Supply Chain Analytics

Lecture 1: Supply-Chain

Lecturer: Davranova Dilorom

THE STRATEGIC IMPORTANCE OF THE SUPPLY CHAIN

Supply-chain management is the integration of the activities that procure materials and services, transform them into intermediate goods and the final product, and deliver them to customers

Competition is no longer between companies; it is between supply chains

SCM VS TRADITIONAL PURCHASING

Traditional purchasing focuses on initial cost; SCM focuses on total cost of ownership

Traditional purchasing tries to negotiate the price that is best for the purchaser; SCM focuses on negotiating a price that is best for the entire supply chain.

A SUPPLY CHAIN

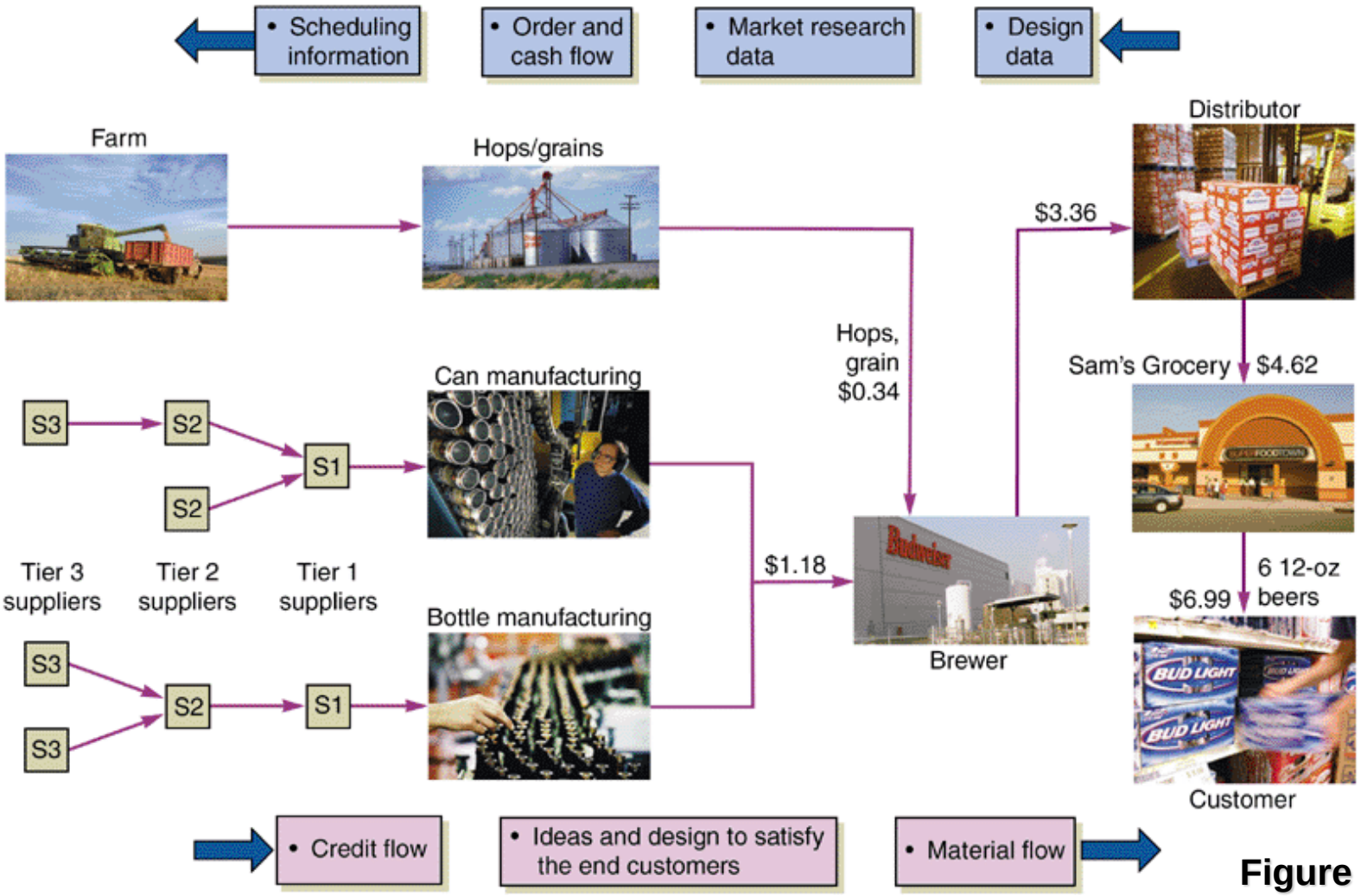
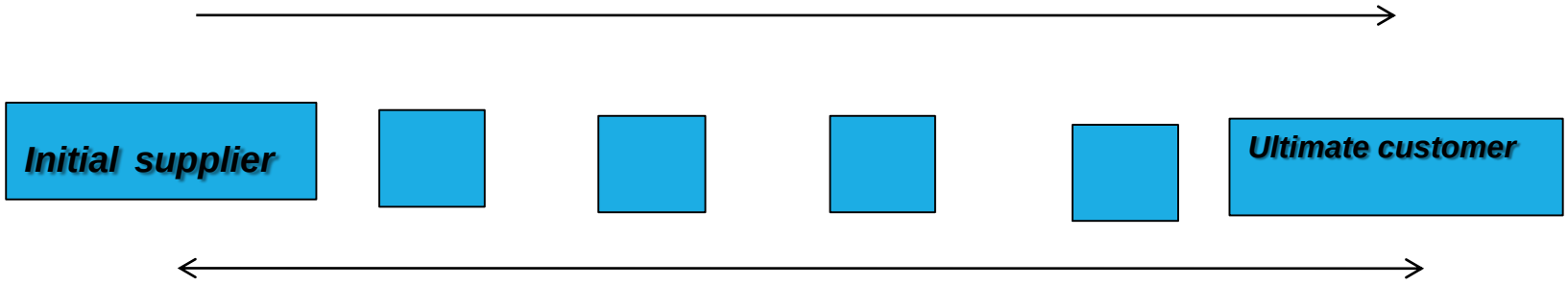


Figure 1

SUPPLY CHAIN FLOWS

Material Flow



Information Flow

There must be a good inter-organizational information provide the required information flow.

SUPPLY CHAIN FOCUS

Traditional purchasing focuses on the flow of goods and information from the immediate supplier and immediate customer; SCM focuses on the flow of goods and information from initial supplier to ultimate customer.

SUPPLY-CHAIN ECONOMICS

Supply Chain Costs as a Percent of Sales

Industry	*% Purchased*
All industry	52
Automobile	67
Food	60
Lumber	61
Paper	55
Petroleum	79
Transportation	62

Table 2

SUPPLY-CHAIN ECONOMICS

Dollars of additional sales needed to equal $1 saved through the supply chain

Percent Net Profit of Firm	*Percent of Sales Spent in the Supply Chain*					
	40%	50%	60%	70%	80%	90%
2	$3.23	$3.85	$4.76	$6.25	$9.09	$16.67
4	$3.13	$3.70	$4.55	$5.88	$8.33	$14.29
6	$3.03	$3.57	$4.35	$5.56	$7.69	$12.50
8	$2.94	$3.45	$4.17	$5.26	$7.14	$11.11
10	$2.86	$3.33	$4.00	$5.00	$6.67	$10.00

Table 3

ETHICS IN THE SUPPLY CHAIN

- ☑ ***Opportunities for unethical behavior are enormous and temptations are high***
- ☑ ***Many companies have strict rules and codes of conduct that define acceptable behavior***
- ☑ ***Institute for Supply Management (ISM) has developed a detailed set of principles and standards for ethical behavior***

PRINCIPLES AND STANDARDS FOR ETHICAL SUPPLY MANAGEMENT CONDUCT

LOYALTY TO YOUR ORGANIZATION

JUSTICE TO THOSE WITH WHOM YOU DEAL

FAITH IN YOUR PROFESSION

Table 5

PRINCIPLES AND STANDARDS FOR ETHICAL SUPPLY MANAGEMENT CONDUCT

1. ***Avoid the intent and appearance of unethical or compromising practice in relationships, actions, and communications***
2. ***Demonstrate loyalty to the employer by diligently following the lawful instructions of the employer, using reasonable care and granted authority***
3. ***Avoid any personal business or professional activity that would create a conflict between personal interests and the interests of the employer***

Table 5

PRINCIPLES AND STANDARDS FOR ETHICAL SUPPLY MANAGEMENT CONDUCT

4. ***Avoid soliciting or accepting money, loans, credits, or preferential discounts, and the acceptance of gifts, entertainment, favors, or services from present or potential suppliers that might influence, or appear to influence, supply management decisions***
5. ***Handle confidential or proprietary information with due care and proper consideration of ethical and legal ramifications and government regulations***
6. ***Promote positive supplier relationships through courtesy and impartiality***
7. ***Avoid improper reciprocal agreements***

Table 5

PRINCIPLES AND STANDARDS FOR ETHICAL SUPPLY MANAGEMENT CONDUCT

8. ***Know and obey the letter and spirit of laws applicable to supply management***
9. ***Encourage support for small, disadvantaged, and minority-owned businesses***
10. ***Acquire and maintain professional competence***
11. ***Conduct supply management activities in accordance with national and international laws, customs, and practices, your organization's policies, and these ethical principles and standards of conduct***
12. ***Enhance the stature of the supply management profession***

Table 5

MANAGING THE SUPPLY CHAIN

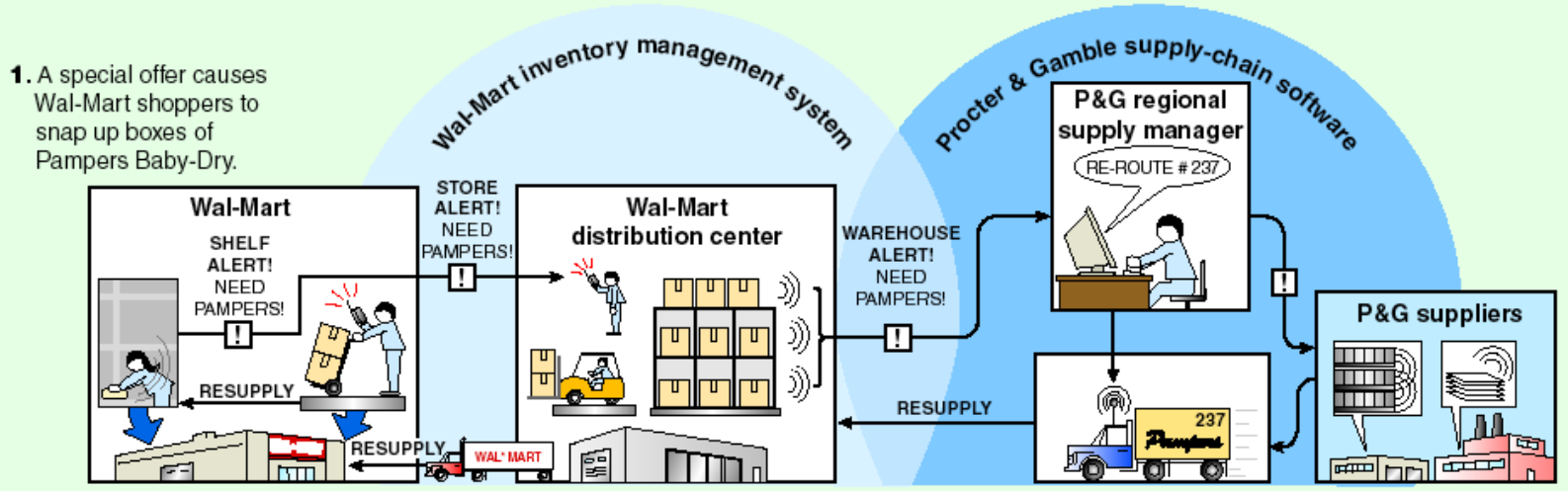
There are significant management issues in controlling a supply chain involving many independent organizations

- ☑ ***Mutual agreement on goals***
- ☑ ***Trust***
- ☑ ***Compatible organizational cultures***

RADIO FREQUENCY TAGS

Radio Frequency Tags: Keeping the Shelves Stocked

The supply chain works smoothly when sales are steady, but it often breaks down when confronted by a sudden surge in demand. Radio Frequency ID (or RFID) tags could change that by providing real-time information about what's happening on store shelves. Here's how the system works.



1. A special offer causes Wal-Mart shoppers to snap up boxes of Pampers Baby-Dry.

2. Each box of Pampers has an RFID tag. Shelf-mounted scanners alert the stockroom of urgent need for restock.

3. Wal-Mart's inventory management system tracks and links its in-store stock and its warehouse stock, prompting quicker replenishment and providing accurate real-time data.

4. Wal-Mart's systems are linked to the P&G supply-chain management system. Demand spikes reported by RFID tags are immediately visible throughout the supply chain.

5. P&G's logistics software tracks its trucks with GPS locators, and tracks their contents with RFID tag readers. Regional managers can reroute trucks to fill urgent needs.

6. P&G suppliers also use RFID tags and readers on their raw materials, giving P&G visibility several tiers down the supply chain, and giving suppliers the ability to accurately forecast demand and production.

VENDOR SELECTION

- ☑ ***Vendor evaluation***
  - ☑ ***Critical decision***
  - ☑ ***Find potential vendors***
  - ☑ ***Determine the likelihood of them becoming good suppliers***
- ☑ ***Vendor Development***
  - ☑ ***Training***
  - ☑ ***Engineering and production help***
  - ☑ ***Establish policies and procedures***

VENDOR SELECTION

- ☑ ***Negotiations***
  - ☑ ***Cost-Based Price Model - supplier opens books to purchaser***
  - ☑ ***Market-Based Price Model - price based on published, auction, or indexed price***
  - ☑ ***Competitive Bidding - used for infrequent purchases but may make establishing long-term relationships difficult***

VENDOR EVALUATION

Criteria	Weights	Scores (1-5)	Weight x Score
Engineering/research/innovation skills	.20	5	1.0
Production process capability (flexibility/technical assistance)	.15	4	.6
Distribution/delivery capability	.05	4	.2
Quality systems and performance	.10	2	.2
Facilities/location	.05	2	.1
Financial and managerial strength (stability and cost structure)	.15	4	.6
Information systems capability (e-commerce, Internet)	.10	2	.2
Integrity (environmental compliance/ ethics)	.20	5	1.0
Total	1.00		3.9

BENCHMARKING SUPPLY-CHAIN MANAGEMENT

	Typical Firms	*Benchmark Firms*
Administrative costs as a percent of purchases	*3.3%*	*.8%*
Lead time (weeks)	*15*	*8*
Time spent placing an order	*42 minutes*	*15 minutes*
Percentage of late deliveries	*33%*	*2%*
Percentage of rejected material	*1.5%*	*.0001%*
Number of shortages per year	*400*	*4*

Table 6

P&G SUPPLY CHAIN

Strategic Objectives and Requirements: P&G recognized that there were potentially millions of feasible options for its 30 product-strategy teams to consider. Executives needed sound analytical support to realize P&G's goal within the tight, one-year objective.

P&G SUPPLY CHAIN (CON'T)

Model Structure: The P&G operations research department and the University of Cincinnati created decision-making models and software. They followed a modeling strategy of solving two easier-to-handle subproblems:

- Distribution/location
- Product sourcing

P&G SUPPLY CHAIN (CON'T)

Project Value: The overall Strengthening Global Effectiveness (SGE) effort saved $200 million a year before tax and allowed P&G to write off $1 billion of assets and transition costs.

CASE 6: AMERICAN AIRLINES REVOLUTIONIZES PRICING

Business Problem: To compete effectively in a fierce market, the company needed to “sell the right seats to the right customers at the right prices.”

AMERICAN AIRLINES (CON'T)

Strategic Objectives and Requirements: Airline seats are a perishable commodity. Their value varies – at times of scarcity they're worth a premium, after the flight departs, they're worthless. The new system had to develop an approach to pricing while creating software that could accommodate millions of bookings, cancellations, and corrections.

AMERICAN AIRLINES (CON'T)

Model Structure: The team developed yield management, also known as revenue management and dynamic pricing. The model broke down the problem into three subproblems:

- Overbooking
- Discount allocation
- Traffic management

The model was adapted to American Airlines computers.

AMERICAN AIRLINES (CON'T)

Project Value: In 1991, American Airlines estimated a benefit of $1.4 billion over the previous three years. Since then, yield management was adopted by other airlines, and spread to hotels, car rentals, and cruises, resulting in added profits going into billions of dollars.

WHAT YOU SHOULD KNOW ABOUT OPERATIONS RESEARCH

How decision-making problems are characterized

OR terminology

What a model is and how to assess its value

How to go from a conceptual problem to a quantitative solution

QUIZ

Record your answers to these questions on a Scantron 882 (the size we use for examinations). Bring this Scantron to Exam III and use it for the rest of the examination. The two questions on this quiz comprise the first two questions on Exam III.

QUIZ

1. Supply chain management is concerned with

a. The flow of goods and information from initial supplier to ultimate customer.

b. The flow of goods and information from immediate supplier to immediate customer.

c. Obtaining the absolute lowest priced materials from suppliers.

d. Playing multiple suppliers against each other to obtain the lowest prices.

e. Increasing the number of suppliers to obtain the lowest prices.

QUIZ

2. A supplier invites you to attend a professional football game at his expense. You have no intention of letting this affect the amount of business you do with this supplier. According to the ISM Code of Ethics this might give the appearance of compromising practice and you should not accept the gift.

a. True

b. False

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