What Value do consumers really expect of Product Service Systems? Reflections on how a different conception of value could facilitate the implementation of PSS in consumer markets

Maurizio Catulli

Senior Lecturer

Hertfordshire Business School, University of Hertfordshire

Hatfield, Hertfordshire, AL10 9AB, UK; Department of Engineering and Innovation, Open University, Walton Hall, Milton Keynes UK, MK7 6AA

Matthew Cook

Senior Lecturer

Department of Engineering and Innovation, Open University, Walton Hall, Milton Keynes, UK, MK7 6AA

Stephen Potter

Professor

Department of Engineering and Innovation, Open University, Walton Hall, Milton Keynes UK, MK7 6AA

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1. Introduction

While tangible products have formed the focus of much research in sustainable design and innovation, today novel configurations of products, services and systems are thought to provide equally valid ways of attaining more sustainable futures. Such product service systems are available in both intermediate and final markets and variously defined (*cf.* Mont, 2004:139):

"A system of products, services, networks or actors and supporting infrastructure that is developed to be competitive, satisfy customers and be more environmentally sound than traditional business models".

Case study research reveals quite diverse PSS offerings such as document and integrated crop management services, car clubs and laundry services. In some instances PSS have been deliberately designed to improve environmental performance while in others, they have been developed purely for commercial purposes. Both PSS and PSS like examples available on various markets have been analysed. These show that the full range of PSS characteristics are rarely exhibited in a single example and therefore emphasize various PSS types:

Product Orientated PSS: ownership of the product (material artefact) is transferred to customers and services are provided to help ensure product performance over a given period of time. Examples include maintenance contracts and warranties.

Use orientated PSS: ownership rights related to the product are retained by the service provider and the customer purchases use of the product over a specified period of time. Examples include, sharing/ pooling, renting and leasing.

Result orientated PSS: similar to use orientated PSS, the product required for service delivery is owned by the service provider. However, in contrast to use orientated PSS the customer purchases an outcome/ result of service provision, which is specified in terms of *performance* not in terms of product use over a period of time. For example, instead of renting a washing machine, households access a laundry service to clean clothes and linen.

Founded in the so called factor four discourse, environmental assessments of PSS have been completed which focus on gains in resource productivity that can be attained from the various PSS types when consumed as substitutes for 'normal' product based consumption in various markets. In summary, the assessments suggest that both product and use orientated PSS hold potential to improve resource productivity by factor two, while gains in resource productivity which may be achieved from result orientated PSS are thought to be far higher but difficult to quantify.

Clearly, PSS do not provide a pathway to sustainability as perhaps early predictions made in the 1990s suggested (Cook et al., 2012; Cook, 2014; Tukker, 2014). Nonetheless PSS can form the basis of the mix of innovations necessary to move society toward sustainable futures (Cook, 2014). With this in mind, the research community has developed further definitions, typologies, design methods to stimulate and assist PSS implementation in various markets (cf. Boehm and Thomas,

2013; Cook, 2014). Yet despite this research effort there is now growing concern that PSS are not being widely implemented (Vezzoli et al., 2012) and more importantly, that their potential to assist in the attainment of sustainability is unfulfilled (Cook, 2014).

Research suggests that PSS implementation is particularly problematic in final markets (Rexfelt and Hiort af Ornäs, 2009) as a shift from normal consumption based on products owned and used by households to one based on PSS is perceived by actors to among other things reduce control, access and performance (Catulli, 2012; Tukker, 2014). Thus crucially, we observe that this implementation challenge in final markets arises in part because PSS do not create sufficient value for consumers. Typically, PSS design strategies involve considering the functionality of products and providing alternate PSS which meet this demand but use far fewer resources (cf. Roy, 2000). However, research suggests that functionality is merely one of many forms of value required by households. Indeed, while the need for PSS to create sufficient value is widely highlighted, there is a paucity of knowledge on how consumers value PSS beyond the narrow focus on functionality and how such broader PSS values may be researched. This gap in knowledge is both surprising and troubling, especially given the PSS implementation gap. In this paper we therefore explore how PSS may create value in consumer markets, situated in urban environments in particular. We present the findings of case study research funded by the UK government which explores a use orientated baby care PSS, including such products as prams, baby car seats and cots.

2. PSS integration and value in consumer markets

There is a paucity of research on PSS and consumer culture (Rexfelt and Hiort af Ornäs, 2009). Few insights are available on how consumers adopt PSS innovations and how they can fit PSS in their everyday life and practices (Heiskanen et al., 2005). Such shortfalls in research mean that there is little understanding of how PSS could survive in unprotected, competitive markets, where success is predicated on an offering's ability to meet consumers' demands for value and satisfaction – emotional, symbolic, social - as well as functionality. Thus we argue that a more sophisticated and nuanced understanding of PSS and consumer value is required to help overcome implementation challenges in final markets.

In the PSS field, notions of value have been influenced by service engineering research, which emphasises functional value (cf.Geum and Park, 2011; Manzini and Vezzoli, 2003; Minguez et al., 2012; Mont, 2002). However, PSS researchers and designers need to consider that the value that consumers seek is not only *functional,* it is multidimensional and includes economic (Babin and James, 2010; Richins, 1994); exchange (relevant to products) (Graeber, 2001; Richins, 1994); *hedonic* (Babin and James, 2010), *symbolic* (Allen and Ng, 1999), and *semiotic* (Baudrillard, 1996, 1998) dimensions (see Appendix 1 for definitions of value and values found the case study). For PSS designers to be able to meet consumer demand for such value they need to be able to unpack it (Arnould, 2008). Often, designers and researchers attempt to capture customer requirements, but they see value as created by suppliers and modelled on presumed representations of value from design and management tools (Bertoni et al., 2013; Minguez et al., 2012; Sakao and Shimomura, 2007).

Integration is one of the main mechanisms through which PSS designers attempt to conceptualize consumer value. For example, car club firms such as *Zip Car* integrate elements such as vehicles, maintenance services, insurance, road tax, a method to pay for fuel (fuel card) and even part of the infrastructure, by providing reserved parking spaces to form a PSS. These may replace or complement the traditional car ownership model, where owner/ drivers integrate various elements which they purchase separately to achieve automobility. Indeed, in the latter, the ownership of specific possessions enables consumers to express their self-identity (Belk, 1988; Dittmar and Bond, 2010; Richins, 1994), and acts as a social marker on "classifying projects" (Douglas and Isherwood, 1996), or identity projects (Arnould and Thompson, 2005). As such this represents a major challenge to PSS provision in final markets.

Designers aim to integrate various elements to form a PSS, which create value for customers and support such value for the duration of the PSS life cycle (Shimomura et al., 2013). However, while PSS literature claims that value is created by PSS designers, researchers from other disciplines such as service innovation and management (cf. Vargo and Lusch, 2004) suggest value is created by consumers. Consumers' consumption practices enable them to create value independently and in a very personal way (Baron and Harris, 2008). Consumers draw on cultural resources, such as competences, meanings, values, knowledge and activities (Pantzar and Shove, 2010) to integrate various elements provided on markets by suppliers. Here, suppliers may not even understand how consumers integrate these elements. Indeed, Vargo and Lusch (2004) suggest that consumers co-create value together with suppliers. Consumers may resist suppliers' attempts to integrate elements for them (Grönroos, 2008), preferring to do it themselves.

In the following section we present a case study of PSS and baby care products. Since baby care products are important goods for identity construction (Thomsen and Sørensen, 2006), this provides an interesting opportunity to explore how providers might integrate elements to form PSS which meet a variety of consumer demands for value. More generally, baby products have been identified as valid area of PSS research (Mont et al., 2006).

3. The case study: PSS and baby care products

The case study investigated consumers' decisions of whether to access a baby product PSS or acquire equivalent products through a traditional purchase. Qualitative data were collected via ten ethnographic interviews of current users of a use orientated baby product PSS as part of a pilot involving a major baby car seat and push chair manufacturer together with a parental support charity. Participants were aged between 21 and 44. The PSS offers an opportunity to consumers to rent these products by paying a fee in advance for six months after which they can then either return the product, which will be professionally refurbished by the manufacturer and reissued to another family, or pay an additional fee to retain the product for a further six months. NVIVO 10 was used to code the interview transcripts. A flexible template approach was adopted (Miles and Huberman, 1994). This involved generating a start list of provisional codes from literature which were subsequently refined as data analysis proceeded.

3.1 Findings

Parents of new born babies, whether they are first time or experienced parents, integrate a variety of resources, competences and values in their parenting practices (Catulli et al., 2013). In selecting the right products and the ways they access them (e.g. a baby-care PSS) they integrate the competences of peers (other parents) and experts, as well as institutional players such as the NCT (Catulli et al., 2013). *Functional value* is certainly important in such processes. We found evidence of economically rational behaviour motivating consumers to select the most effective method of accessing baby products for the least money outlay. In this respect, PSS seems to be a winning formula with products such as baby car seats and cots. Here, participants were concerned with saving space as well as money, and a PSS solution was perceived as efficient because it would enable them to keep physical products as long as needed, to then return them without the need to invest time in reselling it or disposing it in another way. In this respect the case study confirms the attractiveness of functional value including a "pay for use" solution as proposed by Manzini and Vezzoli (2003;2005). However, in some cases participants seem to integrate values in their practices in ways that influence their decision of whether buying or renting products. These include *materialistic values*, associated with *status* and a desire to acquire top quality products and brands,

> *"You want to feel like you've got a nice pram and you knew what you were doing, I think it is important to feel good about when you're pushing your baby around."*

Young parents seem to prefer ownership of a top brand to rent one with a lesser perceived status, in spite of a much larger financial outlay,

> *"….the one who bought the [a brand], I can't imagine her renting one, ever",*

and this is compounded by the emotional desire to provide the best for their child,

> *"….when you've got a new baby you want everything new.*"

In fact, these participants also respond to other values such as *motherly love* and a desire to appear as a *competent parent*. Here these values stimulate a desire to draw *symbolic value* from the baby products PSS, as this drives these parents' identity construction, to the point of causing emotional distress, e.g. for a participant who felt unable to acquire the "right" brand,

> *"I saw other mums with bigger, better prams, and they were lovely and it just wasn't an option for me…".*

This seemed at times to result in self-doubt when comparing notes with peers and experts,

> *"…when those people were discussing these things, I thought, gosh, maybe I'm wrong, maybe they are right, I'm not thinking about everything I should".*

This emotional attitude means that these participants also expect *hedonic value* associated with positive feelings deriving from their purchasing decisions. This is particularly important for first time parents, who lack the confidence coming from experience,

> *"It's hard enough coping with having a new baby but feeling like you can't use the stuff that you bought, it was really emotional…"*

In effect a number of participants showed an emotional attachment to prams. This suggests a need for hedonic value which can be a challenge for PSS,

> *"…we've got memories and photographs of her in it; oh it was perfect for me*".

Importantly, we found that participants discriminate between different products, e.g. prams and car seats. The former, being highly visible, is seen as a product that needs to deliver symbolic value, unlike the second, with which most participants have a rather utilitarian relationship,

> *"Prams are much more visible, so everyone can see your pram, not many people get to see your car seat, so that's an issue for most mums".*

Some participants seem to have adopted pro-environmental values, and this is important for their identity construction as they want to appear to be responsible parents,

> *"I don't want to have, in the environment, loads and loads of products that are still usable…. there must be a mountain of car seats in this world…"*

Participants seem to care for *thriftiness*, together with a desire for *self-development,* here the participant wanted to save not for the sake of saving, but for investing the money in alternative beneficial pursuits for their baby, perhaps sacrificing the present self-image for a future valuable benefit,

> *"I'd rather save my money for things that are more important like, giving her opportunities to go to university in the future than have spent £1,000 on the brand new [a brand] system…".*

Freedom is another value held, as some participants felt that adopting baby care PSS involved a commitment including for example an additional responsibility for possible damage to the products,

> *"I'd be conscious somehow that I have to give it back and I'm not as free as I would be if it was mine. What would happen if I dropped it,* (causing) *accidental damage?"*

We found this interesting as it seems to contrast with the expectation of Roy (2000) and Manzini and Vezzoli (2003) that consumers would be careless of products supplied as part of PSS as they do not own them.

Furthermore, some participants seemed very interested in the *exchange value* of their prams, to the point of being very aware of the market value of their used goods, which they had selected on this basis, and having worked out a strategy to sell them through *e-bay*. This is clearly in opposition with the very concept of PSS. Our case study suggests therefore that consumers integrate resources and in particular values and for this they need to be able to construct multidimensional value from PSS practices. Finally, a number of participants seem to have a nomadic lifestyle as they frequently move between towns for professional reasons.

4. Discussion and Conclusions

As we observed earlier, the approach of PSS researchers to value and integration has been predominantly positivistic (Cook, 2014), e.g. focused on functionality, cf. Bertoni et al. (2013); Sakao et al. (2009); Kimita et al. (2012); Aurich et al. (2006). When they include value created by consumers as a variable they exclude its complexity and construct it in the "black box" of "intangibles" (Bertoni et al., 2013:110). The orientation of PSS researchers is that the process of understanding value and customer requirements is an orderly task, and designers have agency in integrating resources and create value. The rate of failure of new products and the scarce success of PSS suggests otherwise.

Our data provides evidence that some of the products are important for consumers' identity construction, so that a push-chair can be a signal to other parents and people in their networks that they are good parents, confirming Thomsen and Sørensen (2006)'s thesis. All products are not created equal however: in the case of a high visible product such as a push-chair, the design of a PSS provision around that product can be problematic, because of the need to fully understand the complex symbolism and hedonic value consumers attribute to that product. Could it perhaps be that a push-chair can be seen as a Veblen Good (Veblen, 1899), where the positional function of the product is so important that ownership is necessary, in line with Douglas and Isherwood (1996)? Or are more complex needs for self-expression at work, in line with Allen and Ng (1999); Baudrillard (1998); Richins (1994)?

In the case of products which are not as visible, such as cots and car seats, consumers seem to have a more utilitarian perspective, so that perhaps functional value is all they are after. We also observed that some of the consumers who took part in the research had a "nomadic" life style: they had moved for work reasons and seemed to highly prize the functional value of products, in line with Bardhi et al. (2012). We found evidence that opportunities exist for baby product PSS for consumers that have migrated to a high density urban area from another home town, and therefore ended up isolated from their informal social network, as suggested by Ward (2003) and Van Hulst et al. (2011). In these circumstances these parents would benefit from PSS. The increased proportion of these consumers may mean that there are opportunities to promote PSS.   In order for PSS designers and suppliers to be able to create value they need to co-create value with consumers and gain consumers' permission to integrate competences, meanings and resources for them. This research shows that the paucity of cultural and institutional resources that arises when consumers migrate away from their home towns might provide an opportunity for such integration through PSS provision. Further research is needed to explore how opportunities for PSS provision might arise in contexts where there is a lack of resources available for consumers for integration.

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Appendix 1

Values - a value is "an enduring belief that a specific mode of conduct (i.e. instrumental value) or end state (i.e. terminal value) is personally or socially preferable to an opposite or converse mode of conduct or end state" (Rokeach, 1973:5).

Examples of values are: Freedom; Love (including motherly love); Security; Cleanness, etc.

Comprehensive information on values can be found in many authors, e.g. Rokeach (1973) and Schwartz (1992).

The concept of "values" explained above can be contrasted with the concept of value:

Value - in the sociological sense: conception of what is ultimately good, proper or desirable in human life; in the economic sense: the degree to which objects are desired, particularly, as measured by how much others are willing to give up to get them" (Graeber, 2001:1)

Functional Value - the practical benefits that the use of goods and services confer to users, e.g. moving from A to B, quenching one's thirst, affixing a picture to the wall;

Symbolic Value - the opportunity that possession or use of an object gives one for self-expression or identity construction (e.g. representation of values in which one believes or of which one believes he/she is endowed); the association of an object (or a service) with one's personal history (Richins, 1994), which is linked to emotional feelings.

Hedonic Value - the opportunity that possession or use of an object / services gives one to experience feelings, e.g. pleasure, pride, satisfaction, etc. (Graeber, 2001)

Exchange Value - the financial value an object (e.g. a product) can confer the owner / user upon exchange for money with other parties (Graeber, 2001). This can be associated with a value, security (Hohti, 2010), as people may perceive an object, e.g. a house of car, as "stored" wealth that can be converted to financial value if needed. Exchange value is normally associated with artefacts (e.g. products); however it is applicable to services as an exchange between user and user as well as exchange between producer and user. E.g. a musician can perform for money; an individual who bought a ticket for a concert can exchange said ticket for money.

Other conceptions of value have been proposed by writers in time, e.g. emotional value, perceived value, etc.

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