Forest Sector Competitiveness in a Global Recession

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“What’s happening is clear: technological and market evolution are finally catching up with this old business and is about to wipe it from the face of the Earth.”

Adam Thierer of the Mercatus Center
In reference to Blockbuster Video, 2005
Outline

Sources of Competitive Advantage

• Production Technology
• Emerging Bio- and Nano- Technologies/Products
• Information Technology
• Supply Chain Management
• Innovation
• Understanding Export Markets
Sources of Competitive Advantage

Production Technology
Sources of Competitive Advantage
Production Technology-Primary

Softwood Lumber - On average mill recovery in is about 22% more efficient than in 1970. Process improvements in chipping technology, thinner kerf saws, curve sawing, and computerized scanning and “optimization” technology have led to better recovery of higher value co-products. (Meil at al. 2007)

3-D scanning technology evaluates each log. Computer-controlled equipment scans the log, checking contour, presence of knots, surface irregularities or defects. Computer programs then determine the optimum size and configuration of boards that can be obtained from the specific log.

Laser /Computerized Optimized Downstream Processing-After scanning, automated equipment guides product through sawing, edging, planing, sanding, and sorting processes. (Taylor, Weyerhaeuser, 2007)
Sources of Competitive Advantage
Production Technology-Primary

**Softwood Plywood** - On average mill recovery in is about 7% more efficient than in 1970.

The use of power drive rolls decrease spinout, and the advent of better lathe technology (which can minimize peeler core diameter) and the use of laser enhanced clipping have aided in the recovery of usable veneer.

Improved adhesive chemistry, application technology, adhesive extenders and new catalysts; the amount of adhesive required has dropped 15% since 1970. (Meil at al. 2007)
Engineered Wood Products - Consist of a combination of smaller components to make a structural product, designed using engineering methods. They are an alternative to traditional sawn lumber.

The wood products industry has also had to adapt, as fewer large trees are available for manufacturing. By developing ways to use smaller diameter trees to manufacture new, lighter weight structural products, the industry uses fewer resources more efficiently, with less waste.

Products in the Market - Some examples of engineered wood products are: I-joists, trusses, and Structural Composite Lumber (SCL) that includes laminated veneer lumber (LVL), parallel strand lumber (PSL), and laminated strand lumber (LSL). (American Wood Council)
Sources of Competitive Advantage
Production Technology-Secondary

“The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.” (Bill Gates)

Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM)

Computer Numerical Control (CNC)-Automated machine tools, such as drills and lathes, that operate from instructions in a program. CNC machines offer unsurpassed accuracy and repeatability.
Sources of Competitive Advantage
Production Technology-Secondary

**Robotics**-Example: Century Furniture Industries, North Carolina- to perform a furniture distressing operation creating simulated “worm holes,” dents, and other distress marks on several styles of dining-room chair subassemblies to simulate age and wear. (Robotics Industry Association)
Sources of Competitive Advantage
REALLY New Products

Wood-Plastic Composites (WPC)-Made of recycled plastic and wood wastes used in numerous applications, such as, outdoor deck floors, railings, fences, landscaping timbers, park benches, window and door frame (Kim and Pal, 2011)

Tiger Bullets™ - New type of plastic-and-wood composite that prevents lost circulation in oil-drilling wells. is made of recycled plastics, recycled cellulosic fibers. Invented by Dr. Qinglin Wu, LSU AgCenter.
Sources of Competitive Advantage
REALLY New Products-Nanotechnology

Cellulose nanocrystals and nanofibrillated cellulose particles that are being extracted from wood and provide a unique "building block" on which a new composites industry can be based.

- Cellulose particles are environmentally safe-sustainable, biodegradable, carbon neutral, and have low environmental, health and safety risks.

- Can be processed at industrial scale quantities and at low costs; byproduct of the paper industry and are a potential byproduct of any cellulose to biofuels program.

- Provide an opportunity to produce green nanocomposites with wide ranging applications for consumer products (packaging), electronics (flexible circuits), energy (flexible solar panels), and defense (body armor).

Source: Robert Moon, Purdue University, Michigan Tech. University
Sources of Competitive Advantage
Emerging Bio-Technologies & Products

• Traditional – From primary logs, woodchips
  - Pulp and Paper mills
  - Sawmills and Lumber mills
  - Plywood
  - Pellets

• Emerging – From biomass residues, chips & pulpwood
  - Bioelectricity
    - *Combustion/Gasification* → *Biopower*
  - Synthetic fuels
    - *Gasification* → *Syngas* → *Fischer-Tropsch Fuels & Chemicals*
  - Biofuels & Biochemicals –
    - *Gasification* → *Syngas* → *Fermented biofuels & biochemicals*
Sources of Competitive Advantage
Emerging Bio-Technologies – Post-Harvest Residuals

• Logging slash:
  – 7 to 20 tons per hectare generated from needles, branches left on site
  – Potential:
    • Chip tree tops instead of pushing it back into stand
Forests for Biofuel:
Short-rotation woody crops

Hybrid Poplar

Paulownia (1 year)
Fastest Growing Species

*Eucalyptus globulus*
(3 years)
Australia

*Eucalyptus sp.*
(6 years-rotation age)
Brazil
Forests for biofuels:
Short-rotation woody crops

- 3-year-old eucalyptus grown for pulpwood in southeast TX
- Matures in 6 years
- Re-sprouts when cut and matures in about 3 years
Wood Pellet Demand in Europe

Sources – Pellets@las and Wood Resource Quarterly

+1,900%
Emerging Bio-Products & Technologies – Pertinent Issues

• Capacity Allocation
  - How to allocate forest resource capacity between
    - traditional downstream industries
    - emerging technologies
  - How much “Spare Resource Capacity” should be maintained to serve emerging industries
  - What future industries should be targeted to maximize strategic value of industry to all stakeholders
  - What is the commercialization potential and time horizon
Supply chain risks

- Uncertainty across supply chain is a deterrent
  - **Resource owners** are uncertain about market potential
  - **Resource processors** are uncertain about supply potential

- Uncertainty manifests into risks for resource owners and processors

- Innovative strategies and business models can help alleviate perceived risks and drive higher acceptance
  - New generation cooperatives
  - Public-private partnerships
Sources of Competitive Advantage
Information Technology

Information
Information Technology Implementation/Success Matrix

IT Adoption (complexity, depth, strategic)

High
- Premature
- Inefficient
- Anxious
- Impulsive
- Inordinate costs
- IT at risk
- Loss of trust

Low
- Dinosaurs
- Traditionalists
- Survival at risk
- Resistant to change
- In denial

Low
- Match between IT and strategic adoption
- Optimal combination for success

High
- Untapped resource
- High potential to lose corporate IT expertise

IT Knowledge (depth, breadth)

(Vlosky 2000)
Sources of Competitive Advantage
Supply Chain/Interorganizational Management

Supply Chain

- PRODUCT SELECTION
- SUPPLIERS
- DELIVERY
- CUSTOMERS
- AFTER SALES
- ORDER MANAGEMENT
- DISTRIBUTION CHANNELS
- CALL CENTER
- LOGISTICS PLATFORM

EUROPE
EGYPT
ARABIA
PERSIA
CHINA
INDIA
SOMALIA
Mediterranean Sea
Indian Ocean
Indian Ocean
JAVA

Camel Caravan in the Desert
A Typical Forest Products Supply Chain

Raw Materials
- Timberland
- Stumpage

Harvesting
- Timbering
- Transport
- Logging contractor

Primary Processing
- Pulpwood
- Saw timber
- Logs

Merchandising
- Marketing
- Sales

Information Interfaces

Distribution
- Channels
- Transport

Secondary Processing
- Remans
- Treaters
- Industrial - etc

Secondary Distribution
- Channels
- Transport

Consumer
- Builder
- Remodeler
- Retail

Merchandising
- Marketing
- Sales

(Adapted from TALPX 2000)
Sources of Competitive Advantage
Supply Chain/Inter-organizational Management

- Collaboration between companies
- Training and support
- Communication with suppliers & customers
- Data Interchange
- Production/buyer demand coordination
- Supply chain responsiveness to changing markets and customer needs
Sources of Competitive Advantage
Supply Chain/Inter-organizational Management

Manufacturers
Wholesalers
Logistics Provider

Exchange Data Integration

Importers
Retailers
Secondary Manufacturers
Sources of Competitive Advantage

Innovation

• Innovation is an idea, practice, or object that is perceived as new to an individual or another unit of adoption (Dewar and Dutton, 1986).

• The terms innovative and innovation are used to describe the flexibility of firms in meeting changes in the business environment (Tyson, 1997).

• Innovation is the engine of economic development (Schumpeter, 1911, in Cao and Hansen, 2006).

• Adapting to changes in competitive markets through innovation is necessary for firms to survive (Bullard, 2002).
Sources of Competitive Advantage
Innovation

- Innovation has long been recognized as critical to a firm’s competitive advantage (Damanpour and Gopalakrishnan, 2001; Scarborough and Zimmerer, 2002).

- Many activities can constitute innovation such as new product development, product line improvements and extensions, improvements in production processes, and innovative marketing and management practices (Wagner and Hansen, 2005).

- Although the most familiar forms of innovation are new or improved products or manufacturing systems, innovation can also take place in business management processes (Nybakk et al., 2009).
Traditional Approach to Innovation

• Sees innovation as a linear process from R&D to the market
• Focuses on public and private R&D
• Mainly supports diffusion of new technologies in timber production and processing.
• Rare support of radical innovations, learning or goods and services other than wood.
Systemic Approach to Innovation

- Sees innovation as a complex process in an environment of multiple actors and institutions.
- Addresses knowledge transfer, interface management or learning processes.
- Addresses cross-sectoral and public good characteristics
- Enables the development of local networks and partnerships that develop innovation
Sources of Competitive Advantage
Understanding Export Markets

- Political/Legal
- Government Bureaucracy
- Phytosanitary Requirements
- Customs

- Cultural
- Language
- Environmental
- Product Dimensions

- eBusiness Capabilities
- Exchange Rates
- Business Practices
-Summary-
Goal is Competitive Advantage

• Adapt to Change → Lead Change
• Improve Efficiencies (production, organizational, supply chain, etc.)
• Increase Value (Products and Services)
• Information Technology
• Process Technology
• Lowering Costs in the Supply Chain
• Penetrate, Secure and Maintain Markets
• Flexibility in Innovation
• Multi-Modal Responsiveness to Customers
• Strong Exchange Partner Supply Chain Relationships
The firms that will emerge as winners are those that get ahead of the curve in changing business environments:

• understanding the changes taking place in supply and customer chains
• identifying and defending against new sources of competition
• understanding new factors that shape purchase decisions
• learning how to become a source of superior value to customers

George Brown, Blue Canyon Partners, Inc., 2010
Questions? Comments?

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