Why use Ecodesign in the industry 2013? A Survey regarding Barriers and Opportunities related to Ecodesign.

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Abstract
This paper describes a study with the aim to identify barriers and opportunities related to companies’ activities regarding sustainability (ecological, economic and social) in general and ecodesign in particular in their product realization. Methodology used: As a start, a pilot interview study within the industry, and a literature review to identify appropriate issues for the next steps were carried out. A web survey was then conducted, giving 108 answers. In order to acquire clearer understanding and more correct interpretation of the results from the web survey, in-depth interviews in 21 companies were carried out. The results from the study were disseminated and refined through a workshop involving industry, researchers and other relevant stakeholders. The study includes Swedish companies with different positions in the supply chain, and of varying size, ranging from a few to over one hundred thousand employees. Most of the companies provide products, components and materials and most of the companies have a global market.

The main results from the study are: Sustainability issues are much more important for companies today than five years ago, and customer requirements and thus competitiveness, are the main drivers to take sustainability into consideration in the product realization. The study also showed that the barriers are mainly connected to the size of the company, the small ones do not afford to have staff dedicated to sustainability exclusively but the issues are still considered very important. Finally, the companies have very varying maturity of working with sustainability and the environmental aspects dealt with are very different depending on the company’s position in the supply chain and on the size of the company.

The study also shows that there is a need for further research; not least in order to find models and methodologies to work strategically with sustainability from a holistic view in companies of different kind and in different positions in the supply chain. Also research about language, attitudes and behaviour at different positions in the companies, (e.g. procurement, market, development and production), and their impact on ecodesign and sustainability in companies is needed. Besides research, there is also a need to support initiatives to increase the competence and understanding regarding how to behave to increase the companies’ sustainability performance at different positions in the companies. This can be done through education at universities, but also in initiatives within companies, where knowledgeable people support companies, not only at a single moment, but in the longer term. From the literature survey a finding is that journals where articles regarding sustainability in industry were published all had sustainability issues as focus.

Furthermore, a need has been identified for broader competence and an adaptable toolbox to better support companies of varying sizes and positions in the supply chain during different phases in their sustainability work. In order to go from working with single issues towards a more holistic approach there is a need of more focus on increased communication and capacity building to enable continuous progress with sustainability with constantly shifting market trends. The opportunities are strongly connected to increased competitiveness; increased use of ecodesign in product realization would not only improve products and corporate sustainability performance, but companies would also be better prepared for a future with growing sustainability requirements in terms of increased customer demands, tougher regulations and higher costs for energy and materials. The industry would thus benefit from taking a large leap in the use of ecodesign in their product realization.

Keywords:
Ecodesign, Product Realization, Opportunities, Barriers, Sustainability, Competitiveness

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1 INTRODUCTION
Sustainability issues are becoming increasingly important from a societal point of view. The focus on sustainability in industry seems to change over time, and the aim of a recent Swedish study called “the Eco-leap” was to identify barriers and opportunities related to companies’ activities regarding sustainability (ecological, economic and social) in general and eco-design in particular in their product realization. Another aim of the Eco-leap study, was to identify gaps in the research on the topic of industry’s ability to perform sustainable innovation in product realization; i.e. which further research would enable industrial changes and would make it possible to create methodologies for implementing sustainability in general and ecodesign in particular in industry.

2 METHODOLOGY
2.1 Overall

![Methodology used in the study](image)

The Eco-leap study comprised pilot interviews, a literature review, a web survey and in-depth interviews. The results were disseminated and refined through workshops involving industry, researchers and other relevant stakeholders, nationally and internationally. Figure 1 describes the different steps of the methodology.

2.2 Pilot study
In the pilot study, where some twenty companies were interviewed face to face, a selected set of questions regarding their product development, sustainability issues and ecodesign were discussed in order to prepare a larger set of relevant questions suitable for a web-survey.

2.3 Literature study
A literature survey was performed with the purpose to explore existing literature on companies’ activities regarding sustainability (ecological, economic and social) in general and ecodesign in particular in their product realization. Both scientific literature and other sources have been reviewed. The theoretical framework for the study is derived from the definition of ecodesign, which can refer to both a process and an outcome. The phenomenon which was studied in the “Eco-leap” study was the process of ecodesign implementation in Swedish companies and thus the literature study focused on the process of ecodesign.

The literature survey started with identification of the currently employed research methods and the challenges involved with the different approaches in the context of the “Eco-leap” study. The reason for investigating the original research design behind scientifically published work was that a combination of quantitative (asking who and what) and qualitative studies (asking why and how) is believed to be useful in this purpose. An example of the rationale in using a qualitative approach to identify the barriers and opportunities related to companies’ activities regarding sustainability is that circumstances that are identified as barriers that hinder sustainability work in one company are not necessarily identified as barriers in another company. Another challenge, related to the choice of research method, is that due to the nature of the research methods most commonly used (case studies, surveys and in-depth interviews) the studies provide results from a snapshot of time and it can be hard to account for the influence of context on the results.

2.4 Web survey
The web survey was made, based on findings from the pilot study. Over 3000 emails with a link were sent out. The answers covered manufacturing companies in different positions in the supply chain (raw material provider, material producer, component manufacturer and product manufacturer), as well as service providers. Small, medium, and large companies (from <50 to >100000 employees) selling Business to Business (B2B) as well as Business to Consumer (B2C) were covered. The respondents had different positions in the companies, including management, and people responsible for product development, environment and market and other.

2.5 In-depth interviews
In order to improve the interpretation of the issue, 21 in-depth interviews were held, with respondents covering the same range as the web survey, different positions in the supply chain, size of the companies as well as the role of the respondents in the companies.

2.6 Result evaluation
Results from the study were gathered and analysed, and workshops, including discussions, were used in order to further evaluate the findings. One workshop with Swedish industry representatives and one workshop with international researchers were conducted.

3 RESULTS
3.1 Literature Survey
An interesting conclusion from the search in scientific literature was that the journals where articles regarding sustainability in industry were published all had sustainability issues as focus. Journals that address general technologies and methods for industry and business are not represented, thereby indicating that sustainability is communicated separately and not as one of the natural core issues. Authors may have selected sustainability oriented journals because they believe these will reach the interested audience or articles on sustainability issues are not accepted in more technically oriented journals. Either way, the broader audience is most likely missed.
The literature on methods and tools for ecodesign is extensive. Publications with focus on energy efficiency as a single issue are heavily represented. The same applies to tools available for implementation of ecodesign but as many have pointed out: even if the tools are at hand the problem is rather that they are not used enough.

Frameworks for categorising a company’s maturity of sustainability considerations in product realization seem to be commonly used and fairly consistent in a four level differentiation from reactive response or work with single issues towards a proactive or strategic and holistic integration.

An example of this is Tien, [1] and Alakeson and Sherwin [2]. The latter have distinguished four levels of approaches for integrating sustainable development into innovation:

1. The single issue approach, where companies address specific sustainability issues but have no systematic way of addressing the full range of economic, environmental and social impacts.

2. The ad hoc approach, where companies take sustainable development under consideration but have no formal tools or processes to ensure the consistency of approach.

3. Sustainability tools, where companies develop tools to integrate social, environment and economic issues in a consistent manner.

4. The strategic integration, where sustainable development itself provides a framework for innovation.

Early findings within the field from Baumann et al [3] and G. Johansson, [4] on the main obstacles for successful ecodesign implementation, confirmed by Jönbrink et al. [5] identify lack of integration of sustainability consideration in companies’ strategies and in particular unsuccessful integration of ecodesign in the product development process. These obstacles occur due to lack of motivation and in some cases competence.

E. Petala et al. [6] points out new product development (NPD) briefs to be an important way to achieve consistency in integrating sustainability considerations in the new product development process - if used with clear communication of goals in regard to a desired level of sustainable innovation. For an efficient implementation they identified interdisciplinary involvement in forming of the design briefs sustainability sections, to both enhance cross-functional work and common understanding and language, as a success factor.

They also discussed different approaches for incremental development and new product development in context of the companies’ level of maturity in integration of sustainability. For incremental product development rather basic eco-design approaches can be used, which results in incremental improvements of the eco-efficiency of the company’s portfolio. To improve the eco-efficiency for a brand as a whole, radical sustainable innovations are needed. This emphasises the importance of nurturing innovation in combination with ecodesign implementation.

Pascual et al. [7] findings from case studies on European electrical and electronic industry are that adapting ecodesign tools into the company’s/industries language dramatically improves the implementation success. The process of adapting the tools creates an acceptance and using a known language improves the communication efficiency and thereby the ecodesign application.

Furthermore, Charter and Clark [8] identify the importance of language as an important parameter for successful implementation of sustainable innovation and in particular the importance of a broader and agile language use with an example from marketing. They find that marketing has a “potential pivotal role to play in the sustainable innovation debate as they sit in the interface of consumption and production decisions in the firm.” It is very important to use flexible language to market eco-innovative products to be able to reach broader stakeholder groups and not only those who speak the environmental-/sustainability language and already know what they are looking for. The authors point out that the interaction between marketing and sustainability professionals is weak and the understanding of each other’s roles and challenges is poor.

Boks [9] summarises the theories presented above well in a study with focus on organisational issues beyond the traditional internal value chain issues, such as formal organisation, management and process tool development. Boks finds that the most important barriers are:

- The big gap between ecodesign proponents and those that have to execute it (feeding environmental information to business units, is often perceived by the latter as criticism).
- Organizational complexities as well as lack of appropriate infrastructure.
- Lack of cooperation between departments.

And the most important success factors Boks identifies as:

- Customized ecodesign tools tailor-made for the company’s needs.
- The use of environmental checkpoints, reviews, milestones and roadmaps.
- Good management commitment and support, which is perceived to be in the form of making public statements about environmental issues, as well as giving environmental issues the same weight as other, traditional business issues, such as quality procurement/assurance in particular.

Boks lastly concludes that “social, psychological and sometimes intangible processes, such as unwillingness to cooperate, gaps between ecodesign proponents and executors and other organisational complexities have an important role” when it comes successful ecodesign implementation.

The fact that all sustainability issues cannot be solved by technology and tools only as they are so closely interlinked
with human behaviour has also been raised by other researchers. Alriksson et al. [10] have studied environmental attitudes and decision making in the Swedish steel industry. The results showed that the link between an attitude and behaviour was often weak. The author states that knowledge of the connection between attitudes and behaviour is of special importance to managers in order to be able to support and inspire towards a more pro-environmental behaviour. The study also showed that identified stakeholder groups view environmental issues in different ways which in turn reflects their different level of knowledge, attitudes and prioritization of environmental and sustainability issues. Another interesting result was that there were two viewpoints on who was responsible for environmental improvements within the stakeholder group. One group of decision makers within the steel industry put the responsibility for environmental improvement within the steel industry (employees, middle management, environmental manager and top management). The other group put the responsibility outside the industry (public, customers, local politicians, legislators and media). But evidently “If a decision maker feels that it is the outside world that has the responsibility to make sure that the environmental work is improved, it may be difficult to gain support for the day to day work with environmental issues” [10] This information is essential for strategic environmental decisions and makes it possible to adapt communication and strategies to targeted stakeholder groups and impact their prioritization of environmental and sustainability issues.

From the literature survey it was concluded that the theories and research areas most relevant to ecodesign implementation in Swedish companies treated:

- a framework of categorising companies’ maturity in incorporating sustainability considerations in their product realization. [1,2]
- the role and challenges of integrating ecodesign in the early product development, the fussy front end, and the two different processes for development of new products on the one hand and incremental development of existing products on the other hand. [6]
- the main obstacles of successful integration of ecodesign include the same areas of concern that general organisational and product development issues but also in particular lack of motivation and competence. [3,4,5]
- addressing “the soft sides of ecodesign” as an important area of research, increasing the knowledge of how to work with the weak link between attitudes and behaviour, motivation and responsibility in decision making. [9,10]
- the language and communication plays a crucial role, and the under-researched link between ecodesign proponents and the executors (technical experts, decision makers and marketing experts especially). [9,10]

3.2 Web survey

The web survey resulted in that 108 anonymous answers were given. The findings from the web survey were mainly gathered in the form of frequency diagrams.

![Figure 2 How important are sustainability issues today compared to five years ago?](image1)

![Figure 3 What drives your company to take sustainability issues into consideration in product and process development? Several answers allowed](image2)

![Figure 4 What prevents sustainability consideration in product development (Ecodesign)? Several answers allowed](image3)
3.3 In-depth interviews

The in-depth interviews gave an extensive understanding on the issue, summarized in the following bullet points:

- The main driver for ecodesign is the **customer requirement**
- Most companies work with the **single issue** approach, only very few take the holistic view
- Owners and **top management are pushing** sustainability issues in many companies, since they think it is profitable or politically correct, but do not always support their organization with resources or policies.
- Sustainability is often handled by a **single person or group**
- Sustainability issues seem to be related to **the supply chain position**. Companies close to the final customer often focus on some main function, such as energy efficiency or lightweight, while companies some tiers away, often focus on specific details, such as providing a specific solution (material XXX, energy use YY, not using chemical ZZ, having an EMS).
- **Purchasing department** has a central role and large effect on sustainability, but are often not educated in sustainability issues
- **Attitudes and behaviour** have a huge impact, but are not often considered

4 DISCUSSION AND CONCLUSION

The present study clearly shows that there has been a major change in the way Swedish companies perceive sustainability issues. From the answers in the web survey it was clear that the majority of the respondents considered sustainability issues to be more important today than five years ago. Furthermore, the in-depth interviews revealed that today some of the company owners and top management push sustainability issues, something which was not seen at all in a similar study in 2008 [5]. However, the top management do not always support their message internally with policies, targets or resources. On the other hand other findings for example that companies work with a single issue approach rather than with a holistic view, that single persons rather than the whole staff works with sustainability in mind, and that the scientific papers on these issues are only available in journals dedicated to sustainability show that great challenges must still be overcome before sustainability consideration is a natural part of the product realization process.

Our interpretation of the results is that there is need for further research both to develop better, more adaptable tools and to develop our understanding of the human behavior and perhaps preferably, research that combines both. New models and methodologies for holistic and strategic work with sustainability should be suitable in companies of different type and at different positions in the supply chain. Deeper understanding regarding how communication, attitudes and behavior, at different positions in the companies, (e.g. procurement, market, development and production), influence ecodesign and sustainability implementation is needed.

Besides research, many companies seem to need external support in order to improve the sustainability focus at all positions in the companies. This can be done through educations at universities, but also by initiatives in companies, where knowledgeable people support them, not only momentarily, but in the longer term.

REFERENCES


