

Servicizing:

The Quiet Transition to Extended Product Responsibility

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For further information

- Tellus Institute is a non-profit environmental research and consulting organization with 50 professional staff spanning engineering, economics, and social science disciplines. For information about the Institute:
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- The work upon which this presentation draws includes:
 - Work under EPA cooperative agreement *CX-826825-01-0* produced the report “**Servicizing: The Quiet Transition to Extended Product Responsibility.**” The report is available for download in PDF format from the Tellus website (“Risk Analysis Group Publications”) or in hardcopy by contacting the Institute.
 - The chemical management services work described as a specific example of the “servicizing” phenomenon has been pursued by Tellus through the Chemical Strategies Partnership (CSP), a project of the Tides Center with major funding by the Heinz Endowments and the Pew Charitable Trusts. For further information, visit the CSP website at <http://www.chemicalstrategies.org> or contact Thomas Votta, Senior Scientist at Tellus.
- The current work of the Risk Analysis group at Tellus Institute includes many closely related topics, including environmental accounting, extended product responsibility, resource management and life-cycle approaches to product and process decision-making.

Overview

- Definitions
- Services and the environment
- Servicizing: our particular focus
 - traditional product manufacturers moving beyond “product in a box” towards a new business model
- How might servicizing lead to greening?
 - Life cycle model, use and non-use impacts
- Servicizing in the real world: 7 companies, Chemical Management Services

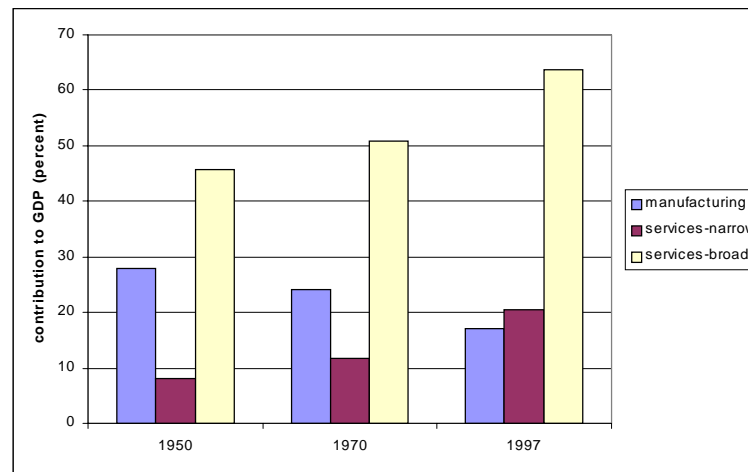
Definitions

- Servicing
 - The emergence of a class of product-based services; manufacturers who traditionally delivered “products in a box” are increasingly viewing products as a vehicle or platform to deliver service or function.
- Extended Product Responsibility
 - The principle that actors along the product chain share responsibility for the lifecycle environmental impacts of the product system. The greater the ability of an actor to affect an impact, the greater the responsibility.
 - European EPR focuses on producer role

Services and the Environment

- Growing importance of services in “advanced industrial economies”

Structural change in the U.S. economy



Services and the Environment

- A trend that is of environmental importance because. . .
 - *Any* structural change of keen interest and concern -- our environmental protection system is deeply rooted in manufacturing; services largely “invisible”
 - A means to divorce economic growth from growth in material, energy throughput?
- But serious analysis is just beginning. . .

Services and the Environment

- Simplest, most optimistic view:
 - “a service economy is necessarily a clean economy”
 - **clearly incorrect!**
- Service economy is rather a value-added layer resting upon a material-intensive, industrial economy
 - growth in services may be less environmentally problematic than growth in manufacturing, but. . .
 - This is not sufficient when society already exceeds environmental limits

Services and the Environment

“If services are to produce a greener economy, it will be because they change the ways in which products are made, used and disposed of -- or because, in some cases, they supplant physical products altogether.”

Services and the Environment

- Dematerialization (services replacing products) has received significant attention
 - e.g., IT reducing transport of physical goods; voicemail replacing answering machines
- . . .but not all products can be dematerialized

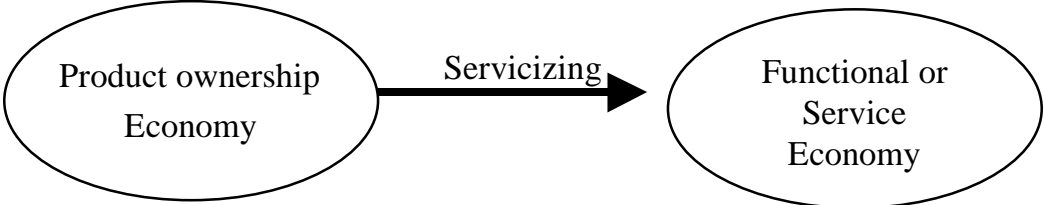


Therefore our focus: cases in which services alter the ways in which products are made, used, and disposed of.

Our focus: Servicizing

- Many manufacturing firms have begun a process that shifts their focus away from product manufacture to service delivery.
 - The product becomes increasingly a means of delivering “function” rather than an end in itself
 - Transition generally driven by business strategy or market considerations, not environment
 - new models of competition, value added.
 - Increased manufacturer involvement in the lifecycle beyond “product in a box” model
 - vendor/customer relationship → supplier/user partnership

Servicizing examples



Examples:

- | | | |
|------------------|-------|---------------------------------------|
| Buying washers | | Buying cleaning services |
| Buying chemicals | | Buying chemical management services |
| Buying copiers | | Buying document reproduction services |
| Buying cars | | Buying "mobility" services |

Servicizing examples

Service (Sample provider)	Description
Chemical management services (Castrol Industrial North America)	Manages chemical procurement, delivery, inspection, inventory, storage, labeling and disposal for industrial customers. Seeks process efficiency improvements. Compensation can be based on cost savings delivered, not volume sold.
Document services (Xerox)	Integrates document storage and reproduction technology — Xerox's traditional manufacturing strength — with customer's business systems to produce automated, just-in-time, customized document production.
Mobility Services (Call-a-Car ~ Netherlands)	On-demand car rental. A fleet of cars is owned by a membership organization; subscribers pay fixed costs and per-kilometer/per hour fees. Cars are reserved "on demand" via a central reservation point.
Furnishing services (Interface; DuPont Flooring Systems)	Interface experimented with an "Evergreen Lease" program. Customers leased installed modular carpet, which Interface undertook to maintain to a given appearance standard with selective rotation or replacement (with recycling) of worn tiles. DuPont, in addition to leasing carpets, also provides a series of carpet-related services throughout the carpet's lifecycle.

Does “servicized” mean green?

- Idea that eco-efficiency follows from a “functional” economy is increasingly popular
 - usual example: manufacturer retains ownership of product, ensuring proper end of life management, increased durability, better maintenance
- A proposition subject to little detailed analysis. . .
 - Meaningful environmental gains must mean reductions in absolute impacts-- NOT sufficient to “spread” same impacts over larger value-added

Approach to the question

- We asked *if* and *how* servicizing can drive extended product responsibility (EPR)

Servicizing

- a *business strategy* that defines and serves a market's need for speed, convenience, flexibility, other value-added attributes

EPR

- a *principle* whose application should result in lower lifecycle environmental impacts for products/product systems

Aside: EPR & environmental gains

- How is EPR supposed to work?
 - EPR: actors with *ability* to reduce lifecycle environmental impacts assume *responsibility* for doing so
 - Manufacturers/service providers: ability to influence impacts through product design, material choices, manufacturing processes, product delivery
 - EPR is P2 applied across the lifecycle. Goes beyond “polluter pays” principle
- EPR in a voluntary context (US Approach)
 - Where environmental costs are internalized, actors are likely to assume responsibility for minimizing them.

Conceptual linkage

- What is the connection between servicizing and EPR?
 - both require manufacturers/service providers to extend their involvement with & responsibility for products beyond traditional involvement
 - IF servicizing is a “greening” influence, will be because this altered relationship with the product drives superior environmental performance
 - in short, environmental gains occur IF servicizing drives EPR

Conceptual linkage

- For servicizing to drive EPR in a voluntary context, must align economic incentives for servicizing firm with environmental gains
 - economic incentive = opportunity for cost reduction or revenue gain
 - may occur when the servicizing business arrangement.
 - internalizes costs whose minimization results in environmental gains (e.g, disposal, energy, consumables)
 - is driven by the economic value of the end-of-life good
 - reconstitutes the product as a cost rather than a profit center
 - in general, when product volume is divorced from profit

Lifecycle impact improvements

- Use impacts
 - scale w/ number of service units delivered AND efficiency of product
- Non-use impacts
 - scale with product throughput (# of products, energy and material throughput per unit)
 - RECLAMATION activities (recycling, remanufacturing, reuse) are generally beneficial from a lifecycle perspective

Servicizing and use impacts reduction

- Can postulate situations where servicizing would create incentives to reduce use impacts:
 - servicizing unlikely to reduce # of service units consumed
 - BUT may reduce impacts per unit of service
 - by product design
 - by change in vintage distribution
 - improved maintenance and operator training

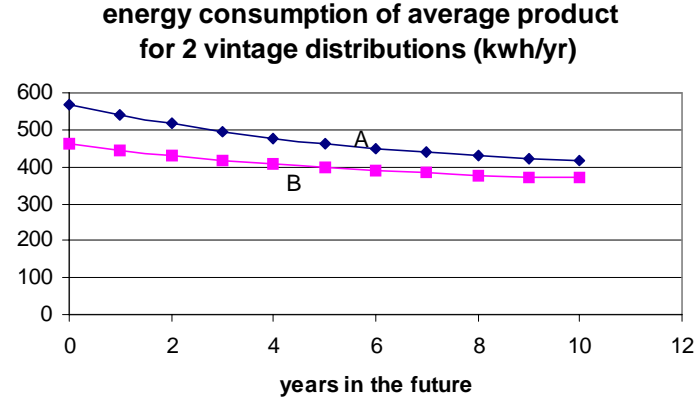
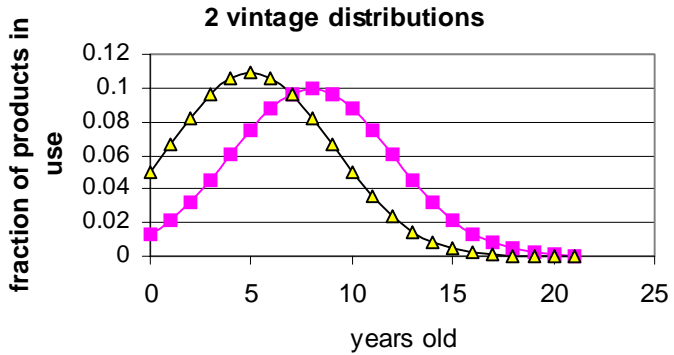
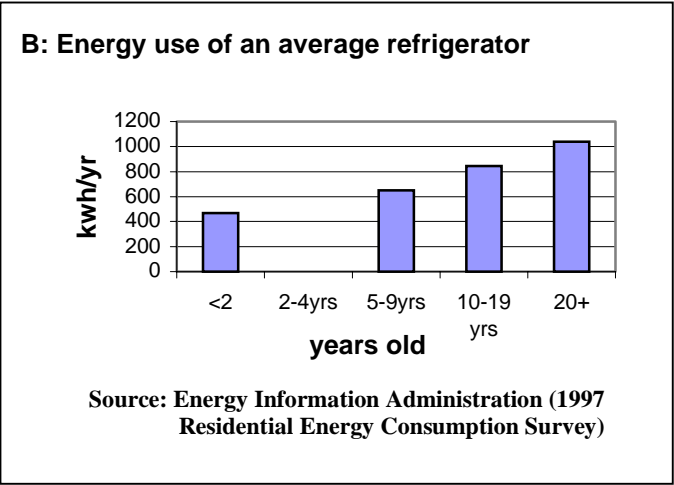
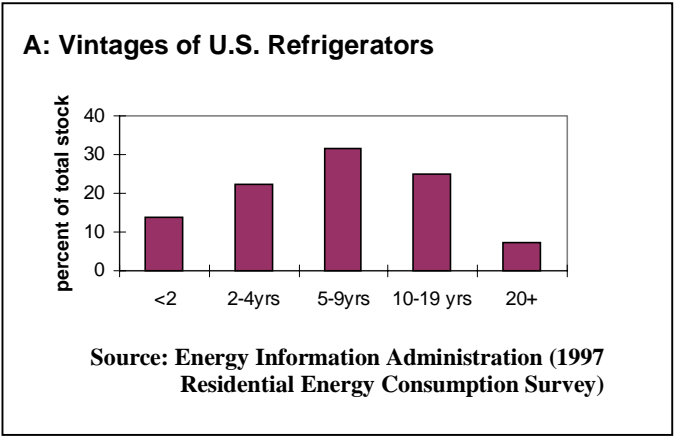
Servicizing & non-use impacts reduction

- Can also postulate situations where servicizing would create incentives to reduce non-use impacts:
 - may reduce number of units manufactured
 - by extending durability, service capacity, efficiency of product in delivering function
 - may reduce material, energy throughput per unit
 - no particular reason to think servicizing will encourage lightweighting or industrial P2
 - but may encourage reclamation activities

Use & non-use tradeoffs

- A younger vintage distribution may offer significant environmental benefits when:
 - the majority of product impacts are in use
 - AND product efficiency increases over time
- . . . BUT achieving a younger distribution means producing and disposing of more units. . .

Vintage distributions



Servicizing in practice: 7 firms

- Looked at 7 “servicizing” firms
 - AB Electrolux
 - Castrol Industrial North America
 - Coro
 - DuPont
 - IBM
 - Radian/Dow
 - Xerox

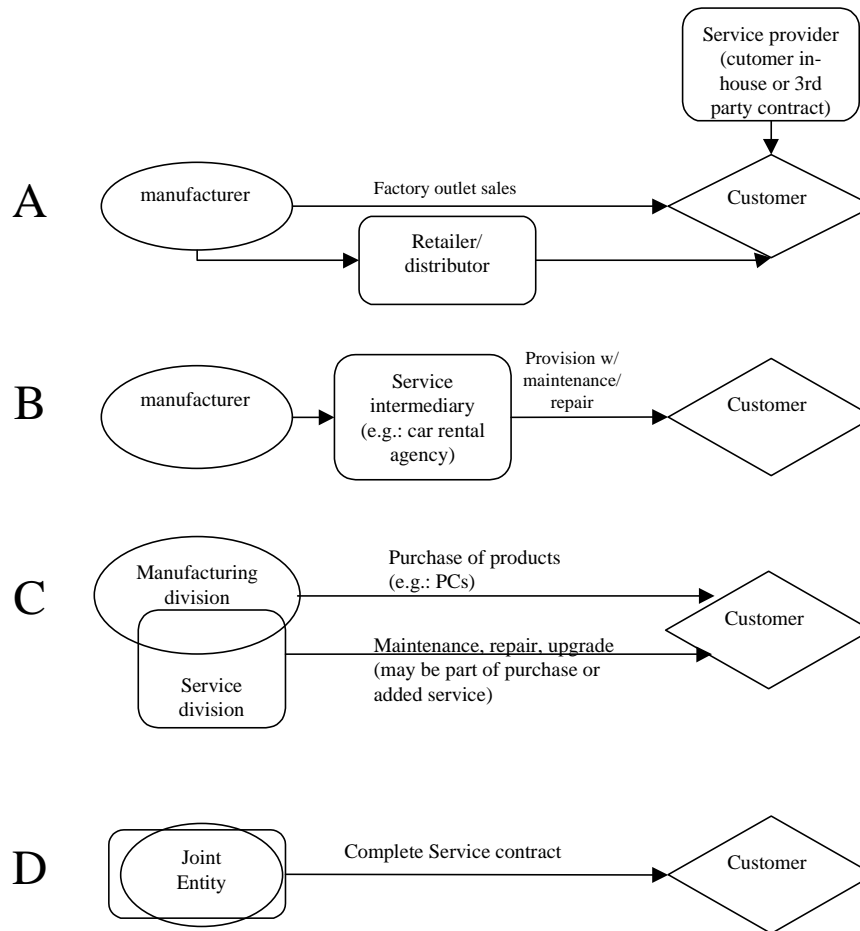
Servicizing in practice: 7 firms

- Environmental gains depend on “economic stimulus and firm response”
 - A simple idea; much more complicated in real world
 - from our 7 “servicizing” firms, we observed:
 - servicizing is a difficult business model
 - market acceptance more likely when rapid technological or regulatory change makes maintaining in house skills difficult
 - potential for environmental gains seems to depend in significant part on integration between manufacturing and service delivery elements
 - a difficult culture change for traditional manufacturers -- divorces profit from throughput

Servicizing in practice: 7 firms

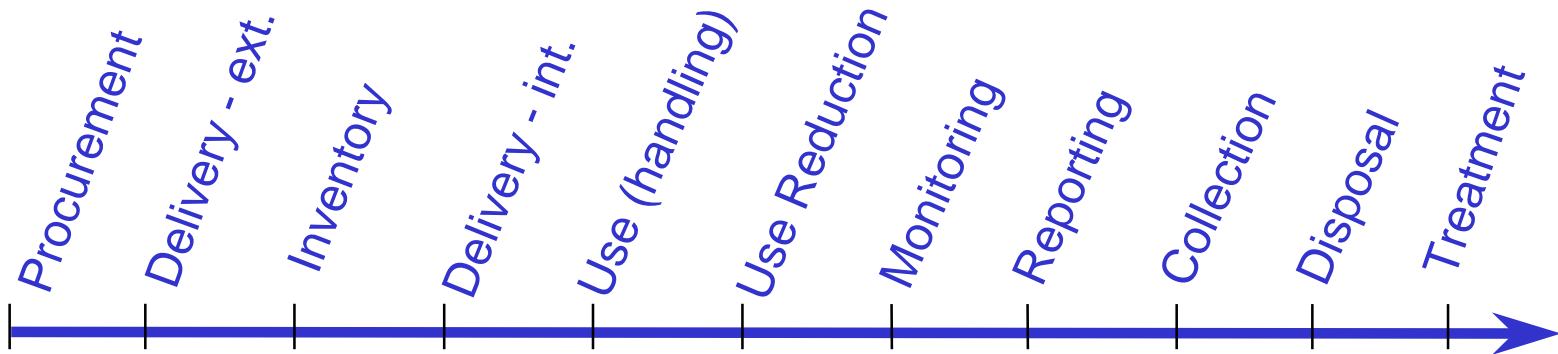
- Servicizing may “break ground” for EPR
- Environmental drivers not observed to play a prominent role

Organizational models observed



CMS: Servicizing in practice

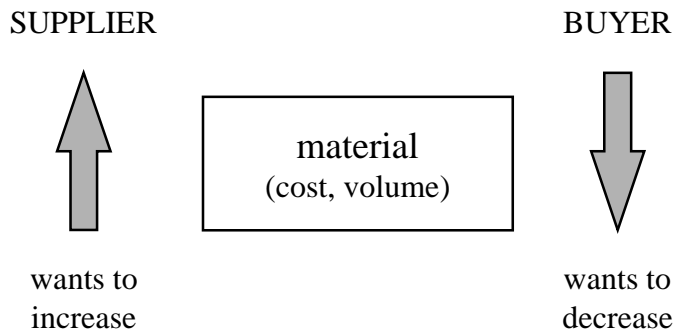
- Chemical Management Services: in-depth look at a servicizing example
 - CMS: outsourcing chemical-related functions in a plant at any (or all points) in the chemical lifecycle
 - Change in compensation for the supplier from volume of chemicals supplied to services rendered



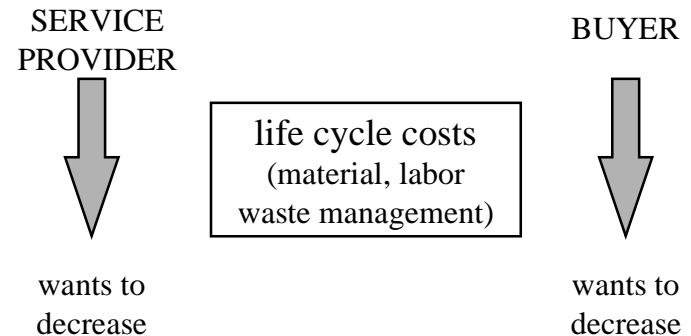
CMS: Servicizing in Practice

- Change in the compensation model: the source of potential environmental gains

Traditional Relationship *Conflicting Incentives*



CMS Model *Aligned Incentives*



CMS: Servicizing in Practice

- CMS Examples and basis for compensation:
 - Auto sector
 - (paint) per car body or assembly painted, not per gallon paint
 - Metalworking
 - (part cleaning or coolant) per part cleaned or per machine
 - Boiler maintenance
 - per unit of delivered energy
 - Electronics
 - (process gases and chemicals) per wafer or circuit board

CMS: Servicizing in Practice

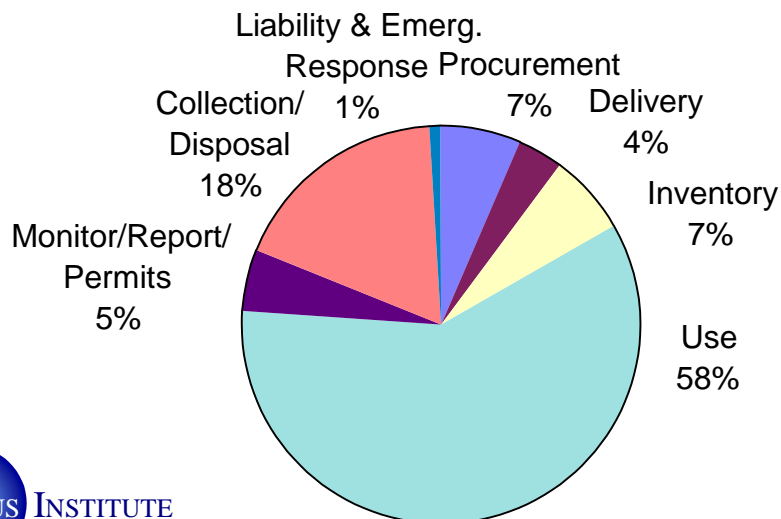
- Does the model work? Evidence from the field
 - Tellus is part of the Chemical Strategies Partnership (CSP), a non-profit established to promote environmentally beneficial CMS
 - funding from Pew Charitable Trusts & the Heinz Endowments; a project of the Tides Center
 - close collaboration in the field with three companies
 - Nortel, Raytheon, Amp
 - benchmarked chemical costs, worked in RFP development and contractual negotiations, and now in implementation tracking
 - Raytheon: \$200M, 5-yr national CMS contract (efficiency based contract)

CMS: Servicizing in Practice

- Findings

- “Buy In” to CMS rests on understanding by both parties of true chemical lifecycle costs via materials, cost accounting

- Purchase costs comprise only 10-50% of total costs associated with chemical use in manufacturing



- Without this appreciation of lifecycle costs, firms focus on “integrated supply” strategies to attain one time unit-cost reductions in purchased chemicals -- this is not CMS!

CMS: Servicizing in Practice

- While CMS is timely in many ways. . . .
 - focus on core competencies, continuous improvement, use of suppliers as strategic resources; environment as business issue
- . . . It is a challenging business model
 - For users:
 - Chemical Management not a Priority; High Perceived Transaction Costs; Organizational Inertia; Supplier Limitations; Lack of Credible Information
 - For suppliers:
 - If a chemical manufacturer, service unit profits are not aligned with increased production
 - Requires coordination across many units of client firms

CMS: Servicizing in Practice

- Results:
 - Contracts can and have been written with gain-sharing and use reduction mechanisms
 - Use reductions and better e-o-l management can be real -- but are dependent on terms of the contract
 - Key is fair and long-term alignment of supplier-customer incentives and readiness for long-term partnership

Implications for policy

- If servicizing as an emergent business strategy is to be leveraged for environmental gains. . .
 - decoupling ownership from use (tax policies)
 - explicit environmental policies
 - aside from mandated producer responsibility, removal of virgin material, disposal subsidies, driving product efficiency improvements
 - recognition of certain kinds of servicizing as preferred environmental practice
 - e.g., Qualified CMS provider engaged to oversee chemical requisition, handling
 - further research, documentation