Eco labelling from the consumer perspective: A case study of indoor paint products

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ABSTRACT:

The use of eco oriented labels on indoor paints in European countries is focused. Based on a technical assessment and information from label organizations, the results show that the consumer should be sceptical to public or official labels as the EU Ecolabel or Nordic Swan Label as they accept almost every product and in fact is the same label even if marketed as different. The financing of label systems may results in more focus on growth and market shares than informing consumers, and there is a market protection dimension related to many label systems. The technical complexity makes it difficult to compare and understand actual label requirements for consumers. The major conclusion is that most trust should be

placed on labels offered by independent organizations focusing goals as health, safety or pollution were the label is just one of its activities and where label revenues is of limited importance for the organization offering it.

KEY WORDS:

Eco labelling, EU Ecolabel, green products, indoor paint, consumer confusion, greenwashing, label requirements.

Juwaheer et al (2012) states that green marketing has been an important research topic for three decades. Within this research stream, the use of eco labels is one of the themes addressed. In the recent years a number of eco labelling or green labelling schemes have been established. As an example, within the food industry more than 200 eco labels were in operation in 2013, where seals and logos communicated some ecological, ethical, ingredient or sustainability attributes to the consumers (www.organicmonitor.com). In Denmark, the number of EU Ecolabel approved product names developed from 438 in 2008 to 856 in 2013, while the number of Nordic Swan labelled products developed from 3021 to 7173 during the same 5 years (www.ecolabel.dk). Research papers focusing on eco labelling often study the impact of eco labels on consumer choices (for example Srinivasan and Blomquist, 2009) or study market segmentation aimed at identifying characteristics of green consumers (Maguire et al, 2001; de Paco et al, 2009).

In research, there has been reported both an effect of eco labels on consumer behaviour, but also mistrust and confusion (Fowler, 2002; Bickart and Ruth, 2013). In this paper, we will look at environment labelling schemes from a consumer perspective focusing on how they are developed and established, and how consumers should evaluate and make decisions if they want to include some of the attributes that may be related to labels in their purchasing choices.

First, we will give a brief overview of the background of labelling schemes, followed by a presentation of the impact of labelling schemes on consumers. Then, we will present an illustrative case study of labelling schemes relevant for indoor paint products in Europe.

Some author's make a distinction between environments related labels and health and safety labels (Melser and Robertsen, 2005). Within the ISO system labels are classified in different types where a major distinction between labels is whether they are organized by the industry, the government or non-commercial organizations. In practice, many labels combine different elements and have a mix of ownership and organizational approaches. We will use the term eco label on all labels that include some outdoor environmental, indoor environment and/or health aspect attempting to influence the consumers' decisions.

For simplicity, we will in the technical part of the presentation focus on the indoor emissions of paints after use, to illustrate how different labels may be designed. It should be noted that the World Health Organization (WHO) expect that within 2030, half the population in industrialized countries will experience allergies or asthma, indicating that

emissions from indoor products like paints is highly relevant for many consumers. In the discussion part, all types of eco-oriented labels will be considered.

Eco label working processes and the international trade agreement background

The typical label systems have a committee determining which products that are covered and which criteria they have to meet in order to "get labelled". Producers may voluntarily seek for acceptance, and if they are approved, they pay a license in order to use the label mark. An important part of the labelling system concept is the voluntary industrial participation. In principle, labelling systems may help the consumers to select environmental superior products compared to other products, as described by Salzmann (1997). A variety of different ownerships of labelling schemes exists, which may be by an industrial initiative, a public initiative or with an independent (often environmentally focused) organization as the main driver. The owners of a labelling system select the members of the decision/label committee.

There exist many examples of criticism of labelling systems, an example from the US being the trade alliance named the Coalition for Truth in Environmental Marketing Information, who according to Salzmann (1997) represented 2900 companies offering consumer goods. This coalition argued that eco labels "are misleading, prevent consumers from making informed choices, do not improve the environment, and restrict international trade" (Salzmann, 1997, page 14).

The often used protection argument linked to eco labelling systems has led to discussions within the World Trade Organization. Two different WTO committees are involved, as both the committee on trade and environment and the WTO technical barriers to trade committee discuss eco label systems. Further, both within the GATT processes and in ISO certification regulations eco labels is part of the international trade rules development discussions. One particular and important theme is whether process and production methods (PPMs) may be included, from the environmental perspective this is regarded as critical and important because it will provide opportunities to assess and include product life cycle considerations. The ISO system has developed eco label standards in the ISO 14000 series, in particular ISO14024 covering third party eco-labels as well as ISO14021 (industry/company labels) and ISO TR14025. An often used slogan of ISO is "Engaging stakeholders and building consensus". In their process description

(http://www.iso.org/iso/guidance_nsb.pdf) they state: "Generally, ISO processes and national body engagement have been viewed as successful to result in ISO standards reflecting a double level of consensus – among market players and experts at the drafting stages of the standards, and among countries at the formal voting stages of the standards". The practical implication of this multi-level consensus approach is that the lowest possible standards may be selected and the processes include an element of veto opportunities. As a further element, the ISO regulations may serve as a basis for challenging eco label programs before the WTO.

Markandya (1997) states that eco labels typically have three main objectives: inform the consumer, develop standards and protect domestic products. Harrison (1999) presented case study evidence from three governmental sponsored programs within paper products from Canada, the EU and in the Nordic countries. Her presentation gives detailed evidence of close government/industry cooperation in processes where national authorities systematically had views in favour of definitions and criteria creating an advantage for their respective industries.

In conclusion, eco labelling systems has to be understood within a context of international regulations where industry and national authorities often have close cooperation and where explicit or implicit trade barriers or market advantages/disadvantages are elements of relevance.

Understanding the impact on labelling schemes on consumers

Two distinct issues have been given considerable attention in research. First: which market segments are most likely to be influenced by "green" initiatives as eco labels and second: what is the effect of eco labels on consumer behaviour and product profit margins.

Market segmentation is a core business activity, where companies differentiate between groups of consumers and target specific products and campaigns towards selected segments. The identification of green market segments is based on company needs to target such segments effectively. Examples of factors from studies of green market segments are that gender (females), income level (high) and education level (high) are factors often identified as related to being more environmentally oriented (de Paco et al, 2009; Roberts, 1996; Furlow and Knott, 2009). It is also suggested that the strongest predictor of a "green consumer" is an attitudinal factor, the belief that he/she as an individual may make a

difference (Roberts, 1996) which may be combined with other characteristics as age, income and gender.

Studies by Nimon and Beghin (1999) and Maguire et al (2001) identified consumers groups willing to pay a price premium for environmental friendly products within clothes and baby foods. Wustenhagen (1998), Vlosky et al (1999) and Veisten (2007) also concluded that groups of consumers are willing to pay a price premium for products with a better health or environmental profile than other products. It should be noted that many of these studies use intentions rather than actual purchase decisions as the empirical basis of their analysis. One study of actual consumer behaviour was presented by Srinivasan and Blomquist (2009), and they identified a consumer group willing to pay a price premium of in average of 69% for paper towels with eco labels in an Internet based grocery store.

The important points are that it seems likely that there exist consumers which may include environmental concerns broadly defined as factors influencing their product selection process, and that they partly are willing to pay price premiums for such products.

On the other hand, Ottman et al (2006) suggest that the "vast majority of consumers, however, will ask: If I use green products, what's in it for me" (page 24) and that only a small niche of consumers are influenced by environmental arguments or factors.

Other studies show that consumers suspect green products being of inferior quality, Fowler (2002) reported that 42% of a consumer sample would not buy green products based on fear of reduced quality compared to other products. It should be noted that frequent use of environmental related terms on products has resulted in distrust among consumers as described by Carlson et al (1996), while Zimmer et al (1994) states that different green labels communicate so many different aspects that they could become meaningless. When observing the large number of terms and symbols used, Borin et al (2011) describe increased consumer scepticism. Partly, some of the eco label initiatives have been criticized as being greenwashing, due to lack of evidence of environmental impact (Chang, 2011; Bickart and Ruth, 2013) while Bustillo et al (2009) states that "the resulting eco-babble is of little practical use" from a consumer perspective (page B1).

From a methodological perspective, Salzmann (1997) points to the difficulties of measuring eco labelling effects as factors such as packaging, prices and promotions are never held constant, making it challenging to develop robust analytical methods. But he also stresses an important point: eco labels may influence company actions and product design, even without a direct effect on sales and profitability. The potential competitive impact may

be more important than the actual impact. One example is the tuna/dolphin labelling in the US. It was observed high incidental dolphin mortality in the eastern tropical pacific due to tuna fishery. Then some major US companies started marking their tuna products as dolphin safe or "no harm to dolphins". This process did change the value chain activities and fishing operations, with limited long term effects on competitiveness and profitability. It was the fear of a possible competitive disadvantage and profit loss which was the main driver of company actions.

This combination of consumers willing to let health aspects or environment impact influence on their purchase decisions, and widespread confusion and partly distrust in eco labelling of products leads to the key contributions in this paper. The first contribution is to increase the consumer understanding of eco labels and the processes and parts involved in typical label development. The second is a discussion about how consumers should evaluate and make decisions when meeting a large variety of different eco labels and environmentally oriented terms in marketing campaigns and products.

Methodology

We have performed a literature search in ABI/Inform, SCOPUS, Web of Science (ISI) and Google Scholar by using a combination of keywords as eco labels, green marketing, green segmentation and eco accreditation. Based on this, we identified a number of relevant studies and used the author search and citations assessment to collect more studies.

The case study is based on three parts. First, within our research group we have had a long-term relationship with a major European producer of paint with focus on laboratory testing of emissions from paints used in their product development processes. We build on the knowledge from this cooperation and informal discussions with the technical staff in the company. Second, we have systemized available information from different eco label systems about technical requirements, and third we made contact by telephone with some of the different label system to discuss their experience and focus areas.

Yin (2009) defines a case study as "…an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (page 18). We define our approach as an illustrative case study where we combine different information elements to describe a real life phenomenon.

Case presentation

First, we will briefly present examples of relevant label marks used in Europe. Then, we will present a) The choice of which substances or effects that are included, b) The choice of test methods and protocols and c) Definition of limit borders in order to be approved for labelling.

Examples of eco oriented labels relevant for paint in Europe

Eco labels initiated and organized by industrial associations include the Finnish Emission classification of building materials (M1) scheme which is well established. The first products were labelled in 1996. Currently, the scheme is operated by the Building Information Foundation (RTS), which has close contact with the building industry, and this has made the scheme accepted and widely used in the Finnish market. The Swedish Paint Manufacturers' Association (SVEFF) has prepared its own industry standard for emission measurements from paint.

The Blue Angel label was developed in Germany and introduced as early as in 1977. It includes many types of products, and is often described as the oldest environmental label in the world. The criteria vary between the various product groups. For paint, the requirements are mainly connected to the impact that the paints have on the external environment – but some requirements also bear relevance for the indoor climate. Natureplus is an organization which has as its objective to promote environmentally friendly, healthy and secure buildings. Natureplus is a voluntary scheme and it contains requirements to both the external environment as well as the indoor climate. The Austrian Ecolabel is a combination of an environmental label and an indoor climate label. Most of the requirements are related to the external environment and they are of the same type as Blue Angel. The Norwegian Asthma and Allergy Foundation (NAAF) have used an independent technical committee to develop specific requirements and states that this is one of the world's most restrictive label systems for acceptance of emissions levels for indoor products. If fulfilling these requirements, the producers may use the approved by NAAF label on products.

Examples of official labels (governmental initiated and supported) are the Nordic Swan label system and the EU Ecolabel system. Especially the EU Ecolabel (the flower) has experienced rapid growth in acceptance and use the recent years. For paints, these systems

consider the chemicals used when producing the paints, not the emissions when used and after use.

A slightly different label is the approval by the Swedish Asthma and Allergy Association (SAAF), they base recommendations on the tests of paint that have been carried out on use of the SVEFF-requirements and products that are recommended may be labelled with the Swedish Asthma and Allergy Association's name and logo. This is an example of close interaction between an independent organization and an industrial alliance. Recently, they changed their requirements making them similar to the Norwegian Asthma and Allergy Foundation requirements.

The choice of substances included

Different substances may be included in indoor paints and when measured, VOC is a term used on volatile organic compounds which may measure individual components, while TVOC is a total or added VOC measure and SVOC is semi-volatile compounds. In addition, it is not possible to measure all substances by use of VOC-directed methods (for example aldehydes), and sensory tests in different variations may be used. Adding to the complexity, focus may be on the impact paints have on the indoor environment, the outdoor environment, the degree of renewable material used, or label systems may operate with lists of not permitted raw materials. Some systems focus on the chemicals added in production, other label systems focus on emissions when used, and some label system combine different of these approaches with varying weight on different elements.

If we examine the choice of substances the label systems focus on, different classifications exist. Chemical compounds that have carcinogenic effect have been classified by IARC (the International Agency for Research on Cancer). On the basis of this classification, EU has adopted rules for the classification and labelling of the carcinogenic properties of chemicals via the Substance Directive (67/548/EEC of 27 June 1967) and the Compound Directive. The substances which are included in the labelling schemes are mainly chemicals that have been classified either in category 1 or in category 2 (high risk groups). These substances may be defined as having risk phase H350 (May cause cancer, H350i May cause cancer by inhalation or H351 Suspected of causing cancer).

The typical labelling scheme has limit values for TVOC concentrations, but often also includes specific border values for selected compounds within the TVOC calculation if these have particularly high risks of negative health effects.

In conclusion, we observe large variation in ownership structure and focus among the labelling systems, partly influencing the selection of compounds or materials included even though all of these labels may be used in indoor paint products.

The choice of test methods and protocols:

When examining VOC measurements, they are difficult to compare as there is several different calculation methods. Further, not all compounds may be measured with methods used for VOC, meaning that other methods are used for measuring for example formaldehyde and other aldehydes. The need for standardization of test protocols is well known, and three different but related reports are important.

The ECA-report: In 1997, a European Union report from “European Collaborative Action – Indoor Air and its Impact on Man” was published under the title “report 18 - Evaluation of VOC Emission from Building Products” – hereafter called the ”ECA report”. In this report a proposition for a labelling scheme had been prepared with a focus on flooring materials. It was the intention that this report should form the basis for a scientific and a harmonized starting point for the national standards.

ISO1600-6: This is the second influential criteria protocol for definitions and tests that may be used for classification of paints and carpets used in the indoor environment, developed by the international standardization organization.

The AgBB scheme: A task force of public health authorities in Germany have developed a test protocol named AgBB. The point of departure for the scheme was a set of criteria prepared by the committee for health related assessment of building materials. It may be regarded as based on ISO1600-6 but modified.

When we evaluate actual processes, most VOC analyses is made according to ISO1600-6 or close to ISO1600-6 while TVOC calculations varies based on one of the three reports above, or has special characteristics. When further looking at the calculations, these may be made at different points in time (3 days, 14 days, 28 days etc.) Often, cancer focused parts are measured after day three and other compounds after 28 days.

The practical implication is straightforward: For example VOC or TVOC numbers may be presented but test methods and test timing will have strong impact on the values found which make it difficult to compare. Adding to the complexity, there will be variation related to which particles are included in the calculations of values.

The definition of limit borders for approval:

The third element is the limit values for the specified parts accepted within a label system. As an illustration, table 1 presents detailed limits for TVOC-compounds used in label systems for floor coverings and/or indoor paint.

Table 1: Limit values for TVOC and evaluation times for emission measurements for different evaluation schemes.

	3 DAYS	14 DAYS	28 DAYS	
	$\mu g/m^3$			
AgBB (Germany)	10 000		1 000	
ECA report	5 000		200	
AFFSET (France)	10000		1000	
Eurofins: Indoor air comfort	10000		1000	
Eurofins: Indoor air comfort gold	1000		100	
Emicode EC1 pluss (very low emission) (Germay)	750		60	
Emicode – EC2 very low emission	1000		100	
Emicode – EC3 low emission	3000		300	
Blue Angel – wood floors (Germany)			300	
Blue Angel – low emission wall paint				No demands
Natureplus – vegetable paint	3000		300	
GUT (Germany)	300			
Austrian Ecolabel – carpet flooring	250		100	
Austrian Ecolabel – Elastic floor covering	1000		300	
Austrial Ecolabel- Wall paints				No demands
	$\mu g/m^2h$			
M1 (Finland)			200	
Sveff (Sweeden)			< 40 40-100 > 100	
SAAF (Sweeden)		10		
NAAF (Norway)		10		

First, it should be noted that there is a slight difference between µg/m2h and µg/m3 which add confusion. Second, both floor coverings and/or paint emission schemes are included. Considering in example Blue Angel, this label has emission values for floors (carpets) but not for paint. Then, an indoor paint may use the Blue Angel label but the requirements then focus other elements than TVOC emissions (only formaldehyde emission). It is not easy for consumers to understand that a flooring product or paint both may have the Blue Angel label, but that these do not have equal types of requirements for the label. Third, the table shows border values measured at different points in time. Three days after use the variation is from 300 µg/m3 (GUT) to 10 000 µg/m3 (AgBB). After 28 days, the best SVEFF class has an emission limit at 40 µg/m2h while M1 has 200 µg/m2h. Recalculation of the SVEFF demand given as specific emission rate (µg/m2h) to reference room concentration (µg/m3) shows that the SVEFF demand for 80 µg/m3 is well below the 1000 µg/m3 demand from AgBB The requirement by the Norwegian Asthma and Allergy foundation and the Swedish Asthma and Allergy foundation are even stricter, with a border value of 10 µg/m2h even earlier (14 days). This variation is fascinating, and illustrates how products in possession of different eco labels have a high degree of variations when it comes to characteristics.

Discussion

Most studies of eco labelling are written with a basis in the business/marketing research areas with a firm/manager perspective. Other studies have an environmental focus, while a different group of studies consider the intra-national processes of regulations and negotiations. Few, if any studies attempts to analyse how the firm level decisions, regulation and development processes and technical considerations interact and which consequences it has for consumers.

When developing eco labels, three criteria for success are of particular relevance according to Harrison (1999). The first is the possibility to distinguish between products by use of meaningful criteria in terms of environmental or health impact. Second, producers must be willing to certify their products and third: the consumers must be willing to select these products. She does not include a fourth criteria, that the border or acceptance levels for accreditation in fact represent a way to identify superior products along on or several health or environmental dimensions.

Having these criteria in mind, in table 2 we have selected Norway as an example and the most dominant producers of indoor paints. This table shows the labels on wall paints.

Table 2: Labels on wall paints on the Norwegian Market 2014

Manufacturer	Product	Nordic Swan	EU Ecolabel	NAAF	SAAF	Other
Jotun	Lady wall	X	X			
	Lady Balance	X	X			Eurofins Gold
	Lady Classic					
	Sense wall	X	X	X		
Flugger	Flutex 5		X			
	Flutex 7s		X			
	Flutex 10		X			
	Flutex 20s		X			
	Flutex 5s		X			
	Dekso 5		X			
	Dekso 25		X			
Gjøco	Bliss	X	X	X		
	Fashion					
	Interior		X			
	Superfinish		X			
Beckers	Elegant	X	X		X	
	Scotte	X	X			
Nordsjø	Ambience	X	X	X		
	Nordic Light	X	X	X		
	Original wall	X	X			
Butinox	Living Room	X	X		X	
	Childrens Room	X	X		X	

Of these 22 products, 20 are marked with the EU Ecolabel (flower) sign. From the consumer perspective, this means that almost every product qualify for this label. Going to Denmark and including all indoor paint variants in trade, 664 different products are approved by the EU Ecolabel system. We are not able to identify the number of products not labelled. However, it seems reasonable to conclude that very few indoor paints have characteristics making them unable to qualify for this eco label.

Then we have the Nordic Swan label system, where it seems as there are a lower number of products approved. But does this mean that the requirements are stricter, as 11 of the 22 products are included? The answer is no, because from 2008 the Nordic Swan requirements were harmonized with the EU Ecolabel system and these two marks are organized within the same national organizations in a process partly driven by international trade agreements within the EU/EEA trade regime. The practical consequence is that manufacturers just decide if they apply for (and pay for) use of one of these labels or both labels, as the requirements are identical.

Finally, the consumer may also meet other labels, four products was market as approved by the Norwegian Asthma and Allergy Foundation (NAAF), three products are approved by the Swedish Asthma and Allergy Foundation (SAAF) and one product used a label named Eurofins Gold.

Going back to the criteria stated by Harrison (1999), it is possible to distinguish between indoor paint products based on meaningful criteria even though test protocols and test choices opens for a high degree of variation. Second, the major producers seem to be willing to certify their products.

Third, are the consumers willing to select labelled products? From the manufacturers perspective this is an important question. From the consumer perspective, the question should be rephrased into: Should a consumer select labelled products? The answer seems to be partly yes and partly no. The EU Ecolabel is not used on two of the paints, which makes it reasonable to avoid these if focusing on which particular substances are used in the production of the paints. But it is not likely that consumers know that the Nordic Swan label is the same as the EU Ecolabel, partly because the information in brochures and web pages include sentences as "...fulfils the strict requirements of both the EU Ecolabel and the Nordic Swan label" (Butinox brochure, 2014). The only value of the EU Ecolabel or Nordic Swan label seem to be to identify the about 10% of products with the weakest environmental profile. For the majority of products, these labels give limited information to consumers.

However, the labels indicating approved by the asthma and allergy foundations in Norway and Sweden in fact distinguishes between products, with few products fulfilling the requirements defined.

This leaves us with the fourth question: are border values for accreditation defined in a way so that superior products are identified? It seem as the answer is no for the EU Ecolabel and Nordic Swan, and yes for the NAAF/SAAF systems. From the consumer perspective this creates confusion, as it is possible to observe two or three labels on most products – but just one of these really give information that might be used for decision making.

In the next paragraphs, we will discuss this situation and raise some questions consumers may be aware of when evaluating eco oriented label systems.

Should a consumer trust public and "official" labels?

If a consumer wants to select an indoor paint product with a superior health profile, the EU Ecolabel and now harmonized Nordic Swan labels in practice just makes is possible to avoid the 10% of products with the most harmful chemicals used in production processes.

Interestingly, the EU Ecolabel now gets basis funding from the EU system and experience rapid growth from product licenses. In 2014, the EU Ecolabel organization states that more than 37 000 products are accepted and that the number is rapidly growing. The consequence is that this label has marketing and communication resources that are actively used to develop and sell the label. At the eculabel.eu home page the label is described as " The EU Ecolabel helps you identify products and services that have a reduced environmental impact throughout their life cycle …promoting environmental excellence which can be trusted.. is a commitment to environmental sustainability. The criteria have been developed and agreed upon by scientists, NGOs and stakeholders to create a credible and reliable way to make environmentally responsible choices. The EU Ecolabel is an easy way to make an informed choice about the products you're buying".

The EU Ecolabel organization further states that the criteria have been developed to ensure that only the 10% to 20% most environmentally friendly products currently on the market can meet them. When we compare this label marketing profile with 20 of 22 selected indoor wall paints in Norway approved, that 664 paints at the Danish marked is accepted, and the growth in use of this label across Europe as described by EU statistics the statements of this label seem strange. A label accepting almost every product within a category has limited value for consumers, and it partly adds confusion for consumers evaluating other labels which in fact divide between different products.

We have only focused on indoor paint products. Lang (2010) presents a report about the EU Ecolabel and forest products. He concluded that the criteria used for forest management and copy/graphic paper is very weak, in fact "so weak as to be meaningless" (page 80), that the processes are non-transparent and that the website statements like that only the very best products are able to carry the label is misleading. As an example, he described a requirement of at least 10% of wood fibres from certified forest, where many EU governments have a mandatory requirement of 100%.

The legislation underpinning the EU Ecolabel makes a point of the importance of non-governmental organizations (NGOs) involvement for acceptance by the general public, and that NGOs should play an important role and be actively involved in development and setting of label criteria. In 2011, a letter was written by 14 NGOs focusing on paper

products, where they described how they were ignored and warned the European Commission that without change “NGOs across Europe will inform their supporters, the public and companies, that the label is meaningless at best, and misleading at worst” (http://www.fern.org).

NGOs use the terms meaningless and misleading for the EU Eco label and paper products, and for indoor paint products we notice that there is a remarkable distance between the actual requirements and the public and official descriptions of the EU Eco label and Nordic Swan label. It seem like the informed consumer should be careful not to let such official labels marketing statements influence purchase decisions to a high degree.

Understanding the financing of label system – how important are revenues?

Most labelling systems need to generate revenues, mainly from company fees for using the label. As a consequence, labels without participating firms may not survive for financial reasons or become irrelevant. Even where there is a public cosponsor system, like for the Nordic Swan label system, it is required revenues from companies. This has consequences, and when examining the annual reports of the Nordic Swan label organization in Norway, terms such as growth rates, competition and market share are commented, with statements as “In the long term, the goal is... increased number of labelled products and increase in revenues” (Nordic Swan Norway, annual report 2013, page 14). A different approach would have been goals of more challenging requirements and fewer accepted products, but few organizations are willing or able to plan for or work towards reduced revenues.

In Norway and Sweden, the fact that the Nordic Swan and EU Ecolabel have identical requirements for paint are almost impossible to understand for a consumer, as this information is not easily available on the web pages and the producers often use statements making a distinction between these labels. In Denmark, this information is more available. Considering the EU Ecolabel there is a fee for applying for the label, a fee for expansion if new technical criteria are added and a yearly fee for use of the label at 0.15% of the turnover in the EU/EEA area with a maximum limit of 25 000 EURO for each product group approved. Adding the fee for use of the Nordic Swan label, this represents increased revenues for the label organization.

In a study presented by Seifert and Comas (2012), Ole Just Sorensen of Grundfos A/S Management commented on the competition between different labels in a race to gain market share: "The market for ecolabels is very confusing and, in some areas, it looks more

like a new industry of 'selling stickers' and where generating money seems more important than the outcome and the importance of the label".

In summary, if the label system designs the requirements too strict, few companies will be able to use the label and the revenues will not reach the necessary levels. On the other hand, many accepted producers and product lines make the label irrelevant due to the weak environmental or health gains or advantages of the products with the label. The number of available label systems also makes it possible for producers to select label schemes fitting their products or having a lower participation cost. In addition, for producers the possibility of establishing their own labels exists, independent of usage payment and application processes.

There is one exception in the entire eco label environment. Some organizations are independent, where income from labels is of limited importance. They may have the opportunity to define strict requirements. This distinction is fascinating, as the entire organization of label systems and the revenue aspect indicates that official or industrial label systems often develops weak requirements while organizations with a different focus (asthma, allergy, beware of the rain forest, reduced green gas emissions etc.) may be more dedicated and likely to decide on technical criteria with higher standards and survive even with limited industrial acceptance and label use.

If it had an effect, would it be accepted by the industry?

Most label systems have to consider financial elements, but also a different dimension: In most label schemes there is strong industrial participation or ownership. It is possible to ask how likely it is for an industrial-owned or heavily influenced label system to decide on criteria or test protocols that is an advantage for one or some companies and a disadvantage for others. In such circumstances, disagreement may be expected. Two examples: Within the Nordic Swan label there has been a process to decide on label requirements for bread and bakery products from 2009, but this process was abandoned without agreements in 2012. And Luukanan (2003) describe how the paper industry decided to discard the Nordic Swan label due to its ability to differentiate between products (prior to the merging with the EU Ecolabel), while Harrison (1999) presents how the Canadian paper industry opposed the Environmental Choice Program. In fact, even Canadian companies that would have an advantage of the proposed technical requirements resisted the label as a solidarity action within the industry.

Normally, it is not likely that eco-oriented labels will develop strict requirements and achieve an actual effect, attracting companies and winning the fight against industrial resistance due to how such label schemes typically are developed and financed.

Is eco oriented labelling systems just a tool for price premiums for specific market segment?

There is empirical evidence of consumer groups willing to pay a price premium for products having improved environmental or health performance. There is no reason to believe that these products normally include higher production or distribution costs, and in some instances they may even have inferior quality (for instance due to exclusion of some chemicals). When assessing indoor paints, the eco label part is not important as most paints from major producers qualify for some labels. For this product type, there is typically no or a low price premium linked to eco labelled or products marketed as green or environmental friendly. However, for other product groups as sanitary/children care products there exist partly large price differences. We are not able to conclude, but the possibility of eco labels as a tool for achieving price premiums for a market segment needs to be studied further.

Understanding the market protection dimension of label systems

When different national industrial organizations establish eco label systems, it would be naive not to expect them also to consider the competitive dimension for the member companies. Examining paper products, it is well documented how national systems and negotiations between nations (Harrison, 1999) are basically driven by national industry considerations.

We would expect that the same situation exists for the paint industry. As a consequence, national systems will often favour producers within the market, while international systems will be based on negotiations and consensus oriented processes with low standards as the result.

We have mentioned the German AgBB scheme, which is voluntary for the manufacturers. According to a press release of June 16th 2011 targeting the AgBB scheme, the European Commission requests Germany "to remove barriers to trade" and "to change current rules and practices (Bauregellisten) concerning construction products which today impose additional requirements for products covered by European harmonised standards, and bearing the CE marking. Such additional requirements are in breach of EU Single Market rules." It is further stated that CE-marking already satisfy all applicable requirements and that current practices reduces the access to the German market.

The protective element of many national label systems has resulted in much discussion within the entire system of GATT, ISO and WTO, where reduction of international trade barriers is of importance. The consequence is also a development where it is increasingly difficult to define and obtain national eco label standards with strict requirements of acceptance as these may be defined as a barrier for trade and a breach of international agreements.

Is it possible for the typical consumer to evaluate the content of eco labels within paints?

We have given a brief presentation of European eco labelling systems used for indoor paints. This demonstrates how difficult it is for a consumer to compare and make purchase decisions. For each labelling system we may ask: Is the focus on indoor climate effect, the outdoor environment or a mix of the two? Which compounds are included? How is measurements made? How is time of measurement treated? How much weight is given to the most dangerous compounds? How high/low are the limit values for acceptance defined? May what seems to be comparable numbers be compared? Are product life cycle and production processes aspects included?

We conclude that even though a consumer in fact wanted to compare and select products, in practice it is difficult to make decisions based on eco labels within this type of products across different labels used by different manufacturers. Even if a consumer gets information about TVOC values used by different labels, the calculation methods are different, and the handling of particular chemicals with negative health effects within the TVOC value would most likely have variations.

It is not surprising that Mitchel and Papasvassiliou (1999) in fact mentions eco labelling and marketing of environmental friendly products as an area with particular high degree of consumer confusion.

A different question is whether eco labels on some products from a producer in fact indicates that they are better for health or environment than products from this producer without such labels. Rephrasing: Is eco labels just put on some products as a marketing gimmick without representing actual product differences? Our research group has had close cooperation with a major European paint manufacturer for several years. Within this company, deliberate processes developing products with a superior health profile have been designed, and the products communicated to the market as having low emissions are in fact superior on this dimension. However, both the main “green” product line and the major ordinary product line use eco label seals like the EU Ecolabel and the Nordic Swan.

We have not included the EU Ecolabel system in our comparison as this focuses on the characteristics of products put into paints – not the emissions from the actual paints when used. How should a consumer be able to know this difference? And to illustrate - the paints with lowest input chemicals emissions are in the 0.3 g/l VOC area while the EU Ecolabel requirements are lower emissions than 30 g/l VOC, a difference factor of 300. When eco labels has been criticized for possible misleading consumers, this is relevant as it may make products with inferior environmental or health characteristics be perceived as equal to much better products.

Within indoor paints, the different label systems does not differentiate between emission values, but there is large differences between the product lines put forward as the green product line of the producers having such product lines, compared to other product lines. When making purchase decisions, it would normally not be the eco label that is important but if the product is part of a green product line or not. However, if a green product line is superior on all dimensions, the producer should be expected to produce all paints with this advantage. But technical qualities as wall coverage, ease to use and durability may be reduced and then there is a trade-off between quality and emission profile.

Concluding remarks – how should the informed consumer treat eco oriented label schemes?

When observing rising levels of asthma and allergy, consumers may want to select products with as limited emissions to the indoor environment as possible, and they may also have ambition about selecting products with limited negative effect on the outdoor environment. For these health and environmental oriented consumers, we would like to provide some advice when they evaluate eco oriented labels:

First, it is impossible for a normal consumer to compare products based on labels due to the number of labels and the differences in technical requirements, test methods and substances included.

Second, if attempting to use labels, a rule of thumb is that international labels as the EU Ecolabel will typically have border values that make it impossible to select between products based on this type of labels, because of the consensus oriented processes. When a label market itself as international or government/public supported (like the EU Ecolabel) this should normally be met with careful distance as it in fact has considerable resources but low value for consumer decision making.

Third, national labels often have stricter requirements, but if they really differentiate between products they will meet resistance from international organizations or governments, or experience producer decline of label use. Labels used by organizations as Asthma and Allergy Foundations is most likely to have relevant and demanding criteria and may in general represent more valuable labels.

Fourth, most eco labels are owned or heavily influenced by industrial organizations and even for more independent eco labels the voluntary element of participation reduce the ability to really develop label differentiation between products. Campaigns against very specific characteristics ("no harm to dolphins" or "without genetic modified ingredients") may be a more effective way of developing better products if a consumer gives weight to these elements. The selection of products with a distinct, concrete advantage may be better than placing trust in general eco labels where it is hard to understand which attributes it includes.

Fifth, consumers should look for label providers were the revenues from the label may be of limited importance and were other goals than label revenues or industrial competitiveness exists.

Looking at research, many studies focus the effect of labels on consumer choices and attempts to describe characteristics of market segments more likely to include environmental or health issues in their purchasing decisions. Few studies critically evaluate how labels are established; focus their goals, analyses the technical requirements for products to be accepted or the revenue patterns. It will be possible to present research making it easier for consumers to understand the eco label system and strengths and weaknesses of different labels. However, this will require a reorientation of researchers towards including the consumer perspective. Such a change is not easy, both the company oriented focus of most journals and the research financing systems often including a need for industrial partners then represent barriers for more attention to the consumer perspective in eco label research. In practice, the critical focus on eco label systems up to now does not occur from research but from different NGOs raising questions, writing reports and attempting to influence decisions processes.

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