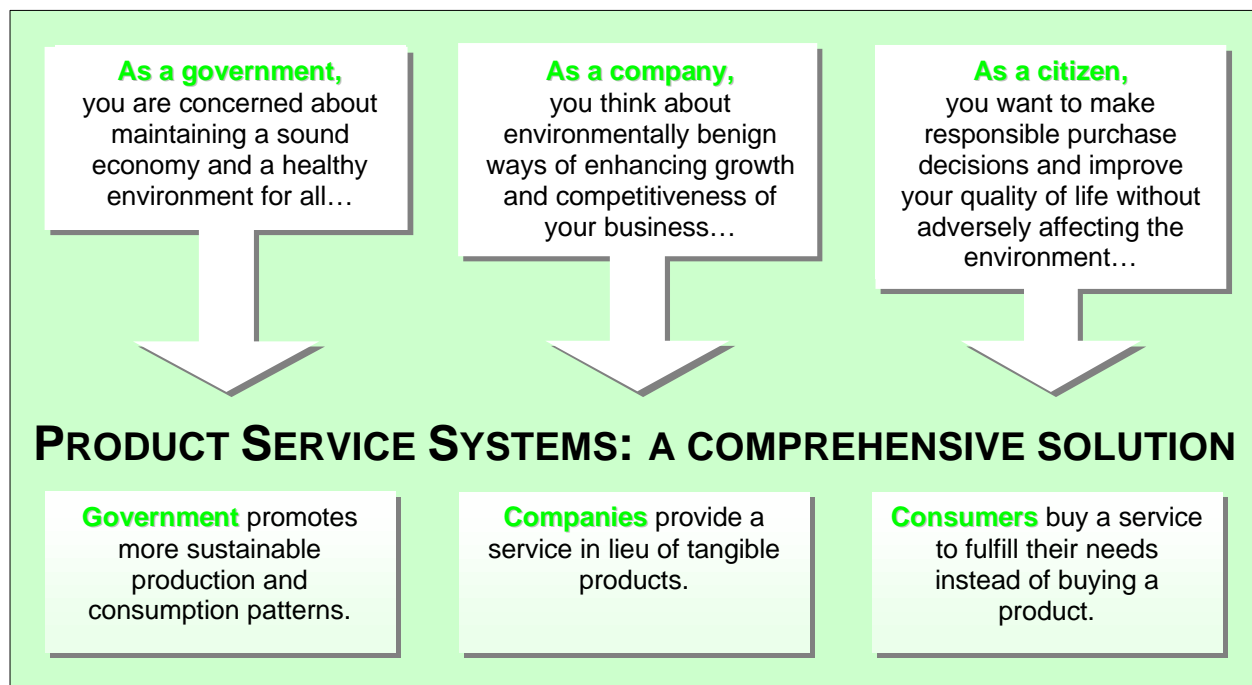


The role of

Product Service Systems

In a sustainable society



Key questions about product service systems:

- **what** are they?
- **how** can they contribute to a sustainable society?
- **what** are the benefits?
- **what** can government, industry, and civil society do to promote them?
- **where** is more information available?

**Reduce the environmental footprint
of production and consumption patterns**



The global problem

Our society is using more resources than the planet can sustainably supply. In many situations the major part of these resources end up as wastes or rejects rather than in the products we use. The energy efficiency of many processes we rely on in our domestic and industrial life is well below 50 percent.

Recent studies indicate that a *sustainable society* in the future should use only about 10 percent of the resources that industrialised societies are using today (per capita). A radical change is needed to move from the prevailing economic system of manufacturing goods and inducing customers

to buy them towards one based on *dematerialised* consumption patterns. Product service systems are one of the elements in such a future.

Material use figures:

	Efficiency of converting primary fossil fuel into usable energy	30%
	Efficiency of converting gasoline into motion in an internal combustion engine	2%

(from Fussler, Claude. *Driving Eco-Innovation*, 1996.)

What are product service systems?

The key idea behind product service systems is that consumers do not specifically demand products, per se, but rather are seeking the utility these products and services provide. By using a service to meet some needs rather than a physical object, more needs can be met with lower material and energy requirements.

A product service system is a competitive system of products, services, supporting networks and infrastructure. The system includes product maintenance, parts recycling and eventual product replacement, which satisfy customer needs competitively and with lower environmental impact over the life cycle.

Meeting consumers' needs with a mix of products and services is not a new concept. House rentals, hotels, taxis and restaurants are good examples based on economic interest. However, there are other new and innovative applications of product service systems that have developed as a response to make business more sustainable.

The main difference between product service systems and the classic examples is that the preference of consumers is influenced by environmental, as well as economic interests. The example below further explains the essential differences between these two similar concepts.

<i>Characteristics of selling a product vs. a function</i>		
Traditional product sales (selling tangible goods)	Innovative alternatives: product service systems (selling functionality)	
Consumer buys a vacuum cleaner to clean house/office.	Consumer rents a vacuum cleaner to clean house/office.	Consumer buys a service from a company to clean house/office. (Company determines best equipment and methods based on consumer's needs.)
The consumer owns, uses and stores vacuum cleaner. Consumer is responsible for maintenance and the 'quality' of the cleaning.	Company retains ownership of vacuum cleaner and is responsible for maintenance. Consumer is responsible for use and 'quality' of cleaning.	Company owns, maintains and stores the cleaning equipment including vacuum cleaner. Company is responsible for 'quality' of the cleaning.
Initial investment for consumer could be considerable.	Consumer costs are spread out over time.	Consumer costs are spread out over time.
Consumer ultimately disposes of vacuum cleaner and buys replacement.	Company responsible for disposal and has incentives to prolong use and product recyclability.	Company responsible for disposal and has incentives to prolong use and recyclability of cleaning equipment.

Who are agents of change?

Product service systems require a co-ordinated approach by several groups of stakeholders. Industry, government and civil society need to work together to create and to facilitate the establishment and smooth functioning of such systems as part of a more sustainable economy.

Industry is particularly well positioned to take the lead and implement new strategies by using 'out of the box' thinking. It is constantly re-evaluating how best to meet consumer needs at the lowest cost and it has increasing pressure to take into account the environmental impacts of its activities (from ISO 14000 standards, public scrutiny or governmental regulation, for example). In addition, the consumers of many products and services are, in fact, other companies operating within similar contexts.

Government's role is to set a policy framework conducive to change. Among other possibilities, it can establish new laws, regulations and/or market-based incentives that encourage establishment of services. Examples could include higher sales taxation for products as opposed to services or mandating product take-back systems to promote recycling of products. Public procurement can also be used to stimulate the market for product service systems.

Individual consumers can use their purchasing power to demand product service systems. They can exert pressure on government and the private sector to support sustainable systems of production and consumption.

In the United States...

'Servicizing' in the chemical industry has begun to change the way chemical manufacturers do business and the way their clients use chemicals. Traditional business practice of chemical manufacturers is based on generating profit from selling increasing volumes of chemicals. But we are also seeing other patterns such as "fixed-fee per part" cleaning contracts which focus on the function of the chemical, not the chemical itself. For example, Raytheon contracts a company to manage the chemicals in fifty of its facilities. Raytheon can focus on its primary business of producing high-tech electronics while the chemical service company focuses on ways to reduce the amount of chemicals used in the production process. In addition, strong incentives to improve environmental performance were included in the contract. The result: near elimination of solvents and VOCs, 71 percent reduction in paint waste, and annual operating savings of at least \$400,000.

General benefits of this type of arrangement include:

- reduced need for resources, human and financial, for monitoring, tracking, reporting, training, handling, storage, special equipment and final disposal associated with chemicals;
- reduced liability and vulnerability to public relations problems; and
- greater incentive to reduce volume of chemicals used.

(From Votta, Thomas J. "Transitioning from Product to Service-Based Chemical Procurement", 2001)

In Germany...

The car manufacturer Volkswagen has built partnerships with some apartment complexes in Germany to offer the service of mobility to building tenants. The two programmes, 'Mietermobil' in Wolfsburg and 'Wonh mobil' in Hamburg, offer a fleet of cars of different sizes (including an electric powered Golf) maintained by a Volkswagen dealer, washed by local filling stations, and used exclusively by residents of the buildings. Benefits of these programmes include:

- lower overall living costs for consumers due to elimination of the need for each to purchase a vehicle;
- reduction in environmental impact since cars are well-maintained by local dealership;
- reduction in land used for parking since less vehicles are present;
- upgrade to rental housing makes it a more attractive option; and
- more efficient way to meet mobility needs through different sizes of available vehicles.

(From Volkswagen Annual Environmental Report, 2000)

Benefits for all

If employed on a global level, product service systems can lead to reduced resource use and waste generation since fewer products are manufactured. The increase in sales of services can offset initial reductions in tangible goods sold. Employment lost in manufacturing can be balanced by jobs created in services. As a business concept, product service systems have the potential to improve standards of living worldwide; however, this change will require a cultural shift to new values which focus on *quality* and *utility*. With product service systems, consumers worldwide have less need to buy, maintain, dispose of, and eventually replace a product. In fact, the quality of the service, and thus consumer satisfaction, may improve with product service systems because the service provider has the incentive to use and maintain equipment properly, increasing both efficiency and effectiveness. The incentive also exists for producers to design closed-loop systems for equipment based on designs for higher durability and recyclability.

In developed countries, which already have a large environmental footprint arising from a high rate of per capita resource consumption, product service systems can facilitate the transition toward a more service-oriented, sustainable society. The service industry can find new and increased market opportunities. Other benefits include reduced dependence on externally produced resources and reduced load on waste disposal facilities.

For developing countries, product service systems may represent a more promising and environmentally sound path to economic development since it enables them to bypass the development stage characterised by individual ownership of goods. Realising that many product service systems already exist as a result of economic considerations, it may be interesting to examine ways of improving the range and environmental quality of such existing systems.

Environmental benefits of product service systems can be combined with other advantages:

Benefits for governments

- Fewer waste management concerns from the domestic and manufacturing sector
- More sustainable economy based on higher levels of service
- Increased employment, particularly in the service sector

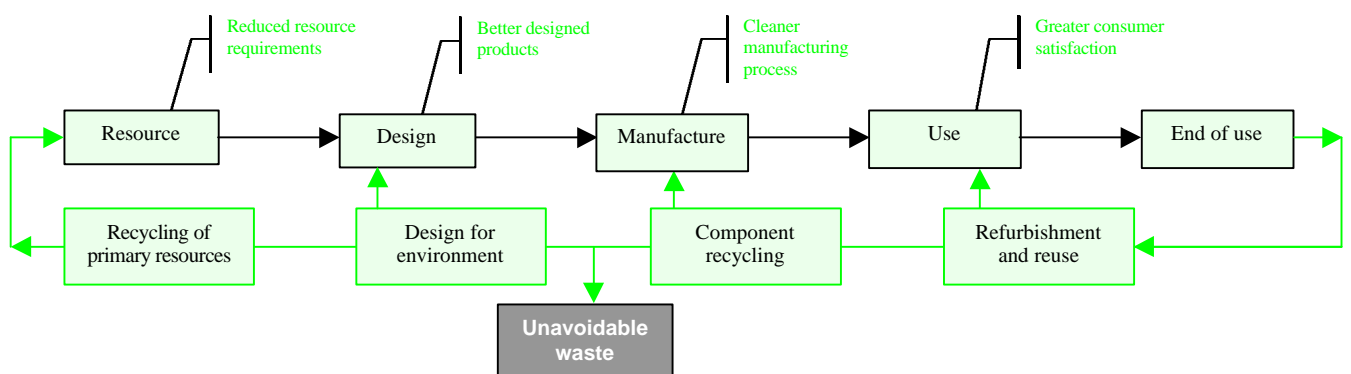
Benefits for companies

- More opportunities for innovation and market development
- Increased operating efficiencies
- More and longer-term client relationships
- Improved corporate identity
- Better feedback on consumer needs

Benefits for civil society

- Lower costs and problems associated with buying, use, maintenance and eventual replacement of products
- Improved environmental quality

The influence of product service systems over the product life cycle



The bottom line

Product service systems can benefit the environment – but it requires a deliberate consumer choice to take this route. The vacuum cleaner, itself only one small element in a consumer society, demonstrates this clearly. Most families in western society will normally buy a vacuum cleaner. In traditional terms, this would be viewed as having a positive effect on the national economy and indicates increasing affluence and quality of life. However, families do not consider the amount of resources required to build all the required vacuum cleaners, and of course, their end-of-life fate in a disposal site.

A more sustainable lifestyle is one where consumers prefer to buy a service which gives them the same clean floor. Imagine if vacuum cleaner manufacturers had offered a cleaning service from the start, instead of trying to sell vacuum cleaners to every citizen. One can only imagine the savings in material inputs and waste generation over the decades that vacuum cleaners have been in use. If this example could be repeated for other commonly purchased consumer products, it would make a significant contribution to the environmental agenda.

Challenges ahead

- Clearly, one of the main challenges to adopting product service systems is the **cultural shift** necessary for consumers, including industry, to prefer having a need met by a service to owning a physical product. Around the world, lifestyles promoted via Internet, international advertising and other media, stress personal material accumulation, individualism and luxurious comfort. This can send a mixed message to consumers or adversely influence sustainable purchasing decisions by discouraging product service systems, or even dismantling existing ones.
- Within a company, barriers can include the lack of **experience and know-how** to design service methods and management systems, the **shift in tradition** from judging and measuring performance based on the quantity of goods sold, and a lack of **skilled service personnel**.
- A product service system must be designed, developed and delivered on a case-by-case basis. Not all product-service mixes will outscore the current product from an environmental point of view nor always from the performance aspect. Some product service system changes could result in unwanted side effects, or **rebound effects**. For example, a consumer may spend the time or money saved in an unsustainable way such as by buying other goods, thereby offsetting any environmental benefits.
- Assessment tools are needed to reveal when product service systems have a clear environmental benefit. Consumers also need the right information to influence their purchase decisions in favour of product service systems where the benefits are apparent. Adapting life cycle assessment and product labelling are two existing possibilities to meet these needs.

A final word...

More work needs to be done to identify how the potential of product service systems can be maximised and answer the many remaining questions: What is the potential for product service systems from a global perspective? What lessons can be shared from experiences to date? How is this experience best shared? Who should be involved? What is the affect of the increasing global pressure on individual consumerism?

Clearly, different products offer different chances for a remix of products and services. For many current consumer needs, the time is ripe to rethink how they can be met. New product service systems continually appear and can be used as models for the applications which will be developed and applied for the first time. As consumers become aware of the practical and environmental benefits, and producers see business opportunities growing, product service systems will play an increasingly important role in a sustainable society.

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About UNEP

Since 1989, the United Nations Environment Programme (UNEP) has been working to improve current production patterns through its Cleaner Production activities and has been a key contributor to the international discussion arena since UNCED in Rio de Janeiro (1992) in the debate on how best to reach sustainable production and consumption. These activities have focused on influencing the supply side – how goods and services are produced and delivered. In 1998, Sustainable Consumption activities were established focusing on the demand side of the economy – on what drives and defines consumption and how to shift to more sustainable production and consumption patterns. Initiatives include: developing business opportunities, engaging youth in the development of sustainable consumption strategies, assessing the role of the advertising and media sectors in changing consumption patterns, and enhancing understanding of life cycle “thinking”.

“It is becoming more and more evident that consumers are increasingly interested in the ‘world that lies behind’ the product they buy. Apart from price and quality, they want to know how and where and by whom the product has been produced. This increasing awareness about environmental and social issues is a sign of hope. Governments and industry must build on that.”

Klaus Toepfer, UNEP Executive Director

