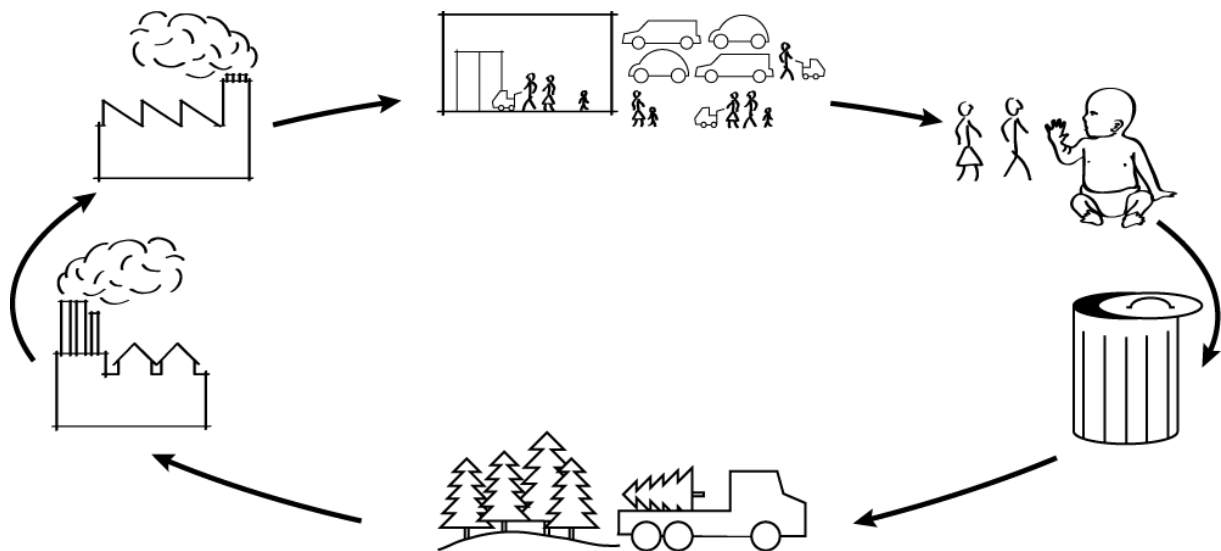




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ENVIRONMENTAL MANAGEMENT IN A PRODUCT CHAIN:

THE LINKS BETWEEN ACTORS IN THE PRODUCT CHAIN OF A DIAPER



Abstract

In this study we investigate and describe the environmental management in a general product chain. Especially how the actors in the product chain work together in a environmental supply chain management (ESCM) perspective. As object of study we have chosen the product chain of a diaper, more specifically the fluff in the diaper. We have studied all companies in the product chain, except transportation. According to our study the largest environmental burden is generated through behavior and attitude and in the pulp manufacturing process. Additionally we discovered that the latter stages of the product chain to some extent has been neglected and disregarded. The product chain of fluff cannot ensure that ESCM are used throughout the product chain because of the fact that we can not see an active work or dialogue forward in the chain.

1. Introduction

Few have escaped to be affected by the ongoing environmental debate in Sweden and the world at large. A company's approach to environmental improvement has gone from end-of-pipe related solutions to a process-oriented approach and on to a product-oriented approach. After much focus on standardized management system, the academic world also has opened their eyes to a new way of thinking where product chain actors are in the spotlight. (Kolk, 2000; Westkämper et al., 2000; Welford, 2003; Finnveden et al., 2009) On this basis, our study contributes to knowledge of how environmental management actually takes place in one of these product chains.

2. Framework

Focus in this study is to investigate and describe, from raw material to final stage, the environmental management in a general product chain in Sweden. Especially how the actors in the product chain work together in a environmental supply chain management perspective. As object of study we have chosen the product chain of a diaper, more specifically the fluff in the diaper. We have identified ESCM as a part of Boons and Baas (1997) *product life cycle* perspective, which they argue is one perspective that can be used to make a lot of improvements in the product chain, and where most efforts are focused on the design process and not on already existing problems.

To begin with we collected given research about environmental management and divided it into three different research perspectives according to Füssel (2005); normative, philosophical and descriptive research. These have different approaches to research in environmental management, life cycle management (LCM) and environmental supply chain management (ESCM). The normative research concentrates on how things should be done with focus on standard methods such as environmental management systems (EMS) (Ammenberg, 2004), strategies (Reinhart, 1999), triple-bottom-line (United Nations Environment Programme,

2007; Seuring & Müller, 2008, referring to Elkington, 2002) and on research about the focal company (Seuring & Müller, 2008, referring to Handfield & Nichols, 1999; Schary & Skjøtt-Larsen, 2001) or the core firm (Kolk, 2000) in the product chain. The philosophical field of knowledge advocates social change and changing norms and values. The researchers point out that companies need to take responsibility for the whole production chain with the help of, among other things; ESCM (Welford, 2003) LCM and life cycle perspective (Westkämper et al., 2000; Jørgensen, 2008). Also research about the use of life cycle assessment (LCA) (Westkämper et al., 2000) and environmental integration into the design process of the product (Baumann et al., 2002) is found in this field of research. Descriptive research describes how something is occurring in reality and tries to explain the mechanisms that are driving to an environmental change. Within this perspective, we find research on the use of LCA and combinations between LCA and LCM (Baumann & Tillman, 2004), suggestions on what is needed for this to work optimally (Rex & Baumann, 2004) as well as how environmental questions best is integrated into the corporation (Kivimaa, 2008, referring to Howard-Grenville, 2006).

We note that there are gaps in the descriptive research about ESCM and about how environmental management, with a focus relations and cooperation between actors in the product chain, is in reality. Therefore we find our study useful.

3. Methods used

The study is based on a conceptual product chain for a diaper, with focus on the fluff a diaper contains. Our product chain includes the following actors: first in the chain we have placed a raw material and pulp producer, the next actor in the product chain is a fluff producer, after them a converter, next step in the diaper chain is the distributor, furthermore have we placed the consumers i.e. parents of young children, and then the last phase in the product chain is the final handling of the diaper and the waste contractor. We have chosen not to include

transportation, since the study only accounts for a general conceptual product chain with a focus on environmental management, and we believe that transportation between the actors not is relevant to our purpose.

Research method used in this study is qualitative and is based on in-depth interviews, less standardized interviews, analysis of literature, scientific articles and theses. We have studied all companies in the product chain, except transportation, and we also interviewed consumers, i.e. parents of small children. Our material for the product chain is based on qualitative interviews, where respondents had to meet similar open questions. This approach was used to obtain structured materials, and above all the method made it possible for new elements, which we had not been aware of, to be recognized. The actors we have chosen to interview and to focus on are those companies that we believe could represent a real product chain.

The result is divided into two parts: one describing the physical chain and environmental burden and one that describes the product chain actors, partnerships and relationships. The analysis of the product chain and the state of knowledge is based on six themes: environmental load in the product chain, control and responsibility for environmental management in the product chain, the collaborations that occur in the product chain, the opportunity for operators to influence the product chain, which actors are most active and conscious and actors thoughts about environmental management in the future.

4. Results

According to our study the largest environmental burden is generated through behavior and attitude. We also found that the pulp manufacturing process had large impacts on the environment. Additionally we discovered that the latter stages of the product chain to some extent has been neglected and disregarded. The product chain of fluff can not ensure that ESCM are used throughout the product chain because of the fact that we cannot see an active

work or dialogue forward in the chain, contradictory according to the literature which stressed it for being of great significance for ESCM (Welford, 2003; United Nations Environment Programme, 2007; Seuring & Müller, 2008; Westkämper et al., 2000). Environmental demands placed along the entire product chain are the requirement for continuous improvement through documented environmental management systems (EMS). The converter is a key company in the product chain, but we cannot determine the distributor's role, they may emerge as another key company. Based on this our product chain differs from the literatures view of a focal company (Seuring & Müller, 2008), because we establish two companies as key companies.

Our results also show that to be effective ESCM requires communication and information exchanged in confidence. Ability to influence is related to the dependency position in the product chain. All actors may partly affect the environmental management of other actors in the chain through collaboration. ESCM effectively requires a committed and involved leadership. It is the visible businesses with a brand targeted at customers who are driving and most active in the environmental management work. Future ECSM focus should be given to relations and co operations between stakeholders across the product chain. The goal of ESCM should be a change in behavior and attitude.

5. Conclusions

We believe it is misleading to call one or two actors for *focal* companies in the product chain, since they do not act in a closed circle and because we found that ESCM does not extend over all actors in the product chain. There is not a center of environmental management since no actor in our product chain can be said to have a center-focused role. On this basis *and* the fact that the definition *focal company* does not say anything about from which perspective it should be used, we believe it can be misleading to name the company that possesses the most control the *focal company*. They are not centrally positioned in the chain and therefore can not

apply influence or exercise control against *all* those involved. However, we can distinguish actors in the chain that are superior to other actors and that have a greater opportunity to make demands. We have found that actors, with influence in terms of ability to make demands and dependency relationships in the product chain, are the visible actors with a trade mark under examination by the public eye - where consumers have a demand potential. We therefore wish to define actors with greater opportunities to exercise demands in terms of environmental management in a product chain: Actors in the Public Eye (APE).

Figure 1 (below) shows where we have identified that the greatest environmental impact occurs, how environmental management is being done and how it is being coordinated in the product chain of diaper/fluff as well as which actors are distinguished as APE. The greatest environmental impact is a result from the behavior and attitude as well as the manufacturing process, i.g. the first and the fifth step of our product chain. Demands and dependency relationships are illustrated by the blue line; the fluff producer can put demands on the raw material and paper producer; the converter may impose terms and conditions of the fluff producer and the producer of raw materials and pulp producer; and the distributor may exercise demands in relation to all three actors back in the product chain. Consumers have the potential to exert command over the other actors in the product chain, especially against the converter and distributor, but seem at present not to be aware of its influence as is illustrated by the dotted blue line. The dotted green line shows the impact that can be done through exchange of information; the raw material and pulp producer affect the fluff producer and converter through knowledge of the product; the converter affects the distributor, and to some extent consumers through product knowledge; the distributor may influence by informing consumers about the product and product selection. Based on these dependency and information conditions, we have identified the converter and distributor of those with greater

ability to exercise demands and influence in terms of environmental management and therefore as Actors in the Public Eye (APE).

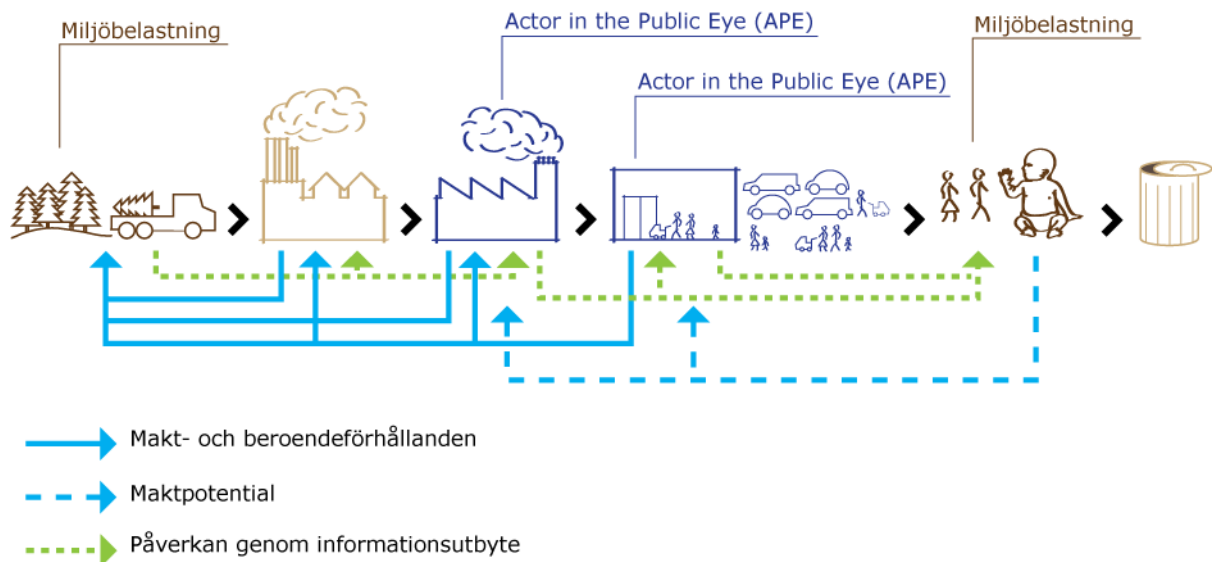


Figure 1 Product chain of the diaper/fluff

Although many actors stressed the importance of communication and cooperation for effective environmental supply chain management ESCM this work does not included all actors in the product chain. Figure 1 clearly shows how the final phase of treatment is not actively included and the fluff producer's role is unclear in ESCM of the product chain. It is evident that the ESCM is not performed throughout the product chain.

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