Trends in Global Supply Chain Management

August 7, 2018
Webinar Agenda

1. **Introduction of today presenters & webinar logistics** – Dirk Dusharme, Editor in Chief, Quality Digest

2. **Trends in Responsible Supply Chain Management** – Alexis H. Bateman, PhD, Director, MIT Sustainable Supply Chains, Research Scientist, MIT Center for Transportation and Logistics, MITx MicroMasters Course Lead

3. **Value Chains Disrupted - Game-changing innovation driving hyper-transparency in the supply chain** – Tom Gosselin, Director of Supply Chain Services, DNV GL Business Assurance North America

4. Q&A
Introduction

• Who am I?
## Types of Regulations – by Mechanism

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td><strong>Absolute Mandates or Command &amp; Control</strong></td>
<td>Strict rules or “Bright Lines” about what is allowed, what is not and how to act.</td>
<td>Endangered Species Act, Electronic Logging Devices (ELD), Seatbelt Laws, Emission Standards, RoHS</td>
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<td><strong>Liability Regulations</strong></td>
<td>Companies or other parties can be held responsible for actions locally or internationally, currently or in the past.</td>
<td>Foreign Direct Liability, CERCLA Act (Superfund), Product Liability Act</td>
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<td><strong>Performance Based or Incentive Regulations</strong></td>
<td>Governments set a standard to achieve but firms have flexibility on how to achieve them</td>
<td>Clean Air and Clean Water Acts, Extended Producer Responsibility (EPR), Take-back Laws</td>
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<td><strong>Market Based Regulations</strong></td>
<td>Regulations that encourage behavior through market signals (incentives and penalties) and allow for trading and credits</td>
<td>Greenhouse Gas Emissions, Ethanol, Cap &amp; Trade</td>
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<td><strong>Disclosure &amp; Transparency</strong></td>
<td>Regulations that do not dictate behavior, but require specified disclosure about product content/performance and/or business processes/practices.</td>
<td>Modern Slavery Act, REACH, Conflict Minerals Act</td>
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Industry & Society

- Media
- NGOs
- Think tanks, academic institutions
- Business partners & competitors
- Shareholders, analysts, capital markets, insurers, and banks

Natural and Social Resources

• Natural Resources
  ■ Finite and Limited
  ■ Tragedy of the Commons
  ■ Water, energy, materials

• Social (Human) Resources
  ■ Working Hours & Conditions
  ■ Child Labor
  ■ Slave Labor & Human Trafficking
Inside Big Chocolate’s Child Labor Problem

Slavery and trafficking continue in Thai fishing industry, claim activists

Leading brands unsure if palm oil in products comes from rainforest land

The Surprising Link Between Trans Fat and Deforestation
Customers

• Business to Business
• Consumers & community
• Changing values
  ■ Higher Awareness
  ■ Cost Conscious
  ■ Transparency
  ■ Trust
Customer Priorities
Responsible Supply Chain Strategies

• **Efficiency focused**: strategies are those that contribute both to sustainability and, at the same time, to profits -- typically, through cost reductions

• **Insurance focused**: strategies that seek to prevent social and environmental related disruptions; this includes supply risks in the form of license to operate/local regulation, demand risks of stakeholders, enabling end to end supply chains

• **Growth focused**: Based on end to end view of their practices and processes, leading companies are committed to reduce relative social and environmental footprint; also aim to achieve absolute reductions in their footprint while achieving aggressive growth targets
Visibility

- Half of global manufacturers don’t have visibility beyond direct suppliers
  - Audit first tier suppliers but cannot see beyond them to suppliers’ supplier
Transparency

- **Myriad of terms** and language in this space – moving towards a common understanding:
  
  - Transparency  
  - Traceability  
  - Visibility  

- “Transparency includes not only *reporting to stakeholders*, but *actively engaging stakeholders* and using their feedback and input to both secure buy-in and improve supply chain processes. (...) Transparency can be improved through vertical coordination across a supply chain as well as horizontal coordination across networks.”

  (Carter and Rogers, 2008)

- Transparency captures the extent to which *information* about the companies, suppliers and sourcing locations is readily *available to end-users and other companies in the supply chain.*
Palm Oil Supply Network

Plantation and Harvest
- Small-holdings
- Middle-men
- Plantations

Extraction
- Mills
- Kernel Crusher

Chemical Process
- Refineries

Manufacture
- Refineries
- Palm oil and derivatives

Retail
- Food manufacturers
- Personal care products manufacturers
- Retailers
- End consumers

Palm and its derivative products: Vegetable Oil, Vegetable Fat, Palm Kernel, Palm Kernel Oil, Palm Fruit Oil, Palmitate, Palmitoleate, Palmitoin, Glyceryl Stearate, Stearic Acid, Elaeis Guineensis, Palmitic Acid, Palm Stearate, Palmityl Oleylamide, Palmitoyl Tetrapeptide-3, Sodium Laureth Sulfate, Sodium Lauryl Sulfate, Sodium Laureth Sulfate, Sodium Palmitate, Sodium Lanolin Sulfate, Hydroxyl Palm Glycerides, Ethyl Palmitate, Octyl Palmitate, Palmityl Alcohol

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Information Gaps and Data Handling

• Major information gaps
  ■ Boundary movement
  ■ Multiple tiers, third parties

• Lack of standardized systems to collect, validate, and distribute data
  ■ Different SC systems
  ■ Poor transfer of data – highly manual

• Legacy systems poorly handle growth of data and formats

• Low absorptive capacity for new info
Supply Chain Visibility – Different Technologies

• Capture & Translation
  ■ Transforming the physical data (location, time, temperature, status, etc.) into digital data
  ■ Examples: Barcodes, Scanners, RFID, Smartphone, Internet of Things

• Transmission & Upload
  ■ Moving the digital data from a local source to global or cloud system and/or database
  ■ Milestone versus Real Time systems
  ■ Examples: Electronic Data Interchange, Application Programming Interface, Global Positioning Systems

• Access & Actionability
  ■ Providing access to and ability to conduct other actions using the data
  ■ Examples: Supply Chain Execution Systems, Transportation Management Systems, Control Towers, Platforms, Blockchain
- Requires mapping of supply chains (how far down? Tier 1, 2, n?)
- Efforts for increased visibility
- Added vendor/supplier compliance vetting – inclusion of a “Supplier Code of Conduct”
- Risk assessment
- Contracting and use of 3rd party auditing firms/organizations
- Supplier training and collaboration
## Brand Examples

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<tr>
<td>Sweden</td>
<td>100k</td>
<td>Trend</td>
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<td>✓</td>
<td>✗</td>
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<tr>
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<tr>
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<td>Sustainability</td>
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<td>✗</td>
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Demand and Adoption

- Issue Recognition
- Early Adopters
- Critical Mass
- Institutionalized

Demand vs. Adoption diagram
VALUE CHAINS DISRUPTED

Game-changing innovation driving hyper-transparency in the supply chain

August, 2018
DNV GL - Global reach – local competence

150+ years
100+ countries
100,000+ customers
12,500 employees
Enabling sustainable business performance

Creating value
While meeting the world’s economic, social and environmental needs.

Bridging today and tomorrow
Manage operational challenges today – building sustainable value over time.

Assuring performance
Along entire supply chains to build sustainable performance and stakeholder trust.
The Evolution of Supply Chain Management

- **Old Model:**
  - Cost as primary risk
  - Availability considered on a short-term basis
  - Redundancy and waste as internalized costs (to buyer)

- **Emergence of Supply Chain Management**
  - Just-in-time logistics
  - Outsourcing of operational and core process functions
  - Globalization and the new risk paradigm

- **From Risk Management to Value Added**
  - Outsourcing of functions, not responsibilities
  - New boundaries of responsibility
  - New decision-making tools (e.g. LCA, footprinting, SROI)
From Visibility to Transparency in the Supply Chain

- New Boundaries of Responsibility:
  - The emergence of commodity product Chain of Custody standards (RSPO, FSC, ASI, etc.)
  - Need for traceability and visibility among sometimes porous chains
  - The new verticality, creating upstream value
  - Shared responsibility, working collaboratively with competitors

- The era of Hyper-transparency:
  - Marfrig & Greenpeace Reports
  - My Story – A Digital Assurance Solution
  - The Ocean Cleanup
Challenges in Assuring Supply Chains

- Accuracy & Traceability
- Complexity and speed (e.g. electronics)
- Remote locations (e.g. agriculture, mining)
- Trading models (e.g. growers, co-operatives, brokers, commodity exchanges, blenders, etc)
- Timing (peak seasons, perishability)
- Availability
Disruptors & Enablers of Digital Assurance

- Blockchain
- Augmented Reality (AR)
- Virtual Reality (VR)
- Artificial Intelligence (AI)
- Internet of Things (IoT) –
  - Satellite Imagery & cameras,
  - GPS,
  - Sensors
Tracking Beef and Deforestation
"My Story illuminates products and their supply chain for the benefit of consumers, who will have instant and in-depth access to key products characteristics such as quality, authenticity, origin, ingredients, water and energy consumption and more, all verified by DNV GL along the entire transformation process.”
The Ocean Cleanup – Digital Assurance of High Seas Plastic Waste

The System 001 monitoring system processes, stores and transfers large-amounts of data collected by many sensors. This data relates to navigation, environmental conditions, the system’s operational status and its integrity. The sensors are linked to five solar-powered electronic pods mounted on the system, all including GPS. The pods communicate to each other via a WiFi mesh network and a satellite connection.

**SAT 2X SATELLITE POD**
The satellite pods enable The Ocean Cleanup team to communicate with the system remotely and retrieve data – including images and GPS locations – from its headquarters in Rotterdam, the Netherlands.

**NAV 2X NAVIGATION POD**
Placed at each end of the system, the navigation pods carry a complete weather station and Automatic Identification System (AIS) - sharing the system’s location with other vessels.

**CAM 1X CAMERA POD**
Located in the center of the system, the camera pods are equipped with two high definition cameras. One of which can be remotely oriented for 360° coverage and provides visual feedback from any direction.

**LAN 9X LANTERNS**
To ensure visibility at all times, lanterns are placed every 100 meters, including two indicating the ends of the system. Seven lanterns also feature radar reflectors for added detectability.

58+ **SENSORS**
All along the system more than fifty blige sensors and strain gauges continuously monitor the integrity of the system.
Our Outlook

TECHNOLOGY OUTLOOK 2025

TRENDS

» Society
» Economy
» Geopolitics
» Environment

Global population will add 80 million a year between now and 2025

Asia’s share of global exports will double to 29% by 2030

Almost 2 in 3 people could face water stress conditions by 2025

DRIVERS

» Policy & Regulation
» Sustainable use of resources
» Climate change
» Digitalization

Internet of Things will encompass up to 1 trillion devices

Economic impact: 2.7 to 6.2 trillion USD

Welcome to the sharing economy and the circular economy

TECHNOLOGIES BY 2025

LIFE SCIENCES

HEALTHCARE

3 billion wearable health sensors

Disease research
detection and monitoring

 FOOD SUPPLY

Agriculture: Dozens
or hundreds of
agricultural
robots on farms

Digital Twins of vessels
as a virtual test bench
for design and operations enhancement

ENERGY

POWER

Onshore wind and solar PV cheapest source of electricity in many countries

Automated drilling reducing drilling time and cost by 30-50%

OIL & GAS

A large share of new commercial ships deploying hybrid power generation systems

Omnipresent sensors in power grids for control of variable renewable energy sources

Operational analytics for smarter subsea tie-ins and simpler, smarter completions
Polling Question

What is your influence on supply chain management?

1) I write and enforce requirements to my suppliers.
2) I handle requests for audits from my clients.
3) I conduct audits of our suppliers.
4) None
Thanks! Questions?
Contact Us

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