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ANALYSIS

Business models for material efficiency services: Conceptualization and application

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ABSTRACT

Despite the abundant research on material flows and the growing recognition of the need to dematerialize the economy, business enterprises are still not making the best possible use of the many opportunities for material efficiency improvements. This article proposes one possible solution: material efficiency services provided by outside suppliers. It also introduces a conceptual framework for the analysis of different business models for eco-efficient services and applies the framework to material efficiency services. Four business models are outlined and their feasibility is studied from an empirical vantage point. In contrast to much of the previous research, special emphasis is laid on the financial aspects. It appears that the most promising business models are 'material efficiency as additional service' and 'material flow management service'. Depending on the business model, prominent material efficiency service providers differ from large companies that offer multiple products and/or services to smaller, specialized providers. Potential clients (users) typically lack the resources (expertise, management's time or initial funds) to conduct material efficiency improvements themselves. Customers are more likely to use material efficiency services that relate to support materials or side-streams rather than those that are at the core of production. Potential client organizations with a strategy of outsourcing support activities and with experience of outsourcing are more keen to use material efficiency services.

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1. Introduction

There are economic, ecological and political incentives for business enterprises to pursue material as well as energy savings. More efficient resource use not only reduces the environmental burden from industrial operations, but often translates into lower procurement and waste management costs as well (Schmidt-Bleek, 1998; von Weizäcker et al., 1997; Hinterberger et al., 1997). It is now more than a decade ago that Porter and van der Linde (1995) presented compelling empir-

ical evidence that efficient resource use can be a major competitive advantage for an enterprise. By now there is an abundance of research on material flows and ways to dematerialize the economy (Bartelmus, 2003; Ayres and van den Bergh, 2005; Bringezu et al., 2004). From an ecological point of view, inefficient use of materials or energy causes pollution, destroys ecosystems and depletes natural resources. The imperative of saving natural resources and minimizing pollution by using them more efficiently in industrial production is acknowledged at both national and international levels.

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Several political measures have been planned and introduced to minimize environmental harm by steering manufacturing and other economic activity. For instance, the European Union and the OECD are aiming to decouple economic growth and the use of natural resources (OECD, 2002; European Union, 2002). The United Nations has also joined the quest for more efficient use of natural resources (United Nations, 2002).

Business enterprises, however, are still not using their resource saving potential to the full. Why is that? Firstly, quite a few enterprises lack the expertise to recognize other than the most obvious opportunities for material or energy saving. This is especially true for energy and support materials that do not lie in the organization's area of core competence. Negligent use of resources is frequently aggravated by the fact that in most firms, resource efficiency is not a high priority since constant improvements in extraction techniques have made resources ever more inexpensive. Secondly, even if enterprises do recognize opportunities for material or energy efficiency improvements, they do not necessarily act upon them. All too often and all too easily, there is a tendency not to go into any improvements that would require investment – even with relatively short payback periods – or that would add to the workload of management or staff (Halme et al., 2005; Kontoniemi, 2004).

This situation opens up business opportunities for various service providers offering material or energy efficiency services. The basic idea is that the service provider takes over the efficiency improvement, and that compensation to the provider is tied to the cost savings achieved from that improvement. As distinct from other types of eco-efficient services, this is usually called a result-oriented service. Compared to product-based or use-oriented services, for example, result-oriented services arguably hold the greatest promise in terms of eco-efficiency (Tukker, 2004).

Result-oriented services, however, are relatively unconventional form of business and they are therefore not necessarily readily accepted in the market. Result-oriented services focus on fulfilling customers' needs, providing lit or warm space, for example (Roy, 2000; Hockerts, 1999). They can include various forms of contracting, such as energy contracting, facility management, waste minimization services (Heiskanen and Jalas, 2003; Vine, 2005) or chemical management services (CSP, 2004; OECD, 2004; Kortman et al., 2005). In essence, the aim of result-oriented services is to "sell functional results". This not only breaks with traditional economic thinking, but in some instances also creates difficulties with regard to some financial stipulations, as will be discussed later in this article (Bertoldi et al., 2005; Heiskanen and Jalas, 2003; Vine, 2005).

Eco-efficient products and services, which can help significantly to reduce the use of natural resources while still meeting people's needs, have attracted a lot of research and led to numerous innovations since the launch of the concept in the mid-1990s. However, despite the abundance of innovation and ideas, only few eco-efficient products and services have made their way to the marketplace (Tukker, 2004). One of the reasons for the marginal market penetration of eco-efficient services is the slow rate of change in institutions and in ways of thinking. However, there is also a lack of systematic analysis of the business perspective; the main focus has been

firmly on the technical design of eco-efficient services (Bleischwitz, 2003). The shortcomings in understanding the business perspective around eco-efficient services became apparent a couple of years ago. It was widely recognized that one of the reasons for the failure of what seemed to be sound eco-service concepts was the lack of attention paid to the market viability of such services. Hence the term 'business model' has proliferated in the discussion on eco-efficient or sustainable services (Mont et al., 2006; Tukker, 2004).

However, while the business model terminology has now been widely adopted by those promoting and researching sustainable services, it is still very rarely that any explanation is offered as to what exactly it means (Tukker and van Halen, 2003); sometimes it is understood simply as a revenue model (Vercauteren and Gerken, 2004) or in terms of flowcharts portraying 'service logistics' (Tempelman, 2004). This is not surprising because there is no established or comprehensive definition of the term 'business model' (Timmers, 1999). However, if we are to gain a better understanding of the business opportunities of eco-efficient services, then some kind of conceptualization or framework for business models is called for.

In this article we propose a conceptual framework that has its roots in the work of Normann and Ramirez (1994), Räsänen (2001) and Magretta (2002). The proposed business model framework allows us to analyse the competitive advantage of the services, the customer benefits, the resources and capabilities of the services providers, and the financing arrangement. After presenting the framework, we apply it to the material efficiency services offered by outside service providers to client organizations. The actual material efficiency improvements made by individual companies within their own facilities thus fall outside the scope of our study. Likewise, we exclude services targeted for waste that has already accumulated.¹ The feasibility of these business models will also be assessed. The article ends with a brief review of the different means of promoting material efficiency in industry.

2. The data and research method

The empirical data consist of material collected in 61 thematic interviews and 3 focus group discussions organized in 2004 and 2005. We were interested to look into opportunities for material efficiency services in the paper and food industries, and most interviewees therefore represented these branches. In order to gain a better understanding of the potential demand and supply of material efficiency services, as well as the necessary financial and regulatory mechanisms, we interviewed representatives of four finance institutions, two waste management companies, the country's largest retail chain, four ESCOs (energy service companies), a seller of chemical products, a manufacturer of pine oil based industrial

¹ Reducing material use (by improving efficiency) will reduce the need of waste treatment as well as transportation of materials in the beginning and end of the life cycle. The latter also means less use of energy and vehicle emissions.

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