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Integrating Environmental Considerations in Product Development Processes

Based on a Case Study Research at the Danish Pump Manufacturer Grundfos

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Abstract

An increased focus and requirements for more environmentally-friendly products from legislation and other stakeholders poses increased challenges for companies. The idea of wanting to change and reduce our environmental impacts has existed in companies for a long time, particularly large manufacturers. However, the approach to finding the best way to reduce the environmental impacts in the context of a company has changed over the years and towards more environmentally-friendly products. The change in environmental and technological strategy from a production focus to a product can, however, be a challenge for companies. In this PhD thesis it is investigated how companies can create a more product-oriented approach to the environmental work; based on an in-depth case study of the Danish pump manufacturer Grundfos. The overall research question for the PhD thesis is:

How can ecodesign be adapted to and integrated in a company's context and how can a company's context on the other hand be adapted to foster ecodesign practices?

The first part of the research question relates to empirical investigations of how ecodesign can be adapted to fit a company's context. Overall, this includes four empirical investigations at a case company: 1) An investigation of a company's preconditions for ecodesign; 2) An investigation of ecodesign related to innovation to understand how ecodesign can be incorporated into existing practices for innovation; 3) An investigation of how ecodesign can involve and motivate product developers to work with ecodesign through interaction, which in the PhD thesis primarily is explored through workshops; and 4) An investigation of how ecodesign tools and methods can be integrated into a company's context.

The second part of the research question supports exploring possibilities that are not directly related to a company's context. The reason for this approach is to allow for other options when working with ecodesign. Taking point of departure in a company's context can limit the potential of ecodesign for the company as it can set boundaries on the solutions suggested. When looking at ecodesign theory and existing experiences with ecodesign, companies can find inspiration for finding new practices that can better support the development of more environmentally-friendly products. This means that the investigation of the second part of the research question include a theoretical framework for analysing and discussing the empirical results.

Based on the investigations during the PhD study, four main conclusions were found:

1. Create interaction on ecodesign through workshops: An investigation of the case company's product development processes outlined that the innovation processes are based on a multiplayer approach. This means that the case company has experiences that can be combined with and used in ecodesign work. To utilise the existing experiences and work practices, a workshop concept was developed for the case company. This workshop concept can both strengthen the existing environmental work as well as support the development of new practices that are relevant for the ecodesign work.

2. Create a balance between context based and expert based ecodesign tools: Context based tools means tools adapted to fit the specific needs and skills within a company, where expert based tools are unaltered from the original purpose and they need expert knowledge and skills to be used. Both the development of context based ecodesign tools and the application of expert based tools are time consuming, but for different actors within the company. A balance that fits the degree of knowledge and engagement in the different department in the company should therefore be considered. Overall, this means that the available time and resources at the company can determine whether tools should be context based or expert based. The tools can be expert based if few resources are available to adapt the tools to the specific needs and level of environmental expertise of the product developers. The tools can be context based if resources are so distributed as to take the company specifics into account, such as existing practices and knowledge about the environmental performance of products.

3. There is interdependence between the strategic and the practical level: There is interdependence between the level of ambition on the strategic level and the level of ambition in the daily work. This means that when a company decides on a strategic environmental approach, the integration of the environmental strategies in the daily practices should be considered and be adapted if necessary. The potential challenges and concerns about the adaptability of the environmental strategies in the daily practices can be highlighted and discussed through strategic workshops. This way it can be ensured that the strategies and the practical implementation of them are consistent. The workshop concept can therefore support developing strategies for a company whilst still considering the practical possibilities in the company. This also means that if there is mutual support, it can be a motivation force for both the strategic and the practical level. In the case company there is management support as well as support from product developers which provide good conditions for the environmental work. However, a mutual support can also have a retention effect on the environmental work, as it can maintain the environmental work in old routines. This can provide challenges for companies when transferring the environmental work from production to product oriented work.

4. Create a balance in the involvement of the employees in ecodesign work: It is important to create a balance when involving employees in ecodesign work. Therefore, if the employees are involved, it should be to the extent that the employees see a value in the work and also have time for their other responsibilities. For the employees to see the value of the work, it is important to have transparency as to why involvement is important and how the tasks can be handled. Through the case study the importance of transparency became clear. After analysing the case company it became clear that the workshop concept could contribute to finding and creating this balance in the involvement of employees.

The primary outcome of the PhD thesis has been on how to establish interaction about ecodesign to secure anchoring ecodesign in the daily work practices. Through the PhD thesis, suggestions have been given on how to meet the challenges of an increased focus on developing more environmentally-friendly products.