

Sustainability and Supply Chain Management

Presented by:
Apostolos Vourvoutsiotis

Freiberg, 14th May 2004

Objective

This lecture focuses on sustainability and more specific corporate sustainability and the total supply chain at all stages of the life cycle.

Sustainability is defined only in a broad sense and the SCM is still in its infancy. In this lecture will be presented the current findings of the existing literature for sustainable supply chains and questions will be addressed.

Important is for the participants to actively participate, identify and address their own questions and to go beyond the understanding of Supply Chain Management.

Content:

- What is Sustainability?
- Sustainable Business
- Value Chain and sustainable competitive advantage
- Supply Chain Management (SCM)
 - Introduction to Supply Chain Management
 - SC optimization
 - Strategies
 - Push-Pull Systems
- Sustainability in SCM. Integrating supply chain management in corporate sustainable business approach
- Sustainable purchasing
- Conclusions
- Case studies

What is Sustainability?

- capable of being sustained, endure, lasting.
- *But what is it that should be sustained?*
- Daly (1986) as interpreted by Burness and Cummings (1986): Sustainability requires that all processes operate only at their steady state, renewable level.
- Pearce, Barbier and Markandya (1988): A necessary condition for sustainable development is the constancy of the natural capital stock.
- Goodland and Ledec (1987): 'development' which optimizes the economic and societal benefits available in the present without jeopardizing the likely potential for similar benefits in the future.
- Tietenberg (1984): The sustainability criterion suggests that, at a minimum, future generations should be left no worse off than current generations.
- Brundtland definition: Sustainable development is development that meets the need of the present without compromising the ability of future generations to meet their own needs.

What is sustainability?

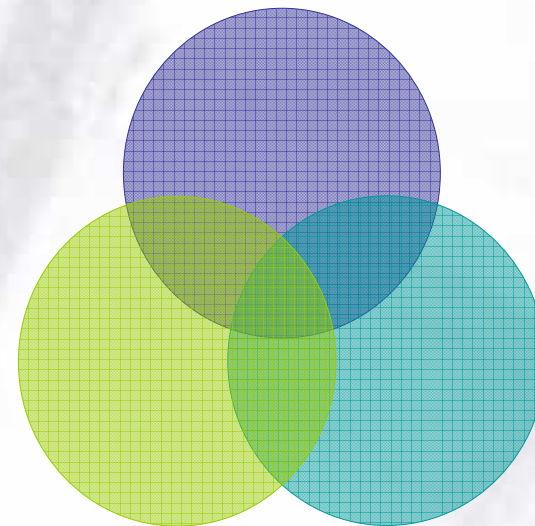
- It means more than just “green” or environmentally-sensitive management
- Important is to know what is to be sustained and in which extend.
- Define it broadly is not difficult but it is rather difficult to identify what has to be done to achieve it.
- Economists vs. Environmentalists
- ...

Sustainable development



Economy

- Best value
- Strategic planning
- Intelligence
- Competitive advantage
- Skills/Innovation R&D (raising competitiveness)
- Gain market share
- Understanding of fundamental changes in a long term and looking for them as opportunities



Environment

- Waste
- Use of materials
- Product development
- Environmental management systems, e.g. ISO14001
- Company environmental policy and commitment
- From cost to saving and opportunities



Society

- Corporate social responsibility (social license to operate in the future)
- Quality of life
- Employment
- Relationship with community
- Business Ethics
- Human rights



Why do we want it?

- Because many believe that we have an obligation to pass down to future generations opportunities that at least exceed our own.
- There is some concern that this obligation is not being met by the current generation.
- ...

Stakeholders

Local communities

Shareholders

NGOs

Ethical Investors



Contractors

Suppliers

Government

The media

Employees

Business partners

The Response of the Business Community

- Introduction of the socio-economic dimension (corporate social response)
- Recognition of the linkages between SD and competitive advantage in the marketplace, which elevates these issues to a strategic level.

“sustainable business”

as one that is able to anticipate and meet the needs of present *and future* generations of customers and stakeholders.

“triple bottom line”:

- Economic prosperity and continuity for the business and its stakeholders
- Social well-being and equity for both employees and affected communities
- Environmental protection and resource conservation, both local and global.

Stimuli for more sustainable products

- Regulatory
 - Global
 - EU
 - National
 - Regional
- Consumer demands
- Supply chains
- ...

Key economic drivers and trends

- Massive transfer of assets to private sector
- Over 3.5 billion **people** to market economies
- Increased **global** integration and **competitiveness**
- Impact of new technology
- Rapid pace of **innovation**
- **Mergers**/restructuring
- War for talent.
- Increased economic **uncertainty** and risk
- Growing importance of **intangibles**

Growing importance of intangibles

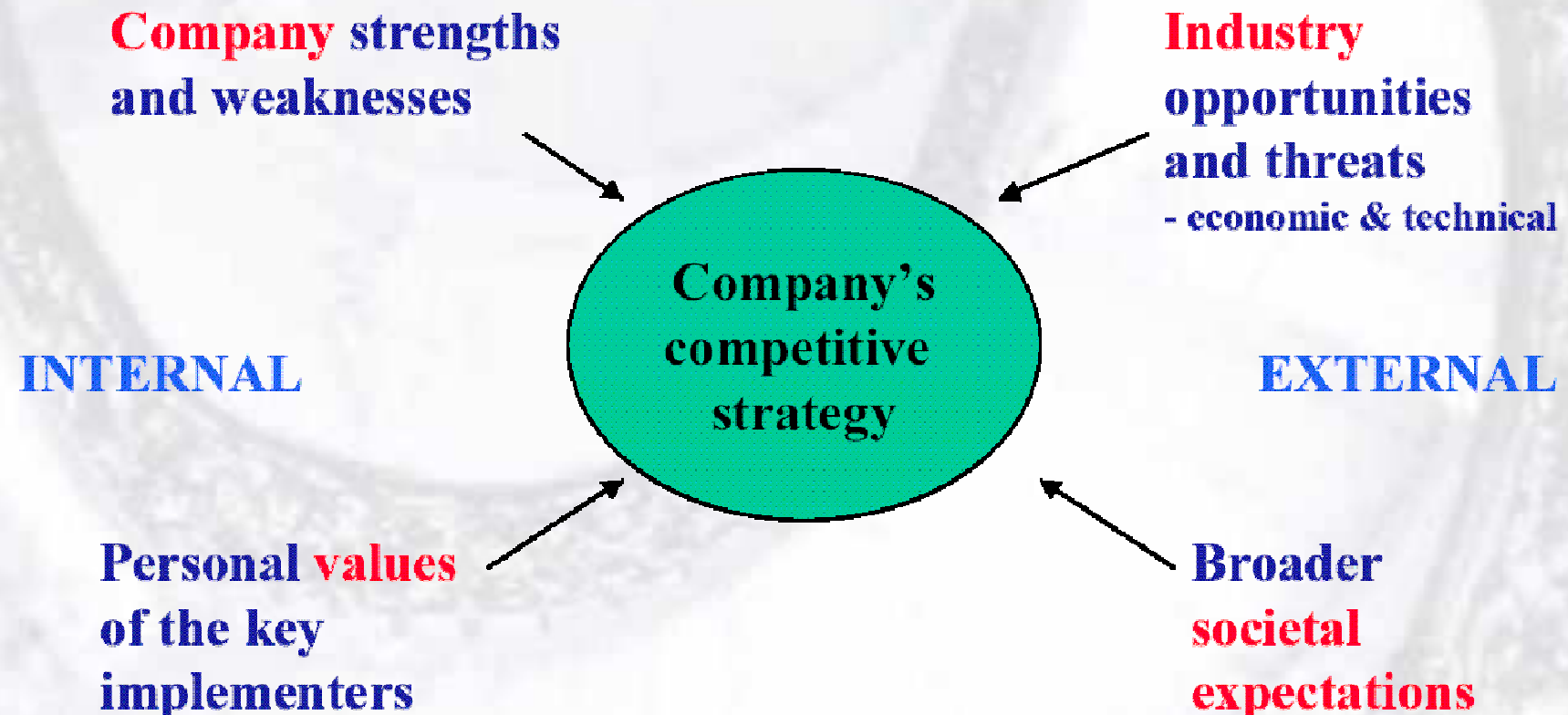
Cap Gemini Ernst & Young *Value Creation Index*

- **Innovation**
- **Quality**
- **Customer Relations**
- **Management Capabilities**
- **Alliances**
- **Technology**
- **Brand Value**
- **Employee Relations**
- **Environmental and**
- **Community Issues**

Key societal drivers and trends

- **Changing** public sector policies and frameworks
- Over 60,000 global **NGOs** and activist groups
- Globalization of the **information** (CNN. world and Internet)
- New research/info on critical social, **governance** and environmental trends
- **Anti-globalisation** movement
- Rising expectations and pressure to build accountability and societal **value-added**

Context in which competitive strategy is formulated



Summarising drivers and trends

- Rising competition and pressure to build reputation and **shareholder value**
- Rising societal expectations and pressure to build **accountability and societal value**
- New **regulatory and fiscal** frameworks: From disclosure requirements to social and eco-taxes and subsidies
- New **voluntary** initiatives and standards: From the Global Reporting
- **New market** mechanisms: From emissions trading to sustainability indices

What is driving sustainable development?



Source: PWC

Why ?

- PROCESS CHANGES
- Cost and liability reduction ...efficiency
- PRODUCT CHANGES
- Customer loyalty & reputation ...value chain
- NEW MARKET DEVELOPMENT
- New markets ...innovation
- Shareholder value
- Revenue
- Operational efficiency
- Access to capital
- Customer attraction
- Brand value and reputation
- Human and intellectual capital
- Risk profile
- Innovation
- License to operate

Summarise

Risk management
Reputation
Resources
Relationships
Responsiveness
Regulation
Results

How are leading companies responding ?

1. **PERFORMANCE** - economic, social and environmental value-added through products *and processes*
2. **GOVERNANCE** - accountability & transparency
3. **ENGAGEMENT** - stakeholders
4. **VALUES** - corporate and brand
5. **INTEGRATED MANAGEMENT SYSTEMS**

What the companies say

PWC Global CEO Survey 2002:

68% of CEOs felt sustainable development/ corporate responsibility would be an increasingly important factor in determining profitability.

69% felt the importance of these issues would not decline in current adverse economic conditions.

Showing how sustainable development and CSR add shareholder value is a tough challenge, but one we feel is of increasing importance and relevance.

British Telecom

In a troubled and unsettled world, we delivered our second best ever earnings in 2001 .We believe that long-term competitive success depends on being trusted to meet society.s expectations. Shell

*Global citizenship is important .our performance will be measured as much by our impact on quality of life as it is by revenue growth and profit margins.*Nike

We define our direction as sustainable growth - the creation of shareholder and societal value. Dupont

Where to next?

- **Robust, generally accepted measures of corporate SD performance still needed**
- **Measure tangibles and intangibles**
- **Moving beyond the .usual suspects. ..today**
- **More and more companies publish corporate sustainability reports**
- **Growing convergence between the corporate governance, sustainability and corporate social responsibility agendas**

Questions

- Do companies really understand sustainable development?
- What are the key areas of focus, and why?
- How are companies integrating sustainable development?
- What is driving the allocation of capital for sustainable development issues?
- What is driving environmental efforts and social practices?
- What do companies expect from their business partners?
- What is on the horizon? How should the industry change in the next 10-15 years?

Tools to manage sustainable companies

- EMS
- LCA and eco design
- Closed loops
- Environmental Accounting
- Environmental Reporting
- Supply Chain Management

The *Value Chain* (Porter)

Key activities that directly support the production of what a firm ultimately offers to customers



Sustainable Value Chains

- **Sustainable Value Chains** - a model to determine which specific **functions** in **business** need to become more **sustainable** and how **those who** perform those functions can see what their profession is doing about it and how to develop sustainability skills relevant to their jobs.

Sustainable competitive advantage (Porter, L.)

- Competitive advantage:
 - the ability of a firm to win consistently over a long term in a competitive situation
- Sustainable competitive advantage:
 - maintaining success over the long term by making old sources of competitive advantage obsolete before competition do; thus, firms must continually build temporary competitive advantages, replacing old with new ones

About supply chain Management

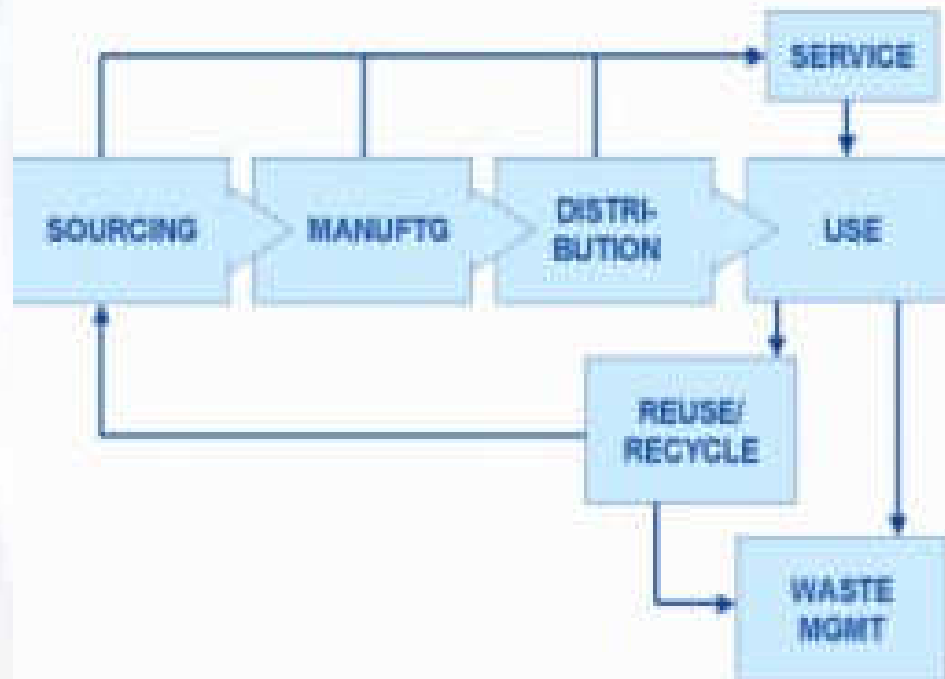
- **Introduction to SCM**
 - **Definition**
 - **The importance of information Technology**
 - **Managing the flow of materials**
 - **Maintaining SC relationships**
- **SC optimization**
- **Strategies**
- **Push-Pull Systems**
- **Sustainability in SCM**
- **Sustainable Procurement**
- **Conclusions**
- **Case Studies**

Definitions for SCM

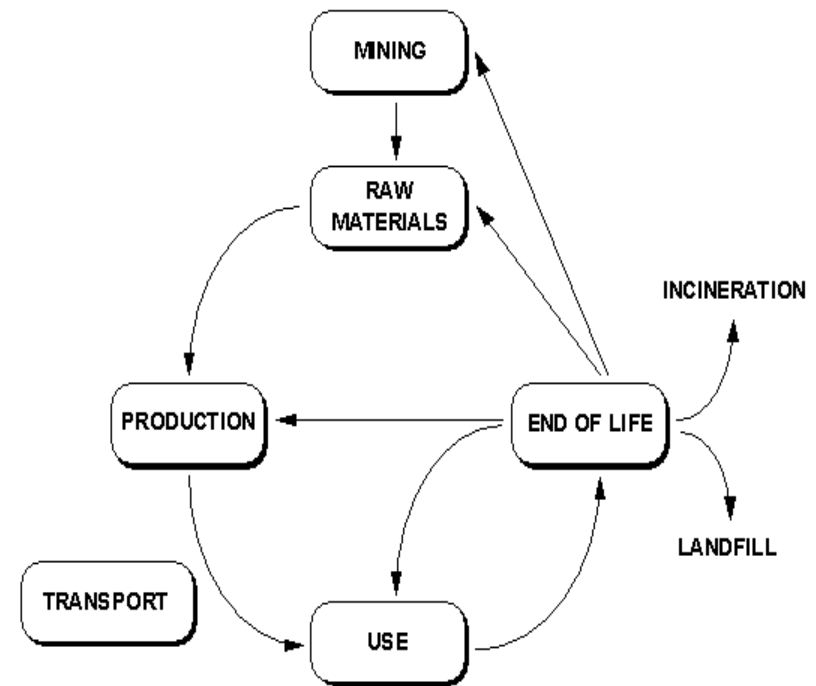
Keywords: Purchasing, Sourcing, Procurement, (Contract) Manufacturing, Key Suppliers, Marketing, Sales, Order Process, Demand Planning, Forecast, Project Financing, Logistics, JIT, Distribution, Inventory, Warehousing, Transport, Service, Closed loops...

Handfield and Nichols: “The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain. SCM is the integration of these activities through improved supply chain relationships, **to achieve a sustainable competitive advantage.**”

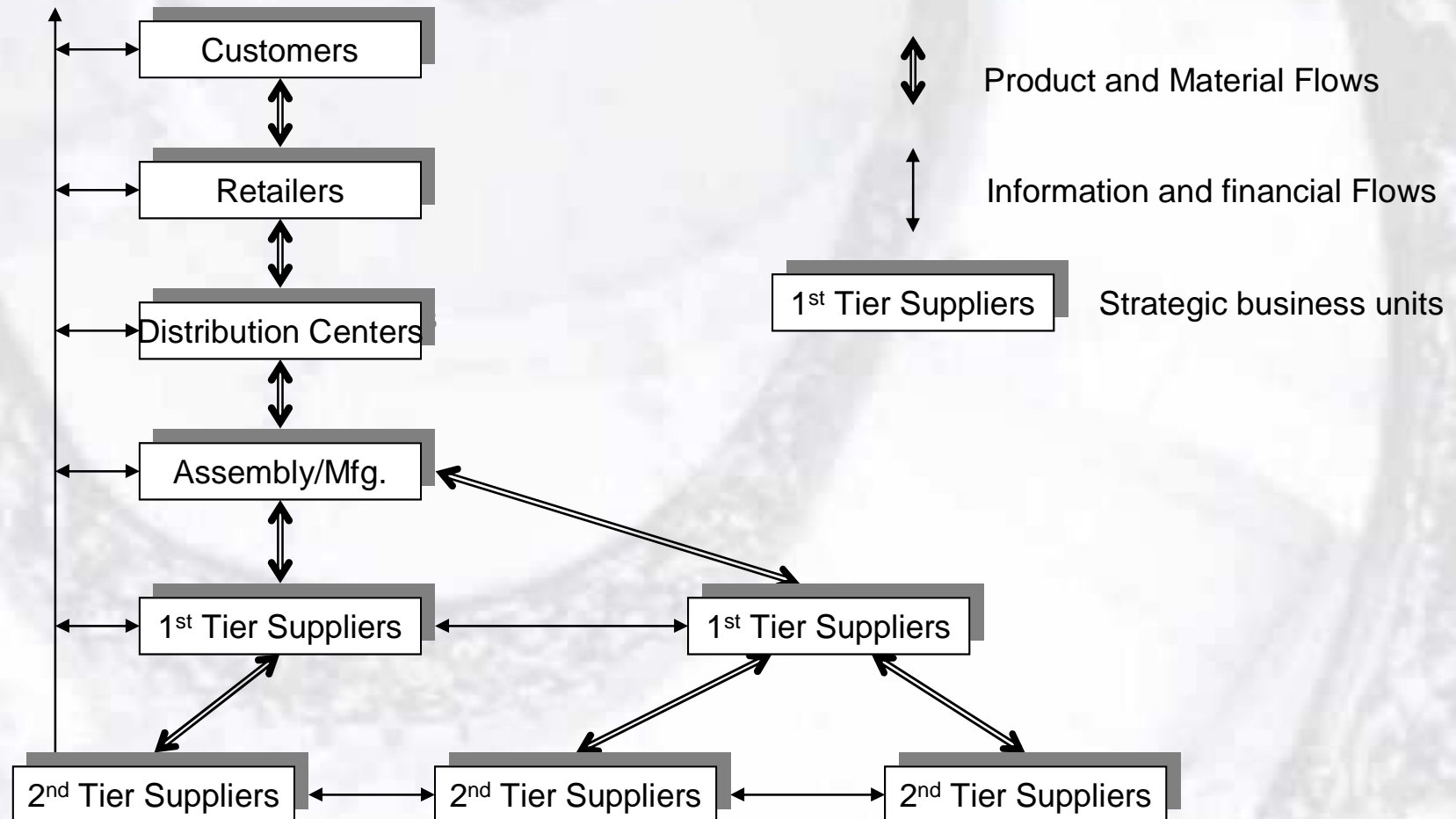
SCM



LCA

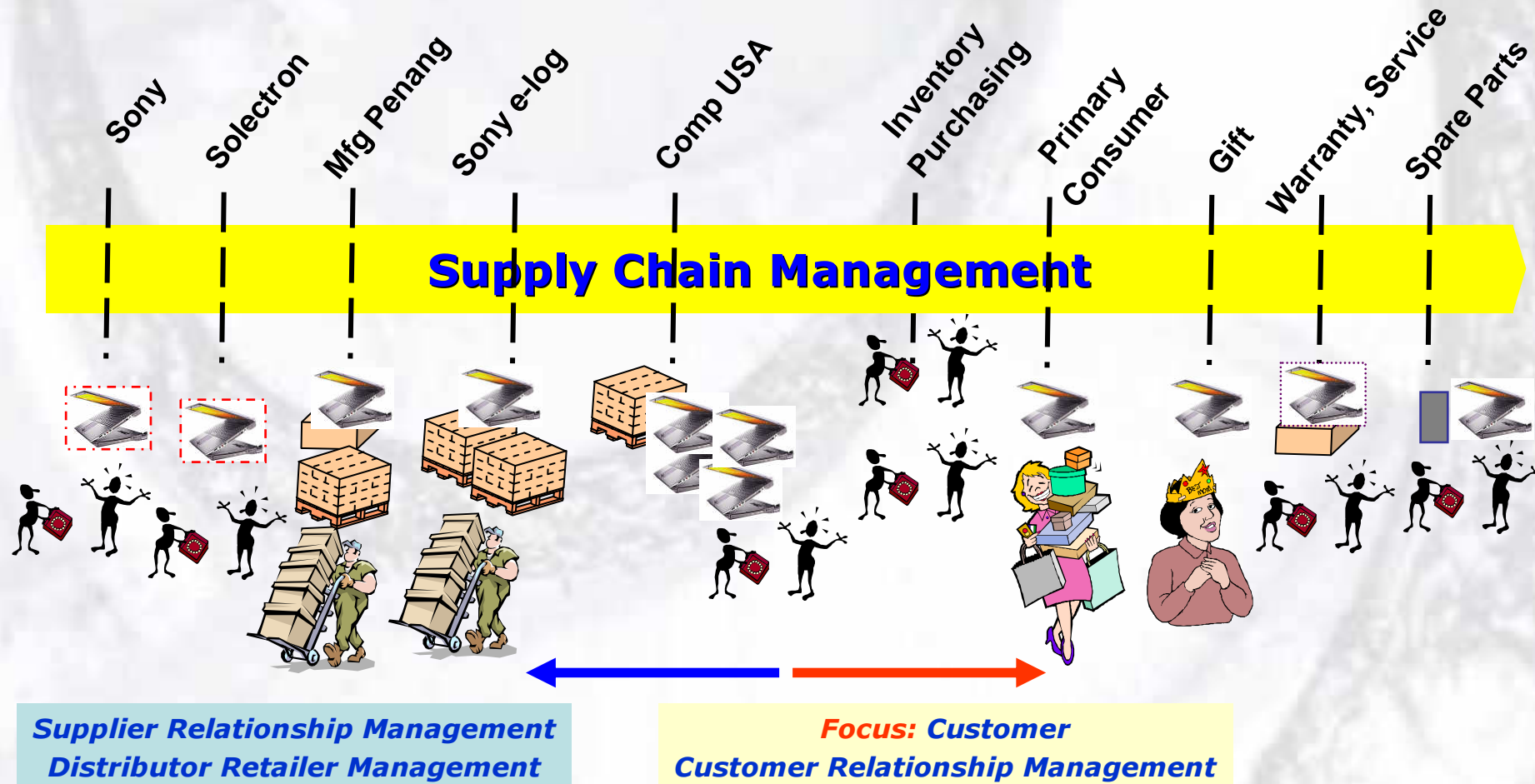


Integrated SC model



Source: after Handfield and Nichols, 1999

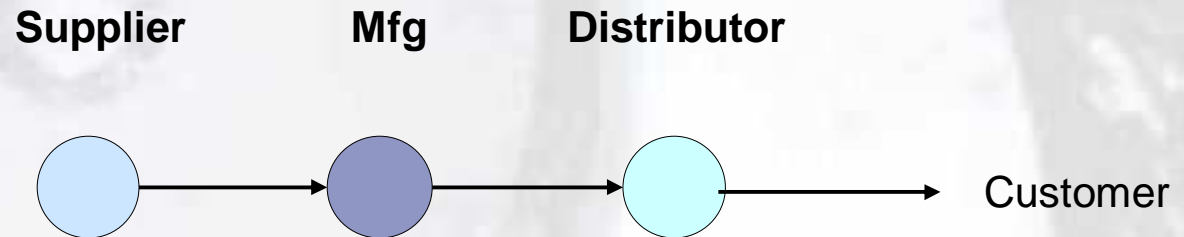
Supply Chain



Changing World: Distributed Intelligence and Adaptive Networks

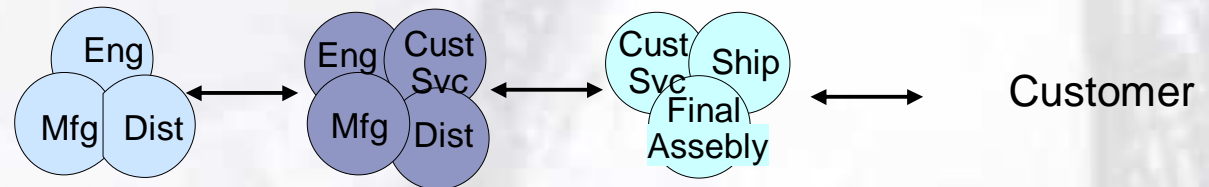
Circa 1996:

Serial flow across organizations



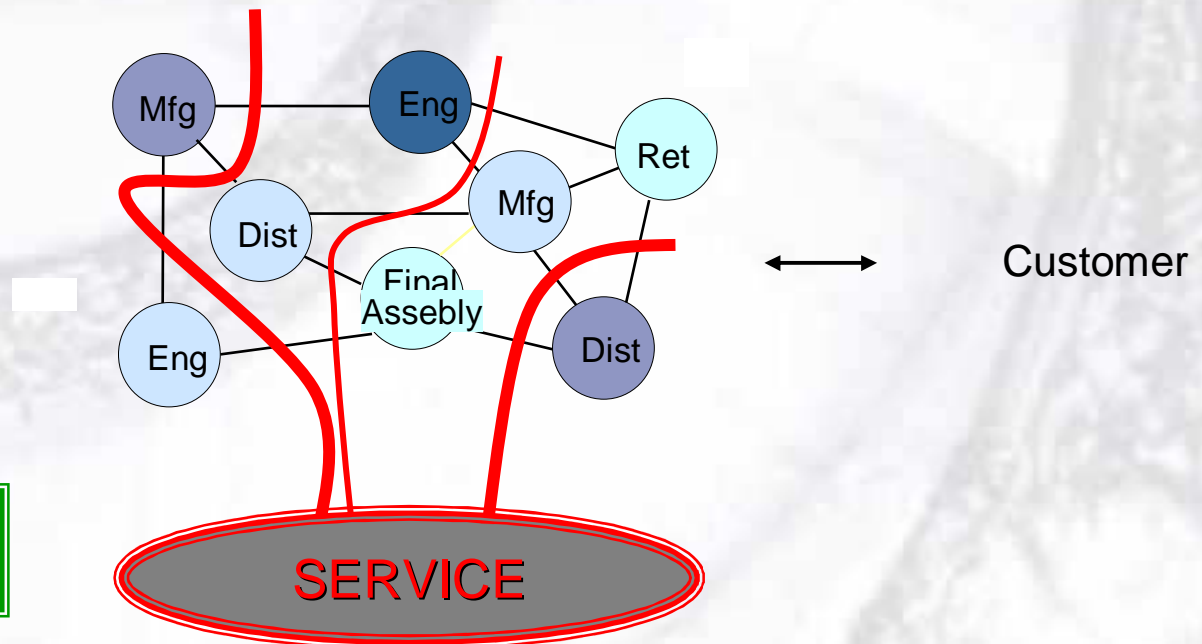
2000:

Internal processes begin to move outward



Today:

Supply network of dynamic trading relationships



Circa 2005:
SERVICE SUPPLY CHAIN

Supply Chain basics

- An organization must focus its SCM on those supply chains most critical to the organization's success. Critical are those supply chains, related processes, suppliers and customers that offer the greatest potential for achieving a *sustainable competitive advantage*
- Output: Target is the customer satisfaction.
- Input: Target is the minimization of Resources (e.g. Material, Inventory, Personal, Capacity), cost reduction, time reduction (leadtime). At the same time a certain degree of flexibility is needed at the SC.

The importance of IT in SCM

- Links the organizations to a unified and coordinated system
- Serving the customer in the best and most efficient manner (order status, product availability, invoices...)
- Information is crucial factor in the managers abilities to reduce inventory and human recourses requirements to a competitive level
- Information flows play an essential role in strategic planning for the deployment of resources

Information and Technology applications for SCM

- EDI (electronic data interchange)
- E-commerce
- Supply Chain IT tools (SAP and company specific)
- Data warehouse
- Bar coding and scanning
- Internet
- Intranet/Extranet
- Decision support systems (static and dynamic information)

Managing the flows of material across the SC

- Integrated management of the movement of materials from initial raw materials supplier across the chain to ultimate end customer
- SCM provide SC members with the opportunity to optimize logistical performance at the inter-organizational level

Managing the flows of material across the SC

The importance of time

Cycle time reduction

- Materials planning and scheduling
- Purchase order cycle
- In/outbound logistics
- Mfg process
- Warehouse operations
- Customer order process
- Return material/reverse logistics

Managing the flows of material across the SC – Performance measurement

Customer
satisfaction/Quality
Time

- Perfect order fulfillment
- Customer satisfaction
- Product quality
- Order fulfillment lead-time

Cost
Assets

- Total SC cost
- Cash to cash cycle time
- Inventory
- Asset performance

Maintaining SC relationships

Alliance Development

- Strategic component
- Process component
- Operational component

Maintaining SC relationships

Supply Chain Partner Audit

- Company profile
- Management capability
- Personal capabilities
- Cost structure
- TQM
- Process and technology capability
- Environmental regulation capability
- Financial capability/stability
- Production scheduling
- Information systems capability
- Supplier sourcing strategies, policies and techniques
- Long term relationship potential

SCM optimization: What to do ?

- Understand customer need
- Monitor supply availability
- Manage supply chain partner performance
- Decentralize problem solving
- Monitor corrective actions and feedback
- Include macro-economic indicators

**Flexibility on
product design side**

- **Design for postponement:** Design products so they can be differentiated in later phases of production or fulfillment
- **Component standardization:** Reduce dependency on custom components -- and promote reusability of standard parts across multiple product lines



Option to produce
demand-specific models

**Flexibility on
sourcing side**

- **Flexible contracts:** Establish structured contracts with suppliers with variable order quantity (within range)
- **Spot markets:** Opportunistic purchases of parts at uncertain yet advantageous market prices



Option to procure and use
lowest-priced components

**Flexibility on
manufacturing side**

- **Dual responses:** Stable production at cost-effective remote locations and variable production at expensive sites close to home
- **Late-phase differentiation:** Custom features are added to generic products closer to consumption points



Option to produce and ship
the exact amount very quickly



Portfolio of Real Options

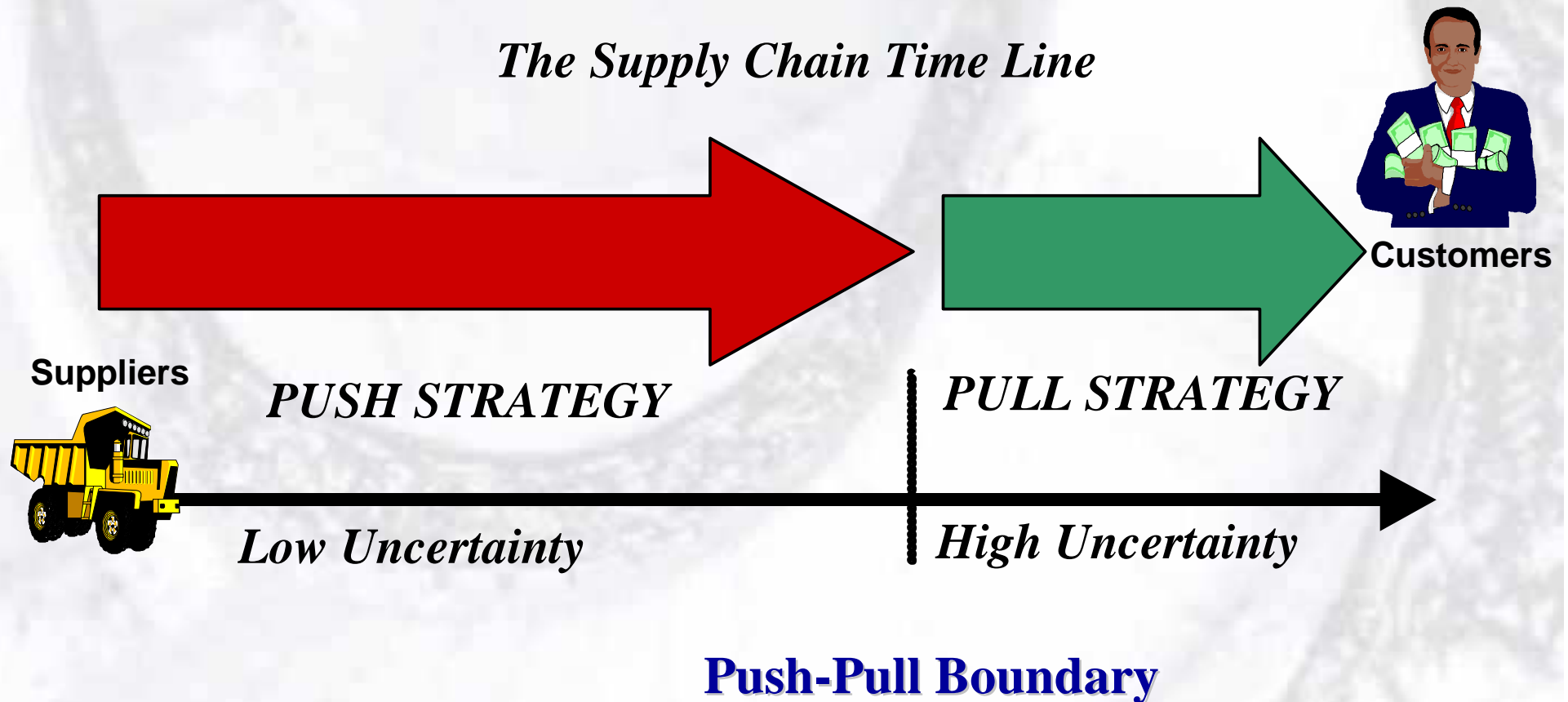
Source: HP & Forrester

A New Supply Chain Paradigm ?

- **A shift from a Push System...**
 - **Production decisions are based on forecast**
- **...to a Push-Pull System**
 - **Parts, inventory replenished based on forecasts**
 - **Assembly based on accurate demand**

Push-Pull Supply Chains

The Supply Chain Time Line



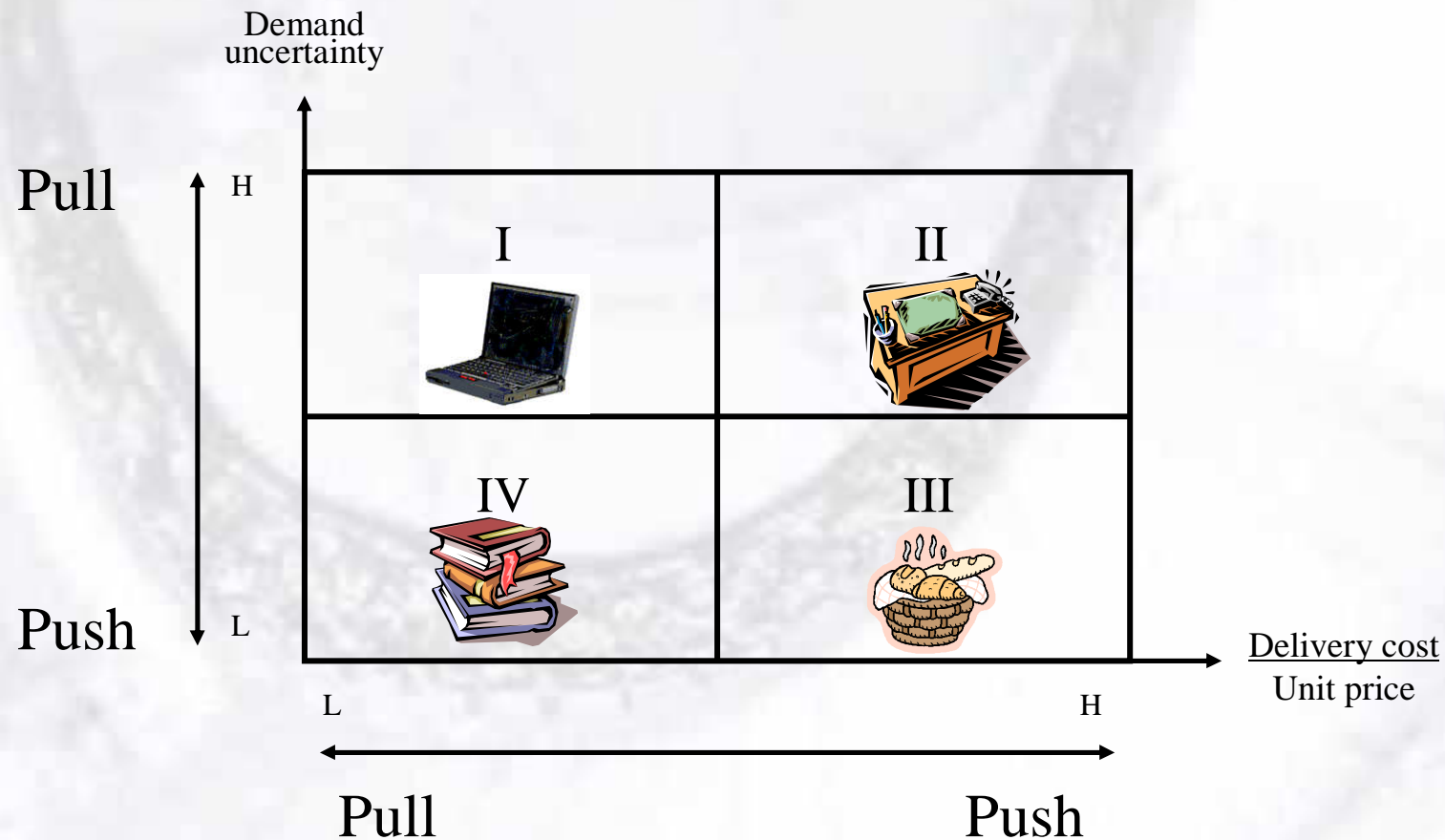
Book Industry

- **Push System**
 - Barnes and Noble
- **Pull System**
 - Amazon.com, 1996-1999
- **Push-Pull System**
 - Amazon.com, 1999-present
 - 7 warehouses, 3M sq.ft.

E-Fulfillment : Requires a New Logistics Infrastructure

	Traditional Supply Chain	e-Supply Chain
Supply Chain Strategy	Push	Push-Pull
Shipment Type	Bulk	Parcel
Inventory Flow	Unidirectional	Bi-directional
Reverse Logistics	Simple	Highly Complex
Destination	Small Number of Stores	Highly Dispersed Customers
Lead Times	Depends	Short

Matching Supply Chain Strategies with Products



Service Supply Chain vs Manufacturing Supply Chain

Where's the Push-Pull ?

Airline Product Features

- check-in time
- reservations help
- meals
- price
- flight frequency
- mileage awards
- route coverage
- baggage handling
- customer care

Dell Product Features

- μ P & modem speed
- CD ROM speed
- MB DRAM & HD
- screen size
- order-to-deliver time
- features range
- fulfillment accuracy

SCM and LCM

- In a holistic view SCM can be seen as part of LCM and SD.
- SD comprises economic, environmental and social issues.
- LCM is an integrated framework of concepts and techniques to address environmental, economic, technical and social aspects of products, services and organizations
- Therefore, the environmental and economic performance of products and services are integral parts of LCM and SCM and are important for the long term success of any business (sustainable competitive advantage).

Challenges in SCM

- Total Supply Chain Cost
- Sharing Risks in interorganizational relationships
- Managing the global SC
- E-commerce and IT
- Greening Supply Chain
- Sustainability in SCM. Integrating supply chain management in corporate sustainable business approach
- ...

Sustainability in SCM

- Use of supply chain relationships to improve social and environmental performance. Partners selection and evaluation
- Purchasing
- Materials handling
- Manufacturing
- Storage
- Surplus and Scarp Disposition
- Carrier selection and transportation
- Product take recovery (reverse logistics)
- Innovative technologies (environmental friendly)
- Customers and partners awareness
- Product design through LCA and eco-design
- ...

SC partner selection and evaluation

- Disclose and label material composition
- Consider long term costs of doing business with partner
- Reusable packaging and shipping materials
- Use partners who can show evidence of sustainable and well managed sources and materials
- Require partner participation on industry-wide environmental panels and organizations
- Environmental risk assessment
- Sustainable resource management
- Skills
- ISO 14000 and 9000

Why environmental corporate purchasing?

- Enhanced competitive strength
- Better service from a group of committed suppliers
- Easier compliance with environmental standard ISO 14001
- Integrated systems approach to purchasing, environmental management and the whole range of business functions

Key elements



How we do it

- Environmental Procurement Strategy
- Product information sheets
- Risk assessment
- Market influence
- Contract strategy
- Delivery through a team approach
- Performance management
- Supplier Development Programme

Sustainable Procurement should:

Meet normal procurement imperatives, but not by:

- Exploiting labour, working conditions and pay (*People*)
- Undermining local cultures, values, practices and local legal requirements (*Community*)
- Damaging future economic and social prosperity of the individual, community, country, future generations (*Future Development*)
- Exhausting or damaging natural resources, wildlife, habitat and bio-diversity (*Natural Resources & Bio-diversity*)
- Polluting air, land and water (*Environment*)

Integrating the Sustainability Agenda

- Risk assessment
 - Determine impacts at Life Cycle stages
 - Answer environmental questions
 - Is there a developing world supply chain? (Eastern Europe, Africa, Asia, Austral-Asia, South America)
 - Primary or secondary supplier?
 - Alternate products/ specification
- Supply chain assessment, focus on primary supplier policies and systems

Integrating the Sustainability Agenda (cont.)

Ask suppliers about their operations/ supply chain policies on:

- Working conditions
- Fair Pay/ Minimum working wage
- Working Hours
- Long term economic development
- Impacts on local community
- Infrastructure (education, healthcare etc)
- Materials regeneration

What are the Benefits

- Making better use of resources
- Reducing materials/ waste
- Used as a market differentiator
- Minimise future environmental liabilities
- Can reduce cost/ risk
- Enhanced business reputation

Investment not a Cost

Examples of supply chain pressure resulted to higher environmental and social standards

- Sustainable management of forests
- Reduction in the use of child labor and slaves
- Replacement of intensive pesticide use with integrated pest management techniques
- EMS at the same importance of QMS
- New innovative technologies less harmful for the environment
- ...

Conclusions

- SC is the operational level of a company and it is changing constantly
- SCM for achieving sustainable competitive advantage
- SC can act as an effective mechanism for raising environmental and social standards
- Transparency in SC could become a source for comparative advantage
- Determine the critical sustainability issues in individual chains
- ...

Main questions

- What is the meaning of sustainability for SCM (integration)
- How are companies integrating SD into SCM?
- How to integrate SCM into company's sustainable business approach?
- Is it enough by greening the SC to achieve SD?
- Is it enough by considering economic, environmental and social aspects at the design and optimization of the SCM to achieve sustainable competitive advantage?
- ...

Case studies and Open discussion

Nike: Global branding and sub-contracting

- Nike is one of the world's leading sport brands
- At 1960s started as importer of Japanese shoes (never have been a manufacturer)
- Concentrated from the beginning in brand development and marketing
- 1970s shifted most of its manufacturing from Japan to S. Korea and Taiwan
- Developed 3 types of relationships:
 - Developed partners (innovated and sophisticated shoes)
 - Volume producers
 - Developing sources (low cost partners, supported by Nike or partners)

Nike: Global branding and sub-contracting (cont.)

- In 1980s began shifting its production to countries with cheaper labor, such as China, Indonesia and Thailand.
- This reduced the cost but had negative impacts, such as:
 - Low ability to deal with innovation
 - Poor quality control
 - Poor raw material sourcing
 - High leadtimes
- In the middle of decade Nike was terminating contracts in China and considering shifting production back to established manufacturers
- In 1990s Nike found a compromise: Concentrating its manufacturing in low cost countries overseen by established partners

Nikes social responsibility under criticism (cont.)

- Nike is in difficult position
- Drop in earnings
- Nike's corporate image has been injured
- Result of the pressure of the critics is Nike to develop social responsibility and to recognize its suppliers/manufactures as a part of their responsibility (pressure of the supply chain)
- Other companies and especially companies in the same Branch to develop social response and recognize its responsibility through the whole SC

Nikes social responsibility under criticism

- A lawsuit filed in San Francisco Superior Court accusing co. of violating California's consumer laws by misleading consumers about the working conditions of thousands of its offshore laborers on countries like Vietnam, China and Indonesia
- Nike employs about 22.000 people but has additional 450.000 workers in Asian factories that are run under subcontractors
- According to lawsuit these workers are subjected to substandard working conditions (exposure to dangerous toxins and carcinogens, poor ventilation, forced overtime, corporate punishment and abuse...), child labor and there is the issue whether these workers receive a fair wage.

Nikes social responsibility under criticism (cont.)

- Nike has responded to the suit in variety of ways:
- Increase the outside monitoring of its overseas plants
- Raise the minimum age of its shoe manufacturing workers to 18 and its apparel workers to 16
- Apply US safety Standards for air quality to its foreign operations
- Founded a program SHAPE (Safety, Health, Attitude of Management, People, Environment)
- Refuses to to increase wages

The power of supply chain linkage

- European food retailers are increasingly specifying the manner in which the products sold in their stores should be produced. This is having considerable impact on farming across the world
- South Africa's citrus industry is depending on the international market (2/3 exported)
- To keep those markets SA citrus farmers have to reduce pesticides and to move to Integrated Pest Management.
- The shift to IPM by growing pest resistance, environmental responsibility, the high cost of pesticides and the need to retain the export markets (critical factor)
- Some buyers requiring IPM and good labor practice from the suppliers