

# Waste minimisation in small and medium-sized enterprises—do environmental management systems help?

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## Abstract

The main research question of our study was as follows: What opportunities for upgrading material efficiency and waste minimisation can be found in small and medium-sized enterprises (SMEs)? The empirical material consisted of 41 theme interviews in Finnish industrial SMEs. In the article, the SMEs are assigned to four different categories according to their attitudes towards environmental protection. This analysis also explains why SMEs build up environmental management systems (EMSs). The EMSs do not appear to provide much impetus for SMEs to implement waste minimisation. The reduction of wastes in SMEs is driven more by the costs of raw materials than by waste costs. From the standpoint of environmental authorities, it is therefore crucial to find procedures to support SMEs in increasing their efficient use of materials. © 2001 Elsevier Science Ltd. All rights reserved.

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## 1. Introduction

In Europe, an enterprise is considered to be an SME if it has fewer than 250 employees and the annual turnover does not exceed 40 million euros (1 euro=USD 0.92; April 26, 2000) or the annual balance-sheet 27 million euros [1]. A further basic criterion for an enterprise to be characterised as an SME is its independence, meaning that it may not be more than 25 per cent owned or controlled by another enterprise or jointly by several enterprises which are not themselves SMEs.

SMEs, and subsidiary companies of corporations comparable to SMEs, are usually sub-contractors operating in different kinds of networks. These networks are principally composed of main customers, other customers, the company's own sub-contractors and competitors. The importance of the SME sector to the world economy is easily recognised. Typically, the sector globally accounts for about 70 per cent of gross national product, although this may vary considerably from country to

country [2]. SMEs account for 99.8 per cent of all companies in the European Union, for 66 per cent of total employment and for 65 per cent of business turnover [3].

The share of SMEs in Finland is smaller than the average in the EU countries: the figure for employment is 58 per cent and that for business turnover is 45 per cent. SMEs account for 99.7 per cent of all enterprises, which is identical to the average for the EU. In Finland, one of the factors decreasing the role of the SME sector is the capital-intensive process industry which dominates the country's industrial structure. There is also comparatively little service sector production by small businesses in Finland [4]. Industry accounts for 27 per cent of overall employment in SMEs, whereas services and wholesale-retail trades have portions of 21–22 per cent each [3]. However, the most important environmental impacts of SMEs emanate from the industrial sector.

The Finnish environmental policy has traditionally been based on administrative and legal regulation and on the procedure of environmental permits. As the latest development, the EU Directive on Integrated Pollution Prevention and Control (IPPC) has been implemented in Finland as part of the new national Act on Pollution Prevention which came into force on March 1, 2000. The present Finnish environmental policy can be described

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as a “partnership model” between government, industry and other stakeholders. In the 1990s, the control of point source inputs by large installations has greatly improved. Now the focus in the industrial sector is moving towards SMEs.

The current Finnish Waste Act came into force on January 1, 1994, and the national waste legislation has now been harmonized with the corresponding EU legislation. According to the Waste Act, waste prevention has the highest priority in actions. However, to date little has been done in practice to limit waste generation.

## 2. Aims of the study

In order to respond to the challenge of sustainable development, we must understand the present situation of SMEs. A wide body of knowledge is available about ecologically based structural change and industrial transformation; see for example [5–9]. What we are still clearly lacking are the opinions and viewpoints of SMEs themselves—what are their real attitudes to environmental protection?

The research questions of our study were as follows:

- What opportunities for upgrading material efficiency and waste minimisation can be found in SMEs?
- What is the business environment in which SMEs operate? What are the roles of customers, owners and competitors with respect to meeting environmental challenges?
- Why do SMEs build up environmental management systems (EMSs)? How far are they genuinely concerned about the environment and what are the other motives which prompt SMEs to develop management systems? How effective are EMSs from the standpoint of waste minimisation?

## 3. Materials and methods

Our study was a case study, the empirical material of which consisted of theme interviews in 41 Finnish industrial SMEs. The following industrial sectors were represented: metal, chemicals, plastics, wood and paper products, textiles, food, construction and construction products. Table 1 summarizes the key features of the case enterprises.

### 3.1. Selection of the case enterprises

The study was carried out during autumn 1998–spring 1999 in the highly industrialized province of Pirkanmaa (14 700 square kilometres, 450 000 inhabitants) in southern Finland. We first selected nine municipalities in Pirkanmaa

with different sizes and economic structures. The case companies were chosen, by using the enterprise register of Statistics Finland, to cover the most important branches of the Finnish industrial SMEs. Two to nine enterprises with various sizes were selected from each branch. Three to seven enterprises were interviewed in each of the nine municipalities.

### 3.2. Theme interviews

The theme interview as a method is not based on a formal schedule of questions to be asked word-by-word in a given order. Instead, the interviewer has a list of themes which she/he attempts to cover in the course of the interview; see e.g. [10]. The main themes of our interviews are listed in Table 2, which also shows the sub-themes most relevant to this article (a few other sub-themes were also dealt with in the interviews).

In a small enterprise, the interviewee was usually the managing director, in larger enterprises for example the manager in charge of R&D and production, the plant manager or the manager responsible for quality and/or environmental performance.

Each interview was complemented by a site visit which familiarized us with the practical reality of the firm and helped us better to understand the issues and problems that the interviewees had taken up. All interviews were mini-disc recorded and complete written transcripts were compiled within a few days of each interview. Altogether we prepared 450 pages of transcribed data.

In order to provide a point of reference for the enterprise interviews, we also interviewed local environmental authorities in the municipalities.

## 4. Results and discussion

### 4.1. Summary of the responses of the case enterprises

The Finnish economy experienced a deep recession in the early 1990s. This depression was a difficult time for most of the case enterprises of the study. However, the years following the recession have seen rapid growth for the enterprises and production had increased in almost every case company. The majority of the interviewees also predicted success in the near future.

The amounts of solid waste, which the majority of the interviewees defined as the most important environmental impact of their firm, had followed the increased production rates of the enterprises. Waste management as a whole had greatly improved since the current Finnish Waste Act came into force in 1994, and although the waste streams had grown in absolute terms, the specific amounts (the amount of waste per unit of production) had somewhat decreased.

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