

Case study at a truck company. Lack of knowledge prevents working with environmental issues.

Abstract

In society today, the opinion is often heard that a prerequisite for sustainable development is greener product concepts. The focus should be on resource efficient product concepts. By a product concept we mean not only the physical product, but also the system of services and products providing a specific function, such as maintenance, financing and repairs. Many companies are today in the situation that environmental issues are becoming more and more important. A lot of tools for design for environment are available, and also legislation is getting stricter and other drivers from the society push for greener product design. Still there are many companies, which do not work with greener product design. The question is why? Would it be possible to make companies interested if they could gain both environmental and economic benefits at the same time? How do companies work successfully to reach both economic and environmental benefits from a product concept at the same time?

A case study was performed at a European truck company where the objective was to study the conditions (e.g. degree of environmental awareness, way of working, products etc.) in that particular company, and how the conditions influenced their handling of environmental issues. The method used was interviews with persons holding different positions in the company and with the customers, and studies of documents about organisation, documents about production and product development processes, documents about the products and the market. The study showed a lack of environmental knowledge at many levels in the company and that customers express no pronounced environmental demands on the products. This is probably the main reason for the quite low degree of activities for environmentally sound product concepts in the company. The study also showed that there are drivers for greener product concepts in the company, for example that it was well prepared for focus on function instead of product, that the product has potential for concurrent economic and environmental benefits, and that marketing of a green concept probably could give market benefits, even if the drivers have not yet become strong enough to initiate the work with environmentally sound product concepts.

Key words:

Function, resource efficiency, market benefit, environmentally sound product concept, Ecodesign

Introduction

After having obtained a Master of science in mechanical engineering I started my professional life with several years out in the industry, mainly working with product development. I worked with design issues and as a project leader of product development projects. During this time I realised that there are a lot of aspects to consider in the design of a new product. Aspects concerning production, customer benefits, function, repair ability, cost, component availability and so forth. Environmental aspects became an issue when designing a new product in one of my projects, and because of that, I went for further education in design for environment. Since four years, I have worked with design for environment at a research institute in Sweden. My main objectives were part of a big research programme (ECO+ in the Ecodesign programme from the Swedish Business Development Agency, NUTEK, and in the Nordic Industrial Fund's Ecodesign) with the main task to find out how to introduce the integration of environmental aspects in product development at companies. I have also performed implementation work in practice at many companies, both smaller and bigger. We learned that there are a lot of different ways to handle the environmental issues in companies (Norrlom, Jönbrink & Dahlström, 2000), which can be useful, but we also learned that the need for greater driving forces to really make it happen is great. We found out that lack of senior management support and lack of clear customer requirements are common barriers to the introduction of environmental issues in product development. Drivers were also found, such as personal interest in the environmental issues, among the product developing personnel and striving for good image from the company.

This former work leads to the interest in finding the way to create market benefits from environmentally sound products, since I believe that this would "make it happen".

Case illustration - anecdote from a baby diaper-manufacturing company

To illustrate the dilemma, which companies get into today concerning environmental issues, I will depict a case, which happened at a baby diaper manufacturing company at the time when environmental labelling of baby diapers first was discussed. To start with, criteria were set up by the labelling authorities saying that the percentage of renewable material in the diaper was what should decide whether a diaper should have the environmental labelling or not. At the time a big baby diaper producer had extreme internal discussions about whether they should go for environmental labelling or not? If the decision was taken that they should go for it, they could easily change the composition of the diaper to fulfil the criteria by adding more renewable pulp material to reduce percentage of non renewable material i.e. plastic. Such a change of the design would make the diaper heavier and consequently less environmentally sound due to higher material use, more transportation work and so on. The performance of the diaper would also be undermined, while the absorbing properties would deteriorate, and the comfort of the diaper would decrease due to the higher thickness. The dilemma was that the company could gain a good environmental image and hence economic benefits by changing the diaper and give it an environmental label, but

that in reality the change would be bad both for the environment and for the performance of the diaper.

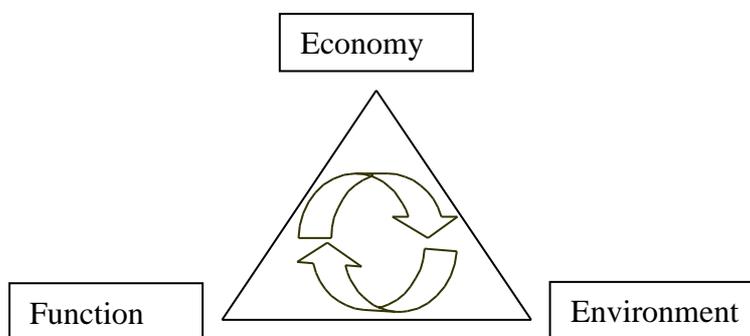


Figure 1. One of the dilemmas for a company wanting to go for environmentally sound products.

The company decided not to go for environmental labelling at that time, but has done other changes with “real” environmental benefits since then. Today, the criteria of the authorities for labelling are changed. Anyhow, this anecdote shows that it is not always easy to make environmentally sound changes of a product or concept, and keep the good economic and functional features. Still, there are a lot of examples, which show that it is possible to get environmental, functional and economic benefits at the same time. The single-use cameras made by Kodak and the photocopiers by Rank Xerox are examples of environmentally sound products, which give good economic gain.

Research field

There is a lot written about product development, environment and marketing. A lot of research is also done regarding product development for environmentally sound products, henceforth called Ecodesign. There is also literature about marketing of “green” products. But there are very few studies on the overlapping segment of these three research fields. This segment would be very interesting to study. The key to gain economic, functional and environmental benefits all at the same time could be to let marketing influence the Ecodesign.

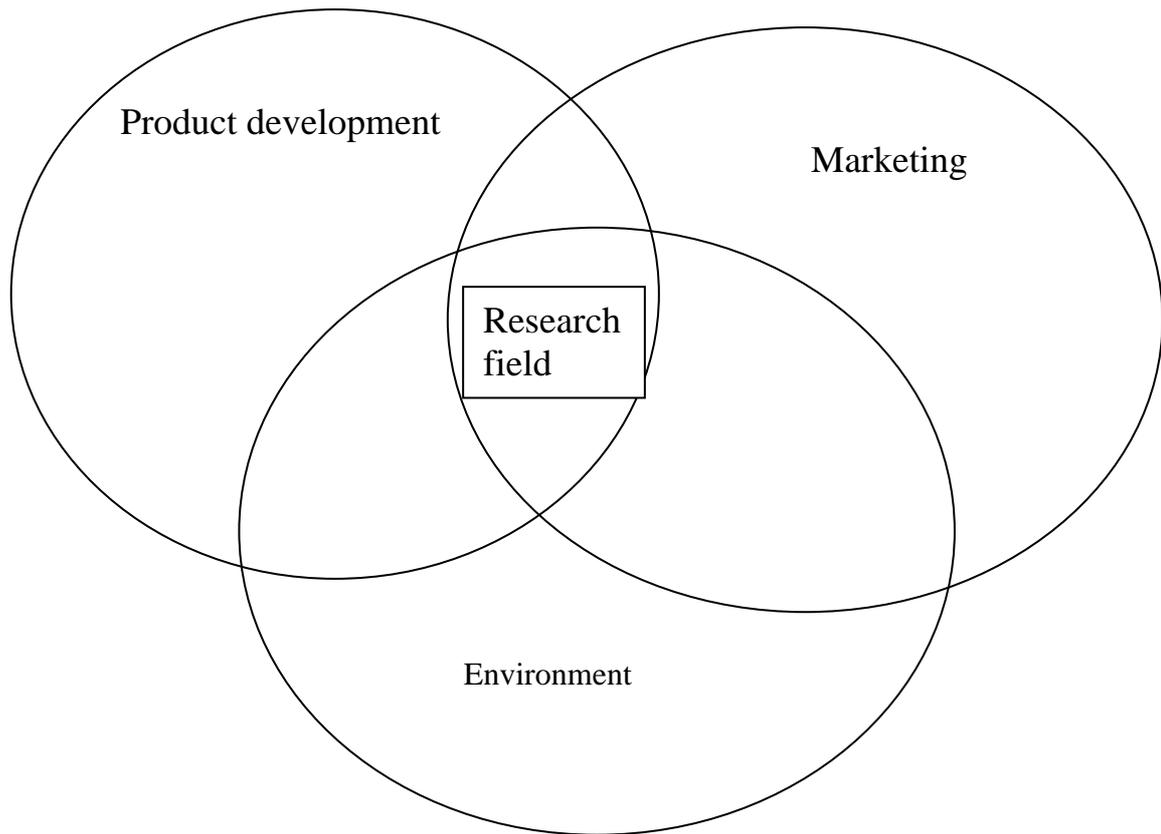


Figure 2 The research field of the project.

Method

This research is aimed at giving answers to some questions, such as “Is it possible to gain both economic and environmental benefits from a product concept at the same time?” “How do companies work successfully to reach both economic and environmental benefits from a product concept at the same time?”, “Why do some companies work with greener concepts and others do not?” One way to get the answers is to make a case study. Yin (1988) argues that a case study is superior to use for answering questions like “how” and “why”. Merriam (1994) persists that the case study approach is appropriate for studying complex phenomena, because case studies are aimed at studying several aspects related to a phenomenon or an event.

Previous research

Brown and Eisenhart (1995) have looked into product development research, and they maintain that there are three major streams: product development as a rational plan, a communication web and disciplined problem solving.

In the first stream, the rational plan, in which the measuring method is financial success, Cooper (1979) and Cooper & Kleinschmidt (1987) say that “Product advantage” is the most important ingredient in a successful product development project. Zirger & Maidique (1990) continues that “Products are more likely to be successful if they are planned and implemented well.” Myers and Marquis (1969) research showed that “Market pull (i.e. identifying and understanding users’ needs) was substantially more important to the success of the products than technical push and thus a cross-functional view was a key component to product success.”

This latter opinion connects to the second stream, called the Communication web stream. Here the performance of a project is measured by the team and management ratings. Allen (1971, 1977) claims that the better the members are connected with each other and with key outsiders, the more successful the development process will be.

The third stream, in which the performance is measured by operational success (speed, productivity), says for example that “for the best performance results, senior management engaged in subtle control by communicating a clear vision of objectives to their teams while simultaneously giving team members the freedom to work autonomously within the discipline of that vision” (Imai, Ikujiro & Takeuchi 1985)

In the Ecodesign literature, there are some factors presented as being important for integrating environmental issues in the product development work. One of them is the support and commitment of senior management (Ritzén, 2000; Allenby and Fullerton, 1991; Bakker, 1995; Ehrenfeld and Lenox 1997; Mc Alone, 1998; Pujari and Wright, 1999). Another important factor is that environmental considerations should be addressed as a business issue, i.e. the environmental considerations need to be balanced against commercial aspects (Keldmann & Olesen 1994; Shelton 1995; Ritzén 2000). Pujari and Wright (1999) and Ritzén (2000) maintain that to get long-term integration of environmental considerations in product development you need to adopt strong customer focus.

Johansson (2001) concludes that the characteristics of and challenges for a development organisation regarding the consideration of the environmental performance are related to the development organisation’s degree of Ecodesign experience.

A large number of Ecodesign tools have been developed, but only a few of them have been adopted and used in product development by industrial companies (Lenox & Ehrenfeld, 1995).

Sustainable development was defined as a development which meets the needs of the present without compromising with the ability of future generations to meet their own needs (WCED 1987). This definition opens up the possibility of a company to gain both economic and environmental benefits if it could handle the full concept of Sustainable development. Politicians and authorities are hopeful

about companies taking “their part” in the work towards a sustainable development of the entire society.

There is also a discussion going on about if selling services or function instead of physical products would decrease the environmental impact.

Kotler (1997) says that “Physical products are really vehicles that deliver services to us. Zaring et al (2001) conclude that “services can play an important role in doing things smarter, more efficient, and in combination with other activities. It is because of these smart arrangements that services can have a positive economic and environmental impact.

Result from an initial case study

Scope and goal definition

As a pre-study in the form of a first case in this research work, a case study of a European truck company was performed. The objective was to study the conditions (e.g. degree of environmental awareness, way of working, products etc.) in that particular company, and how they influenced the company’s handling of environmental issues.

Method

The method for performing the case study (Yin 1988) was mainly deep interviews, but studies of internal company documents such as documents about organisation, documents about production and product development processes, documents about products and market were also done. Visits at customers’ were also performed. The deep interviews were tape-recorded, and staff categories interviewed was marketing directors, design managers, design engineers, product planners and sales force people.

The company

The company is of the size of about one thousand employees. A Quality certificate ISO 9000 has been obtained. The organisation is quite traditional with separate selling and product organisations. The selling organisation consists of a sales force and also marketing people, who besides traditional marketing also develop new concepts of selling systems, such as different rental systems. The product organisation includes the development of new products and physical concepts and also the purchasing and production divisions for the different plants in the company. When studying the different categories of staff, it is obvious that there is lack in communication between them, while information from them is going apart.

Today, the company has some different rental systems in their portfolio besides traditional selling of physical trucks. The rental systems can include service, products, financial service, maintenance, repairs, etc, which can be combined

according to the need from the customer. In some specific cases the customer is even provided with “all their internal logistics”.

The customers and market

The company sells its products all over the world, but is not a market leader. Pronounced environmental demands from the customers are quite rare, even if energy consumption and similar issues are often discussed within the customer groups. Anyhow, some customers send questionnaires regarding material contents and such things. Some of the consumers do have a strong environmental profile, but they still do not ask for environmentally sound trucks, probably because they do not even think of the possibility that a truck could be more or less environmentally sound.

Environment at the company

The company has the traditional environmental issues such as emissions, outlet etc under control. However, the knowledge about the environmental impact of their products is small. The senior management is interested in environmental questions, even if they have not yet supported the introduction of environmental issues in the product development goals. Also the “floor employees” are quite interested, contrary to the middle management, who is quite uninterested of the environmental issues.

Environment impact from the product

As for many products, the main environmental impact of a truck is the energy consumption during use, due to emissions and use of non-renewable resources. It is also clear that the truck itself has some impact from production, mainly due to use of resources but also from the emissions and energy consumption in the production plant. The maintenance of the truck has also an influence, due to the impact from spare parts, and transportation needed. At the end of life, a truck is mainly treated to make materials recyclable. Many of the trucks coming from rental back to the company, are not scrapped but are refurbished and then sold on the second market, often in Eastern Europe.

Barriers for taking environmental issues on the agenda

The knowledge of the environmental issues is small. The people in decision positions do not know what can give both environmental and economic benefits at the same time. They do not even know how to avoid bad image environmental accidents. Product developers and production people neither know the environmental impact of their products nor how to design and produce environmentally sound product concepts. Marketing people do not know the environmental performance of the products or how to communicate it to the customer. The company does not know much about how the competitors handle environmental issues either.

Customers seldom pronounce environmental demands, such as environmental impact from use or production of the products or end of life treatment, which is one of the main reasons for the lack of interest in the organisation.

Product development in the company is not controlled by clear routines. There are routines in the ISO 9000 system, but they are not used a lot, which is one of the major changes going on in the managing of product development work. The integration of environmental issues in the company routines for product development is non-existent. The environmental issues are therefore easily forgotten in the daily work.

The internal communication between sales force, marketing, production and product development is weak, thus making it difficult for the product development people to focus on the proper things to do.

Possibilities for taking environmental issues on the agenda

Many customers have a pronounced interest in the environment, which probably can be extended to include the trucks. To become the first truck company with a “green” truck concept would probably generate market benefits.

The company has a lot of experience of focusing function and customer demands in their rental concepts. This experience can be used in the design for environment work, while the main task is to design concepts with maximal function and minimal environmental impact.

An analysis of the environmental impact of the product shows that the energy consumption has a large impact. This makes it easy to point out the benefit of an environmentally sound truck, i.e. a truck with low energy consumption, to the customer..

Conclusions

Based on the experience of the researcher, the literature available and the result of the case study, it is obvious that the truck company until now has not had the opportunity to work with ecodesign or marketing of green concepts. This is described in following statements.

The lack of knowledge regarding environmental issues has restrained the company from many activities for environmentally sound product concepts. The management has not even thought of environment in their management work, and has therefore not supported for example the work with environmental issues by integrating them in the company strategies or in the specifications of requirements for new products. The literature (e.g. Imai, Ikujiro & Takeuchi 1985 and Ritzén, 2000) says that product development projects need management support to become successful. The product development staff has not enough knowledge about how to design environmentally sound products with good economic performance. They do not know the environmental impact from their products, and hence not how to design a truck with a lower environmental impact and a

good economic performance. The marketing people do not know what the important environmental questions are from the customers, and how to communicate the environmental benefits from their own products. The production people do not know how to produce the trucks in an environmentally sound manner (such as environmentally sound joining methods), except from those issues pointed out by the authorities, such as emissions from painting.

The company needs better routines for their product and marketing development work, since the routines in the system today are not used regularly. That can be done either by implementing the old routines or change the old routines into new better ones. Better routines could also support a better communication between the different categories of staff in the company, and according to the product development literature (e.g. Allen) described earlier hence increase the possibilities for successful product development projects.

Environmental considerations must be incorporated in those routines to become a part of the daily work with new products, and hence have an impact on the design of them.

The communication between different functions and groups in the company is not good enough, making it difficult to develop the right physical products and marketing concepts, which fit well together. The communication must increase both in quantity and in quality, which can be done partly by better routines described above, and partly by other activities, such as closer relationships and so on.

The study also showed that there are some drivers for greener product concepts in the company, even if they until now have not been strong enough to initiate the work with environmentally sound product concepts. Still they show that the opportunity for a successful work in the future is quite good.

The company is well prepared for focus on function instead of product, because its experience from rental systems where they often provide the customers with a function instead of a product.

The product has potential for concurrent economic and environmental benefits, due to the fact that one of the main environmental impacts from the product is energy. While energy is a cost to the customer, a product concept with lower energy consumption would give both environmental and economic benefits at the same time.

Marketing of a green concept could probably give market benefits while many of the customers do have an environmental profile but have not yet asked for an environmentally sound product.

As a continuation of the research it would be of interest to go further into the field where marketing interact with product development. This could for example be done by studying in depth how customer needs are transferred into the organisation via sales force and marketing and to the product development groups.

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