

# What makes it slow? A questionnaire survey of environmental attitudes, management and performance

Pernilla Gluch<sup>1</sup>  
Birgit Brunklaus<sup>2</sup>  
Karin Johansson<sup>1</sup>  
Örjan Lundberg<sup>2</sup>  
Ann-Charlotte Stenberg<sup>1</sup>  
Liane Thuvander<sup>3</sup>

<sup>1</sup> Building Economics and Management, Department of Civil and Environmental Engineering

<sup>2</sup> Environmental Systems Analysis, Department of Energy and Environment

<sup>3</sup> Built Environment and Sustainability, Department of Architecture  
Chalmers University of Technology, S-412 96 Göteborg, Sweden.

Phone: +46-31-772 1000.

e-mail: pernilla.gluch@chalmers.se

## ABSTRACT

Over the last two decades the Swedish building industry has made much effort to develop green building practices. Researchers within the field have provided theoretical knowledge on how to design green buildings and analytical environmental management tools have been developed to guide the practitioners. Information campaigns have raised the general environmental awareness among building practitioners. In spite of these efforts, mainstream building practices do not seem to have undergone any marked changes. This raises the question of how environmental issues actually are dealt with in the building industry. Has the development stagnated? And if so why? What causes green innovation inertia in the Swedish building industry? What makes it slow?

This paper provides some answers to these questions by empirically examining environmental attitudes, management and performance in the Swedish building industry. The paper is based on a structured questionnaire survey directed to environmental managers at all companies in Sweden with at least 50 employees within technical consultants, building constructors, and property owners and managers and companies with at least 20 employees within architecture. The response rate was 45,4% which corresponds to 246 respondents.

The study detects possible causes to deficiencies and creates larger understanding on why the development, despite much effort, sometimes does not go in the direction as intended by top management. Focusing on relations between the definition of the environmental challenge, taken measures and results from taken measures the paper identifies trends and institutionalising processes that hinder sustainable development within the building industry.

**Keywords:** Environmental management, environmental attitudes, building industry, Sweden, questionnaire survey

## **1. INTRODUCTION**

Over the last two decades the Swedish building industry has made much effort to develop green building practices. Researchers within the field have provided theoretical knowledge on how to design green buildings and analytical environmental management tools have been developed to guide the practitioners. Information campaigns have raised the general environmental awareness among building practitioners. In spite of these efforts, mainstream building practices do not seem to have undergone any marked changes (Gluch, 2005; Femenías, 2004). This raises the questions: why is it so difficult to incorporate environmental issues into mainstream building business? How are environmental issues actually dealt with in the building industry? Has the development stagnated? What causes green innovation inertia in the Swedish building industry? What makes it slow?

This paper aims to provide some answers to this question by empirically examine environmental attitudes, management and performance in the Swedish building industry. The paper is based on a questionnaire survey carried out in autumn 2006 which is an almost identical replication of the survey carried out in 2002 (Baumann, et al., 2003).

The questionnaires were directed to environmental managers or alike at all companies with at least 50 employees within technical consultants, building constructors, and property owners and managers and at least 20 employees within architecture firms. This covered 542 firms and the response rate on the questionnaire was 45,4%. The structure of the surveys covers the industry's definition of its environmental challenge, attitudes towards this challenge, and the response and performance from environmental measures taken. The questionnaire contains a total of 55 questions.

Results from 2002 years study showed that many firms at that time were working with environmental issues. However, the study showed that their work mainly focused on a few targeted subjects e.g. toxic substances and waste management, which departed from what they perceived as the industry's main challenge, i.e. energy-savings. Firms also on one hand mainly laid effort into top-controlled governing environmental management activities, e.g. EMS, while implementation of technical environmental measures on the other hand met large resistance. Striking was also that much focus was laid on pre-planning activities while feed-back and self-assessment were neglected. This caused an asymmetric communication within the firm with the consequence that many environmental managers lacked information of their firms' environmental performance. By repeating the survey it is possible to identify trends and institutionalising processes that contribute as well as hinder sustainable development within the building industry. In this paper we point at some possible explanation to why the development although much effort sometimes does not go in the direction as intended by top management.

## **2. RESEARCH PROJECT**

The Environmental barometer for the Building sector is a questionnaire study with the objective to survey environmental attitudes, management and performance within the Swedish building and real estate industry. The structure, as schematically illustrated in Figure 1, has been developed from the questionnaire used by the

International Business Environmental Barometer (IBEB) which has measured the state of environmental management in industry since 1993. Terminology and wordings in IBEBs standardised questionnaire has been adjusted into more sector-oriented terminology and words in order to suit the building sector.

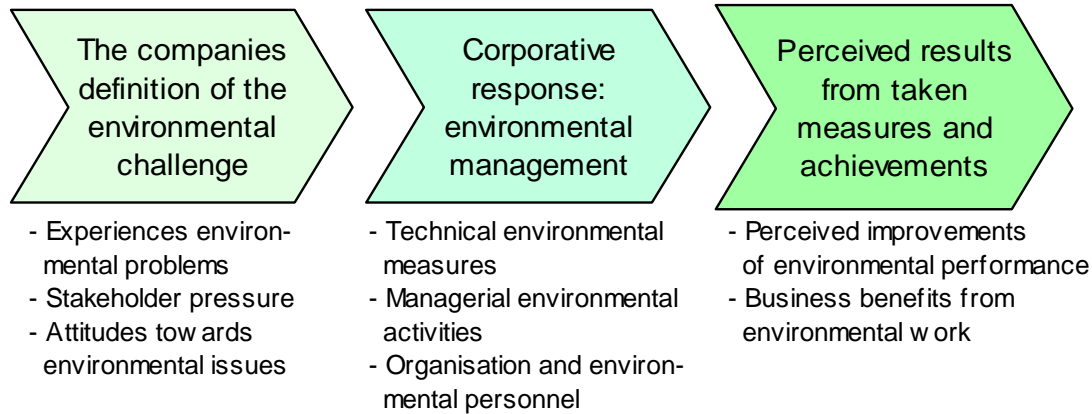


Figure 1: General structure of the survey

The structure of the survey covers the industry's definition of its environmental challenge, attitudes towards this challenge, and the response and performance from environmental measures taken. The questionnaire contains a total of 55 questions.

## 2.1 Preparation of the questionnaire

The questionnaire used in 2002 years study has only slightly been changed. Keeping the questionnaire as intact as possible has been a deliberate move in order to be able to make comparisons over time. Due to its actuality a section concerning energy declarations directed to real estate firms was added. However, since this section only was directed to real estate firms it is not presented in this paper.

## 2.2 Statistical population

The survey covers all companies in Sweden with at least 50 employees within technical consultants, building constructors, and property owners and managers and to companies with at least 20 employees within architecture. According to the Swedish Statistical Office, 620 companies have a core business that falls into one of these categories. However several of these, especially among the technical consultants, do not belong to the building industry, for example IT consultants and energy suppliers. After a correction the final population, which the questionnaire was sent to, consist of 542 companies and/or organisations. The questionnaires were directed at environmental managers or alike. 246 companies of 542 answered on the questionnaire which corresponds to a response rate of 45,4%.

Table 1: Total number of companies, response frequencies and response rates.

	Total number of companies	Rate per cent	Responses	Rate per cent	Percentage of answers
Construction companies	300	55,4%	123	50,0%	41,0%
Property owners and managers	151	27,8%	78	31,7%	51,7%
Architects	36	6,6%	20	8,1 %	55,6%
Technical consultancies	55	10,2%	25	10,2%	45,5%
<b>Total</b>	<b>542</b>	<b>100%</b>	<b>246</b>	<b>100%</b>	<b>45,4 %</b>

## 2.2 Organisation of survey

The questionnaire, together with an introductory letter, was sent out to each company in the statistical population in September 2006. Addresses were obtained from the Swedish Statistical Office's company register. Three reminders were sent out, the first in the beginning of October, the second in the end of October and the third, which contained a copy of the questionnaire, in the beginning of November. Responses were collected until the end of December.

In addition and with the purpose of investigating dropout reasons an e-mail was sent to environmental managers in companies that had not answered the questionnaire after the second reminder.

The data has been stored in and analysed by using the statistical data programme SPSS. In order to secure reliability and validity of the study a statistician has been consulted both during data collection and analysis.

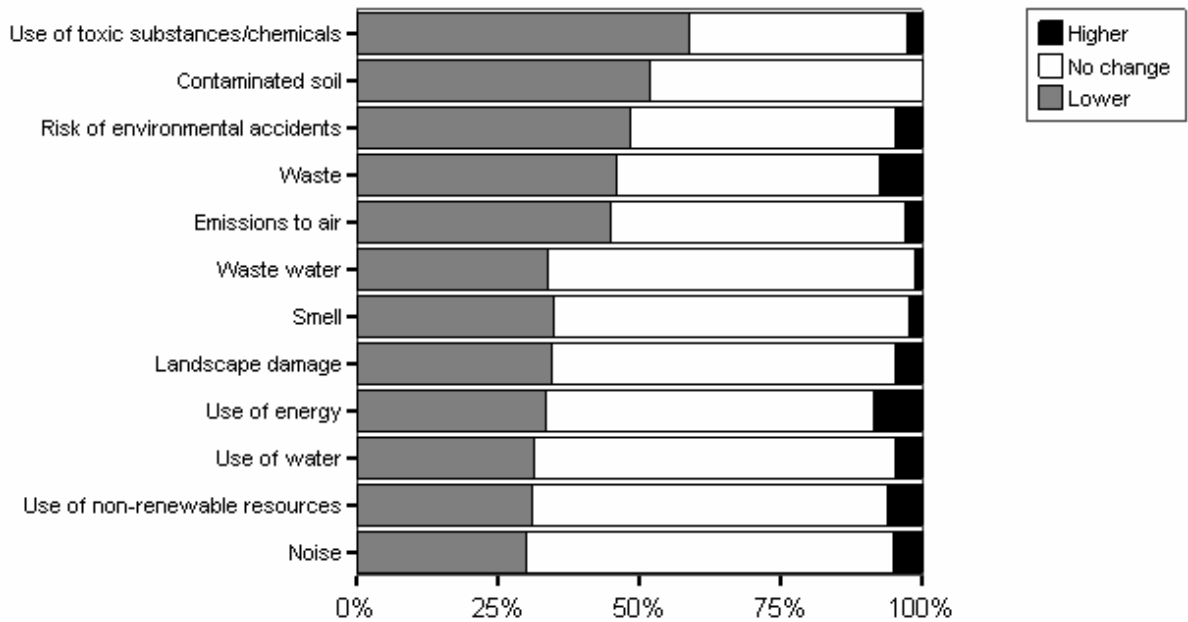
## 3. RESULTS FROM THE SURVEY

### 3.1 The environmental challenge as perceived by the companies

The environmental challenge is defined by how the companies see themselves contribute to environmental problems and how they experience environmental pressure from stakeholders.

#### 3.1.1 Environmental problems

Most companies see use of non-renewable resources, use of energy and water as their most serious environmental problem. Three areas were a majority of the respondents perceive that they have lowered their impact and sees as their least serious problem is within contaminated soil, risk of environmental accidents, waste management use of toxic substances (see Figure 2).



*Figure 2: Companies' rating of their contribution to various environmental problems relative the industry average*

Energy aspects, global climate change and waste are the three top issues the respondents put forward as the building sector's major challenge now and in the future.

### 3.1.2 Stakeholder pressure

Clients together with managers are the environmentally most influential stakeholders in most companies (see Figure 3). Also the final customer is considered as an important stakeholder as well as the employees and owner/shareholders of the company. Seen out of an environmental research as well as environmental information perspective it is noticeable how low influence on the companies environmental work that researchers, environmental organizations, mass media and politicians are assumed to have. Neither financial actors, such as banks, insurance companies and financial analytics nor controlling instances such as accountants are perceived as influential on the companies' environmental work.

There are some differences between different actors groups within the building sector, although the client is placed as top stakeholder by them all construction companies and technical consultancies rank them higher than property owner/managers and architects. Property owners set managers and environmental authorities high.

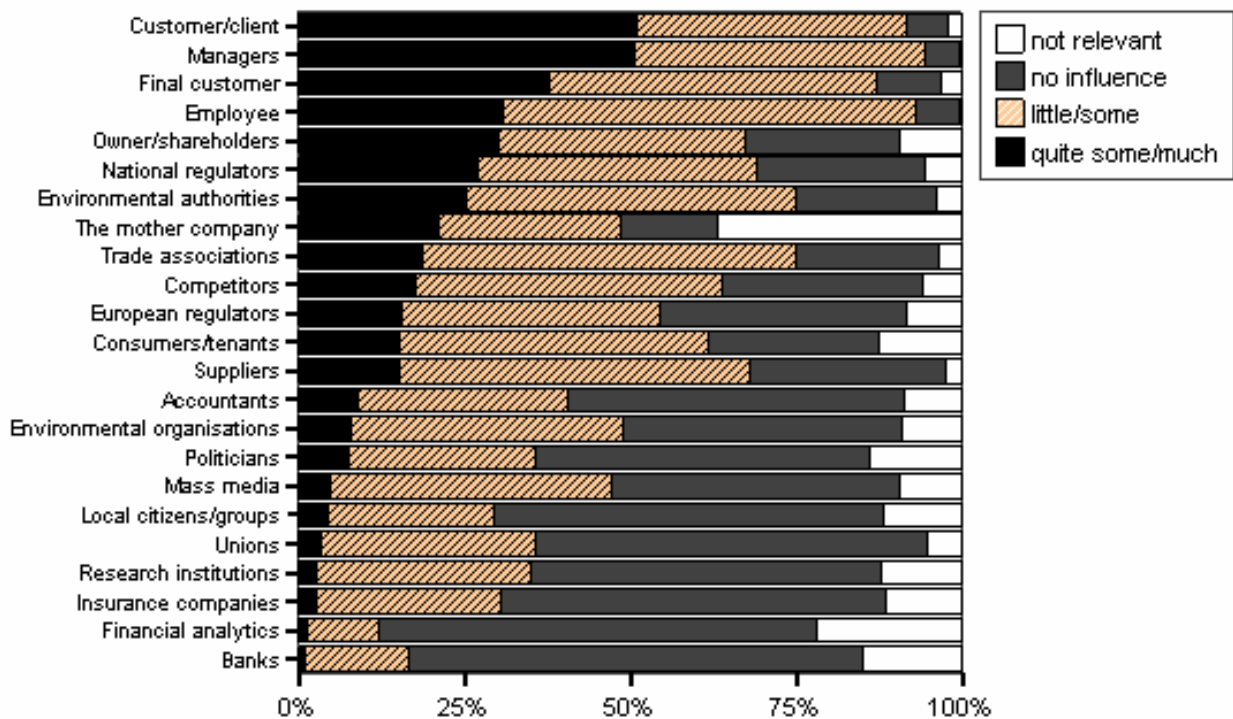


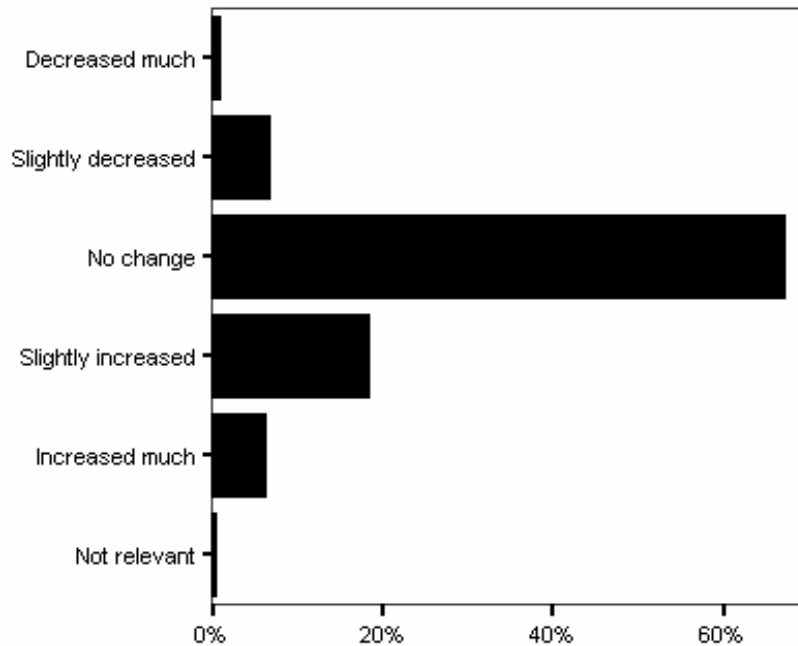
Figure 3: Companies' rating of stakeholders' influence on environmental activities in the company.

### 3.2 The companies' response to the environmental challenge

The companies' response towards their environmental challenge can take different expressions; employing personnel and create environmental working groups, cooperation with stakeholders, technical measures as well as managerial measures are some examples.

#### 3.2.1 Staffing and environmental personnel

A majority of the companies have some kind of personnel that handles environmental issues within the company (81%) although the share that does not (19%), is comparing to manufacturing industry comparatively high (10% in 2001, Nilsson and Hellström, 2001). Many of the personnel that work with environmental issues do this on part time, i.e. the person has other tasks besides the environmental work. Most respondents answer that the number of environmental personnel has been the same during the last four year period (see Figure 4). In 2002 (Baumann et al., 2003) the number of environmental personnel was still increasing fairly or much in the companies which indicates that the environmental personnel in the companies have stabilised to a level of approximately one person per company.



*Figure 4: Changes in number of environmental personnel during the last four year period.*

How influential the environmental work is in the company are partly connected to which formal position the environmental manager has in the company. The study shows that a majority of the environmental managers (66%) are not members of the board which is a decrease comparing to 2002 when 56% did. This differs between the actors were it is more usual that the environmental managers sits on the board in construction companies (44%) than in real estate companies (21%).

A majority of the respondents think they have, at least partly, enough knowledge in order to influence practice (85%) as well as strategic decisions (85%). On the other hand a relatively large share of the respondents (appr. 25%) is not in a position that they have authority to stop environmentally damaging processes and/or influence strategic decisions. This reveals a certain discrepancy between knowledge to influence and actual authority to do so.

### **3.2.2 Managerial measures**

The environmental work in many of the companies within the building sector work in accordance with an environmental management system (73%). This is a large increase since 2002 when 46% had an EMS.

Together with the companies that are under an implementation phase or that are considering to implement an EMS in their organisation it adds up to 90% which mirrors the pervasive force EMS has. Figure 5 also show that the managerial activities that are carried out in the companies largely are related to the EMS. For example have 93% of the companies set up an written environmental policy, implemented routines to secure the observance of environmental laws (82%),

established an order of accountability (83%), and formed environmental goals as part of continuous improvements (80%) as well as measurable goals (76%).

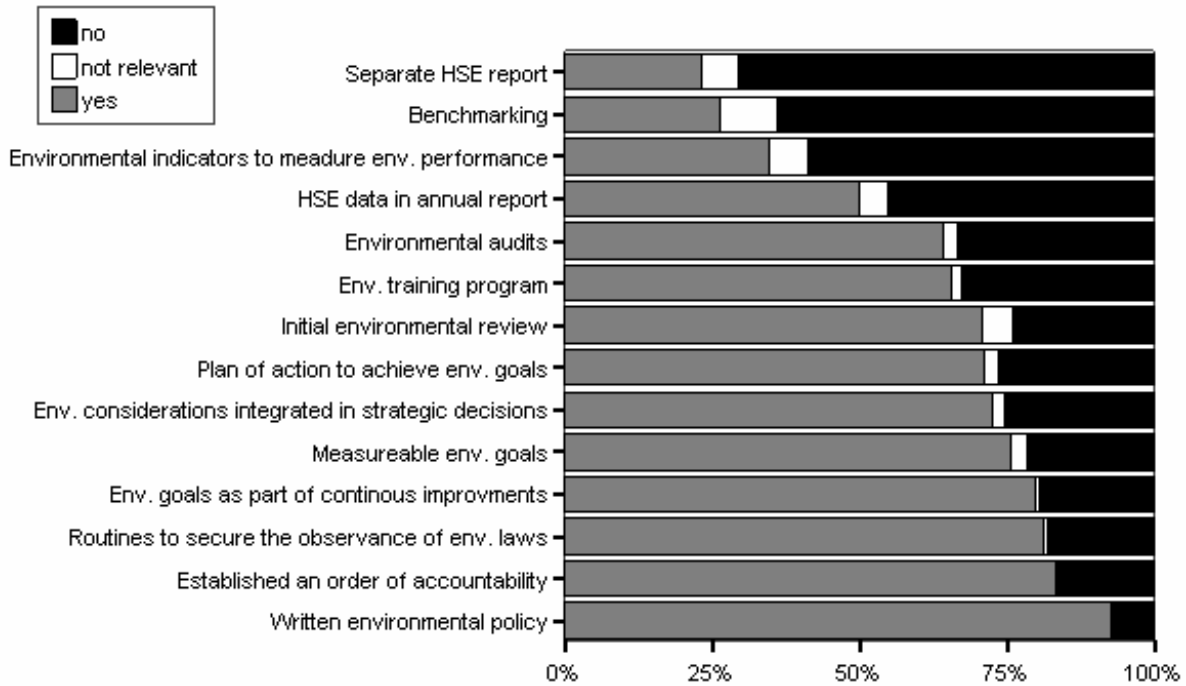


Figure 5: Environmental management activities related to the EMS.

Considering that an overwhelming majority of the companies say the set measurable environmental goals relatively few perform activities that in turn measure the environmental performance (see Figure 5).

Besides activities related to the EMS the companies foremost carry out activities that aim at transfer environmental information and demands between actors that takes part in the supply chain (see Figure 6). Another communicative move is to develop checklists and guidelines.

Considering that the clients and customers have been put forward as the main stakeholder, it is surprising that marketing measures such as green marketing and eco-labeling is so rare activities among the companies. In a "relay"-business were the so many actors are dependent on each other throughout the whole building process, from planning to administration, it is also surprising that so few are involved in cooperative activities and even more amazing that one fifth consider it as not relevant.



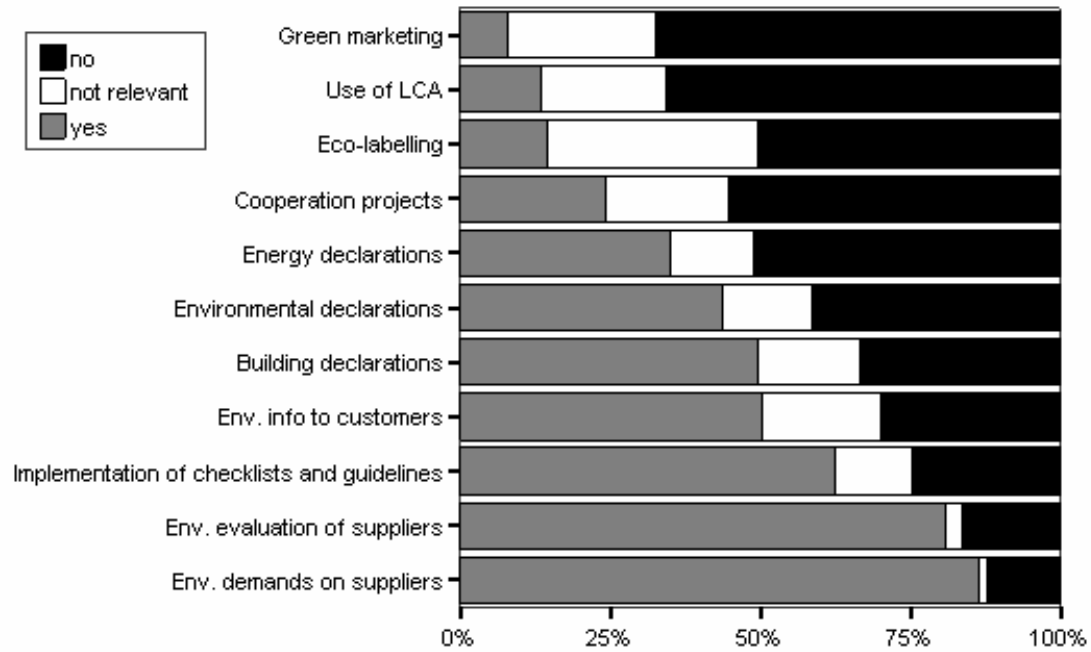
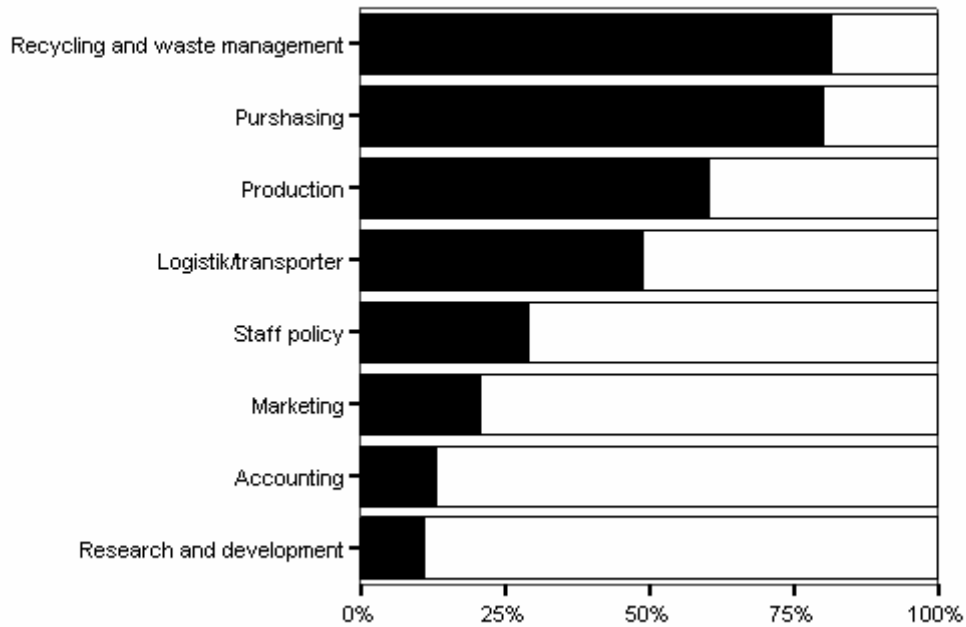


Figure 6: Environmental management activities related to purchasing and market.

The environmental work in companies within the building sector is just as in 2002 not an integrated activity within the companies. Figure 7 shows that several areas, such as R&D, accounting, marketing and staff policy, according to the respondents has no relation to the environmental work performed within the company.

Environmental work has mostly been integrated with quality and health&safety work which probably are a consequence from that many companies have organisationally structured these areas together, for example assigned personnel with these multiple tasks.



*Figure 7: Business areas where environmental measures are taken.*

### 3.2.3 Technical measures

Waste separation is by far the most common measure to reduce environmental impact in Swedish building industry (see Figure 8). Also, other waste management activities and substitution of hazardous substances/chemicals is common measures within the building sector. Although much effort has been made to reduce waste several of the respondents sets it as one of the major environmental problems the sector is facing. Figure 8 also shows that more companies still are more devoted to handling of already generated waste instead of performing waste minimising measures. In spite that many of the respondents emphasise energy as a major problem for the sector to hand there is only 39% that during this latest four year period actively has acted to substitute non-renewable energy sources. This is surprising given the importance of energy issues in the building industry.

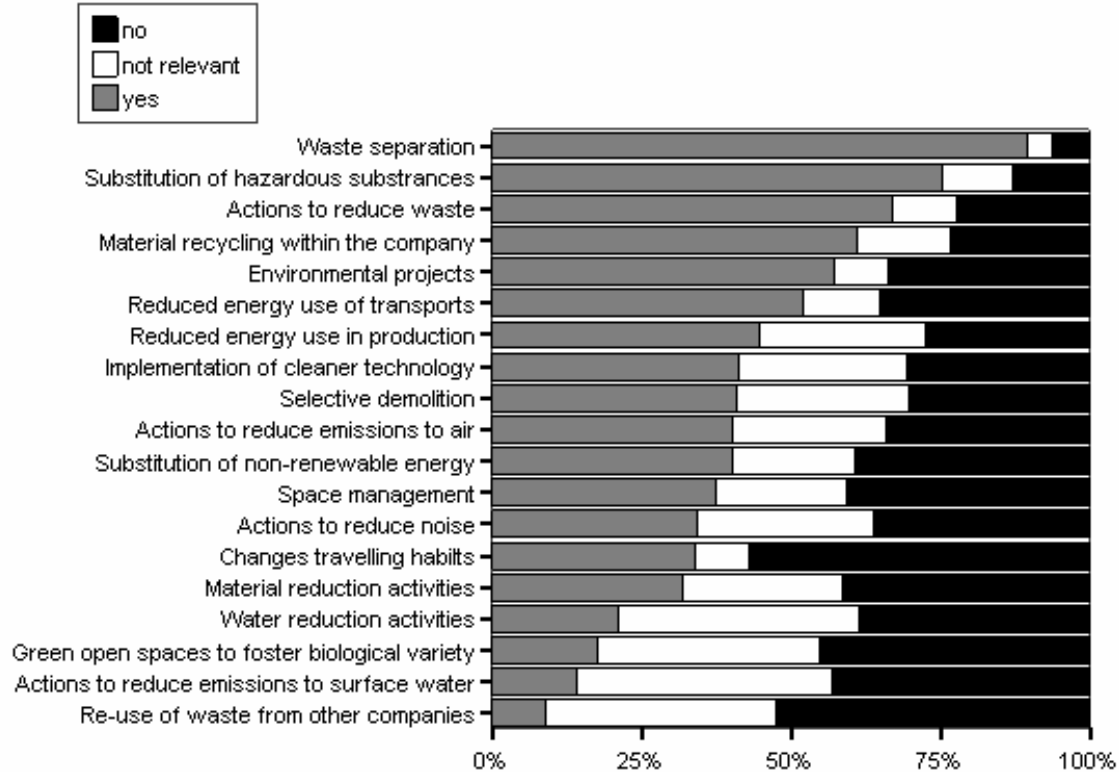


Figure 8: Environmental activities of a technical nature in the companies.

### 3.3 Results from the companies' environmental activities

An indication of the success of the environmental work is obtained by looking at what extent environmental activities have had on environmental performance and business.

#### 3.3.1 Environmental improvements

Environmental activities have had most impact on waste, use of hazardous substances, use of non-renewable materials and energy use (see Figure 9). Apart from energy use, the results are in line with Figure 8 which shows that waste management and substitution of hazardous substances are common activities in the industry. For several problem areas the companies however state that there has been no effect or that they have no information of it.

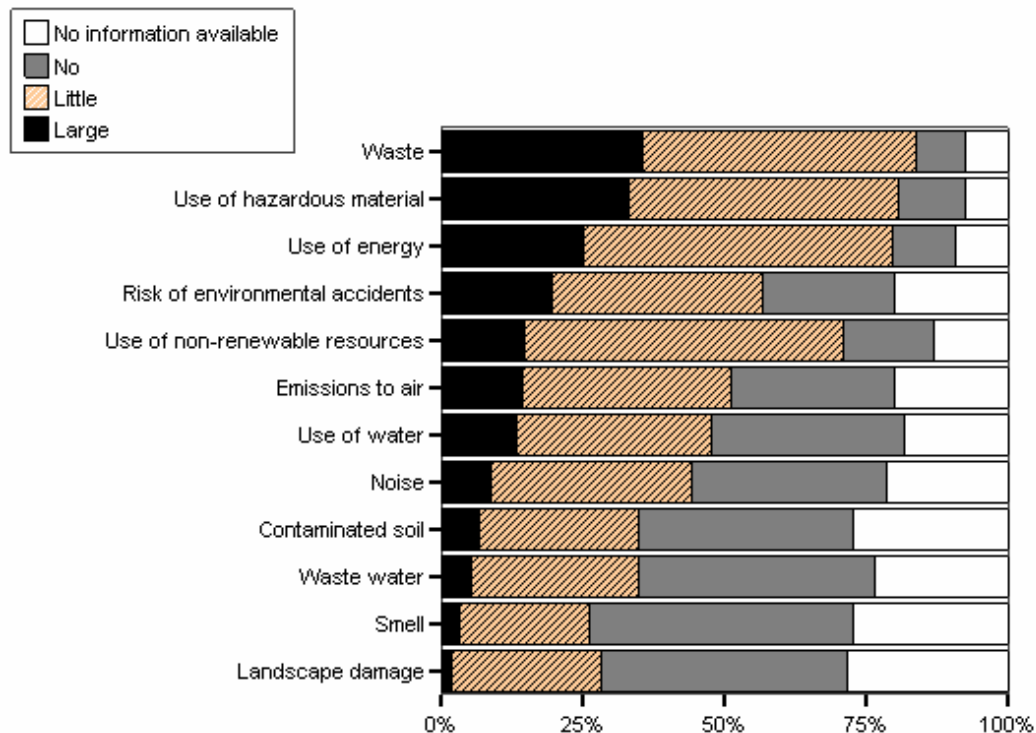


Figure 9: Effect of environmental activities on environmental problems.

### 3.3.2 Business effects

Similar to the results from 2002 years study (Baumann et al., 2003) as well as to other industry sectors (Nilsson and Hellström, 2001), companies in the building sector consider that environmental activities mostly bring long-term benefits to business or benefits for the principal stakeholders, such as staff, management and owners/shareholders. Figure 10 shows that a majority of the companies answered that environmental activities has had a positive impact on especially company image, whereas environmental activities have had a negative on profits, cost savings and productivity.

Moreover, Figure 10 shows that environmental measures taken for most of the companies have had no effect on several business areas. The lack of effect on market aspects such as creation of new markets and increasing market shares is especially noticeable. This apprehension of an absence of market can explain the low interest into making efforts within R&D and development of new technology, such as clean tech.

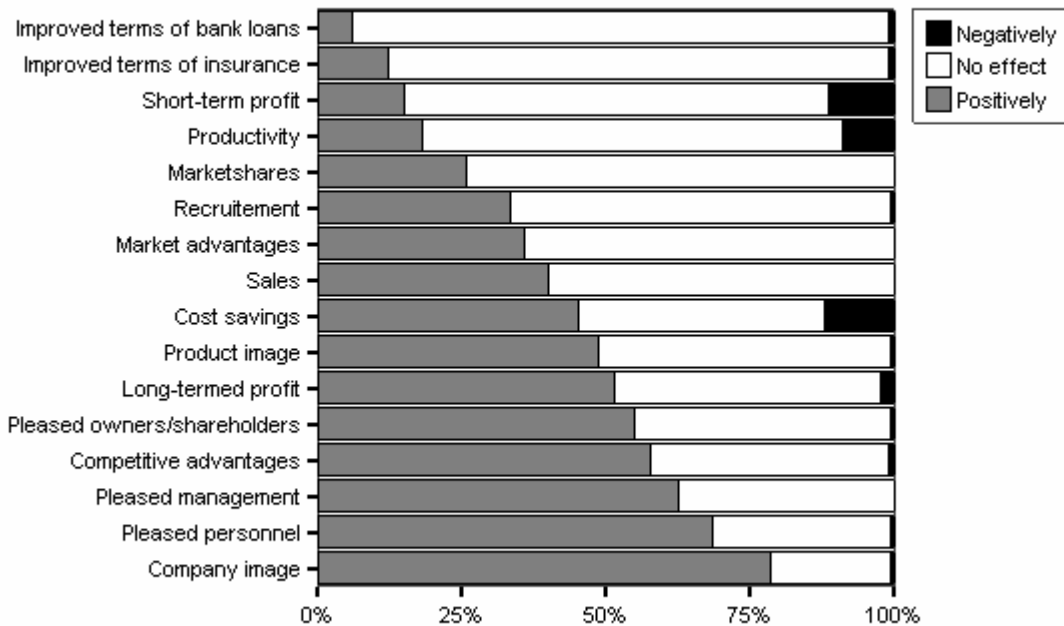


Figure 10: Effect of environmental activities on business.

### 3.3.3 Obstacles for an effective environmental work

Obstacles for carrying out an effective environmental work can be divided into internal and external obstacles, where the external are out of the company's immediate control and the internal are easier for the company to have an effect on. External obstacles that companies experience as hampering is foremost lack of market incentives (see Figure 11). This perception has since 2002 rose, which may be a result from the respondents experiencing problems entering the green products/services market.

An internal obstacle that many companies emphasize is that environmental work is too costly. Also lack of educated personnel is mentioned as an obstacle for effective environmental work.

On an overall level, the building industry experiences that obstacles except for regulation are more pronounced (between 5 and 10% more) now than four years ago. In comparison with other sectors in Sweden (Nilsson and Hellström, 2001) the building sector to a higher degree also speak for regulation as a solution to their environmental problem.

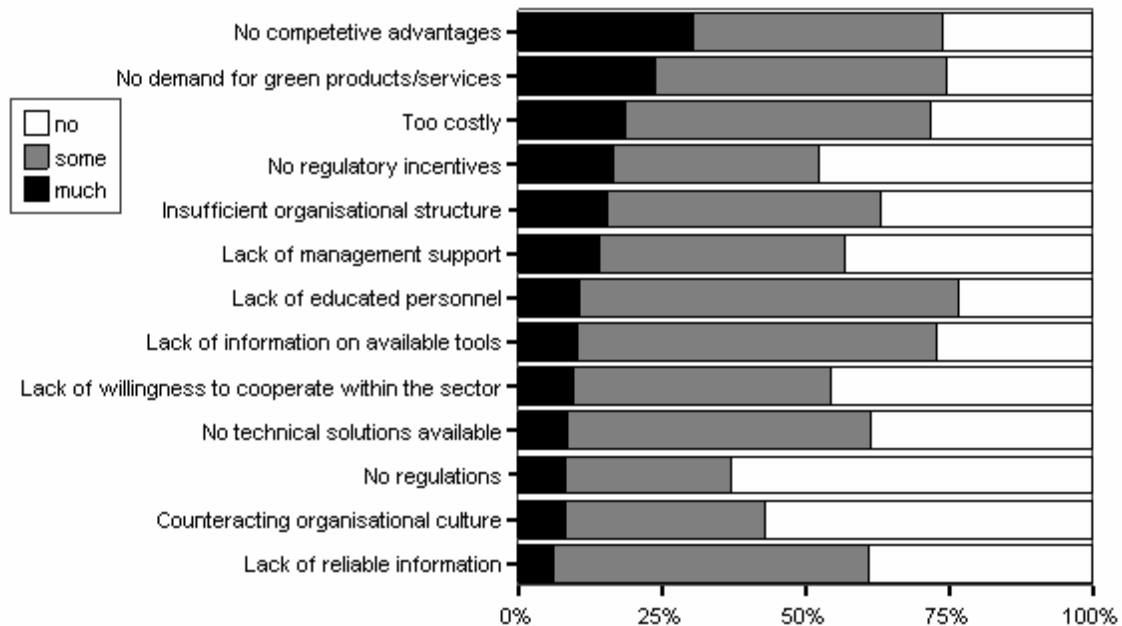


Figure 11: The extent which obstacles have influenced environmental activities in the companies.

#### 4. DISCUSSION AND CONCLUSIONS

We started this paper by asking; what makes it slow? Firstly we can conclude that there is an environmental inertia within the Swedish building sector, i.e. it is slow. The sector is still struggling with energy aspects and use of non-renewable resources, the companies continue to have a preference for waste management and environmental activities of a managerial kind and they, like 2002 (Baumann et al., 2003), perceive that they have accomplished most results concerning use of toxic substances/chemicals and waste separation. Companies within the building sector have especially put much effort into measures related to Environmental Management Systems.

So why is that? The study reveals five possible reasons to this inertia. First, the notion that the market for green products and services are dysfunctional does not stimulate innovation and new approaches. Second, the lack of cooperative actions between actors involved in the building process limits the possibility to view the products and services out of a holistic perspective. Third, for goals and goal setting to have a motivating effect it is important to provide information of whether one has achieved the goals or not (Locke and Latham, 1984). Although many companies say they have set environmental goals the lack of follow-up activities and environmental performance measurements has the consequence that the motivating effect do not take place. Fourth, the perception that banks and other financial institutions have little or no effect on the environmental work hinders that the issues are considered on the business agenda. Last but not least, little or no cooperation

with R&D departments or institutes creates poor foundation and stimuli for the development and creation of pioneering green ideas, innovative green technique and new green business opportunities.

#### **4.1 Some comments on validity and reliability of the study**

There is always a risk in surveys that intend to measure peoples' attitudes and values that the respondents may answer as they believe they should answer and/or tries to place themselves and their companies in a favourable light. It is therefore important to acknowledge that this survey do not present an objective truth about the companies environmental work but rather measure what the respondent perceive as their environmental challenge, problems and so forth. There is also a risk, since the survey, is directed to environmental managers, that they in general have a larger interest in environmental aspects and therefore is not representative for the overall values within the company.

Moreover, it may also be so that the companies that pay more attention to environmental management are more benign to answer which might lead to that the results are not representative for the whole building sector. The importance of this discussion is that the reader acknowledges these possible biases when interpreting the results. Moreover, this paper only present basic frequency analysis the database permits more advanced and detailed analysis which will strengthen the study's validity.

#### **ACKNOWLEDGEMENT**

The authors gratefully acknowledge the financial support of Centre for the Management of the Built Environment (CMB).

#### **REFERENCES**

- Baumann H., Brunklaus B., Gluch P., Kadefors A., Stenberg A.-C., and Thuvander L. 2003. *Byggsektorns miljöbarometer 2002*. CMB-report, ESA Report 2003:2. Chalmers, Sweden.
- Femenias P., 2004. *Demonstration Projects for Sustainable Building: Towards a strategy for Sustainable Development in the Building Sector based on Swedish and Dutch experience*. Dissertation thesis, Chalmers University of Technology.
- Gluch P., 2005. *Building Green – Perspectives on Environmental Management in Construction*. Dissertation thesis, Chalmers University of Technology.
- Locke, E.A. and Latham, G.P., 1984. *Goal setting: A Motivational Technique That Works*. Prentice halls: Englewood Cliffs, NJ.
- Nilsson A. and Hellström D., 2001. *Miljöbarometern 2001*. HandelsConsulting AB, Göteborg, Sweden. Internal report of the Swedish Business Environmental Barometer 2001.