Lecture Series: Consumer Electronics
Supply Chain Management

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Lecture 1: Introduction to Consumer Electronics (CE) Supply Chain Structure
Agenda

- CE Products and Supply Chain Structure
- Product and Industry Characteristics
- Industry Drivers and Issues
- Future Trends in Products
- Future Trends in Industry
CE Products and Supply Chain Structure
End Product Offerings - Diverse Product Range

- Digital Still Cameras
  - PV-SD5000
- Plasma TV
- Electric Shavers
- VCR’S
US Consumers bought 95 billion dollars of CE product in 2002
Supply Chain for End Product

Matsushita Electric  Panasonic  BEST BUY

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Supply Chain Structure for CE

- Defined by
  - Product
    - Lead time
    - Cube
    - Life cycle
    - Margin
    - Volume
  - Geography
    - Sales Market
    - Manufacturing locations
    - Transportation / Logistics
OEM Manufacturing Divisions are Typically by Product and Global

- Low cube high margin product build offshore and can use air freight
- Low cube low margin build offshore and shipped for global consumption
- High cube product assembled for local consumption

- Combos: US, TV (Mexico), Speakers (Puerto Rico), VCR (Indonesia), Fax (Malaysia), Microwave (China), Audio, Camcorder Phones (Japan), Audio Systems (Singapore)
OEM Sales Companies are Localized by Geography and Focus on Local Markets

- Microwave
- China
- Audio, Camcorder, Phones, Japan
- Audio Systems
- Singapore
- Combos
- US
- TV
- Mexico
- Fax
- Malaysia
- VCR
- Indonesia
- Speakers
- Puerto Rico
Product and Industry Characteristics
**CE Product Characteristics**

- **Digital Still Cameras**
  - PV-SD5000
  - 4-month life cycle

- **Plasma TV**
  - Hi Tech
  - Low turn
  - High Margin

- **Electric Shavers**
  - 50% sales done in December
  - Commodity
  - Low Tech
  - High Turn
  - Low Margin

- **VCR’S**
Industry Characteristics

- Primarily built to stock
- Long supply chain lead times (typically 4 months)
- Customer service is a big issue
- Global manufacturing and market base
- Typical CE OEM’s in manufacturing are aligned along product divisions and sales companies are aligned along geographies
- The supply chain requires tremendous coordination between Design, Manufacturing, Distribution and Transportation
Industry Characteristics

4 month lead time

Coordination

Built to stock

Delays, Out of stock, Overstocked
OEM’s are the Major Players in CE

- Fujitsu
- Philips
- Fry’s Electronics
- Panasonic
- Casio
- Best Buy
- Sony
- Toshiba
- Circuit City
- Thomson Multimedia
- Seiko EPSON Corp.
- Samsung
- Canon
- Bose
- Ultimate Electronics
- Sears
- Wal-Mart
Industry Drivers and Issues
Industry Drivers for Suppliers

- **Semiconductor (15%)**:
  - Strategic, capacity shared with other segments
  - Long lead-times, constrained material
- **Electric and Electronic parts (35%)**
  - Core technologies, such as laser pickups, ni-cad batteries, printing engines, light sensors, motors, etc.
  - Designed into the product
- **Processed parts (25%)**
  - Non-strategic, such as bodies, gears, fasteners, wiring
  - Either custom or standard
- **Contract manufactured products (15%)**
- **Indirect and other (10%)**
Industry Drivers for OEM’s

- **Asian OEMs**
  - Lengthy supply chain creates need for collaboration between centralized product divisions and regional distribution divisions
  - Lack of transparency between product and distribution divisions worsens bull-whip effect

- **North American and European OEMs**
  - Shorter supply chains with more local assembly reduces internal collaboration requirements, but increases need for supply collaboration

- **General**
  - Slowing growth and commoditization of core product categories (home audio / video, home appliance) squeezing margins
  - High competition in growth categories (personal electronics)
  - High degree of custom parts content and engineering centric culture designs in extra cost and inflexibility to supply chain
Industry Drivers for Sales Companies

- Own the channel relationship, compete on differentiated customer service, and content delivery
- Responsible for customer service and inventory, but depend on product divisions for replenishment
- Dependencies and lack of transparency to true supply/demand situation leads to order/inventory manipulation that amplifies the bull-whip effect
- Vulnerable to product obsolescence and clearance costs, especially in short product lifecycle categories (personal electronics)
- Transportation cost minimization a major issue for bulkier categories (TV, appliance)
Industry Drivers for Retail

**North America**
- Rise of category killers (Best Buy) consolidated purchasing and pressuring OEM margins
- Growth of internet retail (Amazon, Buy.com, ApplianceOrder.com) offering electronics and durables pushed traditional retailers on the web

**Europe and Asia**
- More fragmented
- Smaller stores with little in-store inventory puts premium on efficient fulfillment and visibility to product availability commitments
- OEMs showroom and company stores act as independent channels

**General**
- Looking to improve collaboration with key suppliers
Men in general are more interested in CE products than women

Overall type of CE products owned by men and women do not differ

Both are equally likely to initiate a purchase

Men tend to contact manufacturers for product help while women look for help at home

Both are showing a trend of decreasing interest – commodity
Industry Drivers – Consumer Behavior
CE Consumer Statistics by Product Category

**Consumers Invest in CE Products**
Total Consumer Investment by Category (in millions of dollars)

- Home Information: 168,579
- Video: 134,672
- Home and Portable Audio: 34,224
- Mobile Electronics: 47,500
- Wireless: 31,219
- Games: 14,063
- Other: 2,700

Source: CEA Market Research, 1Q02

**Americans Own More Than 1.9 Billion CE Products**
Total Units Owned for Selected Categories (in millions)

- Home and Portable Audio: 621
- Video: 512
- Home Information: 350
- Mobile Electronics: 190
- Wireless: 144
- Games: 56
- Other: 35

Source: CEA Market Research, 1Q02

**U.S. Household Penetration of CE Products**

- Color TV: 98%
- VCR Deck: 94%
- Cordless Phone: 81%
- Wireless Phone: 66%
- Personal Computer: 60%
- Home CD Player: 57%
- Camcorder: 39%
- Car CD Player: 31%
- DVD Player: 25%
- Home Theater System: 25%
- Direct-to-Home Satellite: 17%

Source: CEA Market Research, 1Q02
CE Industry Issues

- High degree of parts customization
- Long R&D design process times
- Long lead time to create additional capacity for custom parts
- Poor customer service / supply flexibility
- Low re-use of parts
- Short component life cycles leading to service issues
- High supply risk due to reliance on custom parts
- Short product lifecycles
- High demand unpredictability, inflexible manufacturing
- Unresponsiveness to demand signals due to manual monthly planning
- Fragmented procurement across factories
- Inventory boom-bust cycle (bull-whip effect)
- Low customer service levels
- Geographically fragmented supply chain
- Margin erosion
- High spares inventory, inconsistent availability
- Stock outs
- Reducing margins
- High logistics costs
- High inventory, store level stockouts
- High promotions costs
Future Product Trends
The Shift From Analog to Digital
New Digital Products

Digital Imaging

[Image of a Panasonic digital camera]
Emerging Digital Technology

Prepare Yourself for a Revolution

Audio/Video
Home Appliances
Telecommunications
Mobile
Personal Computers
Five Fastest Growing Product Categories in 2001
(year-over-year growth in units)

- DTV 125.1%
- Home-Theater-In-a-Box 99.2%
- Headset Radio/CD Players 91.1%
- DVD Players 49.5%
- Digital Cameras 44.5%

Source: CEA Market Research, 1/02
Future Industry Trends
CE Industry Trends

- Retail Consolidation
- Strong Regional and National Retailers
- Increased Competition
- Continuous Downward Price/Margin Pressure
- Shorter Product Lifecycles
- Increased Pressure on Inventory Levels
- Business is Rapidly moving to Digital & Networking Products
Supply Chain Structure Trends in CED Industries

- Elimination of layers – reduce DC-DC flow
  - Direct Ship (Factory to retailer)
  - Drop Ship (Factory to regional DC)
  - VMI (Manufacturer manages shelf inventory)
  - Air Freight (Typically direct ship)
  - Internet

- Increased information sharing across the supply chain
  - Multi-enterprise planning
  - Sharing of information on new products, Sales & Mktg., etc. across the supply chain

- Outsourcing
  - Assembly to third parties
  - Kitting to Retailers
Summary: Dynamics in the Consumer Electronics Industry

Technological Developments
- Shortened product lifecycles - digital technology products like DVD, Digital Camcorders have lifecycles of less than four months
- Convergence of industries like consumer electronics, Home Gateway, Wireless A/V, Home networking
- New business models driven by non-consumer electronics companies e.g., Initial product revenue sharing, Downstream revenue sharing

Competitive Pressures
- Widely different retailers needs and expectations, e.g., varying SCM requirements
- Broad channel strategies and distribution models, e.g., internet selling, electronics super stores, A/V specialist, warehouse clubs
- Increasing price pressures due to:
  - global production
  - accelerated price erosion
- Traditional analog categories becoming a commodity – loss of customer brand loyalty