Sustainable Supply Chains: The Regulator’s Perspective

Vedat Verter

John H. McConnell Endowed Chair of Business Administration
Chairperson, Supply Chain Management Department
Editor in Chief, Socio Economic Planning Sciences
Why Circular Economy?

- Maximize Profit
- Improve the Triple Bottom-line
- Legislation
Early Industry Examples - XEROX

- **Document Center 265 in 2006**
  - 84% re-manufacturable & 97% recyclable
  - 265 replacement parts rather than 2,000

- **Fuji Xerox – zero landfill product**
Early Industry Examples - Auto

NISSAN March vehicle:
• designed to reduce dismantling time by 40%
• high reusability rate

DAIMLER
• 15% of large components are produced from reusable materials
Is There a Need for Legislation?

- Rationalize the Consumption of Virgin Materials
- Design of Environmentally Friendly Products
- Landfill Diversion
Main Policy Options for the Regulator

- Mandatory Requirements (Europe)
- Price-based Incentives (U.S.)
- Hybrid policies (Canada)
Policy Differences in the U.S.

- **State passed producer responsibility law**
- **State passed ARF (consumer fee) law**
- **Legislation introduced in 2011**
- **Bill introduced to add new products to law**
Michigan – Lot of work to do

2008 EPR Legislation & Electronic Waste Takeback Program; currently

Michigan's Recycling Rate
15%

National Recycling Rate
34%
Mandatory Requirements in EU

- Collection/Reuse/Recycling Targets
- Take-Back Legislation
  - Packaging Directive
  - RoHS Directive
  - EoL Vehicles Directive
Price-based Incentives

- Taxes on the use of virgin materials
- Recycling subsidies
- Advanced disposal fees
- Deposit-refund requirements
Example: Our Research on Collection

- Retailer / Collector
  - Retail Network
  - Collection Network
  - Financial Incentives

Return Product Flow

Product Flow

Product holder

Independent decision to purchase and return or not

Deposit-refund requirement

Regulator
Current Practice: Adding the Deposit on the Price

\[ r, \Pi \]

\[ r_0 + s \]

\[ r_0 \]

\[ \tilde{d}_c^* \]

\[ \Pi^* \]
Optimal Policy: Partially Subsidizing the Deposit
The Role of Supply Chain Management

POLICY CHOICE

IMPLEMENTATION

PRODUCER RESPONSE

ECONOMIC IMPACT

Environmental Economics Perspective

SCM Domain
Outlook on Sustainable Supply Chains

Fruitful Avenues:

- Product Design
- Environmental Impact
- Legislation
Thank you!

Vedat Verter
verter@msu.edu