

Part I  
**Product-services:  
the context**

# 1

## Introduction

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### 1.1 From products to solutions or product-services

Selling products used to be the standard way of doing business. A company makes a product, sells it to a user, receives compensation, and that is it. It is up to users to finance their purchase, learn how to use it, arrange maintenance for it, insure it if needed, buy any consumables and auxiliary materials the product needs to be operational, discard it after its useful lifetime and, above all, apply the product for a useful purpose. In one sentence: it is left to the user to transform the purchase of a product into something that fulfils effectively a final user need.

Two streams of research, which normally have very distinct perspectives on the world, in the last two decades surprisingly converged to a common conclusion: selling products is old-fashioned business. Companies should switch their focus to selling need fulfilment, satisfaction or experiences (e.g. Pine and Gilmore 1999). Or, in other words: sell integrated solutions or product-services.

Which two knowledge streams are we talking about? The first is of course the business management literature. ‘Go downstream’ stated Richard Wise and Peter Baumgartner (1999). ‘Skate where the money will be’ suggest Clayton M. Christensen and colleagues (2001). ‘Deliver integrated solutions’, is the message of Andrew Davies *et al.* (2003). ‘Turn ordinary products into extraordinary experiences’ is the advice of Diana LaSalle and Terry Britton (2003). All these messages have one thing in common. With a true focus on the integrated, final client needs, and delivery of integrated solutions fulfilling these needs, companies will be able to improve their position in the value chain, enhance added value of their offering and improve their innovation potential. In a business world where many products are becoming equally well-performing commodities, this strategy is one of the ways to avoid a competition on price alone—a type

of competition that Europe can never win against emerging and low-cost economies such as China (Manufature 2003). In that sense, product-services can mean new business for old Europe.

The other knowledge stream has a totally different starting point. In the early 1960s it became increasingly clear that human production systems could be a significant threat to the health of ecosystems. Initially, the focus in this debate was on toxic emissions to water and air (including the use of certain pesticides; e.g. Carson 1962). However, over the years it has become clear that the sheer mass of resource flows through our economy is an important driver for the volume of emissions and waste flows (e.g. climate change-causing CO<sub>2</sub>; Adriaanse *et al.* 1997; Matthews *et al.* 2000). Additionally, it was realised that most (80%) of these materials were used by just a small percentage (20%) of the world population (i.e. in the USA, Europe and Japan). The combined effect of the world's population growth from 6 billion to 9 billion people in 2050, and wealth growth in the still under-developed world, could increase the volume of the world economy four- to tenfold. Without a change in production and consumption systems, resource use and emissions would rise by similar factors. This, it is believed, will cause a near-certain disaster. Hence, ways have to be found to de-link economic growth and environmental pressure: 'doubling wealth, halving resource use' (von Weizsäcker *et al.* 1997). Many authors in this essentially environmentalist-driven arena quickly understood that, if one could really take final consumer needs (rather than the product fulfilling the need) as a starting point, the degrees of freedom to design need fulfilment systems with Factor 4–10 sustainability improvements are much higher.<sup>1</sup>

The idea that need-focused solutions could be inherently more sustainable than products was born. Product-services would offer the value of use instead of the product itself, such as a 'clean clothes service' versus a washing machine, or a 'mobility service' rather than a car. Making the value of use the centre of business could decrease its environmental load in two ways. First, companies offering the service have all the incentives to make the (product-)system efficient, as they get paid by the result. Such a company would probably use an efficient washing machine, or a light and economical car. On the other hand, consumers would alter their behaviour as soon as they gain insight into all the costs involved with the use. For each kilometre in a car from a car-sharing company, one would pay the actual costs. With one's own car, this is much more difficult, as the purchasing costs, taxes and fuel costs all add to the total costs. Fuelled by these ideas, a string of research activities by mainly environmental scientists and (eco-)designers on this theme followed suit (e.g. Schmidt-Bleek 1993; Stahel 1998; Meijkamp 2000; Charter and Tischner 2001; Mont 2004).

Until today, the connections and interchange between the two research streams have been quite limited. Each group works mainly in its own arena, with its own institutions,

1 In general, one sees in environmental policy a downstream shift in focus through the production–consumption chain. The first-generation environmental policies focused on remediation and emission reduction via end-of-pipe technologies. The second generation paid more attention to inherent cleaner production. The third generation included an attention to products. And the fourth generation takes final user needs as a starting point, looking at how production–consumption systems can be organised so that these needs can be fulfilled with the least environmental impact (Simons *et al.* 2001).

journals, funding sources/clients and, indeed, basic goals.<sup>2</sup> In the business management stream, several theories with explanatory and predictive power about the (business) sense of servicing seem reasonably well established (e.g. Wise and Baumgartner 1999). In the sustainability stream, this point has not yet been reached (e.g. Hockerts and Weaver 2002). There is some conceptual integration and co-operation between the different research groups, but research still focuses too often on individual empirical case studies without striving for a good theoretical foundation. Whether product-services truly are the avenue to a sustainable world is still under discussion and this book develops a systematic and clearer view on this issue.

## 1.2 SusProNet

### 1.2.1 EU-funded product service research

This potential of product-services to enhance competitiveness and contribute to sustainable development prompted the EU to invest heavily in the theme of product-services. Under the EU's 5th Framework Programme (FP5; 1997–2002), a variety of research and development projects in the field were supported. These include:

- MEPSS (Methodology development and Evaluation of PSS; van Halen *et al.* 2005)
- Homeservices
- HiCS (Highly Customised Solutions; Manzini *et al.* 2004)
- ProSecCo (Product-Service Co-design)
- Innopse (Innovation Studio and Exemplary Developments for Product-service)

Most projects were performed by a mix of European research institutions and companies. Some of these projects focused on developing methods that could help industries to change their offering from a product to a service (MEPSS), others focused on method development and development of new product-services or solutions (HiCS, ProSecCo, Innopse), and again others tried to analyse under which circumstances product-services are likely to be implemented and accepted by consumers (homeservices). One project focused on dissemination of the PSS (product-service system) concept to SMEs (small and medium-sized enterprises) (lean services). Other projects focused purely on PSS development, such as Brainfridge (an intelligent fridge managing its supply chain), ASP-NET (application service providers), Protex (intelligent enzymes) and IPSCON (receivers for wireless telephones). Apart from these research and business development projects, a network project was also supported, which served as a platform for experience exchange on product-service research. This network was called the Sustainable Product Development Network or, in brief, SusProNet. This book is the main outcome of SusProNet.

2 For instance: journals such as *Harvard Business Review* and *Sloan Management Review* versus the *Journal of Cleaner Production* and *Business Strategy and the Environment*; business schools versus environment and design schools; major industries versus sustainability research programmes; and improving competitiveness of business versus reducing environmental impact.

### 1.2.2 The network

As a thematic network under FP5, SusProNet had the following aims:

- Exchange, analyse, complete and make easily available information on best practice on development of product-service systems (PSS)
- Identify research needs to create excellence in PSS development in Europe

Additionally, SusProNet aimed to create a strong network of all EU experts in this field, as well as from industry, research institutes and others. Overall, by achieving these goals, SusProNet wanted to support various EU policy objectives, such as competitive growth, integrated product policy and sustainable development.

Table 1.1 and Figure 1.1 give an overview of the structure of SusProNet. The network involved some 50 core participants, with the following roles:

- Seven network partners, including the network co-ordinator. These institutions took the lead and primary responsibility for all activities (laid down in work packages) related to preparation and management of the network. Together they formed the steering committee of the network
- More than 30 network participants, mainly from industry and their representative organisations and governmental institutions. They brought in their current experience and were able to apply the lessons from the network in their daily practice
- About 15 participants from other research projects on PSS in the EU's FP5, which formed a 'cluster' with SusProNet. In these cluster projects, about 17 new product-services were developed

Since product-services have a clear focus on final client needs and consumer satisfaction, it was decided to organise SusProNet around five 'need areas'. Each need area formed a work package (WP7–11), and was allocated to a SusProNet partner. Each of the 40 other participants took part in the need area group that was most directly related to their business, interest and market field. The need areas were defined somewhat pragmatically in order to ensure that each group would have a similar number of participants and indeed would deal with topics of common interest. Eventually, need area groups were formed on base materials, information and communication technologies, office work, food and households. During the time that these need area groups were operational, five workshops and conferences were organised (WP12–16). Each workshop dealt with a specific step in PSS development (analysis, idea generation, implementation). The two conferences focused on agenda setting/validation of the analysis phase (Conference 1), and dissemination and policy implications (Conference 2). These conferences were open to any person interested in PSS, even if they were not part of SusProNet or its cluster. A cluster dissemination (WP2) event finalised all work in the cluster.

Furthermore, SusProNet organised an overall work package on PSS methodology and market potential (WP1), in which representatives of the more methodologically oriented cluster projects, Innopse, ProSecCo and lean services, participated. Work packages on overall management and cluster co-operation (WP3/4), network communication and website (WP5 and WP6) and network heritage (WP17) completed the structure of SusProNet.

WP leader*	Need area	WP	SusProNet participants	Participating cluster partners
P7-INETI	Materials	WP7	Dow Corning Europe	Protex 1 (enzyme application)
			Ecobouw C.V.B.A	Innopse 3 (teleservice for machines)
			Green alliance	Innopse 4 (online inspection)
			Johns Manville	
			Product-LifeInstitute	
			Redco/Eternit	
P5-CfSD	Information	WP8	Alcatel	Brainfridge 1 (automatic display)
			Bespak Europe Ltd (for IEE)	Innopse 1 (price strategy calculations)
			Crawford, Hansford & Kimber Ltd	
			IBM (for IEE)	
			Orange UK	
			Recyclingpartner e.G. (RPG)	
P4-econcept	Offices	WP9	AGFA Gevaert AG	Innopse 2 (facility management)
			Hewlett Packard	ASP-NET 1 (e-messaging)
			Pars Pro Toto	ASP-NET 2 (project management)
			Samas Benelux	ASP-NET 3 (HR management)
			Veldhoen & Company	
P2 TNO Industry	Food	WP10	Apetido	Brainfridge 2 (supply management)
			Apintech Ltd, the Daedalus Group	ProSecCo 2.1, 2.2 (remote patient monitoring)
			ETNA PelgrimHome Products BV	ProSecCo 3.2 (food chain monitoring)
			Food and Drink Federation	
			Siemens Nederland BV	
P3 Vito	Households	WP11	Ecofys Energy and Environment B.V.	Protex 2 (carpet cleaning)
			JAGA NV	ProSecCo 1 (culture on demand)
			Nokia Mobile Phones	
			Philips Consumer Electronics	
	Free role <sup>†</sup>		Alliance for Global Sustainability	
	Free role <sup>†</sup>		European Environmental Bureau	
	Free role <sup>†</sup>	INSEAD		

\* Other partners in SusProNet were TNO-STB (management and, together with econcept, PSS Methodology), and O2 Global Network (website and external communication)

† These organisations (a university network, business school and NGO) are mainly involved for their dissemination potential and are free to participate in the need area they want

**TABLE 1.1 Partners and participants in SusProNet per need area**

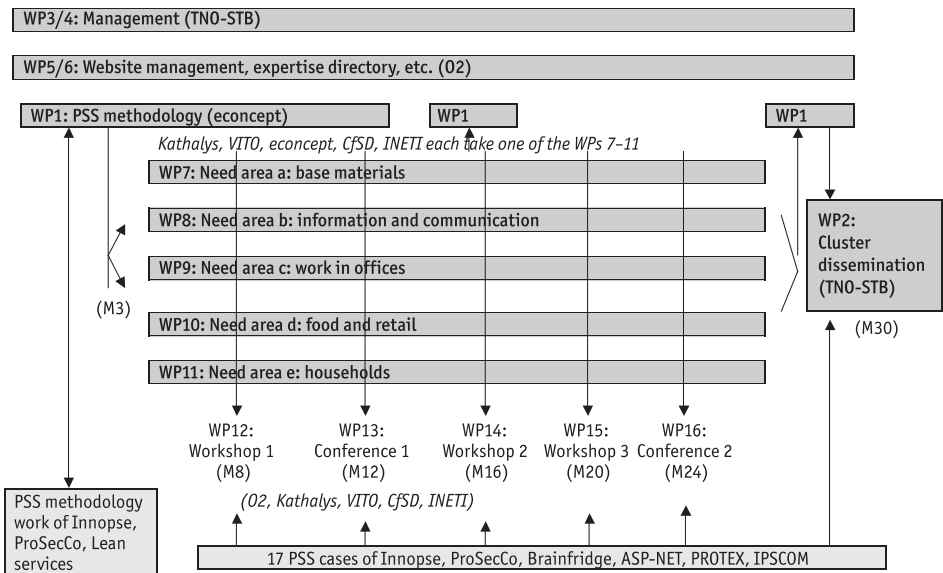


FIGURE 1.1 Structure of SusProNet

### 1.2.3 Goal of the network

Essentially, thematic networks are meant to collect and evaluate the existing knowledge in a specific research field, to describe the state of the art and best practice, to coordinate research, and to develop a research programme highlighting the existing gaps in knowledge. The SusProNet approach allowed us to do this in the following ways:

- By collecting, analysing and discussing the research results of the projects in the SusPronet cluster and other product-service projects (WP7–11 and WP1)
- By an in-depth exchange of experiences with the 40 mostly industrial participants that followed a product-service development trajectory during the workshop series, with a focus on specific need areas (WP7–11)
- By connecting all this information with a focused literature search (WP1)
- By collecting a large set of case studies (about 200) in a structured database (WP1), which allowed for analysis of, among others:
  - Indicative environmental gains of the product-service compared with a regular product
  - Economic advantages and disadvantages of the product-service compared with a regular product
  - Other drivers/barriers for implementation

The database, in particular, has a clear added value over most research to date on (sustainable) product-services. Most of the research to date was based on individual or a limited amount of case analyses. This database made it possible for the first time to do research into specific patterns related to sustainable product-services, and hence contribute to theory development.

### 1.3 Goal and structure of this book

This book bundles the results of SusProNet and has the following goals.<sup>3</sup>

First, it aims to bridge the gap between the largely business-oriented literature from the first research stream, and the largely normative/sustainability and design-oriented literature from the second research stream mentioned in Section 1.1. This must lead to a better-founded understanding of the business drivers for embarking on product-service development, and its relation with sustainability. For this purpose, Chapters 2–4 deal with the following issues:

1. We want to give a clear definition of product-service in relation to both the sustainability-oriented and the business-oriented literature (Chapter 2)
2. We want to understand what drives the competitiveness of business systems, and how product-services can contribute to competitiveness (Chapter 3)
3. We want to understand if and, if they do, how product-services can contribute to more sustainable production and consumption systems (Chapter 4)

Second, a large number of studies have developed tools, methods and approaches that can support marketers, product developers and strategists in business to develop product-services. This book will review this information, select the best-practice approaches from it, and analyse any gaps in view of the more theoretical review of business management and competitiveness in Chapter 3. This work is presented as Chapter 5.

Third, we want to show what opportunities there are for product-service development in a variety of need areas. For this purpose, after a common introduction in Chapter 6, Chapters 7–11 give the results of SusProNet's need area-oriented activities. Each chapter discusses the need area, developments that will stimulate or hinder the market opportunities for product-services, product-service examples, and typical implementation challenges for product-services in that need area. These chapters can serve as a quick introduction for companies interested in developing product-services in a specific area.

3 Underlying research reports, conference proceedings, and even an extensive database on product-service literature are available via the SusProNet website: [www.suspronet.org](http://www.suspronet.org). In due time, the information on this website will be redirected to the website of a follow-up project, [www.score-network.org](http://www.score-network.org).

Fourth, we want to translate all the lessons gathered from the former chapters into suggested approaches for product-service development by companies. This reflection is presented in Chapter 12. A lightweight 'product-service development manual' is presented in Annex 1, with an alphabetical list of useful underlying tools in Annex 2.

Finally, Chapter 13 ends with conclusions about:

- The market potential of product-services
- The sustainability potential
- Gaps in knowledge
- Policy implications