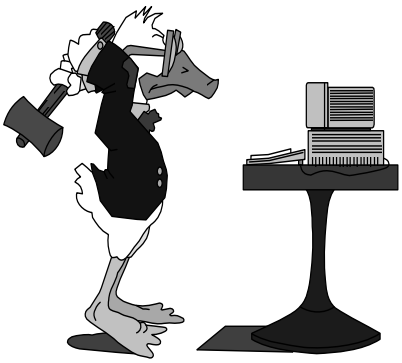
Chapter 12
Order Processing and Information Systems

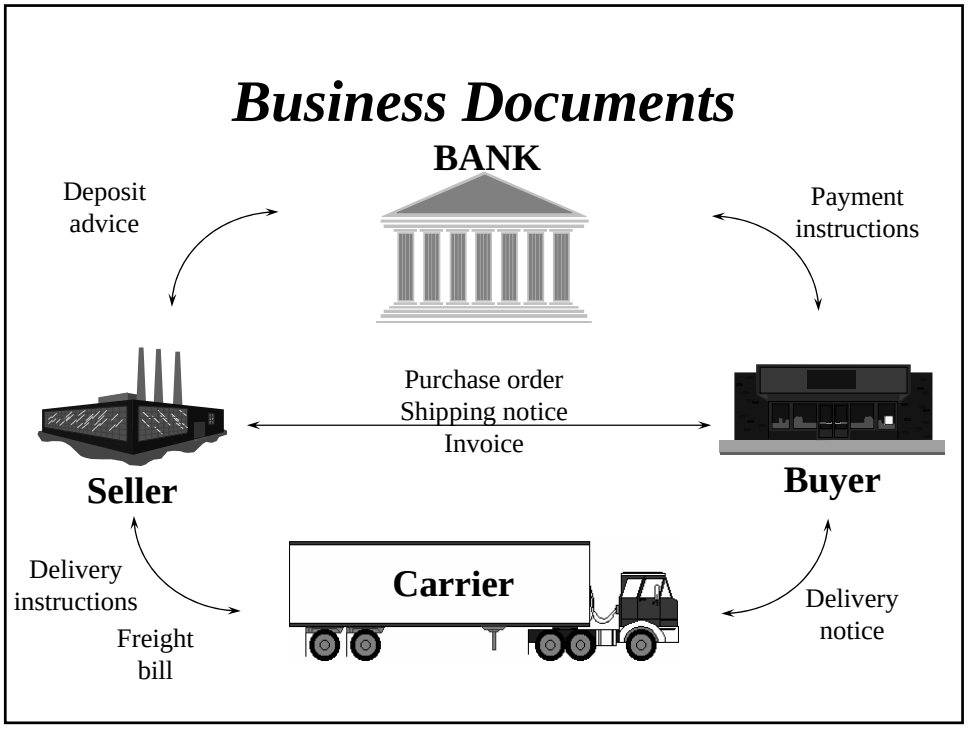


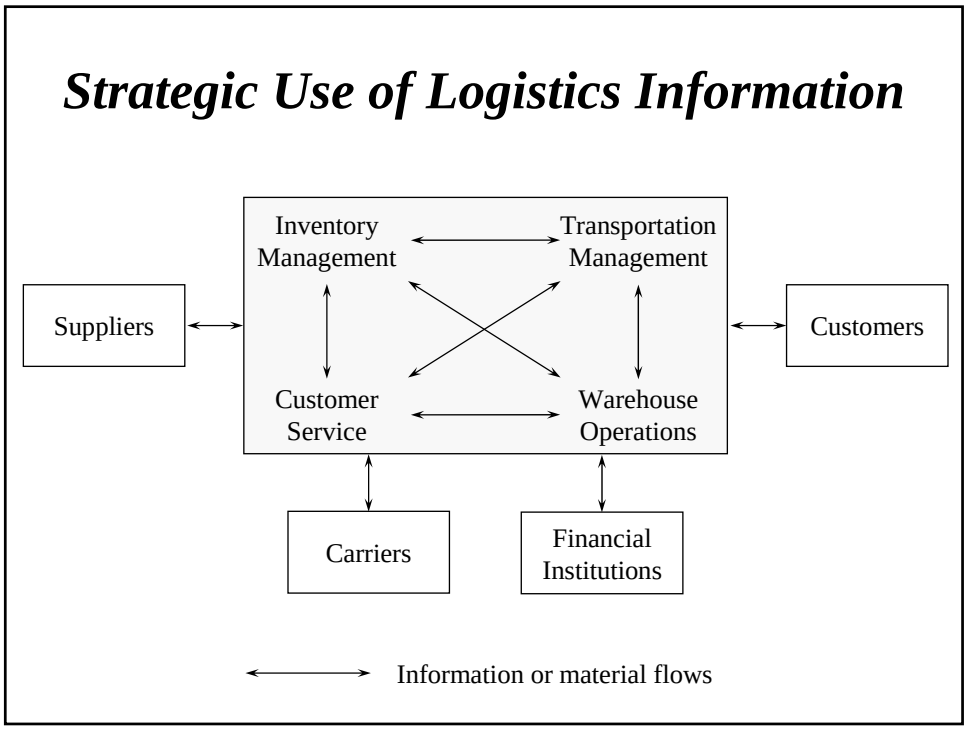
- Quantity and Issues of Information Systems
- Logistics Information Systems
- Electronic Data Interchange
- Decision Support Systems

Critical Business Processes
(North American Responses)

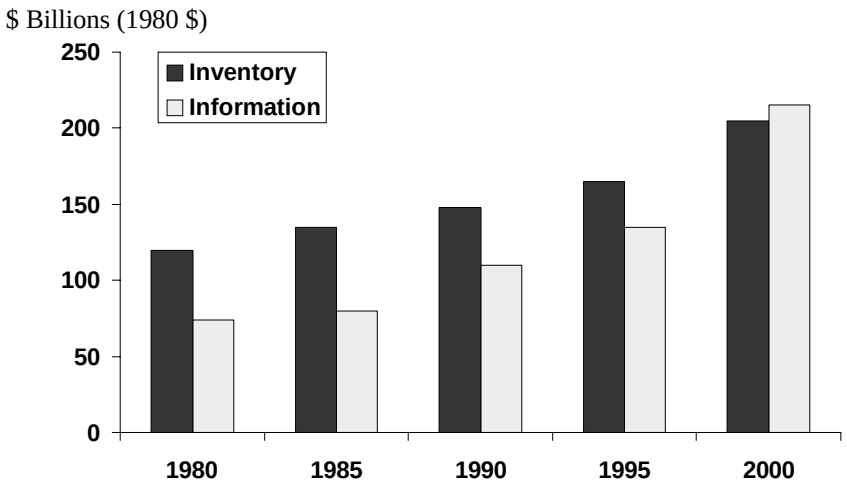
	Business Process	%
1.		48.4%
2.	Order Processing	38.8%
3.		27.7%
4.	Sales	24.4%
5.	Accounting/Billing/Finance	22.6%

Source: Computer Sciences Corp., *Critical Issues of Information Systems Management for 1995*, CSCC News Release, pp. 3H


Business Documents
BANK
Deposit advice
Payment instructions
Purchase order
Shipping notice
Invoice
Seller
Buyer
Delivery instructions
Freight bill
Carrier
Delivery notice


Strategic Use of Logistics Information
Inventory Management
Transportation Management
Suppliers
Customers
Customer Service
Warehouse Operations
Carriers
Financial Institutions
Information or material flows

Expenditures on Information Will Equal or Exceed Those on Inventory

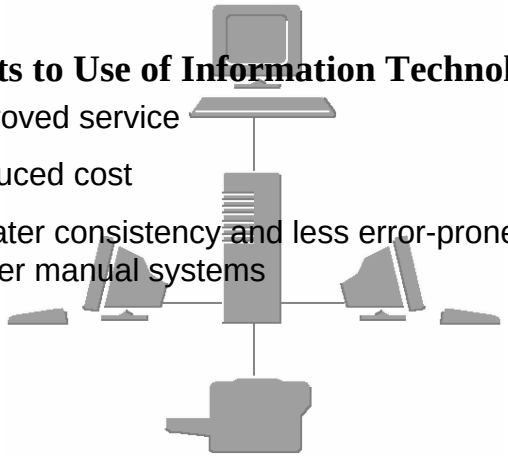


Source: Mercer Management Consulting, Inc.

Logistics Information Systems

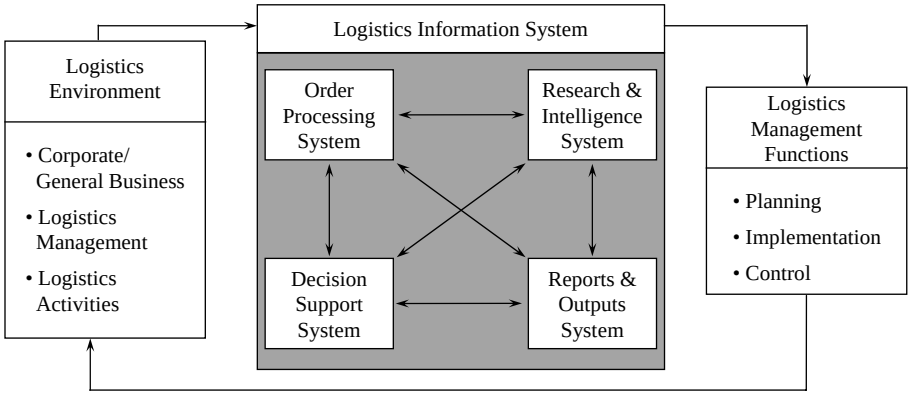
- Issue of Quality of Information
  - Need to have the right information available
  - Need for accuracy of information
    - Poor information leads to poor decisions
    - Trend towards ABC logistics information
  - Need for effective communications
    - Language of intended recipient
    - Overcome selective perception
    - Must key into person's values and expectations

Logistics Information Systems



- **Benefits to Use of Information Technology**
  - Improved service
  - Reduced cost
  - Greater consistency and less error-prone than earlier manual systems

Logistics Information System

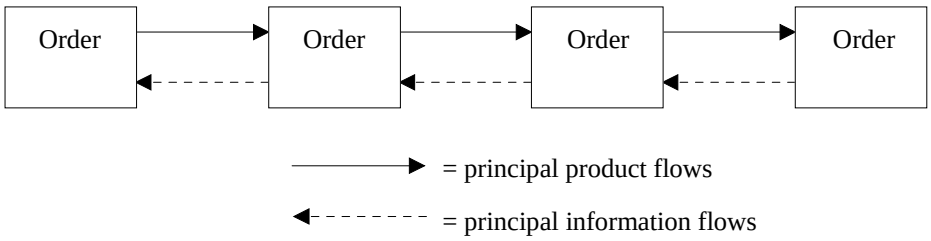


Source: Adapted from Kotler, *Marketing Management: Analysis, Planning, and Control*, 5th edition, 1984, pp. 189

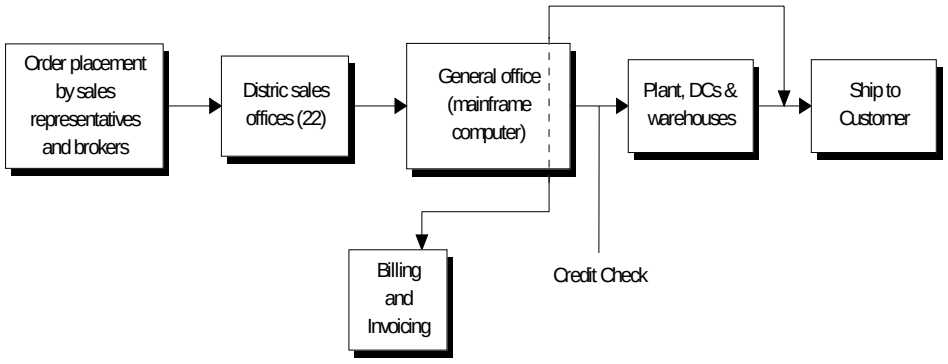
Order Processing System

- Purpose → Communication link between manufacturer/DC and customer
  → Initiates <u>all</u> logistics activities
- Benefits <u>most</u> from advances in computer electronic technology
- Approximately 55-65% of logistics functions have responsibility for order processing
- Order cycle and its major components
  - See diagram on the next slide
  - Need to understand length and variability of order cycle and its components
  - CLM study showed that greatest portion of order cycle length occurs <u>before</u> order is received and <u>after</u> order is shipped
- How orders enter firm's systems
  - See research results, CBL pp. 409-412

Order Cycle and Its Major Components



Example: Order Processing System



Methods of Order Receipt (U.S. Grocery Industry - 1993)

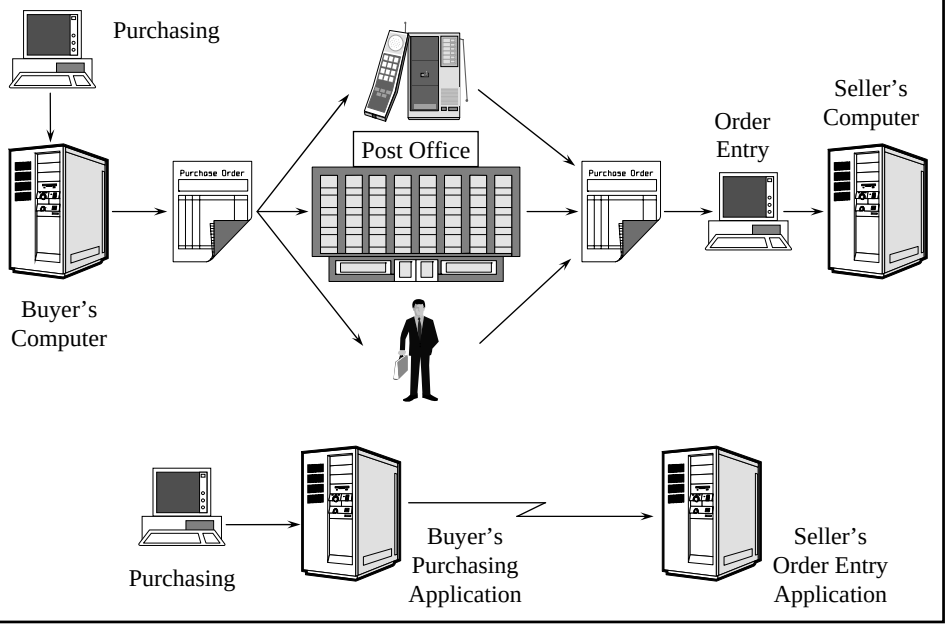
	Phone	Fax	Mail	EDI	Auto Replen	Other
Grocery Retail	20%	25%	5%	39%	3%	8%
Wholesale grocers/distributors	18	28	3	41	2	8
Drug retail	16	33	8	29	0	14
Mass merchants & club stores	15	29	3	40	3	10
Food service	22	57	3	12	0	6

Electronic Data Interchange (EDI)

- EDI is "the organization-to-organization, computer-to-computer exchange of business data in a structured, machine-processable format. The purpose of EDI is to eliminate duplicate data entry and to improve the speed and accuracy of the information flow by linking computer applications between companies."

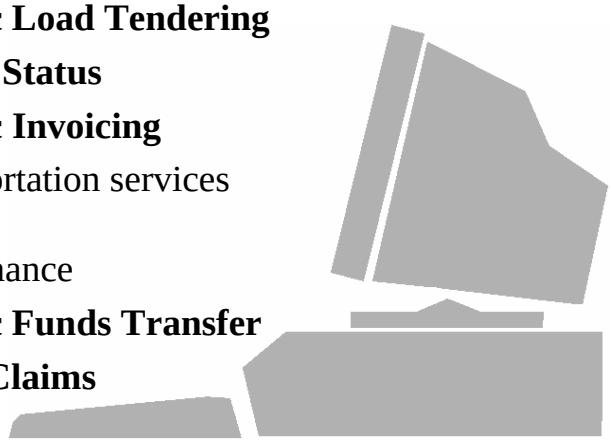
Source: Emmelhainz, "EDI in Logistics," Ch. 33 in *The Logistics Handbook*, 1994, pp. 84.

EDI vs. Traditional Methods



Example Applications of EDI

- **Electronic Load Tendering**
- **Shipment Status**
- **Electronic Invoicing**
  - Transportation services
  - Fuel
  - Maintenance
- **Electronic Funds Transfer**
- **O S & D Claims**



Comparison of Communications Formats

• Two Primary Formats: ANS X12 and EDIFACT

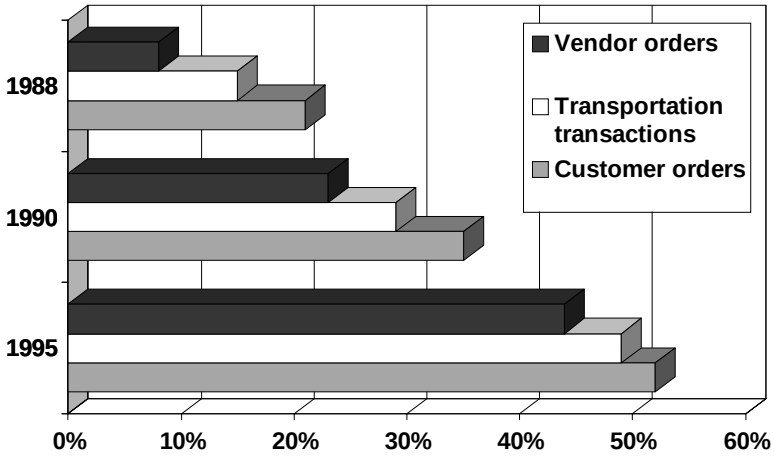
Paper Format					ANS X12 Format
Qty.	Unit	No.	Description	Price	
3	Cse	3900	Cellulose Sponges	12.75	IT1·3·CA·127500·VC6900 N/L
12	Ea	P450	Plastic Pails	.475	IT1·12·EA·4750·VC·P450 N/L
4	Ea	1640Y	Yellow Dish Drainer	.94	IT1·4·EA·9400·VC·1640Y N/L
1	Dz	1507	6” Plastic Flower Pots	3.40	IT1·1·DZ·34000·VC·1507 N/L

Source: Temple, Barker & Sloane, Inc.

Why Use EDI?

- Handles a Large Volume of Repetitive Transactions
  - 70% of one computer's input is another computer's output
  - 25% of a transaction's cost is data entry and re-entry
- Improved Service
  - Greater accuracy and consistency
  - Time-sensitive
- Reduced Expense
  - Improved effectiveness of inventory management
  - Decrease in total logistics costs
- Competitive Necessity
- Requested by Partners

Percent of EDI Orders/Transmissions

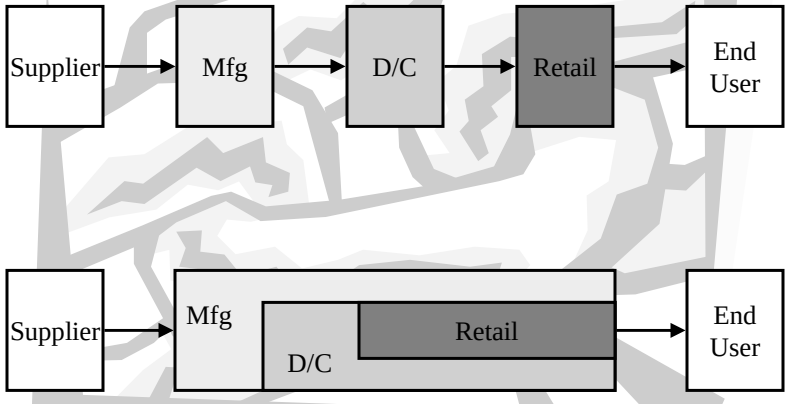


Source: 1988 CLM/OSU Customer Service Study

Example Savings Through Use of EDI

- Super-Value Stores, Inc.
  - Savings of $5,000-$6,000 per week by eliminating manual processing of invoices and other documents
  - Projected savings of $600,000 per year by reductions in clerical staff that validates purchase orders against invoices
- NAVISTAR
  - Inventory supply reduced from 30 to 6 days
  - Premium payments for expedited freight shipments reduced by 90 percent

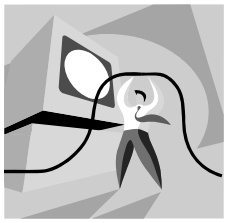
Effects of EDI on Supply Chain



Research and Intelligence System

- Identify / Distinguish Between Trends
  - Corporate / general business
  - Logistics management
  - Logistics activities
- Approaches to Environmental Scanning
  - - "Reactive" scanning (problem specific)
  - - "Anticipatory" (maybe monthly - surveys)
  - - "Long-term" (customer advisory boards)
  - Additional approaches CBL, pp. 418
- Sales Forecasting
  - Needs to integrate with production scheduling and overall logistical needs
  - Approaches include statistical, judgment, etc.

Decision Support Systems



- Provide:
  - Data-order information
  - Analytical models
- Types of Modeling Approaches
  - *Optimization* - "Best" answer
  - *Heuristic* - "Good" or Rule-of-Thumb answer
  - *Simulation* - "Computer" answer
- New/Innovative Information Systems
  - Artificial Intelligence/Expert Systems
  - Activity Based Costing / Management Systems

Artificial Intelligence / Expert Systems

- Artificial Intelligence (AI)
  - Portions of computer science concerned with making machines do things which require intelligence if done by a person
- Expert Systems
  - Transfers knowledge of an expert into a software package which "mimics" the human expert
- Examples of Expert Systems Use
  - Digital Equipment - keep track of WIP inventories
  - Eastman Kodak - improve case-picking productivity of workers
  - US Navy - provide information to inventory analysts in their retail DCs
  - Sea-Land - routing and scheduling of ships

Reports and Outputs System

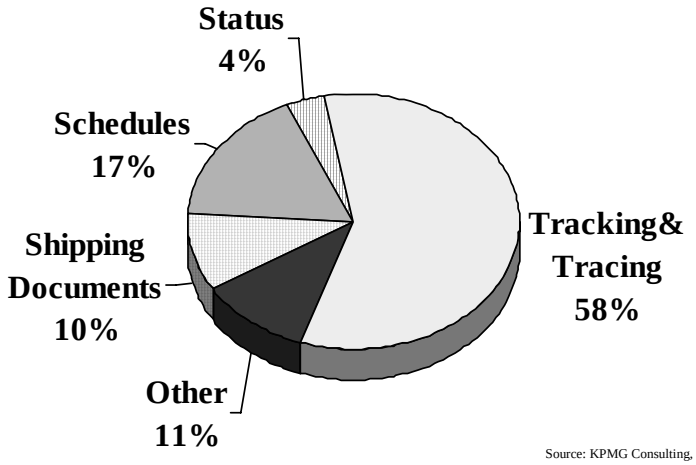
- Types of Reports
  - Planning - sales trends, forecasting, etc.
  - Operating - on-hand inventories, current orders, transportation, etc.
  - Control - budgets, expense summaries, etc.
- Retail Technology Innovation
  - Store-level POS transactions
  - DC Volume - Barcoding
  - Store Automated Receiving

Percent of Total Information Transactions Performed with Modern Information Technology

Function	1990	1993	1996
Traffic	11%	28%	57%
Warehousing	16%	36%	69%
Purchasing	10%	20%	47%
Order Entry	24%	40%	67%
Customer Service	15%	24%	45%
Inventory Control	23%	39%	68%
International	7%	16%	38%

Source: Masters and LaLonde, *The 1993 OSU Survey of Career Patterns in Logistics*

Shippers Top Requirements from e-Commerce Transactions

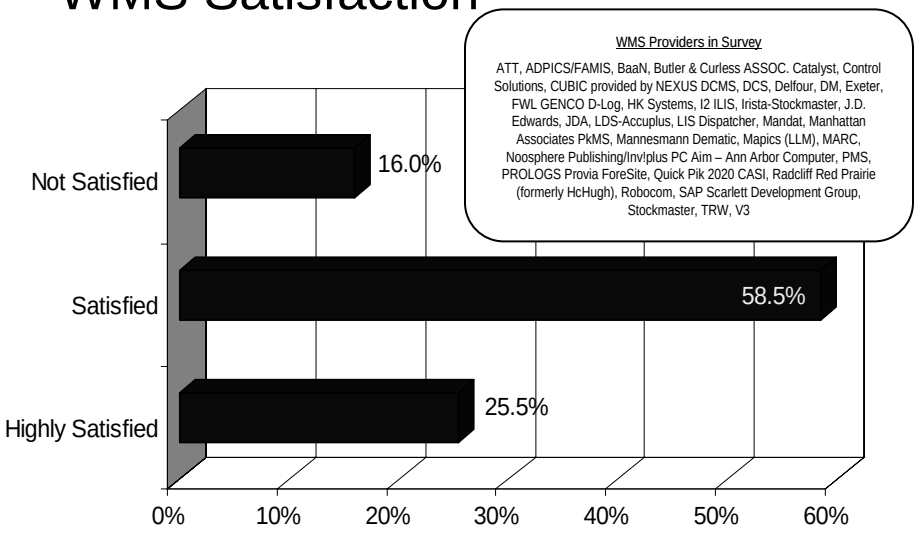


Source: KPMG Consulting, 2000

Numerous "New" Technologies

- Supply Chain Analysis Tools and Programs
- ERP
- WMS/TMS
- RFID
- Who knows what is going to be next?

WMS Satisfaction

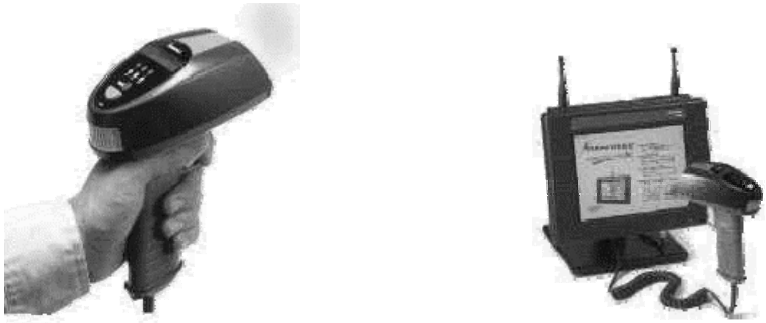


Source: Edward H. Frazelle Ph.D.- 2003 TLI/ WERC Warehouse Benchmarking Survey

RFID

RF tag size comparison

RF tags and readers



RFID Tags-Read-Write vs. Read Only

- Read-Write
  - Information can be added to or written over existing information when tag is within range of the reader.
  - Cost: $1.00/tag
  - Used for tracing high-value items
- Read Only
  - Information is stored during manufacturing. Cannot be written on after production
  - Cost: less than $1.00/tag
  - Used for tracing low-value items

Benefits

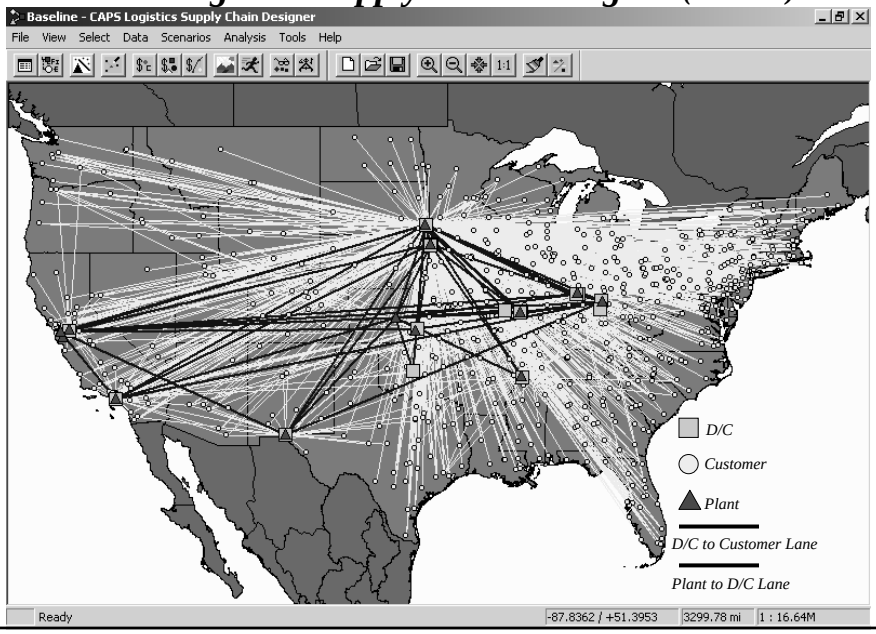
- Reduce theft
- Simultaneous reading of multiple items
- Save time/money
- Product handling by employees reduced
- Eliminate counter-fit products
- Non-line-of-sight technology
- Product recall is specific

Challenges

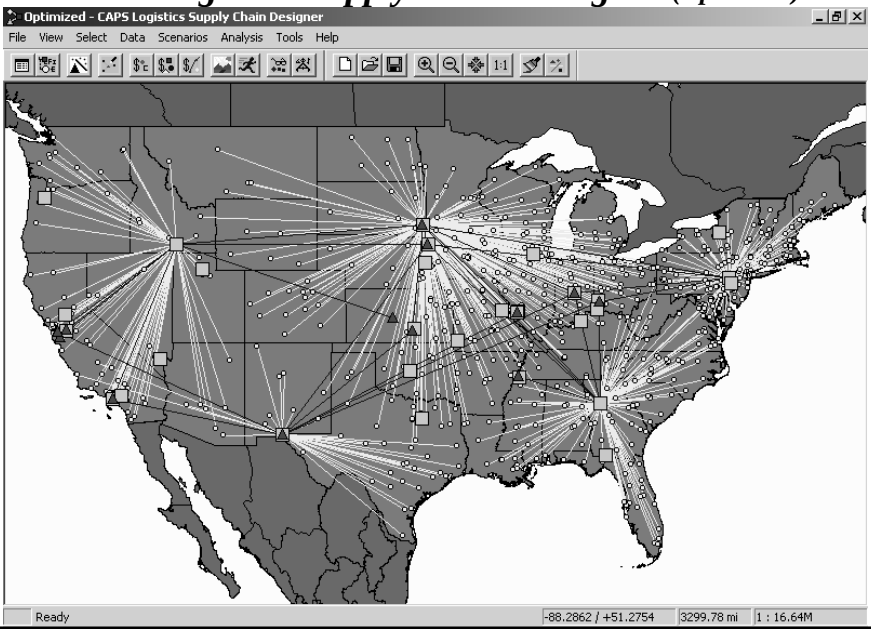
- Common radio frequency
  - No common frequency has been identified. Frequencies are monitored by governments across the world. Almost no part of the electromagnetic spectrum is available everywhere in the world.
- Cost
  - Currently, RFID tags are too costly to install in low value goods like grocery items.
- Chip durability
  - No chip can currently withstand all temperatures and states of nature.
- Creating universal standards
- Data Management
  - Vast amount of data to manage.

Supply Chain Analysis Software

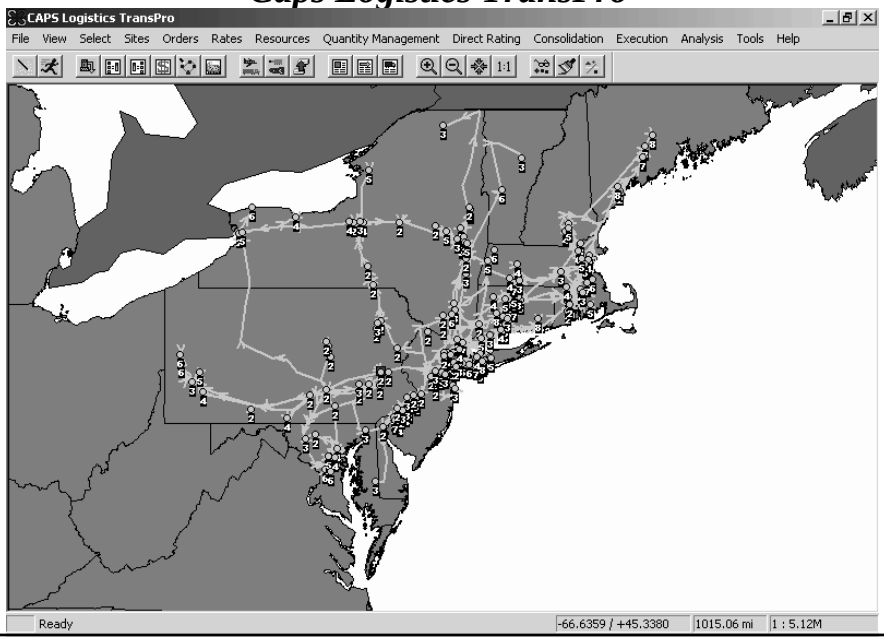
CAPS Logistics Supply Chain Designer ***(Baseline)***



Supply Chain Analysis Software
CAPS Logistics Supply Chain Designer (Optimized)



Supply Chain Analysis Software
Caps Logistics TransPro



Challenges to Implementing Technological Changes

- Understanding customer and suppliers' information requirements
- Lack of coordination and integration among key logistics activities
- Logistics organizations still focus on functions and not the process
- Poor , non-available, or non-sharing of data throughout both the organization and supply chain
- Employees' unwilling to accept technological changes

Strategic Management of Information in Logistics

- Fundamental Thoughts
  - Logistics Managers - should know more about info. systems
  - IS Managers - should know more about logistics
- Information Technology Changes the Way You Compete
  - Technological advances
  - Shipment tracking at individual item level
  - Greater control over entire logistics channel
  - Information is the key to logistics value-added