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Shaping the face of environmentally sustainable products: image boards and early consumer involvement in ship interior design

Pekka Murto [a,*], Oscar Person [a,b], Markus Ahola [a]

[a] Aalto University School of Arts, Design and Architecture, Department of Design, Hämeentie 135C, 00560 Helsinki, Finland
[b] Delft University of Technology, Faculty of Industrial Design Engineering, Department of Product Innovation Management, Landbergstraat 15, 2628 CE Delft, The Netherlands

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ABSTRACT

The study reported in this paper addresses image board usage and environmental sustainability in the early stages of product development. Simulating the early stages of product development, image boards for three ship interior concepts were created based on different principles for environmentally sustainable design. The boards were used in interviews to elicit feedback on the concepts and to draw conclusions about how consumers make inferences about sustainability. The results of the interviews suggest that consumers infer sustainability from the appearance of interiors in a number of different ways and that image boards can elicit a range of inferences. However, the results also show that the inferences consumers make can differ widely and it is hard to control what inferences they make from an image board. Building on these results, the use of image boards in environmentally sustainable product development is discussed and hands-on advice for their use as an interview stimulus is outlined.

1. Introduction

How should environmentally sustainable products be designed to improve their acceptability in the marketplace? Sustainability is an important consideration in new product development due to the environmental impact of production and consumption (Vezzoli and Manzini, 2008; Luttropp and Lagerstedt, 2006). In addition to its environmental benefits, focusing on sustainability opens up new value opportunities for companies. Environmentally sustainable products yield higher cost-efficiency and innovativeness (Porter and Linde, 1995), enhance consumer experiences (Cagan and Vogel, 2002) and can be sold at premium prices (Trudel and Cotte, 2008). Hence, it is not surprising that a growing number of companies are shifting towards designing more environmentally sustainable products. However, many companies struggle with conveying the value of their efforts to consumers and, more generally, with the market acceptance of sustainable products.

Environmentally sustainable products only hold a marginal share of the market (Dupré, 2005; Tseng and Hung, 2013). A major reason for this is that consumers do not always know what makes a product sustainable (Lin and Huang, 2012). Another important reason is that consumers do not necessarily prioritise environmental sustainability when buying products. In fact, in the case of some products, references to environmental sustainability may even hold negative connotations. For example, Luchs et al. (2010) found that marketing laundry detergents, car tyres and liquid hand sanitisers as being environmentally sustainable made consumers think that they did not perform as well as regular products. Thus, how sustainability is communicated to consumers represents a key challenge for companies in implementing practices for more environmentally sustainable product development. This challenge is compounded by the fact that consumers often are driven more by affect and emotions than rational product evaluations in selecting more sustainable product alternatives (Koenig-Lewis et al., 2014).

The study reported in this paper follows as a direct response to the above challenges and addresses (1) how consumers infer beliefs about environmental sustainability from the appearance of products and (2) how image boards can support designers in mapping out such inferences during the early stages of product development. The context for the study is the appearance of ship interiors and the work of industrial designers. What products look like and what they communicate through their appearance is a major concern for industrial designers in new product development (see e.g. Ulrich and Eppinger, 2000). The appearance of products has the

* Corresponding author. Tel.: +358 50 383 4649.
E-mail addresses: pekka.murto@aalto.fi, pekka.murto@gmail.com (P. Murto), oscar.person@aalto.fi (O. Person), markus.ahola@aalto.fi (M. Ahola).

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potential to evoke emotions, alter expectations of product quality and influence product choice by conveying both functional and symbolic meanings to consumers (Norman, 2004; Bloch, 1995; Creusen and Schoormans, 2005). The appearance of products has been suggested as an important, yet often underutilised, means to communicate environmental sustainability to consumers (Walker, 1995; Vezzoli, 2007; Saito, 2008; Hassi and Kumpula, 2009). Yet, the appearance of environmentally sustainable products and how to design it have received limited attention in the literature on sustainability and design (see e.g. Mackenzie, 1997). Addressing this methodological shortcoming constitutes the starting point for the reported study.

The contribution of the study is positioned at the intersection between industrial design and environmental sustainability in new product development. In particular, the study provides much needed insights on the process by which consumers infer beliefs about environmental sustainability from the appearance of products. At present, companies are often limited to eco-labels in communicating the sustainability credentials of their products to consumers. However, due to the narrow scope of eco-labels, companies are encouraged to use other means as well in raising consumer awareness about the environmental impact of products. For example, Rex and Baumann (2007) argue that companies need to learn from conventional marketing and expand their practices for communication if they seek to improve the market acceptance of sustainable products. Following earlier work on design in marketing (see e.g. Bloch, 1995), the appearance of products has recently been shown to fulfil an important role in improving such practices (Hosey, 2012; Luchs et al., 2012). The reported study adds to this emerging body of research on sustainability and design by unveiling the variety and complexity by which consumers infer beliefs about sustainability from the appearance of products and the possibilities for designers to address such beliefs in the early stages of product development and lifecycle design, prior to product engineering. The appearance of products and their factual environmental credentials do not always go hand in hand. Additionally, as noted earlier, consumers seldom have a full understanding of what makes one product more sustainable than another. With a focus on the early phases of design prior to activities such as detailing and manufacturing, the reported study addresses the appearance of products in terms of seeking inspiration and locating guiding principles for the continuation of a development process. In doing so, the study investigates the relevance of a fundamental design tool for industrial designers in developing more sustainable products. As argued by Lofthouse (2004, 2006), many design tools do not sufficiently support the everyday work of industrial designers in developing sustainable products. An image board is a basic design tool "used by a variety of design professions for a range of reasons" (Martin and Hanington, 2012, p. 100). However, the literature on design has little to say about the use of image boards in consumer interviews and what insights industrial designers potentially can gain from using them on empirical grounds. Based on the results of the study, the possibilities for designers to express sustainability through the appearance of products are discussed and hands-on advice for image board usage in product development is outlined.

2. Industrial design and environmental sustainability

A number of guidelines are available in the literature to support the development of more environmentally sustainable products and services (see e.g. Brezet and Hemel, 1997; Lewis et al., 2001; Mont, 2002; Vezzoli and Manzini, 2008; Fiksel, 2009; Shedroff, 2009). Many of these eco-design guidelines build on design engineering and life cycle design methods for decreasing the environmental impact of products. The guidelines often focus on providing detailed (hands-on) instructions for the technical development of products (e.g. how to use materials or energy more efficiently in different stages of the product lifecycle). The guidelines also outline basic principles for industrial design. For example, Walker (1995, p. 21) states that "maintenance, repair and upgrade requirements also suggest a reduction and simplification within product design". Similarly, Whiteley (1993) notes that the use of natural colour dyes often results in a more muted colour range for products. However, beyond such basic principles, the guidelines provide limited advice on what environmentally sustainable products should look like and how different principles can be explored and implemented during product development from the perspective of industrial design.

The appearance of environmentally sustainable products and the sometimes questionable marketing practices of companies have been topics of concern in the literature. Both scholars and practitioners have been particularly concerned about greenwashing, which means making a product look environmentally sustainable without any factual improvements in terms of its sustainability credentials (for a general discussion on the problems of greenwashing see e.g. Lyon and Maxwell, 2011). Besides representing a display of poor business ethics, greenwashing misleads consumers (Polonsky et al., 1997) as well as damages the market for sustainable products in general (Ottman, 2008).

The limited guidance on how to shape the appearance of sustainable products adds an additional layer of complexity to the question of how to design and market such products. As noted earlier, consumers do not always favour direct references to sustainability, nor do they always favour an overly green aesthetic (as typically is the case when companies resort to a stereotypically muted green appearance). For example, as described by Steffen (2010), consumers in the 1980's rejected many sustainable products from the 1970's due to their overly green connotations. In the case of fashion products, Niinimäki (2010) found that 70% of the consumers participating in her study wanted the appearance of sustainable products to be indistinguishable from regular products. Hence, in supporting the market acceptance of green products, designers need to shy away from ecological determinism in which ecological constraints and ambitions fully dictate the appearance of products (Saito, 2008). This is perhaps particularly so as having a superior product appearance may counter some of the negative connotations associated with sustainable products in terms of performance (Luchs et al., 2012). At the same time, as noted earlier, they still need to make reference to the sustainability credentials of products if they wish to help consumers recognise such products and, in doing so, extend the marketing practices of such products beyond eco-labels. To this end, designers are challenged with the task of balancing their interest in sustainability with the interests of consumers in shaping the appearance of more environmentally sustainable products.

2.1. Image boards and early consumer involvement

An image board is a basic design tool in shaping the appearance of products, used by a variety of design professionals ranging from industrial to interior to fashion designers. Image boards (or mood boards) are typically used in the early (exploratory) phase of design and product development, prior to detailing and engineering. They are collections of images, drawings and other visual materials that designers bring together to explore and showcase the underlying ideas for products (see e.g. Garner and McDonagh-Philp, 2001; McDonagh et al., 2002; McDonagh and Storer, 2004; McDonagh and Denton, 2005; Julier, 2007). In reviewing and selecting different visual materials, designers establish a platform for conveying the overall feel of a new product (or the interest of a