

Product-Service Systems across Life Cycle

The influence of ownership on the sustainable use of product-service systems - A literature review.

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Abstract

The evolution towards sustainable product service systems introduces a new relationship between product and user in PSS, where we see that the user no longer is the legal owner of the product. This article reports upon an exploration of the psychological relationship between consumer and product within the context of PSS, and addresses the way a shift in ownership influences consumers' perception. A literature review was needed towards the psychological side of the consumer-product relationship and its relation to different research fields (product attachment, experience design and non-ownership modes of consumption). The result is a set of characteristics that describes the system and the ownership dimensions. This set of characteristics could lead to future research into the correlation of different characteristics, ultimately leading to a set of guidelines for designers designing new PSSs.

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Keywords: Product-service systems; sustainability; rebound effects; ownership; product design

Abbreviations

PSS Product-service system

1. Introduction

The evolution of traditional products to product-service systems (PSS) is a valuable strategy for making a shift to sustainable consumption both for the people, planet and profit aspect. These PSS often results in non-ownership modes of consumption, such as renting, leasing or sharing. In this research, we focus on the new consumer-product relationship, which is marked by shifts in property rights, responsibility and the temporality of possession. The nature of this altered relationship is important because not all PSSs automatically lead to sustainable solutions [1], [2]. This level of sustainability depends on a lot of influencing factors. The shift in ownership, meaning that the user is no longer the legal owner of the product, is one of these factors. Non-ownership modes of consumption are presented to be collaborative, prosocial, altruistic and environmentally sustainable [3], but previous

research has shown that this is not always the case [4]. The shift in ownership, firstly, has the potential to make the PSS more sustainable by incentivising companies to make better products and the decreased amount of products that is needed to satisfy the same amount of consumers [5], [6]. Secondly, it can help changing the consumers' idea that ownership is the only option. Ownerless consumption has been identified as a trend over the past few years, meaning that consumers are willing to change their consumption pattern [7], although mainly for their own benefit [8]. Nonetheless, this shift in ownership has also been identified as a possible origin of rebound effects [1], [9]. Rebound effects turn a potential sustainable solution into an eventual increase of resource consumption [10]–[13]. Rebound effects linked to consumer behaviour are influenced by the shift in ownership. When consumers are no longer the owner of the product they might exhibit careless behaviour concerning the product [1], [4]. These types of behaviour can compromise the sustainability of the whole PSS and should be precluded, therefore it is of extreme importance to investigate the psychological relationship between a user and the product or PSS. The reasoning model behind this paper is based on the assumption that adding a service to a product that solely

focusses on a shift in property rights, responsibility or the temporality of possession, can decrease the (perceived) value of that product for the user, which can result in rebound effects. If this added service on the other hand goes beyond this pure functionality it can increase the (perceived) value of that product. Besides this it is important to note that this research does not see the tangible product and intangible service as two independent factors and mainly focusses on the difference in ownership between product and PSS and its influence on the psychological relationship between users and product. Therefore, the term product will be used while describing the different fields, but also refers to PSSs

Fields of research into consumer-product relationship such as product attachment and experience design, shed a new light on how this relationship can be designed to be more sustainable. This article explores a state of the art of the techniques from the different fields to make the consumer-product relationship more meaningful and long-lasting. This literature review results in a set of characteristics, describing ownership in the case of PSS.

2. Literature review

This review will first of all briefly describe the concept of PSS, the shift in ownership in PSSs and its possible rebound effects.

Secondly, ownership is analysed and examples of non-ownership modes of consumption are discussed. Thirdly, two fields of research proposing new ways of designing consumer-product relationships are discussed; product attachment and experience design. This section delineate a state of the art of the different fields in apropos the (psychological) relationship.

2.1. Product-service systems

Tukker and Tischner define product services as “mixes of tangible products and intangible services designed and combined so that they jointly are capable of integrated, final customer needs. The system is defined as the network, infrastructure and governance structure needed to ‘produce’ a product-service” [14]. This definition acknowledges that the products and services in a PSS are inseparably linked, but also that not all PSSs offer the same ratio between product and service since this highly depends on the offering. Based on this ratio the range of PSSs can be divided in three main categories; product-, use-, and result-oriented PSS, and subcategories (see figure 1a). The product-oriented PSSs are still mainly focused on the sale of products and offering services supporting that product, while the result-oriented PSSs are purely focussed on selling the result and solely use products to get that result. The European Commission also gave a definition of PSSs and

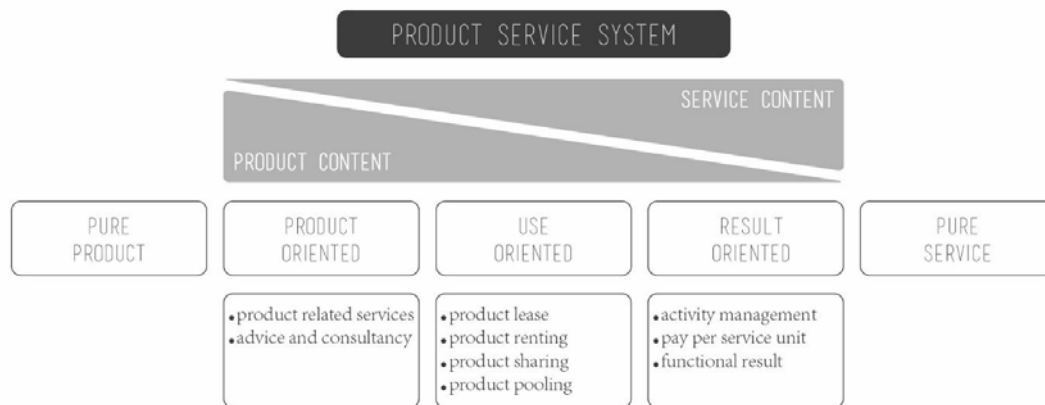


Figure 1a; Main and subcategories PSS (Tukker 2004)



Figure 1b; Shift in property rights



Figure 1c; Shift in responsibility



Figure 1d; Shift in temporality

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