

Sustainable Innovation 2015

20th International Conference

'State of the Art' Sustainable Innovation & Design

9th – 10th November 2015

University for the Creative Arts

Epsom, Surrey, UK

www.cfsd.org.uk



User-Intensive Cars: Design Barriers and Opportunities for More Sustainable Approaches to Personal Transportation

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Production of passenger cars in Europe, EU27 + EFTA, has been steadily declining despite a large growth in markets such as Asia and Middle East (OICA, 2015; ACEA, 2014). Furthermore, the number of younger newly licensed drivers in Europe is declining due to later transitions towards traditional adult life and the cost of car ownership (Metz, 2012 and 2013). However, 54% of the world population now lives in urban areas and growing middle classes demand more consumer goods. This number is expected to grow until 2050 (United Nations 2014); road congestion and waste generation have been pointed out as some of the outcomes of such growth. Social changes towards vehicles in Europe and increase in urban population globally, may generate new opportunities to other forms of personal transportation and ownership models, inherently reducing the number of cars. Taxis have been a mainstay in every city but car-sharing schemes are still relegated to a marginal share of the car market.

Different solutions have been suggested in order to reduce the environmental burden of cars. Nieuwenhuis (1994) argues that doubling the lifespan of cars from 10 years to 20 years would potentially reduce the volume of vehicles produced and the associated impacts. Kagawa et al. (2011) found that extending the lifespan of vehicles reduces their life-cycle CO₂ emissions. Allwood and Cullen (2012) suggest that vehicles can last up to 20 years thus potentially reducing material and energy demands. On the other hand, according to Van Nes and Cramer (2006) and Vezzoli and Manzini, (2008), for products that consume most energy during their user stage, as distinct from manufacture, a user-intensive approach should be taken. User-intensive models of product consumption have been discussed by several authors (Mont 2002; Manzini and Vezolli 2003; Williams, 2006 and Moreno, Braithwaite and Cooper 2014). These suggest a shared product by many consumers in order to reduce the amount of materials and energy during their manufacturing process, consumption and disposal stages. Furthermore, user-intensive products will be replaced faster by new more efficient iterations without raising total levels of products and disposal.

There is also an increasing interest in studying the effects of car-sharing in some European cities (Firkorn, Muller 2011; Steininger, Bachner 2014; Baptista, Melo and Rolim 2014). However there is little evidence on whether cars used currently in a user-intensive environment are fit for purpose, if they fulfil the needs of multiple-users or overcome issues such as ownership, cleanliness and performance under different driving styles. It is unclear if such cars should follow the design model of, for example, the London Taxi with a fit-for-purpose solution where durability, accessibility and safety are the main features.

This paper presents initial findings from preliminary interviews about user-intensive passenger cars with key industry representatives such as car designers and engineers. It identifies, mainly from a design and development point of view, the barriers and opportunities to user-intensive vehicles. This will contribute to a better understanding of the car as a user-intensive product shared by a number of consumers as opposed to the dominant model of private ownership.