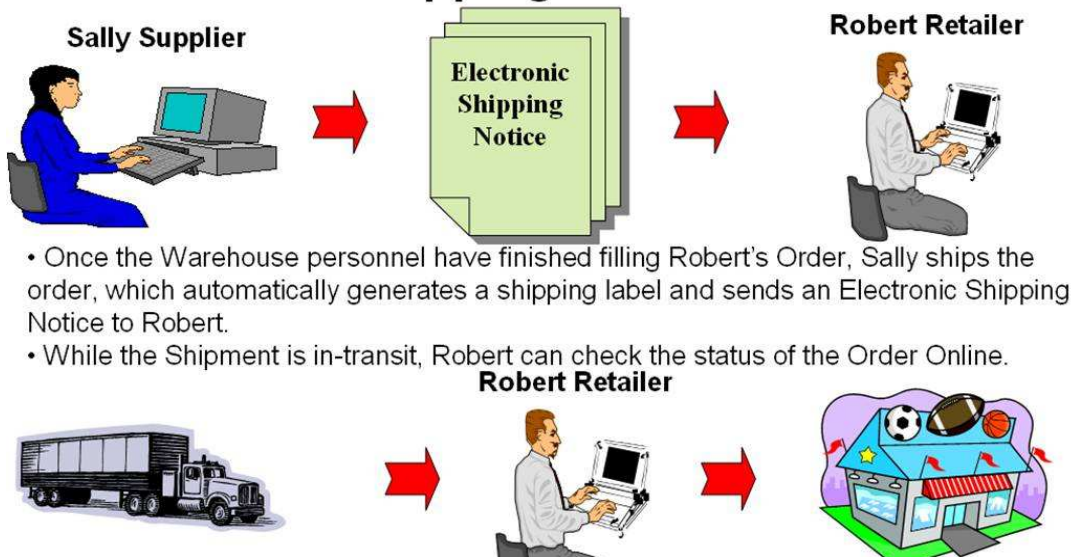
STEP 4: The Retailer receives the Order from the Supplier

The Receipt Notice
Robert Retailer

Electronic Shipping Notice   **Electronic Receipt Notice**

• Once the delivery arrives at Robert's store, he signs onto his inventory system and converts the Electronic Shipping Notice to a Receipt Notice
• Robert then prints the Receipt Notice to verify the shipment contents are correct.
• Once placed on the store shelves, the soccer balls are then available to be purchased by Robert's customers.

NOTES: Electronic Document Example
The electronic documents (transactions) example assumes that the retailer's inventory management system is fully integrated with this supplier via electronic documents (e.g. XML). As a practical matter, most retailers may have only a single transaction automated (e.g. The Purchase Order). Additionally, even if a fully automated process was cost justifiable, most retailers would likely automate a single transaction at a time (e.g. The Purchase Order followed by the Shipping Notice, etc.).

Supply Chain Enabling Technologies

Supply Chain Management Enabling Technologies

Supply Chain Management Enabling Technologies generally fall into one of two categories: Electronic Documents or Automatic Identification Technologies.

Electronic Documents
* Electronic Data Interchange (EDI): – Older Technology uses Phone Lines
* Extensible Markup Language (XML) – Newer Technology uses the Internet

Automatic Identification Technologies
* Barcodes – Optical Machine-readable Tag
* Radio-Frequency Identification (RFID) – Electronic Tag sends a radio signal

Advantages of SCM Enabling Technologies

There are three primary operational (business) advantages obtained through the use of SCM Enabling Technologies: Lower Transaction Costs, Improved Data Quality and an Accelerated Business Cycle.

[1] Lowers Transaction Costs
* Eliminates manual processes with each electronic requisition saving $13.62 in North America^

[2] Improves Data Quality
* Eliminates re-keying and the resulting potential errors
* Eliminates errors from illegible, lost or damaged documents

[3] Speeds-up the Business Cycle
* Time saved re-keying data
* EDI/XML transactions exchanged in minutes instead of days

SOURCE:
^"A Comparison of Supplier Enablement Around the World", Christopher Dwyer, The Aberdeen Group, Sector Insights, April 28, 2008
http://www.aberdeen.com/Aberdeen-Library/5097/SI-supplier-enablement-enterprise.aspx
Cost to process paper requisition in North America $37.45 versus $23.83 for electronic requisition (Aberdeen Group Study)

Automatic Identification Technologies for SCM

There are two Automatic Identification Technologies that are used in Supply Chain Management applications: Radio Frequency Identification (RFID) and Barcodes.

Radio Frequency Identification (RFID)

Radio Frequency Identification Tag is an electronic tag attached to the product, carton or pallet that communicates product information via radio waves to a receiver.

Barcodes

A barcode is an optical machine-readable representation of data, which provides data about the item to which it is attached. Barcodes need to be read by a barcode reader.

Major Conclusion:

"Small business with high value inventory items (especially those with serial numbers or lot numbers) should consider using barcodes and RFID technologies"

Electronic Document (Transaction) Technology

There are two competing technologies for electronic communication between supply chain trading partners: EDI and XML.

Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) messages are sent from trading partner to trading partner via phone lines, and usually require a Value Added Network (VAN) to serve as a messaging intermediary. EDI has been used by large retailers since the 1960s, while major national and international standards have been in place since the 1980s. EDI Messages are transmitted in a machine readable format (please see the example EDI Order below).

EDI Order

CustomerOrder.txt - Notepad

File Edit Format View Help

```
INTHDR 0001;|00125;20010929T07:00:00|1250.00;USD|Joe Smith;3410 Hillview
Avenue;Palo Alto;CA;94304;650-849-4000|001;17AHP-105;SJM 17mm HP Aortic
Valve;1;1250.00|INTTRLR 000000002|
```
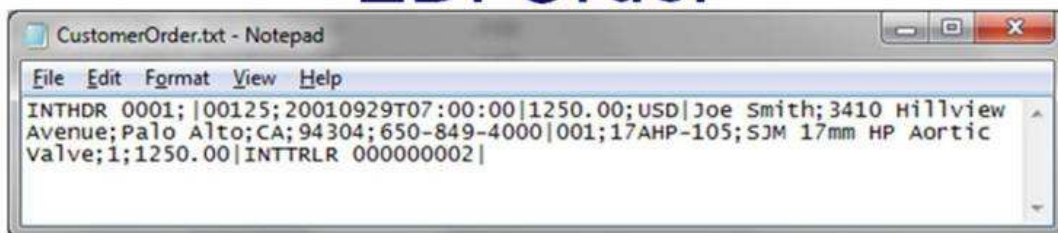
Extensible Markup Language (XML)
Extensible Markup Language (XML) is a set of rules for encoding documents in readable format (please see the example XML Order below). Messages are sent from trading partner to trading partner via the Internet. XML was first created by a World Wide Web Consortium (W3C) working group in the late 1990s; although today there are several competing standards sponsored by major application and integration providers.

XML Order

```
<?xml version="1.0"?>
<?soxtype urn:x-commerceone:document:com:commerceone:XCBL35:XCBL35.sox$1.0?>
- <CustomerOrder>
      <OrderNumber>00125</OrderNumber>
      <OrderDate>20010929T07:00:00</OrderDate>
      <OrderAmount>1250.00</OrderAmount>
      <CurrencyCoded>USD</CurrencyCoded>
      <Name>Joe Smith</Name>
      <Street>3410 Hillview Avenue</Street>
      <City>Palo Alto</City>
      <State>CA</State>
      <PostalCode>94304</PostalCode>
      <ContactNumber>650-849-4000</ContactNumber>
      <OrderLine>001</OrderLine>
      <ItemNumber>17AHP-105</ItemNumber>
      <ItemDescription>SJM 17mm HP Aortic Valve</ItemDescription>
      <Quantity>1</Quantity>
      <Price>1250.00</Price>
  </CustomerOrder>
```

Comparison Summary of EDI versus XML

	EDI	XML
Summary	Well Established Technology	Emerging Technology
History	Dates from the 1960s, with standards established in 1980s	Dates from the late 1990s, a few competing standards
Transmission Cost	Expensive bandwidth charges and VAN Fees	Requires only an internet connection
Setup Costs	Requires highly skilled development and testing	Requires less skill to setup and is easier to debug
Data Format	Compressed Binary	Plain Text
Hardware Required	Dedicated Server $10,000 or more	PC with Internet Connection

Major Conclusion:
"The simplicity and lower cost of XML has made electronic documents feasible for even the smallest Small Business!"

Example: Electronic Document ROI

Return on Investment for Electronic Purchase Orders

The Return on Investment (ROI) for implementing electronic documents is a function of the costs associated with implementing the electronic transaction (document) and the expected savings of implementing the electronic transaction. The hypothetical example below assumes that the desired third party purchasing application will cost $500 and it will require $1000 in consulting fees to implement this application with QuickBooks. The savings are derived from the 150 yearly Purchase Orders that will be automated and that the average transaction savings identified in the Aberdeen Group study accurately approximates the savings per Purchase Order that will be obtained from automation. This scenario results in a Payback Interval of 268 days, meaning that the costs to implement Electronic Purchase Orders will be covered by the per transaction savings in 268 days. The calculations are outlined below:

COSTS ($1500)
* 3rd Party Purchasing Application for QuickBooks ($500)
* Consultant Fees to implement XML Purchase Orders ($1000)

SAVINGS ($2043 per year)
* 150 Purchase Orders per Year (150 **x** $13.62^)

PAYBACK (268 days)
$1500 / $2043 per year **=** 0.7342 years

Conclusion:

"ROI of Electronic Documents is driven by Transaction Volume and Savings per Transaction"

^"A Comparison of Supplier Enablement Around the World", Christopher Dwyer, The Aberdeen Group, Sector Insights, April 28, 2008

Notes, Electronic Document ROI Example:

[1] The cost of the 3rd Party Purchasing Application is an approximation, and it may require a yearly renewal of up to $500 in addition to the initial fee.

[2] The $1000 consultant fees estimate for implementing the Electronic Purchase Order is only an approximation. The actual fees will depend on the complexity of the integration task and whether preexisting document maps are available.

[3] The $13.62 savings per Electronic Purchase Order is an approximation based on the Aberdeen Group study. The actual savings will be driven by the complexity of the tasks that have been automated, the greater the complexity the greater the savings. An estimate of actual savings can be generated through an Activity Based Cost (ABC) analysis.

Reducing Inventory Cost with Supply Chain Management

Cost of Excess Inventory

The cost of holding excess inventory includes: financial costs, warehousing costs and the risk of loss or damage. The financial cost of holding excess inventory (referred to as Inventory Carrying Cost) is a function of the value of the excess inventory, the cost of capital of the business and the time period for which the excess inventory is held:

> Inventory Carrying Cost = Inventory Value **x** Cost of Capital **x** Time

EXAMPLE: Financial Cost of $100,000 Excess Inventory
* Yearly Cost: $10,000 (Cost of Capital at 10%): $100,000 **x** 10% per year **x** one year
* Yearly Cost: $20,000 (Cost of Capital at 20%): $100,000 **x** 20% per year **x** one year

Conclusion:
> *"Reducing excess inventory will decrease your cost of doing business or free working capital for investment in other areas."*

Cost of Excess Inventory: Other Costs

In addition to the financial costs explained previously, the cost of maintaining inventory includes warehousing costs and the risk of loss or damage.

EXERCISE: List the Other Costs of Maintaining Inventory

Please take a moment to list some of these other costs associated with having too much inventory. (See Appendix A for some potential answers to this "Other Costs" Exercise)

_____
_____
_____
_____
_____
_____
_____
_____

Reducing Inventory with Supply Chain Management

Supply Chain Management provides two major techniques for reducing the cost of inventory, sharing information with trading partners and increasing cooperation with the trading partners.

An example of increased cooperation would be the coordination required to support Just-in-time (JIT) Manufacturing. With JIT Manufacturing inventory costs are reduced by dramatically reducing the time period for which the inventory is held. The typical goal for automotive manufacturing is to complete the vehicle manufacture within 24 hours of receiving parts or sub-assemblies from their suppliers.

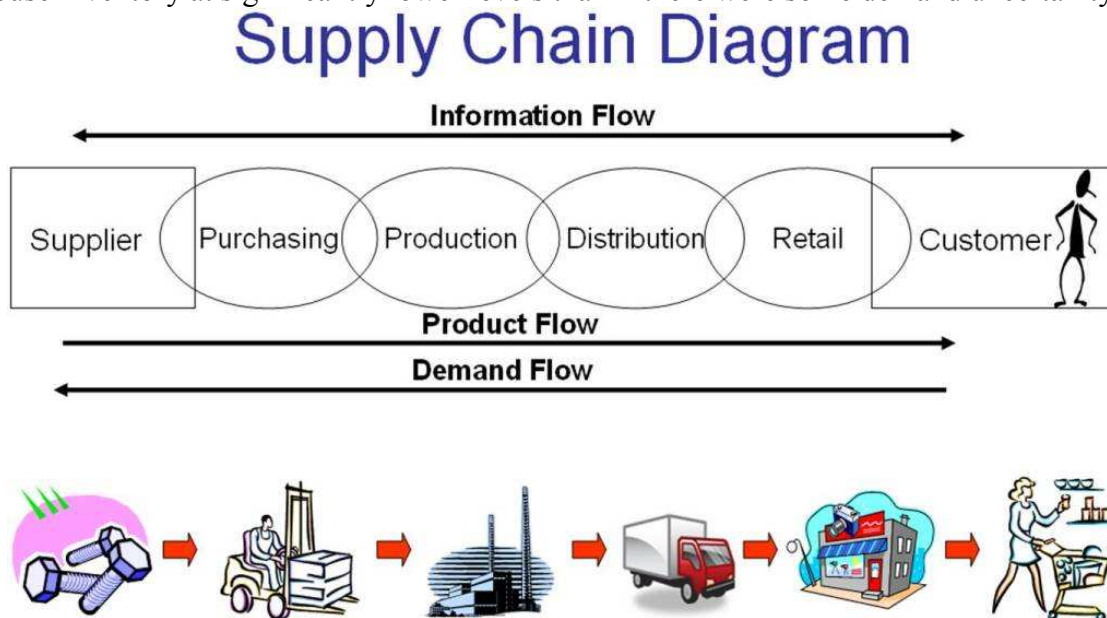**[1] Share Information with Trading Partners**
* Knowledge of consumer demand and inventory levels throughout the supply chain reduces the need for safety stocks for every trading partner in the Supply Chain

[2] Increase Cooperation with Trading Partners
* Better integration with your buyer's business increases the velocity of inventory in the Supply Chain. By reducing the Time that inventory remains in possession of the holder, the financial cost of the inventory is reduced.

Value of Information in the Supply Chain

Another method for reducing excess inventory is to share information with your trading partners. By having real-time knowledge of downstream demand every trading partner can maintain their in-house inventory at significantly lower levels than if there were some demand uncertainty.

Information Sharing with Trading Partners
* Customer demand information flows backwards from the retailer to every trading partner in the Supply Chain
* Your suppliers are ready to replenish your inventory since they know you have shipped product to your customers

Contrasting Views of Vendor Relations

There are two contrasting views of vendor relations. One view is where the buyer wants to have as much competition as possible between suppliers so that they can obtain the lowest possible price. The second view is that suppliers are valued partners who provide valuable services for which they deserve a fair return.

In the more cooperative view, the supplier collaboration provides value above and beyond the price of the material they provide. For example, suppliers providing parts and subassemblies for a JIT manufacturing operation reduce overall inventory costs for the buyers by delivering the product just when it is needed. This dramatically reduces the time period that the inventory is held and therefore the cost of the inventory to the buyer.

	Traditional ("adversarial")	**Co-maker** ("cooperative")
Selection & Qualification	* Buyer wants multiple sources * **Suppliers fight for business**	* Buyers wants few sources * **Best suppliers are sought out and retained**
Vendor's Production Processes	* Arm's length relationship * Focus is on final test * Stability is the goal	* Works closely with buyer * Focus is on process control * Improvement is the goal
Pricing	* **Buyer wants the lowest possible price** * Leveraged-based * Short-term agreements	* **Buyer expects to provide fair return** * Trust-based * Long-term agreements

Reference: Table 7-2: "Dynamic Manufacturing, Creating the Learning Organization" by Hayes, Wheelwright and Clark; The Free Press 1988

Vendor Relations: A Historical Perspective

In the 1980's Japanese Automakers began building assembly facilities in North America:
* Honda: Marysville, OH (1982)
* Nissan: Smyrna, TN (1983)
* Toyota: Georgetown, KY (1986)
* Subaru: Lafayette, IN (1988)

This was considered to be a great economic benefit to the states that received these plants as they were thought to provide assembly jobs and also generate increased revenue for local auto parts suppliers. However, instead of using North American based (local) suppliers the Japanese chose to recruit their Asian suppliers to North America.

Only after studying the dynamics of the North American automobile industry did academics later determine why the Japanese chose to avoid using the local suppliers. They discovered that in the 1980's the American Automotive Industry had treated their suppliers as expendable, seeking to obtain the lowest possible price. But, the Japanese Automotive Manufacturers had always treated their suppliers as valued partners. Because of this differing philosophy, the Japanese auto parts suppliers were capable of much greater levels of collaboration than their local counterparts, including supporting JIT Manufacturing.

The president of Honda North America on visiting the Harvard Business School in the fall of 1991 noted that they did not even count the car tires that arrived from their suppliers on a daily basis. When asked by a student how they knew the correct number of tires were delivered, the Honda executive replied that the correct number of tires were delivered as every vehicle completed that day, had exactly four tires when it was driven off the end of the assembly line.

Conclusion:
"By partnering with their suppliers, the Japanese Automotive Manufacturers in the 1980's had achieved efficiencies that their domestic competition could not match!"

Introduction to Supply Chain Management References

SUPPLY CHAIN MANAGEMENT DEFINITION AND PRINCIPLES

[1] Supply Chain Management {Wikipedia}
http://en.wikipedia.org/wiki/Supply_chain_management

[2] "Supply Chain Management Definition and Solutions" March 19, 2007, by Thomas Wailgum and Ben Worthen, CIO.com
http://www.cio.com/article/40940/Supply_Chain_Management_Definition_and_Solutions

[3] "Supply Chain and Logistics Terms and Glossary" February 2010, Council of Supply Chain Management Professionals (CSCMP), Definitions compiled by Kate Vitasek, Supply Chain Visions
http://cscmp.org/digital/glossary/glossary.asp

SUPPLY CHAIN MANAGEMENT EXAMPLES

[4] "Nordstrom Links Online Inventory to Real World" by Stephanie Clifford, The New York Times, August 23, 2010
http://www.nytimes.com/2010/08/24/business/24shop.html

[5] "How Wal-Mart Lost Its Technology Edge" By Thomas Wailgum, CIO Magazine, October 4, 2007
http://www.cio.com/article/143451/How_Wal_Mart_Lost_Its_Technology_Edge

MEASURING SUPPLY CHAIN MANAGEMENT PERFORMANCE

[6] "Performance of Measurement - Supply Chain Management" -- R V Ramakrishnan, Managing Consultant, Chennai
http://www.iimmbangalore.org/index.php?option=com_content&view=article&id=198%3Aperformance-of-measurement-supply-chain-management&catid=38%3Aeducation&Itemid=93

[7] "Supply Chain Benchmarking" The Performance Measurement Group, LLC
http://www.pmgbenchmarking.com/public/Product/scorecard/supply_chain/scorecard.aspx

[8] "Supply Chain: Are you optimizing your performance?" July 13, 2009, The Performance Measurement Group (PMG), available on the PMG Website:
http://www.pmgbenchmarking.com

ELECTRONIC (TRANSACTIONS) DOCUMENTS

[9] Electronic Data Interchange {Wikipedia}
http://en.wikipedia.org/wiki/Electronic_Data_Interchange

[10] XML {Wikipedia}
http://en.wikipedia.org/wiki/XML

SUPPLY CHAIN ENABLING TECHNOLOGIES

[11] "A Comparison of Supplier Enablement Around the World", Christopher Dwyer, The Aberdeen Group, Sector Insights, April 28, 2008
http://www.aberdeen.com/Aberdeen-Library/5097/SI-supplier-enablement-enterprise.aspx
NOTES: Cost to process paper requisition in North America $37.45 versus $23.83 for electronic requisition (Aberdeen Group Study)

[12] "Mojix Sees Virtualization as Way to Cut RFID Cost for Inventory Management," By Peter Sayer, CIO Magazine, June 6, 2012
http://www.cio.com/article/707778/Mojix_Sees_Virtualization_As_Way_to_Cut_RFID_Cost_for_Inventory_Management

[13] Radio-Frequency Identification {Wikipedia}
http://en.wikipedia.org/wiki/RFID

[14] Barcode {Wikipedia}
http://en.wikipedia.org/wiki/Barcode

REDUCING EXCESS INVENTORY

[15] "Taking Stock of Inventory Management" by Jeremy Quittner, Bloomberg-Businessweek, October 17, 2008
http://www.businessweek.com/magazine/content/08_70/s0810060789798.htm

[16] "Build a Good Relationship With Suppliers" By Bob Reiss, Entrepreneur Magazine, April 6, 2010
They're your hidden growth assets. Follow these 4 tips to become a valued customer.
http://www.entrepreneur.com/article/205868

EXERCISE: Supply Chain Management Self-Assessment Quiz

INSTRUCTIONS: Please select the best answer to the following questions. Each of these questions cover a key principle from the Introduction to Supply Chain Management section, and the student may wish to review the sections pertaining to any questions that are answered incorrectly. (See Appendix A for the correct answers to the questions along with an explanation for each of the answers.)

[1] What is a Supply Chain Management technique for reducing the costs of a company's operations? (please select the best response)
A. Use information of downstream customer demand to reduce the safety stocks of inventory
B. Collaborate with trading partners to reduce the time that inventory is held
C. Implement Electronic Transactions to decrease manual data entry
D. Use automation technologies (e.g. barcodes and RFID tags) to decrease manual data entry
E. All of the above

[2] True or False: Supply Chain Management changes the rules of product marketing to deliver other value to customers (beyond price and quality) in exchange for a premium price?
A. True
B. False

[3] Supply Chain performance is measured in what category? (please select the best response)
A. Responsiveness
B. Flexibility
C. Cost
D. Asset Utilization
E. All of the above

[4] What is an example of a Supply Chain Management Enabling Technology? (please select the best response)
A. Barcodes
B. Radio-Frequency Identification (RFID) Tags
C. Electronic Data Interchange (EDI):
D. Extensible Markup Language (XML)
E. All of the above

[5] What is an advantage of Supply Chain Management Enabling Technology? (please select the best response)
A. Lowers Transaction Costs
B. Improves Data Quality

C. Speeds Up the Business Cycle
D. All of the above

[6] The Return on Investment of implementing Electronic (Documents) Transactions is determined by? (please select the best response)
A. Transaction Volume
B. Savings per Transaction
C. Cost of Implementing the Electronic Transaction
D. All of the above

[7] The Financial Cost of holding inventory (Inventory Carrying Cost) is a function of what? (please select the best response)
A. The value of the inventory
B. The length of time the inventory is held
C. The company's Cost of Capital
D. All of the above

[8] What is NOT a potential cost of excess inventory? (please select the best response)
A. Increased risk of damage or theft
B. Increased risk of product obsolescence
C. Higher rent, insurance and utility costs
D. Increased customer orders
E. Increased labor costs

[9] Japanese automobile manufacturers that built assembly facilities in North America in the 1980s chose NOT to use local parts suppliers because? (please select the best response)
A. Their prices were too high
B. Their quality was too low
C. They had no experience in manufacturing cooperation
D. All of the above

Supply Chain Applications for Small Business

Overview: Small Business Supply Chain Applications

Introduction

For large and mid-sized business, specialized Enterprise Resource Planning (ERP) applications are available with customized functionality for a variety of industries (e.g. Aerospace & Defense, Electronics, etc.). For small businesses, accounting packages provide ERP functionality through the purchase of additional modules or add-on packages.

In the past ten years, another class of enterprise applications has emerged in the Software-as-a-Service (SaaS) space. These applications are sometimes referred to as Hosted Applications and are part of a broader class of applications known as Cloud Applications/Services. With these applications, companies do not purchase the software and buy hardware to run the applications or pay for an IT staff to manage the software and run the hardware. Instead companies rent access to the applications which are hosted remotely and are accessed via the Internet.

Since the target audience of this paper is small businesses, we will concentrate on Small Business alternatives (i.e. accounting packages) and discuss the upgrade alternatives (mid-sized ERP applications and SaaS ERP applications).

Small Business Supply Chain Applications

Three normal application classes that small and growing businesses should consider are Small Business Accounting Packages, Hosted (Cloud) ERP Applications and Mid-Tier ERP Applications.

[1] Small Business Accounting Packages

* Limited SCM functionality in base package: purchase add-on applications/modules, and consider industry specific versions, if available
* $250-400/year/user plus $500 or more for each add-on application

[2] Hosted (Cloud) ERP Applications

* Rich and growing SCM functionality; some industry specific versions
* Software & hardware maintenance are included in the monthly/yearly price
* Approximately $1200/year/user with a minimum of 5 – 25 users

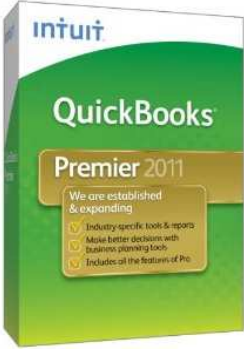# [3] Mid-Tier ERP Applications

* Rich and growing SCM functionality with industry specific applications and versions
* Will need to buy hardware and hire/rent IT support
* Expensive with minimum of 25 users (or more)
* Typical clients have +100 employees and +$50 Million revenue

Small Business Accounting Packages

The top small business accounting packages (as chosen by PC Magazine) include QuickBooks by Intuit, along with Peachtree by Sage Group and Account Edge by Acclivity, LLC.

Small Business Accounting Software Comparison

	QuickBooks Premier 2011	Peachtree Premium Accounting 2010	Account Edge 2010 for Windows
Application			
PC Magazine Rating^	4.5/5	4.0/5	3.5/5
Price Range	$233 -$370	~$350	~ $299
Main Website	www.quickbooks.com	www.peachtree.com	www.accountedge.com
Bottom Line	*** Must consider QuickBooks applications for small business accounting software** * Superior blend of accounting tools, usability, and integration	*** Solid competitor with robust accounting, exceptional inventory tracking, and powerful people & item management** * Vertical solutions add to overall excellence	*** Account Edge is a formidable competitor** * Accounting tools are thorough and accessible * Excellent interface
Positive	* Intuitive interface & detailed setup * Intuit Payment Network & many payroll options *** Extensive network of certified application providers**	* Impressive overall accounting prowess *** Robust inventory functionality** * Crystal Reports. *** Industry specific versions**	* Clean, simple and fast interface * Web-store integration *** Deep financial management and inventory**
Negative	*** Weak inventory tools** * Little attention to Preferences	* No alternative to multiple open windows * Navigation and interface could improve * No Mac compatibility	* No standard online bill-pay * Fewer online tools * No company dashboard

SOURCES:

"The Best Small Business Accounting Software" PC Magazine Roundup by Jeffrey L. Wilson, May 13, 2010
http://www.pcmag.com/article2/0,2817,2363725,00.asp

"QuickBooks Premier Edition 2011" PC Magazine by Kathy Yakal, October 1, 2010
http://www.pcmag.com/article2/0,2817,2370094,00.asp

Small Business Accounting Software Notes

Both Intuit's QuickBooks application and the Peachtree application by Sage are available in different versions which provide increased functionality at higher price points. The links below provide an online comparison of these different versions:

Intuit QuickBooks Comparison
http://quickbooks.intuit.com/product/accounting-software/quickbooks-comparison-chart.jsp
QuickBooks is available in several different editions. QuickBooks Simple Start is a single user application while QuickBooks Pro and Premier will support up to five simultaneous users (with purchase of additional licenses). The top-tier application, QuickBooks Enterprise Solutions supports up to 30 users, and packages start at $3,000 for 5 users with support and upgrades included the first year.

Sage Peachtree Accounting & Financial Software Comparison
http://www.peachtree.com/productsServices/compare/
Sage Peachtree Accounting & Financial Software is also available in several different editions. Peachtree First and Pro are single user versions while Peachtree Complete and Premium will support up to five simultaneous users (with purchase of additional licenses). Sage Peachtree Quantum is the top-tier application in this family with packages available for 5 – 40 users.

Add-Ons for Small Business Accounting Software

Although these small business account applications provide some Supply Chain Management functionality out-of-the-box, sophisticated functionality (e.g. the ability to implement Electronic Purchase Orders) will require the purchase of third-party Add-on applications. The links below identify the online marketplace for these add-on applications:

Intuit Application Marketplace
http://marketplace.intuit.com/
The Intuit Marketplace allows QuickBooks users to easily find tested and proven third-party software applications built to meet their specific business needs:
* Search by Industry or Business-Specific Solutions
* Search by your QuickBooks Product
* Search by Certified QuickBooks Gold Developers

Sage Peachtree Integrated Accounting Software Add-Ons
http://www.peachtree.com/productsServices/peachtreeAddOns/
The Sage Peachtree Endorsed Solutions meet rigorous strategic, technology and integration criteria and have been hand picked by Sage. These solutions solve unique business issues and optimize the performance of Sage Peachtree.

Hosted (Cloud) ERP Applications

The Hosted ERP application vendors will normally want a minimum of 5 – 25 users. Top SCM choices for hosted ERP applications include NetSuite (founded by Oracle), and SAP's Business ByDesign:

[1] NetSuite
www.netsuite.com
* June 2010, first full-suite offering for mid-market manufacturers
* Pure Software-as-a-Service (SaaS) company, which supports multiple sites, languages and currencies
* Plan to target complex manufacturing industries

[2] SAP Business ByDesign
www.sap.com/BusinessByDesign
* July 2010 release was first SaaS move into manufacturing
* SAP has tremendous manufacturing domain expertise to incorporate
* Plan to focus on mixed-mode manufacturing and engineer-to-order

[3] Plex Online
www.plex.com
* Plex was the first SaaS player to target manufacturing in 2001
* Plex is a pure SaaS vendor, all of their manufacturing clients are in the cloud
* Focus on expanding global capabilities, and vertical manufacturing

SOURCE:

"The Cloud ERP Shortlist for Manufacturers" By Derek Singleton, Software Advice, February 11, 2011
http://www.softwareadvice.com/articles/manufacturing/the-cloud-erp-shortlist-for-manufacturers-1021111/

Mid-Tier ERP Applications

Midmarket companies (according to Gartner) are generally considered to have 100-999 employees and annual revenue between $50 Million and $1 Billion. Mid-Tier ERP applications include SAP's Business One, Microsoft Dynamics and Epicor:

[1] SAP Business One
http://www.sap.com/sme/solutions/businessmanagement/businessone/index.epx
SAP Business One is an integrated ERP system developed by SAP in Germany. It caters to business software requirements of small & medium sized businesses.
Gartner Magic Quadrant: Leaders

[2] Microsoft Dynamics ERP Solutions
www.microsoft.com/Dynamics
NOTE: Microsoft Dynamics is available in five versions AX, GP, NAV, SL, and C5.
Microsoft Dynamics is a line of ERP (enterprise resource planning) and CRM (customer relationship management) applications developed by the Microsoft Business Solutions Group or acquired by purchasing independent vendors.
Gartner Magic Quadrant: Leaders (Microsoft Dynamics AX)

[3] Epicor
www.epicor.com
Epicor develops ERP and retail business software for midmarket companies primarily in manufacturing, distribution, retail, hospitality and services.
Gartner Magic Quadrant: Visionaries

SOURCE:

"Magic Quadrant for ERP for Product-Centric Midmarket Companies" Gartner, December 17, 2010. A link to download a free copy of this Gartner report can be found on the SAP Website in the following Press Release: "SAP Positioned in Leaders Quadrant of Magic Quadrant for ERP for Product-Centric Midmarket Companies" SAP Newsbyte - January 20, 2011
http://www.sap.com/corporate-en/press-and-media/newsroom/press.epx?pressid=14639

Recommendations: Application Selection & Implementation

Some issues to consider when evaluating small business supply chain applications include:

[1] Choose an application that you can use for a minimum of five years (10 years would be better)

* Application implementations require: management attention, personnel time and monetary expense. Do not be fooled by terms like "rapid cycle" or "simple implementation".
* You must consider what the application will look like in 5 – 10 years (Will the application provider still be in business then?)

[2] The simplest solution is often the best solution

* Systems integrators (software consultants) have an incentive to recommend solutions that result in larger consulting expenditures.
* Application providers have an incentive to recommend alternatives that will provide higher training and maintenance revenues.

[3] Industry Specific Solutions

* Some small business accounting applications (e.g. Peachtree) are available in industry specific versions (e.g. apparel, automotive, chemicals, electronics, etc.)
* Businesses should consider utilizing industry specific applications, if available!

[4] Beware of Customized Solutions

* Systems integrators (software consultants) have a huge incentive to recommend customized solutions that result in larger consulting expenditures.
* Businesses need to consider not only the cost and risk of a customized solution, but also that these customizations will be incompatible with all future releases of the base software application.

References: Supply Chain Applications for Small Business

OVERVIEW: SMALL BUSINESS SUPPLY CHAIN APPLICATIONS

[1] Enterprise Resource Planning {Wikipedia}
http://en.wikipedia.org/wiki/Enterprise_resource_planning

SMALL BUSINESS ACCOUNTING PACKAGES

[2] "The Best Small Business Accounting Software" PC Magazine Roundup by Jeffrey L. Wilson, May 13, 2010
http://www.pcmag.com/article2/0,2817,2363725,00.asp

[3] "QuickBooks Premier Edition 2011" PC Magazine by Kathy Yakal, October 1, 2010
http://www.pcmag.com/article2/0,2817,2370094,00.asp

[4] "Peachtree by Sage Premium Accounting 2010" PC Magazine by Kathy Yakal, May 12, 2010
http://www.pcmag.com/article2/0,2817,2363702,00.asp

HOSTED (CLOUD) ERP APPLICATIONS

[5] "The Cloud ERP Shortlist for Manufacturers" By Derek Singleton, Software Advice, February 11, 2011
http://www.softwareadvice.com/articles/manufacturing/the-cloud-erp-shortlist-for-manufacturers-1021111/

[6] "The CIO as Supply Chain Manager" By Zohar Gilad, CIO Magazine, December 7, 2011
http://www.cio.com/article/696055/The_CIO_as_Supply_Chain_Manager

[7] "The Cloud Solves Those Lingering Supply Chain Problems" By Greg Kefer, Network World, October 28, 2011
http://www.cio.com/article/692784/The_Cloud_Solves_Those_Lingering_Supply_Chain_Problems

MID-TIER ERP APPLICATIONS

[8] "Magic Quadrant for ERP for Product-Centric Midmarket Companies" Gartner, December 17, 2010. A link to download a free copy of this Gartner report can be found on the SAP Website in the following Press Release: "SAP Positioned in Leaders Quadrant of Magic Quadrant for ERP for Product-Centric Midmarket Companies" SAP Newsbyte - January 20, 2011
http://www.sap.com/corporate-en/press-and-media/newsroom/press.epx?pressid=14639

RECOMMENDATIONS: APPLICATION SELECTION & IMPLEMENTATION

[9] "ERP Market Shake-Up: What It Means to Your Company" Posted by Todd R. Weiss to Enterprise Resource Planning (ERP), CIO Magazine Blogs, August 3, 2011
http://advice.cio.com/enterprise-resource-planning-erp/16432/erp-market-shake-what-it-means-your-company

[10] "An Insider's View of Selecting an ERP Vendor" By Donald Burleson, TechRepublic, September 5, 2001
http://www.techrepublic.com/article/an-insiders-view-of-selecting-an-erp-vendor/1040161

[11] "New SCM Deployments Help Food and Beverage Companies Streamline Business Operations" By Todd R. Weiss, CIO Magazine, July 21, 2011
http://www.cio.com/article/686552/New_SCM_Deployments_Help_Food_and_Beverage_Companies_Streamline_Business_Operations_

Detailed Supply Chain Management Processes

Background & Overview: Supply Chain Management Processes

What is Supply Chain Management?

Supply Chain Management (SCM) encompasses all operations within the supply chain, including the sourcing, acquisition, and storage of raw materials; the scheduling and management of work-in-process (WIP); and the warehousing and distribution of finished products. Additionally, since there are often many third-parties involved throughout the supply chain, SCM practices enhance communication, collaboration, and coordination. Vendors and suppliers, transportation and shipping companies, intermediaries, and other partners all benefit from improved information sharing.

Supply Chain Management Processes

Supply Chain Management processes discussed in this paper will include the following:
* Electronic Commerce
* Purchasing/Procurement/Supplier Relationship Management (SRM)
* Inventory Management
* Warehouse Management (WMS)
* Retail Management
* Point of Sale (POS) Management

Determine Essential Functionality

Supply Chain Management is composed of several individual process, not all businesses will require sophisticated functionality for each process. Consequently, businesses should evaluate their specific needs for each of the supply chain process and seek to acquire advanced capabilities only when necessary!

Electronic Commerce

Electronic Commerce (also called Internet Commerce, Online Sales, E-Commerce or eCommerce) is the buying and selling of products or services over electronic systems such as the Internet or other computer networks. It includes the entire process of developing, marketing, selling, delivering, servicing and paying for products and services online.

Electronic commerce that takes place between businesses is referred to as business-to-business or B2B. Electronic commerce that takes place between businesses and consumers, on the other hand, is referred to as business-to-consumer or B2C.

Inventory Management Functionality of Electronic Commerce Software
The California Resources and Training (CARAT) Technology Training Program for small business also has training sessions in E-Commerce and E-Marketing. Since these training sessions cover procedures and software available to operate and market an online business, the Electronic Commerce functionally discussed in the Purchasing and Inventory Management training session will concentrate on the backend integration aspects of Electronic Commerce, such as order processing, inventory management and payment processing. Attendees of the Purchasing and Inventory Management training session that wish to have an online store are strongly encouraged to also attend the E-Commerce, E-Marketing and Website Development training sessions.

CARAT's online Training Calendar lists the currently scheduled E-Commerce, E-Marketing and Website Development classes/webinars can be found on the CARAT Website at:
http://www.caratnet.org/calendar.htm

What is Electronic Commerce Software?

Electronic Commerce software applications provide online merchants with tools that automate all facets of selling products on the Internet. It supports all related activities end-to-end, including creation and maintenance of an online product catalog, marketing, payment processing, inventory management and order processing.

Key Benefits of Electronic Commerce Software

Electronic Commerce software provides operational efficiency and enhanced functionality to online retailers, including:
* Enhanced efficiency through integrated order processing and inventory management
* Improved service and loyalty by enhancing the customer experience
* Greater efficiency through full process automation and minimized site administration
* In-depth insight into the trends and factors that impact sales and profitability
* Improved branding through more professional and comprehensive Website design, promotion and management

Key Features of Electronic Commerce Software

Modern Electronic Commerce software is a robust, feature-rich application that provides:
* A single, centralized database that stores all product listings, as well as order and customer history data.
* The ability to easily add or update new products and product categories, as well as the ability to include comprehensive product descriptions, images, and other features.
* End-to-end checkout automation including dynamic calculations of product prices, taxes, shipping and handling fees.
* Integration with third-party payment gateways, providing customers flexible payment options.
* Integration with shipping service providers, offering fully-customizable delivery options at checkout.
* Integration with backend accounting applications, for more effective management of revenue, invoices, payments, financial reports and taxes.

Electronic Commerce: Essential Functionality
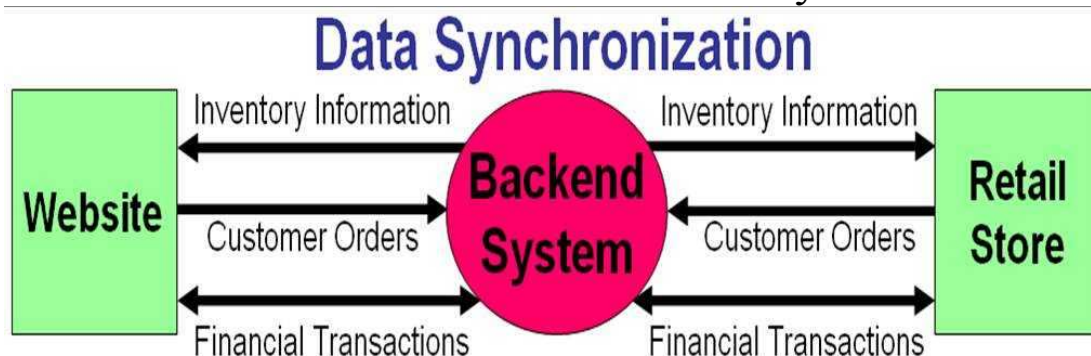
Real-time Inventory Management
Electronic Commerce software that automatically adjusts inventory (synchronizes) quantities as orders are processed across all channels (including the retail store, Website, etc.) is said to provide Real-time Inventory Management. While it is possible to maintain separate inventory quantities for online stores, merchants will achieve superior operational efficiency and reduced

overall inventory, if their Electronic Commerce application provides Real-time Inventory Management.

An alternative to Real-time Inventory Management is to use a batch method. With batch synchronization, inventory quantities are reconciled at predetermined intervals, instead of when each order is processed. With batch synchronization, it is possible for the same item to be sold in two channels since this problem is only discovered at the time that the batch synchronization is completed. Consequently, Real-time Inventory Management is superior to both batch synchronization and maintaining separate inventories for each channel.

Payment & Financial Transaction Integration
While providing flexible payment options to online customers is desirable, the Electronic Commerce software application should also integrate payment information with the backend accounting system. This integration allows online payment transaction records to automatically be incorporated in accounting reports and business tax records.

Electronic Commerce References

[1] Electronic Commerce {Wikipedia}
http://en.wikipedia.org/wiki/Electronic_commerce

[2] Online Shopping {Wikipedia}
http://en.wikipedia.org/wiki/Online_shopping

[3] eCommerce Resources {SBA Website}
http://www.sba.gov/content/ecommerce-resources

[4] Online E-Commerce Guide {SBDCNet Website}
Links to online information resources.
http://www.sbdcnet.org/small-business-information-center/e-commerce-for-small-business

Purchasing

Purchasing [which in some instances can be called Procurement or Supplier Relationship Management (SRM)] is the acquisition of goods and/or services to fulfill business needs. Normally, the goal is to obtain these items at the best possible total cost of ownership while still meeting the customer's needs for quality and quantity, time and location.

Procurement versus Purchasing

Procurement may involve a bidding process i.e., tendering. A company may receive several bids from potential suppliers, and normally, the company will select the lowest bidder. But, if the lowest bidder is not deemed competent, the company may then select the next best price.

Direct versus Indirect Materials

The purchasing process will in most cases be significantly different for Direct versus Indirect Materials. Direct materials are raw materials or other goods used in the production of finished goods. Direct Materials are typically characterized by large order quantities and more frequent orders. Indirect materials are used in maintenance or repair of production machinery or consist of general operational supplies (such as office supplies). Indirect materials normally have small order quantities and less frequent orders.

Procurement Life Cycle

The Procurement life cycle in modern business usually consists of several steps:
1. Information Gathering (identify potential suppliers)
2. Supplier Contact (request proposals or bids)
3. Background Review (evaluate proposals or bids)
4. Negotiation (finalize agreements)
5. Fulfillment (receive goods or services)
6. Consumption, Maintenance, and Disposal (use goods or services)
7. Renewal (reevaluate supplier relationship)

Purchasing References

[1] "How to Find and Work With Suppliers" December 11, 2003 {Entrepreneur Magazine} Whether you're looking for raw materials for manufacturing or finished products to resell, this guide will help you find and forge great relationships with suppliers.
http://www.entrepreneur.com/article/66028

[2] Purchasing {Wikipedia}
http://en.wikipedia.org/wiki/Purchasing

[3] Procurement {Wikipedia}
http://en.wikipedia.org/wiki/Procurement

[4] "Financing Growth Through Suppliers" October 31, 2006 {Entrepreneur Magazine}
By working closely with your key suppliers, you can improve your cash-flow management and spur growth by using credit wisely.
http://www.entrepreneur.com/article/169866

Inventory Management

Inventory Management Defined

Inventory Management (or Inventory Control) is the process for managing and locating objects or materials. An inventory control system can be used to automate a sales order fulfillment process, manage the inward and outward flows of material, and provide a real-time view of stock levels for all items in inventory.

Inventory management/control supervises the supply, storage and accessibility of items in inventory to insure an adequate supply without excess or oversupply. Inventory control aims to reduce overhead cost without hurting sales.

In many cases, a company's inventory represents one of its largest investments. Inventory management software helps companies cut expenses by minimizing the quantity of unnecessary or redundant parts and products in storage. It also helps companies keep lost sales to a minimum by insuring that there is enough stock on hand to meet demand.
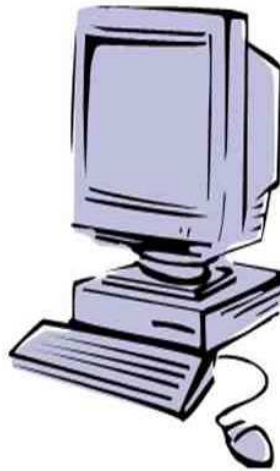
Inventory Management Software

Inventory management software is a computer-based system for tracking product levels, orders, sales and deliveries. It can also be used in manufacturing to create a work order, bill-of-materials (BOM) or other production-related documents. Companies use inventory management software to avoid product overstock and outages.

Inventory management software is used for a variety of purposes, including:
* Maintaining the balance between too much and too little inventory
* Tracking inventory as it is transported between locations
* Receiving items into a factory, warehouse, distribution center or other location
* Picking, packing and shipping items from a warehouse
* Keeping track of product sales and inventory levels
* Reducing product obsolescence and spoilage

Inventory Management History

The Universal Product Code (UPC) was adopted by the grocery industry in the 1970's. It helped drive down costs for inventory management by establishing a universal standard.

In the early 1980s, personal computers (PCs) debuted pushing down the cost of barcodes and readers, and also allowed the first versions of inventory management software to be put into place. Starting in the early 2000s, inventory management software progressed to the point where people no longer needed to input data by hand but could instantly update their database with barcode readers or RFID tags

Inventory Management Terminology

Physical Inventory Counts
Physical Inventory Counts verify that the data records for items, quantity and location match the physical stock. It provides information on the level of control achieved, allowing targets to be set and monitored.

Buffer Stock and Batch Stock
Buffer Stock (or safety stock) is used to compensate for uncertainties in the timing and volume of supply/demand. Batch Stock (or cycle stock) is the stock ordered on a regular basis to meet demand and allow operations to cope with not making all products simultaneously.

Consignment Inventory
Consignment Inventory are goods or product that are paid for when they are sold by the reseller, not at the time they are shipped to the reseller. They are owned by the vendor until they are sold to the consumer, meaning that there are no tax implications for the reseller until these items are sold.

FIFO and LIFO Accounting
FIFO and LIFO are accounting techniques used in managing the inventory of produced goods, raw materials, parts, components, or feed stocks. FIFO stands for first-in, first-out, meaning that

the oldest inventory items are recorded as sold first. LIFO stands for last-in, first-out, meaning that the most recently produced items are recorded as sold first.

RFID Tags
RFID tags streamline and improve inventory management by allowing manufacturers to more efficiently enter and track the flow of goods. RFID can add a boxful of goods to inventory systems all at once, without having to unpack the carton and scan each piece separately.

Inventory Management References

[1] "Five Steps to Painless Inventory Management" By Lisa Girard, November 3, 2011 {Entrepreneur Magazine}
http://www.entrepreneur.com/article/220631

[2] Inventory {Wikipedia}
http://en.wikipedia.org/wiki/Inventory

[3] Inventory Management Software {Wikipedia}
http://en.wikipedia.org/wiki/Inventory_management_software

[4] "Inventory Matters: The First Steps to Inventory Management" By Relph, Brzeski and Bradbear (NOTE: Download the First Steps to Inventory Management available at this Website.)
http://www.inventorymatters.co.uk/portfolio/the-first-steps-to-inventory-management?type=publication

[5] The Goal (novel) {Wikipedia}
http://en.wikipedia.org/wiki/The_Goal_(novel)
The Goal is a management-oriented novel by Dr. Eliyahu M. Goldratt, a business consultant whose Theory of Constraints has become a model for systems management. It was originally published in 1984, and has since been revised and republished every 10 years; once in 1994 and again in 2004. This book is often used by elite business schools in North America to introduce new MBA students to the basics of manufacturing, inventory management and Supply Chain Management.

[6] "Controlling Your Inventory" By Geoff Williams, Magazine, October 4, 2006 {Entrepreneur Magazine}
How to find a balance between too much stock and not enough
http://www.entrepreneur.com/article/168406

[7] "Inventory Control" April 20, 2006 {Entrepreneur Magazine}
When it comes to inventory, the key is striking a balance between too little and too much.
http://www.entrepreneur.com/article/21842

Warehouse Management

Warehouse Management Defined

A Warehouse Management System (WMS) controls the movement and storage of materials within a warehouse and processes the associated transactions, including shipping, receiving, put-away and picking. The system also directs and optimizes the stock put-away process based on real-time information about the status of bin utilization. Warehouse management systems can be stand alone systems or modules of an Enterprise Resource Planning (ERP) system or supply chain execution suite.

The objective of a warehouse management system is to provide a set of computerized procedures to handle the receipt of stock and returns into a warehouse facility, model and manage the logical representation of the physical storage facilities (e.g. racking, etc.), manage the stock within the facility and enable a seamless link to order processing and logistics management in order to pick, pack and ship product out of the facility. It also manages order processing and logistics movements into and out of the facility.

Auto ID Data Capture (AIDC) Technology

Warehouse management systems often utilize Auto ID Data Capture (AIDC) technology, such as barcode scanners, mobile computers, wireless LANs and Radio-frequency identification (RFID) to efficiently monitor the flow of products. The data collected is transmitted to a central database which can then provide useful reports about the status of goods in the warehouse.

Warehouse Management Processes
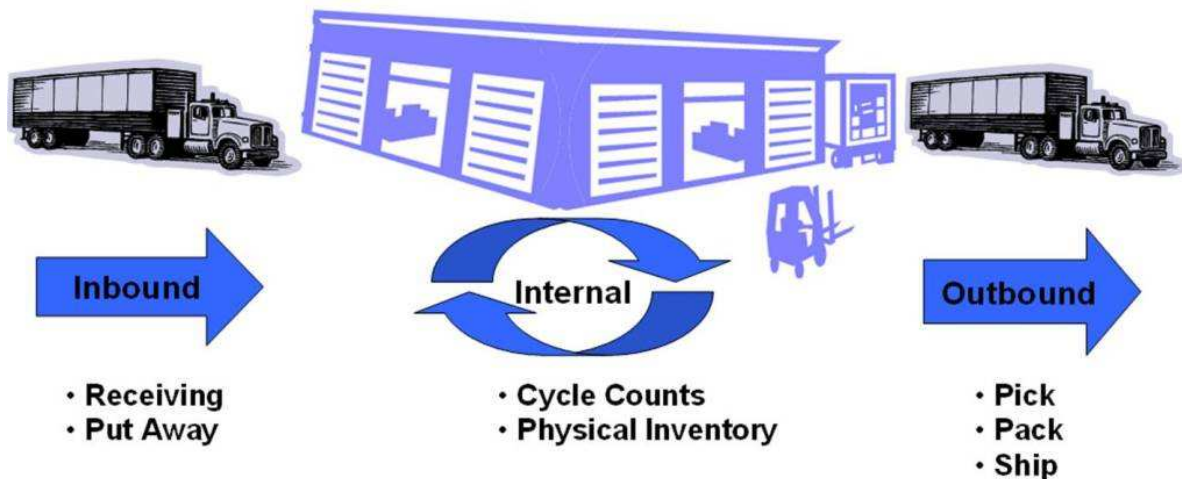
Major warehousing processes include inbound, internal and outbound processes:
* Receiving, Inspection and Acceptance
* Proper Storage (a.k.a. "Put Away")

* Order Preparation, Picking and Packing
* Dispatching / Delivery (a.k.a. "Shipping")
* Inventory Audit (checking system versus actual stock)
* Warehouses can also provide value added services, such as: Co-packing, Kitting and Repair.

What is a Distribution Center?

A distribution center is a warehouse or other specialized building, often with refrigeration or air conditioning, which is stocked with products (goods) to be redistributed to retailers, to wholesalers, or directly to consumers. A distribution center is a principal part, the order processing element, of the entire order fulfillment process. A distribution center can also be called a warehouse, a DC, a fulfillment center, a cross-dock facility, a bulk break center, or a package handling center.

Warehouse Management System Functionality

When evaluating a warehouse management system, choose a system that matches the unique needs of the business. Consider the following capabilities:

Bin and Pick Management
Bin and Pick Management allows customer orders to be picked more efficiently, organizing warehouse bins and tracking the exact location of items.

Demand Based Inventory Replenishment
Demand Based Inventory Replenishment provides intelligent inventory replenishment, ensuring anticipated orders are filled while minimizing excess stock.

Integrated Inventory Management
Integrated Inventory Management allows user to specify pricing, caption, images, etc. when creating new items and provides sales representatives and partners with full view of inventory. It also instantaneously adjusts inventory when filling Website, retail or sales orders.

Multi-location Inventory Management
Multi-location Inventory Management manages inventory in multiple locations and provides the ability to designate warehouse and location that will fulfill the order.

Lot Numbers
Lot Number functionality provides complete history for each lot number and allows expiration dates to be set and notes entered for each lot number.

Serial Numbers
Serial Number functionality allows orders to be placed for specific serial numbers.

Warehouse versus Inventory Management

Common situations that might require a Warehouse Management System versus a less sophisticated Inventory Management System:
1. Inventory storage facility organized into aisles and bins
2. Inventory items have serial numbers, lot numbers, or expiration dates, and orders might be placed for specific serial numbers or lot numbers
3. Inventory items consist of more than a few SKUs (Shelf Keeping Units)
4. Orders might be filled using a combination of LIFO and FIFO

Warehouse Management References

[1] Warehouse Management System {Wikipedia}
http://en.wikipedia.org/wiki/Warehouse_management_system

[2] Distribution Center {Wikipedia}
http://en.wikipedia.org/wiki/Distribution_center

[3] "WMS Software-How to Build Successful Business Case" SCM-OPERATIONS.com
http://www.scm-operations.com/2011/01/wms-software-building-business-case-for.html

Retail Management

Retail Management Systems
A retail management system should integrate and streamline business processes, so that retailers can obtain operational efficiencies, sustain growth and reduce costs.

Retailers today face a complex sales environment with an ever-growing number of sales channels (retail store, Website, call center, catalog) to manage. Consumers are demanding more information, better service and more control over the shopping experience. It is not unusual for a consumer to go to the Website to research product choices, call the retailer to place an order, and then go to the retailer's brick and mortar store to pick up the merchandise.

This shift has caused retailers to augment the traditional in-store retail channel with online sales channels, cross-channel service capabilities and advanced customer service and marketing tools. In order to remain competitive, retailers must also be able to orchestrate successful cross-channel sales initiatives. With multiple brick-n-mortar and E-Commerce competitive alternatives in the marketplace, retailers can ill afford to provide anything but a delightful customer experience.

Retail Management System Functionality
A superior retail management solution should provide everything needed to be successful. Ideally, the product should deliver:
* Streamlined day-to-day operations and an unparalleled ability to grow in-store and on-line sales
* Real-time, 360-degree view of customers and business processes across all channels
* A partner program with timely, cost effective and pre-integrated access to fulfillment solutions
* Shipping labels for UPS, FedEx or USPS, and automatically retrieve and forward package-tracking information
* Products managed from initial order to point of sale

Retail Management References
[1] Retailing {Wikipedia}
http://en.wikipedia.org/wiki/Retail

[2] Point of Sale {Wikipedia}
http://en.wikipedia.org/wiki/Point_of_sales

[3] "Integrated Shopping Is the Future of Retail" By Karen Mracek, Associate Editor, The Kiplinger Letter, July 24, 2012
http://www.kiplinger.com/columns/practical-economics/archives/integrated-shopping-is-the-future-of-retail.html

Point of Sale (POS) Management

The Point-of-Sale (POS) is the location where the sales transaction occurs. A POS terminal manages the selling process and prints the receipt. Once the item is scanned, the system automatically calculates the price (including discounts and taxes) and removes the item from inventory.

A Retail POS system typically includes a computer, monitor, cash drawer, receipt printer, customer display, barcode scanner and a debit/credit card reader. It might also include a weight scale, a signature capture device and a customer pin pad device.

The POS system software handles all customer centered transactions such as sales, returns, exchanges, layaways, gift cards, gift registries, customer loyalty programs, BOGO (buy one get one) and quantity discounts. POS software also allows for pre-planned promotional sales, coupons, foreign currency handling and multiple payment types.

Back-office computers typically handle other functions of the POS system such as inventory control, purchasing, receiving and product transfers. The POS system records sales information for reporting purposes and analysis, and stores customer information for receivables management, marketing and analysis.

What to look for in Point of Sale Software

Point of Sale (POS) software is the most vital retailer system. It enhances the customer's shopping experience, increases productivity and drives sales. Integrated with mission critical systems, it interacts with other stores and sales channels. Basic POS solutions include:

Point of Sale (Hardware)
Point of Sale hardware is the register where sales occur and customer payments are made.

Inventory Control
Inventory Control functionality manages inventory, allowing employees to create item descriptions, track orders, count inventory and make store transfers.

Customer Relations Management (CRM)
Customer relations management features track customer history and store important details including contact information. It also provides real-time access to all purchases, returns, support requests, and other customer information across all sales channels.

Credit/Debit Card Processing
Credit/Debit Card processing functionality allows for automatic processing of sales transactions.

Employee Management
Employee Management functionality defines user access parameters and allows transactions to be tracked by employee.

Multi-Channel Management
Multi-Channel Management functionality provides native E-Commerce and fully integrated POS capabilities which manage sales channels and back-end operations in real time.

Multi-Location Management
Multi-Location Management functionality allows visibility for managing sales, inventory and all other operations in real-time at the store, region, or company level.

Point of Sale Management References

[1] Point of sale {Wikipedia}
http://en.wikipedia.org/wiki/Point_of_sales

[2] "Point of Sale (POS) System Buying Guide" eBay Guides
http://pages.ebay.com/buy/guides/point-of-sale-pos-system-buying-guide/

[3] "The Future of Shopping" by Darrell Rigby, The Harvard Business Review, December 2011
http://hbr.org/2011/12/the-future-of-shopping

Appendix A: Answers to Exercises

EXERCISE ANSWERS: Supply Chain Value Added Services

The exercise at the end of the Supply Chain Management Examples section requests that a list be made of the value added services for which your customers would be willing to pay a premium. The instructor's list of potential services follows below:

[1] Parts/Subassemblies for Just-in-Time (JIT) Manufacturing
Suppliers that support JIT Manufacturing operations provide a valuable service that greatly reduces the inventory holding cost of their customers. These customers can justifiably share some of these savings with their suppliers by providing a price premium.

[2] Vendor Managed Inventory (VMI)
With Vendor Managed Inventory (VMI) the supplier is responsible for managing the inventory for their customers, sending replenishment inventory as required and maintaining the inventory at the customer's location. An example of VMI would be with soft drink distributors that manage the inventory of their beverages at supermarkets and convenience stores.

[3] Payment Terms/Financing/Discounts (e.g. 2% 10, Net 30)
Providing customer with flexible payment options is a valuable service that can justifiably charge a premium price.

[4] Superior Customer Service
Customer service that is noticeably superior to the competition will always be worth a premium to some customers. The value of this superior service increases as the complexity of the product increases.

[5] Consignments ("Retailer doesn't pay until the item sells")
In some industries, consignment inventory is the norm. Items provided on consignment are owned by the supplier until their customer sells the item.

[6] Multichannel Shopping Support
As seen with the Nordstrom example, multichannel shoppers spend four times as much as the average shopper. They also greatly value the convenience provided by being able to conduct their research online and then arranging with store front operations to evaluate the desired products in-person.

[7] Customized or Personalized Products
With the advent of the Internet and E-Commerce, retailers can now sell to anyone/anywhere that has a computer or smart phone with an internet connection. And with the advent of FedEx (and competing overnight delivery offerings by UPS and the U.S. Postal Service) retailers can now deliver personalized or customized products to customers worldwide within a day or two.

EXERCISE ANSWERS: Other Costs of Excess Inventory

The exercise in the Reducing Inventory Cost section requests that a list be made of the additional costs (beyond the financial costs) of maintaining inventory, which include warehousing costs and the risk of loss or damage. The instructor's list of potential other costs follows below:

[1] Larger facility leads to higher rent, equipment, insurance and utility costs
The costs associated with having too much inventory, likely include a larger than necessary facility (with a higher rent). This larger facility will also lead directly to higher equipment costs, higher insurance rates and higher utility bills.

[2] Increased risk of damage, theft, spoilage or product obsolescence
An excess of inventory increases the risk due to spoilage and product obsolescence. Having more inventory also increases the risk of (and the potential value of the loss due to) damage or theft.

[3] Increased labor costs for cycle counts and physical inventory
Having more inventory will require more time to complete physical counts in the warehouse.

[4] Increase put away (time) cost
Having more inventory will also likely increase the put away time for incoming shipments as the larger facility and higher levels of inventory will impede the progress of the warehouse personnel.

[5] Increased order picking (time) cost
Having more inventory will also likely increase the picking time for outgoing orders as the larger facility and higher levels of inventory will impede the progress of the warehouse personnel.

EXERCISE ANSWERS: Supply Chain Management Self-Assessment Quiz

The quiz at the end of the Introduction to Supply Chain Management section provides several multiple choice or true/false questions. The instructor's list of correct answers to these questions, along with an explanation for each answer, follows below:

[1] What is a Supply Chain Management technique for reducing the costs of a company's operations? (please select the best response)
CORRECT ANSWER: E. "All of the above"
EXPLANATION: In the Supply Chain Management Definition and Principles topic area there is a listing of "Supply Chain Management Key Principles" that identify three principles which can be used to lower cost and improve service:
* Trade Information for Inventory ("use customer demand information to reduce inventory" and "collaborate with trading partners to reduce the time inventory is held")
* Implement Electronic Transactions ("to decrease manual data entry")
* Deploy Automation Technologies (e.g. barcodes and RFID tags "to decrease manual data entry")
Consequently, since options A, B, C and D all reduce the cost of a company's operations, the best answer is E (All of the above).

[2] True or False: Supply Chain Management changes the rules of product marketing to deliver other value to customers (beyond price and quality) in exchange for a premium price?
CORRECT ANSWER: A. "True"
EXPLANATION: In the Supply Chain Management Examples topic area there is a quote identifying the "Value of Supply Chain Management." This quote reads "The typical differentiators for a consumer product are price and quality. Supply Chain Management changes the rules to deliver other value in exchange for a premium price."
Consequently, the correct answer is A (True).

[3] Supply Chain performance is measured in what category? (please select the best response)
CORRECT ANSWER: E. All of the above
EXPLANATION: In the Measuring Supply Chain Management Performance topic area, under the title "Supply Chain Performance Measurement" it is stated that "Supply Chain performance is measured in four categories: responsiveness, flexibility, cost and asset utilization."
Consequently, since options A, B, C and D are all categories by which Supply Chain performance is measured, the best answer is E (All of the above).

[4] What is an example of a Supply Chain Management Enabling Technology? (please select the best response)

CORRECT ANSWER: E. All of the above
EXPLANATION: In the Supply Chain Enabling Technologies topic area, there are two categories of enabling technologies: Electronic Documents and Automatic Identification Technologies. Under Electronic Documents the two technologies listed are EDI and XML. Under Automatic Identification Technologies the two technologies listed are Barcodes and RFID Tags.
Consequently, since options A, B, C and D are all enabling technologies for Supply Chain Management, the best answer is E (All of the above).

[5] What is an advantage of Supply Chain Management Enabling Technology? (please select the best response)
CORRECT ANSWER: D. All of the above
EXPLANATION: In the Supply Chain Enabling Technologies topic area, under the heading "Advantages of SCM Enabling Technologies" there are three advantages listed: Lowers Transaction Costs, Improves Data Quality and Speeds Up the Business Cycle.
Consequently, since options A, B and C are all advantages of SCM Enabling Technology, the best answer is D (All of the above).

[6] The Return on Investment of implementing Electronic (Documents) Transactions is determined by? (please select the best response)
CORRECT ANSWER: D. All of the above
EXPLANATION: In the Supply Chain Enabling Technologies topic area, in the example "Example: Electronic Document ROI" it clearly states that "The Return on Investment (ROI) for implementing electronic documents is a function of the costs associated with implementing the electronic transaction (document) and the expected savings of implementing the electronic transaction." Note that the expected savings are a function of the number of transactions and the savings per transaction.
Consequently, since options A, B and C are all parameters that determine the Return on Investment (ROI) for implementing electronic documents, the best answer is D (All of the above).

[7] The Financial Cost of holding inventory (Inventory Carrying Cost) is a function of what? (please select the best response)
CORRECT ANSWER: D. All of the above
EXPLANATION: In the Reducing Inventory Cost with Supply Chain Management topic area, the equation for "Inventory Carrying Cost" is a function of inventory value, the Cost of Capital and time.
Consequently, since options A, B and C are all parameters that determine Inventory Carrying Cost, the best answer is D (All of the above).

[8] What is NOT a potential cost of excess inventory? (please select the best response)
CORRECT ANSWER: D. "Increased customer orders"

EXPLANATION: In the Reducing Inventory Cost with Supply Chain Management topic area, there is an exercise where students are expected to list the other costs (in addition to Inventory Carrying Cost) of maintaining excess inventory: "EXERCISE: List the Other Costs of Maintaining Inventory." All of these costs are related to warehousing costs and the risk of loss or damage. Since the ability to fulfill customer orders requires that there is inventory on hand to fill these orders, increased customer orders is not a potential cost of excess inventory. In fact, excess inventory can be defined as inventory that is beyond what is required to fill customer orders.

Consequently, option D (Increased Customer Orders) is NOT a potential cost of excess inventory; it is the correct answer to this question.

[9] Japanese automobile manufacturers that built assembly facilities in North America in the 1980s chose NOT to use local parts suppliers because? (please select the best response)
CORRECT ANSWER: C. "They had no experience in manufacturing cooperation"
EXPLANATION: In the Reducing Inventory Cost with Supply Chain Management topic area, under the title "Vendor Relations: A Historical Perspective" it is noted that the automobile parts suppliers in Japan had a long history of collaborating with automobile manufacturers in Asia, whereas the North American automobile parts suppliers had a more adversarial relationship with U.S. automakers.

Although certain Japanese manufacturers may have had issues with the cost or quality of certain North American automobile parts suppliers, there is nothing to suggest that these issues were prevalent to the parts suppliers in North America. So when the Japanese automobile manufacturer chose to use Japanese automobile parts suppliers for their North American assembly facilities, it was because the Japanese automobile parts suppliers had experience in manufacturing cooperation. Consequently, the correct answer is C "They (the North American automobile parts suppliers) had no experience in manufacturing cooperation."