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Consumer perception of product-service systems: Depicting sector-specific barriers in the mobility, clothing and tooling sectors

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The viability of PSS models has been shown to be frequently jeopardized by low levels of consumer appeal and retention. Using Social Practice Theory (SPT) and the habitual practice approach, this paper posits that barriers to consumer adoption and retention of PSS offers are twofold: 1) generic to the PSS offers—that is, common to all sectors but playing differently from one sector to another and 2) sector-specific. The purpose of the paper is to study how routinization of habitual practices differently affects consumers' propensity to change their consumption practices and to move towards PSS offers across sectors. To gain in-depth understanding of generic and sector-specific barriers and to distinguish between them, three sectors of PSS are analysed and compared: mobility, clothing and tooling. A quantitative and qualitative mixed methodology was used with consumers in the Brussels Region (Belgium). Two results emerge from the study. First, we confirm the existence of generic barriers to the adoption of PSS offers (e.g., not feeling like a target customer, flawed price representation, fear of unavailability of the product, not wanting to share the use of the product, dislike for subscription, or preference for ownership). Second, just as the relative weight of the barriers differs according to the sectors and there are specific obstacles to certain sectors (e.g., morphology in the clothing industry), we demonstrate that determinants of pleasure and determinants of consumption type (purchase or PSS) differ across cases. In addition, we discuss the fact that the type of payment (pay-per-use or subscription) and the related consumer engagement (requiring a change in established practice or not) have an impact on the perception and adoption of PSS offers by consumers.

KEYWORDS

PSS, habitual practices, consumer perception, practice change, barriers to PSS adoption

1 Introduction

To meet the environmental, economic and social challenges of this century, a transition towards more sustainability is necessary (Grin et al., 2010). This is why research has largely focused on the emergence of new economic models and new modes of production and consumption likely to induce this transition (Geels, 2011). Among these economic models, Product Service Systems (PSS) are particularly innovative and promising. This model consists in replacing the sale of a good with the sale of the use of that good. PSS is "*a system of products, services, support networks, and infrastructure designed to be competitive, meet customer needs, and have a lower environmental impact than traditional business models*" (Mont, 2002). It is therefore no longer goods that are sold but a combination of goods and services, or even a performance.

One of the classic typologies of PSS (see Tukker, 2004) distinguishes between three types of PSS "*according to the ratio of service involved and the ownership of the products*" (Yang and Evans, 2019): product-oriented, use-oriented and result-oriented PSS. Product-oriented PSS refer to product offers that are sold with additional services (e.g., after-sales service, insurance, device monitoring or maintenance service) that add value to the product sold (Armstrong and Lang, 2013). This first type of PSS can be viewed as the least radical form of PSS (Armstrong et al., 2015). Use-oriented PSS consist in selling the use of the product and not the product itself, the ownership of the product remaining with the provider (Yang and Evans, 2019). Finally, result-oriented PSS is when the provider guarantees a result, a performance, regardless of the combination of products and services needed to satisfy that result. Selling 'optimum lighting' rather than selling an electrical installation and lamps is one example of result-oriented PSS.

PSS are often considered one of the branches of circular economy (CE), since they stand in opposition to the linear economy. More particularly, the reason lies in PSS offering the possibility of reducing the waste associated with production and consumption while also fostering end-of-life options such as refurbishment and reuse, which are key elements of CE-related strategies (see Haber and Fargnoli, 2021). Indeed, since the ownership of the good remains within companies, the latter have a financial incentive to improve the product's life cycle and make it as efficient as possible so that it can serve the largest number of consumers. By making a goods available to several customers (either simultaneously or sequentially), this business model intensifies the use of goods, thus potentially contributing to a systemic dematerialization of economic activity. Yet, the actual contribution of PSS to sustainability is not unequivocally established and there is no empirical evidence of a generalised better environmental performance (Annarelli et al., 2016; Kjaer et al., 2018; Kjaer et al., 2019).

However, even if this model was more sustainable than the linear model, its transformative contribution to the transition could be limited due to the low capacity to recruit and retain enough consumers (Hazée et al., 2017; Roman et al., 2020; Tunn et al., 2021). Indeed, PSS aim to offer a combination of integrated products and services capable of achieving final user satisfaction, sometimes referred to as the *satisfaction unit* (Bacchetti et al., 2016). This requires consumers to replace personal ownership and material consumption with alternative use options (Briceno and Stagl, 2006; Bacchetti et al., 2016; Bacchetti, 2017). Therefore, a transition is needed in customers' perception of well-being. Being designed towards the satisfaction of needs, PSS provide a sense of well-being based on access to the service or experience gained through using the product (Dyllick and Rost, 2017) and no longer a sense of well-being derived from the possession of that product as proposed by traditional sales.

Nevertheless, it has been shown that consumers would often prefer to retain control over the goods they use (Mont, 2002; Halme et al., 2006; Tukker and Tischner, 2006; Intlekofer et al., 2010; Catulli, 2012; Tukker, 2015). In that respect, the capacity of PSS to be an economically viable model applied at a significant scale remains a prominent sustainability challenge.

Therefore, research related to PSS development over the past 20 years has intensively studied the barriers to consumer adoption (e.g., Rexfelt and Hiort af Ornäs, 2009; Lamberton and Rose, 2012; Armstrong et al., 2016; Tunn et al., 2021): barriers related to the practicality of PSS or barriers situated at a psychological, socio-cultural, or financial level.

However, the literature has still little to say on the relative weight of these barriers, and the reasons for their relative importance in consumer adoption remain poorly understood (Tunn et al., 2021). In their article, Tunn et al. (2021) show that depending on the PSS product and the duration of the offer, the barriers to adoption—or their relative weight—are different. But the question remains as to *why* different weights can be observed.

One of the approaches that could shed original light on the relative weight of the barriers depending on the product or the consumer's needs is Social Practice Theory (SPT). Based on this approach, the difficulty for a consumer to change from a purchasing practice to a PSS practice can be explained by the entanglement of ingredients (price, quality, importance of society's perception, meaning of the purchase, *etc.*) linked to the practices at stake (mobility, clothing, tooling, *etc.*). It is a set of ingredients that must be changed to unlock a practice. These entanglements are different depending on the type of practice domain and they contribute to the routinization of a current practice. This routinization will need to be broken to allow for practice change, regardless of the domain being the subject of a PSS offer.

Based on the theoretical framework, we assume that some barriers and their relative importance may be related to the sector-specific entanglement of the current consumption practices. This research assumption would thus imply that the relative weight of the barriers to adopting a PSS-related offer would depend on the type of practice domain. The ensuing

research question of this paper is therefore two-fold: 1) what are the generic factors influencing the intention to turn to PSS and how do they play in different sectors/PSS offers? and 2) what are the barriers that appear sector-specific?

To test this research assumption, two methodologies were mixed. On the one hand, a quantitative survey tested whether Brussels consumers have the same perceptions of the obstacles to PSS adoption depending on three different sectors (mobility, clothing and tooling). On the other hand, three confrontational qualitative focus groups (one per sector) questioned the underlying reasons for the sector-specific obstacles.

The remaining of the paper is organized as follows: in the following section, the theoretical framework is introduced with the aim of specifying the barriers and levers to consumers' positive perception of PSS-related offers, presenting the Social Practice Theory, and elaborating on the theoretical assumption. The methodological section then describes the empirical strategy and the two data collection processes (the survey and the focus groups). The fourth section displays the results and is divided into two parts, in accordance with the research hypotheses: the generic barriers to PSS and those specific to each sector. Finally, the results are discussed and a conclusion is drawn.

2 Theoretical framework

2.1 Barriers and levers to positive consumer perception of PSS-related offers

A significant number of papers have identified barriers and levers to consumer adoption and retention of PSS (Tunn et al., 2019). Many authors point out important ***psychological barriers*** such as *environmental awareness* of the consumer (Moeller and Wittkowski, 2010; Baumeister and Wangenheim, 2014; Lawson et al., 2016; Akbar et al., 2018; Yin et al., 2018), the *symbolic value* consumers associate with products: the possession of a product can be an external sign of status and identity, it is a projection of one's image (Bardhi and Eckhardt, 2012; Catulli, 2012; Ceschin, 2012; Baumeister and Wangenheim, 2014; Tukker, 2015; Armstrong et al., 2016; Lawson et al., 2016; Catulli et al., 2017; Park and Armstrong, 2019) or the fact that consumers may have *concerns about the health and safety* of a product previously used by other consumers (Catulli, 2012; Armstrong et al., 2015; Lawson et al., 2016).

At the ***socio-cultural*** level, the consumer is *influenced by society, culture, and his environment*: consumer society, shopping pleasure, rental as an inferior and stigmatized mode of consumption are all elements that affect consumer adoption of PSS (Mashhadi et al., 2019; Catulli et al., 2017; Hannon et al., 2015; Bardhi and Eckhardt, 2012; Ceschin, 2012; Rexfelt and Hiort af Ornäs, 2009; Shove, 2003).

Barriers are also related to the ***financial*** aspect of PSS. Consumers have to pay *in proportion to the time of use* of the product (Catulli, 2012; Baumeister and Wangenheim, 2014; Lawson et al., 2016; Schaefers et al., 2016; Akbar et al., 2018) and, in the case of daily-use PSS offers, they have to *pay continuously* to access the PSS product (Baumeister and Wangenheim, 2014; Rexfelt and Hiort af Ornäs, 2009).

Consumers also face *misunderstandings and uncertainties* caused by the complexity of the model (Catulli, 2012; Armstrong et al., 2016; Lang, 2018). They have *little control and flexibility* over the product (customization) and its use (Baumeister and Wangenheim, 2014; Armstrong et al., 2015; Möhlmann, 2015; Tukker, 2015; Catulli et al., 2017; Akbar et al., 2018) and they face *research costs* on the availability and location of the product (Catulli, 2012; Baumeister and Wangenheim, 2014; Akbar et al., 2018). These last three barriers can be considered as barriers related to the ***practicality*** of PSS.

Finally, it must be kept in mind that the level of commitment of providers and consumers differs according to the three types of PSS (Armstrong et al., 2016). The supplier is required to provide an increasingly efficient service depending on the type of PSS and consumer's commitment and trust in the supplier are for instance greater in the context of a result-oriented PSS offer than in a product-oriented one. As this level of commitment differs across the three types of PSS (Armstrong et al., 2016), one can assume that the weight of adoption-related barriers also differs across the three types of PSS. Therefore, this article focuses on use-oriented PSS offers to avoid methodological bias. In this regard, each of the offers used in the empirical part of the study are use-oriented PSS offers.

2.2 Social practice theory

The Social Practice Theory (SPT) is rooted in the thinking of sociologists such as Bourdieu (1977, 1990), Giddens (1984, 1991) and Taylor (1971). It was consolidated through the work of the American philosopher Theodore Schatzki (1996, 2002) and the German sociologist Andreas Reckwitz (2002). This approach has emerged as a new approach in the sociology of consumption (see Schatzki, 1996; Reckwitz, 2002; Shove, 2003; Warde, 2005; Røpke, 2009; Shove et al., 2012; Southerton et al., 2012; Spurling and McMeekin, 2014).

The SPT defines practices as "*forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understandings, know-how, states of emotions and motivational knowledge*" (Reckwitz, 2002, p. 249). Practices are composed of a set of elements called ingredients that can be grouped into three categories: 1) *social interactions*, including membership in social groups and norms, 2) *material context*, which includes infrastructure, devices, resources, and income, and 3) *attached meanings*, encompassing meanings, motivations, skills, and beliefs.

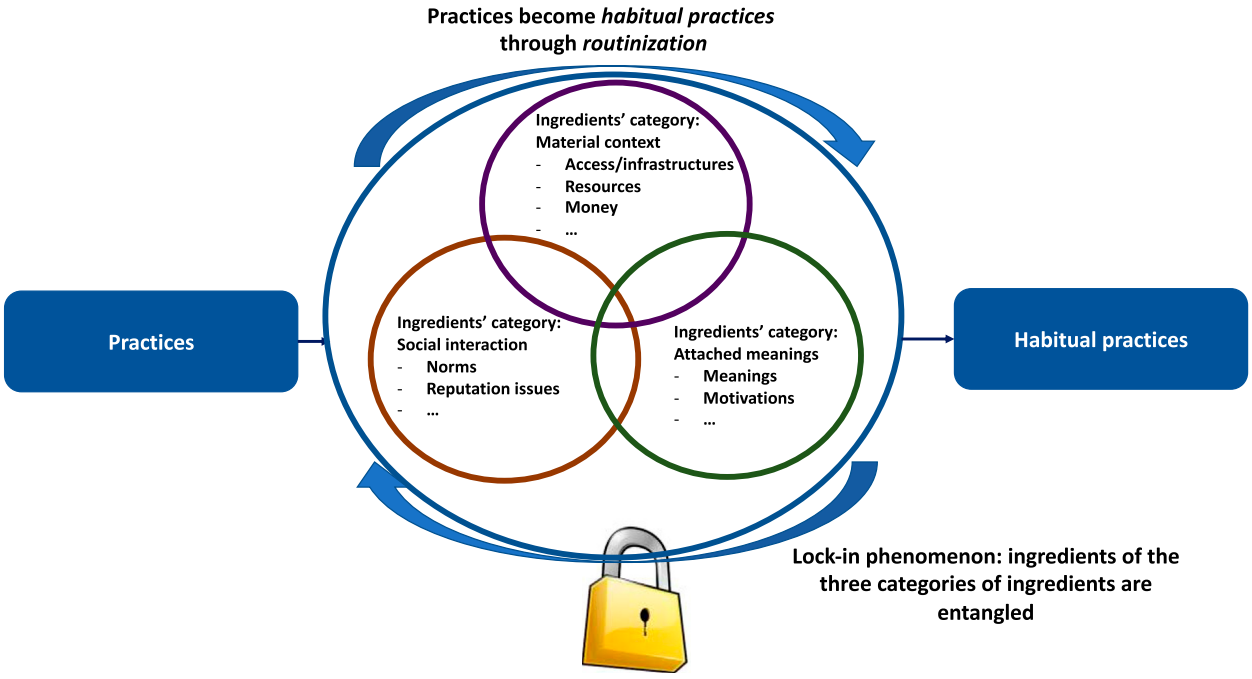

FIGURE 1
Conceptual scheme of locked-in habitual practices. Source: Authors' elaboration based on Maréchal and Holzemer (2015, 2018).

With this categorization, the barriers previously listed can be reorganized as follows: the influence of society, culture and the consumer's environment can be considered as ingredients of the *social interactions* category. The financial aspect, hygiene, quality and accessibility (i.e. misunderstandings and uncertainties, and lack of control and flexibility) are ingredients of the *material context* category. Finally, environmental awareness of the consumer depends on his beliefs or motivations, the research costs depend on his skills and the symbolic value associated with a product by the consumer depends on the meanings. These are three ingredients of the *attached meanings* category.

While SPT identifies practice ingredients and provides an understanding of the constitutive elements of a practice, the *habitual practices approach* integrates the principle of *routinization*, that is, the repetition and perpetuation of practices. The contribution of *habitual practices* is to highlight that lock-ins prevent the transition from one habitual practice to another. Practices become *habitual practices* through the force of *routinization* (Maréchal and Holzemer, 2015), i.e., through the weight of culture and habits that underlie these practices (Maréchal and Holzemer, 2018). Thus, it is difficult to change practices because they are routinized. And this routinization comes from the *entanglement* of ingredients, i.e., the fact that ingredients are intertwined. Such entanglement constitutes the set of lock-ins that prevent practice carriers from shifting from a conventional consumption mode (purchase of goods) to a potentially more sustainable—but also less conventional—one, such as use-oriented PSS (see Muylaert and Marechal, 2022).

Figure 1 illustrates that a practice becomes a habitual practice through the force of routinization. This routinization is itself a lock-in phenomenon on change since the ingredients that constitute the practice are entangled. The change of one ingredient does not necessarily break a routine and change a practice (a change in price does not necessarily change the whole practice). It is the disentanglement of ingredients that can change practices. It takes a greater lever than changing a single ingredient to unlock a practice and trigger a change (see Maréchal and Holzemer, 2015, 2018), especially when considering changes that need to be long-lasting (i.e., consumer adoption *and* retention of a PSS).

Therefore, rather than changing one ingredient (e.g., the price or quality of a product), it is a set of ingredients that must be modified to unlock a practice. In this respect, two constitutive elements are to be considered in the analysis of practice lock-ins: the relative weight of each ingredient, and the type of entanglement generating the routinization.

The approach allows the ingredients of the practice and the ways in which they are arranged to take different forms in different practices. For example, the *motivations* related to mobility and clothing are not the same. The way one travels may be linked to commuting, to the place of vacation to be reached or to whether one has children, while owning a particular

piece of clothing depends for example on the dressing code at work (see Veblen, 1970). Just as the ingredients of specific practices may differ, their entanglements also differ according to the type of practice. For example, when buying food for dinner or clothing, consumers may unconsciously not place the same importance on price: in the former case, they may buy the cheapest or best quality products (the price or quality ingredient is higher in this mix of entangled ingredients), whereas when buying clothing items, they often project socially shaped perceptions of what they should wear and then they determine whether they are willing to pay the posted price of the item. In this case, the price ingredient is not the most important, socially shaped perceptions of what type of clothing is expected are.

It should be noted that there are but few studies that deal with barriers to adoption of PSS-related offers using a practice-based perspective (see especially Mylan, 2015). One of them confirms the intertwined nature of the ingredients of practices (and therefore of barriers to change) and the relevance of using the SPT to understand the barriers to PSS adoption (Sousa-Zomer and Cauchick Miguel, 2016).

Another paper highlights that social change has the potential to influence adhesion to more virtuous practices such as PSS (Retamal and Schandl, 2017). However, since such social change usually takes a long time to unfold, more research needs to be done on shorter term levers to PSS adoption.

Finally, a last paper highlights that aligning new practices with the configuration of existing practices can remove disincentives. In this sense, PSS companies should configure their offers so as not to create any barriers related to entangled ingredients of current practice (Retamal, 2019). However, the complexity of PSS offers does not make this solution obvious or generalizable to all PSS offers.

2.3 Theoretical assumption

The weight of PSS adoption barriers varies according to the type of sector because practice ingredients are sector specific. It is therefore relevant to study PSS perception through several practices in parallel and not simply through the general appreciation of consumers for sector-unspecific PSS.

This observation also leads us to make the assumption that ***some barriers may be linked to the sector-specific entanglement of the current consumption practices***' *ingredients*. The barriers are specific to the function targeted by the offer. Therefore, the barriers to adopting PSS models cannot be generalized without anchoring them in their respective function. Barriers are different depending on the type of practice, since the entanglement precisely depends on the type of practice. In this case, the importance of the barriers would depend less on the type of product than on the type of practice (e.g. mobility, clothing, cooking, gardening . . .) to which the product's consumption and the use of PSS is linked. To further explore this assumption, three sectors are explored: mobility, clothing and tools.

3 Methodology

3.1 General empirical strategy

To address the questions raised above, the analysis draws on two distinct sets of data: one quantitative and one qualitative. Both methods have specific contributions to make in the analysis of the two assumptions (Creswell, 2008). Details on the methods are provided in sections 3.2 and 3.3.

The quantitative survey tests whether the barriers to the adoption of PSS offers differ according to the sector of practice by asking the respondents to openly express the barriers they perceive to the adoption of the offer presented. If, as our assumption suggests, barriers vary according to sectors, it was important to give respondents the opportunity to express these ingredients spontaneously. Moreover, while the literature on consumer disincentives to adopt PSS offers is extensive, it does not address the relative weight of these elements, nor the reasons why consumers are reluctant (Tunn et al., 2019, 2020, 2021). With a large number of respondents, it is possible to give those ingredients a weight linked to the recurrence of their mention. By refraining from assessing the weight of predetermined barriers and by letting respondents freely think of barriers they might face, we tried to avoid a conformity bias.

This quantitative survey can also show how the importance of barriers differs depending on the sector. But the survey needs to be complemented with another methodological approach to more thoroughly explain why these obstacles differ across sectors.

Accordingly, it was chosen to complement the survey-based quantitative appraisal of our assumption with a more qualitative exploration through focus groups. Drawing on the aforementioned conceptual framework of habitual practices and its associated empirical lenses (see Maréchal and Holzemer, 2018), this qualitative approach is specifically aimed at explaining the weight of the barriers to the adoption of PSS according to the type of sector.

The results of the quantitative survey are thus used as a prerequisite for the qualitative analysis, and in doing so the two methodologies reinforce each other. In order to maximize the complementarity of the methodologies, the construction of the survey and the analytical categories of the quantitative analysis were based on the same concepts, those related to changes in practices.

For both methods, three sectors were studied: mobility, clothing, and tooling. For the sake of coherence in our sample population, all use-oriented PSS offers related to these sectors were addressed to final consumers.

As far as the quantitative part is concerned, the choice was made to present fictitious offers. Fictitious offers can indeed be

presented more concisely and are more easily understood by consumers, which allows to overcome an understanding bias. However, as in Tunn et al. (2021), the fictitious offers resemble existing PSS offers, to be "more credible and imaginable for respondents" (Rao, 2014; Tunn et al., 2021). Moreover, these fictitious offers cover a larger range of needs or uses than the existing PSS offers (that often meet a specific need). In the mobility sphere, it seemed more relevant to present a mobility passport-type offer, which does not yet exist - although in development - in the Brussels Region (see MaaS—Mobility-as-a-Service[1]) and which already exists elsewhere (see for example the mobility passport in Strasbourg[2]). Moreover, presenting a PSS solution offering a package of different transport modes allows the consumer to see the offer as a global solution, which helps ruling out negative responses based on potentially anecdotical personal experience with one given transport mode.

Conversely, this understanding bias can be easily overcome in a qualitative process such as a focus group by conducting a question-and-answer session, which we did. Since more time is given to understanding the existing needs and practices of consumers, the focus groups were based on real cases of existing PSS offers rather than on fictitious offers. The consumers were given the opportunity to explain more finely why they feel they are target customers of these offers or not. Finally, during the discussion in focus groups, consumers could also spontaneously express in which ideal, fictitious cases, certain barriers could be overcome.

This mixed methodology is therefore justified because the two sets of data shed different light on the research question and because independently, the two methodologies present biases, which can be partly overcome by carrying out a cross-analysis of the two sets of results (Creswell, 2008).

3.2 Survey

In a survey targeting consumers in Brussels, the barriers and drivers to adoption of three fictitious PSS offers[3] were investigated. As mentioned above, the survey is used as a prerequisite for the qualitative analysis. Only some specific data are used here, while other parts are mobilised for other scientific purposes.

The survey took place between June and September 2021. It was disseminated mainly on social networks. QR codes were also placed in the mailboxes of the Brussels municipalities that had the fewest respondents following the social networking strategy. Finally, a market research and opinion polling company was hired to specifically recruit respondents belonging to targeted profiles. Altogether, this led to a sample of 814 respondents.

To analyse the three above-mentioned sectors, three surveys of 20 min each were created, and the respondents were randomly divided into three representative groups. The generic questions were the same for each group, only the offers proposed were sector-specific.

Table 1 presents the three fictitious PSS offers. See Supplementary Appendix 1 to read the fictitious PSS offers as respondents read them in the survey.

The panel is composed of Brussels consumers. This territorial choice was made to remove one of the main barriers described in the literature, that of accessibility (Roman et al., 2020). Indeed, consumers will not be inclined to experiment an offer which they perceive as out of their geographical reach.

To compare the barriers linked to the type of PSS offer (mobility, clothing or tooling), we analysed the open question "*What would be the reason(s) not to subscribe to the offer?*". The *n = 910* of this dataset differs from the number of respondents to the survey (n = 814). Since the question was open-ended, with no word limit and no obligation to answer, some respondents chose not to answer the question while others responded with more than one answer. The 910 reasons given through the three sectors were coded with the Excel software. The responses were then grouped together to form categories. Respondents expressed as much the barriers related to the fictitious offer as their current consumption practices.

3.3 Focus groups

The qualitative methodology consisted of three sector-specific focus groups, which took place online (due to sanitary conditions) in December 2020 May 2021, and September 2021. The participants were recruited on social networks and through word of mouth. The focus group on mobility brought together 16 men and women, the focus group on clothing brought together 21 women (the existing clothing libraries currently target women, so we chose to call on women only for this focus group) and the focus group on tools and objects brought together seven men.

In line with the theory of practices, the focus groups were designed as to study the practices and not the individuals, who are the carriers of practice (Shove, 2003, 2012). The design was also made up so as to apprehend the tacit aspects and unconscious influences of habitual practices (Browne, 2016). It is precisely the confrontational aspect of group methodologies that makes possible to bring out elements, such as socio-cultural norms and constructs, which would not necessarily be apprehensible in the more traditional framework of individual interviews (Maréchal and Holzemer, 2018). The focus groups were divided into two parts and consisted of open-ended

1 https://smartcity.brussels/news-756-the-stib-launches-its-maas-pilot-app-an-all-in-one-service

2 https://www.passmobilite.eu

3 Only part of the results of the survey are used as a prerequisite for the qualitative analysis.

TABLE 1 Main elements of the survey PSS offers.

Characteristics of the PSS offers	Mobility	Clothing	Tooling
Name	EasyMOB	The Clothing library	The Object Library
Aims	Easily move in and out of the city modulating your means of transportation according to your needs and desires	Just like a library, wear all sorts of high quality and ethical clothes at a lower cost and according to your desires	Just like a library, rent out objects/tools that are infrequently used at a lower cost and according to your needs/desires
Product	Electric bikes and cars (hybrid or electric)	Pants, shirts, blouses, skirts, dresses, jackets, coats*etc.*	Household appliances, utensils for organizing a party, shears, shredders, hedge trimmers*etc.*
Subscription fee	80€/month for all your trips (including fuel, maintenance, insurance . . .)	39€/month to borrow 3 pieces (change your piece any time you wish)	30€/month (all you can rent) Cumulated virtual sale value of the objects cannot exceed 1.000€
Deposit	500€: will be used as franchise if needed	None Repairs are made by the clothing library	None Repairs are made by the object library
Booking	*Via* application	In store or online	*Via* the application or on the website
Pick-up and drop-of	Freely on any parking place of the city	In store or at home (+3.5€ shipping costs)	At the nearest relay point of your home
Maintenance	By the providers	Garments are washed by the providers between each use	Condition is checked between each use and, if necessary, repairs are made
Additional characteristics	- Possibility to book, 1x/month, a vehicle for a whole weekend - If needed, 24h/7 call number available Subscription can be stopped at any time, free of charge	If obvious misuse, it will be charged at half its original selling price	None

Source: Authors' elaboration.

discussions: the first concerned the purchasing habits and ingredients of the practice for the concerned sector and the second part was about the barriers to the adoption of PSS offers.

Prior to this procedure, participants were told that the research was about the consumption habits of the sector, without mentioning the PSS offers, to limit as much as possible a desirability bias. After an hour of discussion about their current practices related to the sector, they were introduced to the PSS offers and the real purpose of the study. Then, a second moment aimed at identifying the barriers to a change of practice towards the PSS offers. The participants discovered two real PSS offers on the Brussels territory (one based on subscription, the other on pay-per-use) in real immersion simulation (visit of the website by each participant), which they were then invited to comment and question. It has been chosen to present two PSS offers for each sector simply because this reflects the reality of use-oriented PSS offers in Brussels: both subscription and pay-per-use offers exist and it might well have an impact on consumer perception.

Table 2 displays the PSS offers presented in focus groups. See Supplementary Appendix 2 to read more information on the existing Brussels PSS offers presented to the participants.

4 Results

From the quantitative methodology, we mobilise the analyses of the open-ended question. From the focus groups (FG), we use the different families of barriers raised by the participants and identified in the transcripts of the sessions. These barriers are related to the contextual elements of the existing consumption practices in each sector.

The first sub-section presents the generic barriers to use-oriented PSS offers and their relative weights in different sectors, while the second sub-section presents the sector-specific barriers.

TABLE 2 PSS offers presented in focus groups.

Characteristics of the PSS offers	Mobility		Clothing		Tooling	
Type of payment	Pay-per-use	Subscription	Pay-per-use	Subscription	Pay-per-use	Subscription
Name	Cambio	Poppy	Coucou	JukeBox	Usitoo	Tournevie
Aims	Car sharing offer	Free-floating car sharing offer	Library of evening dresses for occasions such as parties, weddings and other celebrations	Clothing Library for everyday life, particularly for women who want chic, quality and ethical clothes	Library of objects	Tool library and a woodworking and DIY workshop
Product linked	The fleet is composed of city cars, breaks and vans	The fleet is composed of city cars and sedans	Dresses + shoes, bags and head accessories	Clothes for everyday life	Raclette machine, bbq, event equipment, gardening or DIY tools, tents, roof racks	Semi-professional Tools
Price	Monthly payment: depends on a small, fixed subscription, the number of hours used and the number of km travelled	0,39 €/min and 0,30€/min in stopover Max 99€/day	From 45 € to 150 € for 5–12 days (Price depends on the sale value)	35 €/month for one garment 60 €/month for two garments 75 €/month for 3 garments	Price depends on the type of object borrowed and the duration of the loan	20 €/month OR 40 €/year Tools at disposal for one or 2 weeks
Deposit	200 € or 500 € depending on the franchise wanted	None	None	None	None	None
Booking	*Via* application (between 2 months and 15 min in advance) for a specific period of time	*Via* application Users can book a car maximum 15 min in advance	At the store	In store or online catalogue	Online Between 24 h and several months in advance	Online Booked a few days in advance
Pick-up and drop-of	At specific stations (the pick-up is always at the same location as the drop-of)	A trip always starts and ends in the defined zone (/3 of Brussels + airport	At the store	At home	At a relay point near the user's home	At the workshop (there are two in Brussels
Maintenance	By the providers Refuelling is done by users, a credit card is available in the cars	By the providers	By the providers Cleaned in an ecological dry cleaner between each use	By the providers Cleaned in an ecological dry cleaner between each use	By the providers	By the providers
Additional characteristics	Users must adhere to a charter, which ensures that the cars stay clean between uses		Insurance against stains and small involuntary damages included in the price	Insurance against stains and small involuntary damages included in the price		Consumables (sanding paper, saw blades, *etc.*) are paid in addition to the subscription

Source: Authors' elaboration.

4.1 Generic PSS barriers

Survey participants were given the opportunity to openly express what they perceived as barrier(s) to the adoption of the fictitious PSS offer. For the mobility, 232 reasons were given, 326 for the clothing sector and 352 for the tooling/objects sector. The main categories of barriers we have identified are displayed in the figure below. We included in the *main* barriers those whose occurrence was equal or superior to 14% in at least one sector.

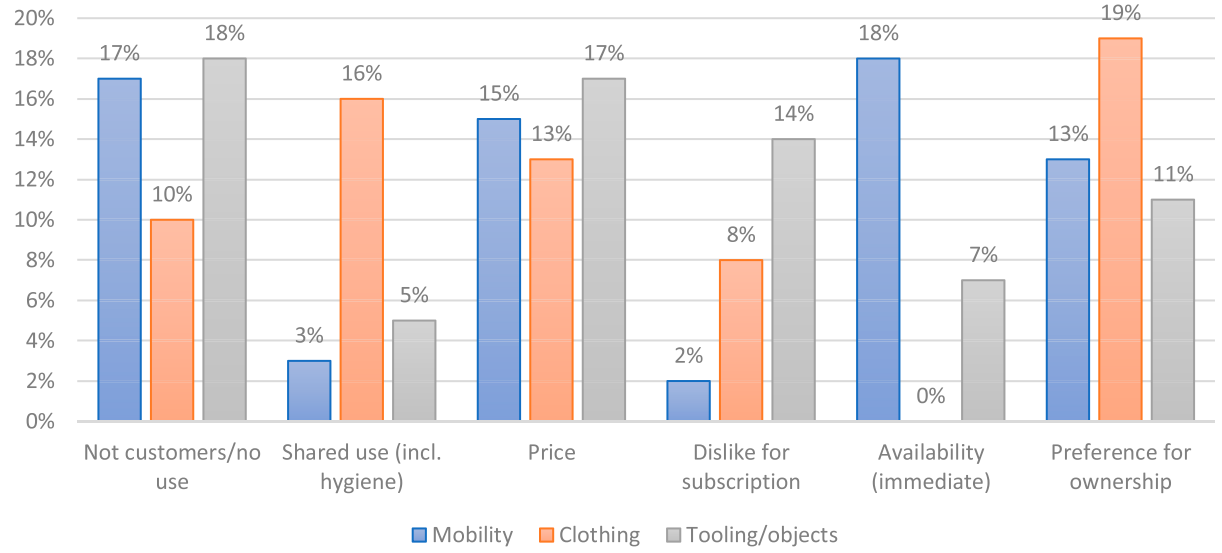

FIGURE 2
Main barriers by sector mentioned by survey participants. Source: Authors' elaboration

The percentages reflect the occurrence of the declared barrier as a ratio of the total amount of barriers declared, for each sector.

Regarding the barriers to practice change towards PSS offers, the results displayed in Figure 2 show first, that certain barriers are specific to the sector (see Section 4.2) and that generic barriers have different relative weights depending on the sector. For instance, hygiene does not seem as important for tooling and mobility as it is for clothing. These specificities imply that potential levers depend on the type of product linked to the PSS offer. As will be shown below, the qualitative enquiry confirms the assumption of sector specificities. For each type of generic barriers (and their various relative weights across sectors) identified in the quantitative survey, the following paragraphs qualitatively enrich the knowledge by resorting to some of the insights from the FG.

4.1.1 Not feeling like a target customer

One of the main barriers standing out is the perceived uselessness of the offer for the consumer. This barrier is more present in the mobility and objects/tools sector than in clothing.

In each FG, some participants did not feel they were part of the target group, but the difference between sectors lies in the virulence with which they expressed this feeling and the strength of their rejection of the offer. This was particularly the case for mobility, where participants expressed that the offers did not correspond to them as soon as they were asked for a first impression. The reasons are related to the current use of their car. For example, the person who uses his/her car to take his/her dog for a walk is not a target of the PSS offer since dogs are not allowed in shared vehicles. Similarly, people who travel long distances by car each month are not target customers of these offers.

In the case of clothing, all participants were able to imagine themselves as a target customer for this offer. Participants who said they would never go for this type of offer gave other reasons and barriers for their choice but admitted that they could be potential clients (because they wear the same kind of clothes for example). And in the case of objects and tools, participants did not emphasize that they did not feel like a target customer. Conversely, two participants who reported very little DIY were attracted to one of the two offers because it offered training and a place to exchange. Thus, the service associated with the offer, this training service, attracted participants who would not otherwise have been target customers for this offer.

This barrier could be explained by the sector-specific routinization of current practices. In fact, mobility and tools practices could be considered more routinized than clothing practices: it happens more often that consumers have to/want to buy a new piece of clothing than to buy a tool or a vehicle. Thus, the fact that their practices are more routinized, more entrenched, makes it more difficult for them to consider alternatives such as the PSS offers. As a result, they are less curious and more likely to perceive the offer as useless to them.

4.1.2 Shared use/hygiene

Shared use and hygiene issues are particularly prominent in the case of clothing and much less for mobility and tools. In their response to the open-ended question, participants expressed their negative perception of the proposed PSS offer in the following terms:

"I do not want to share the use of objects". In a minority of cases, some respondents expressed that they did not want to use the PSS offer for hygiene reasons. This barrier also appears in previous quantitative research on barriers to consumer potential adoption of PSS offers in the form of "*concerns or negative perception of product due to prior use by other consumers*" (Tunn et al., 2021; on the subject, see also Baxter and Childs, 2017; and Camacho-Otero et al., 2017; Hazée et al., 2017).

These hygiene issues surprisingly did not emerge in the FG. However, some consumers who expressed that they did not want to share the products, linked this to the fact that they preferred to own the products. In the clothing FG, one consumer expressed she did not want to share the use of the garment. Two reasons were put forward: first, the willingness to keep the ownership of the garment, and second, the identification to the garment that would wane when sharing it with strangers. Thus, since the garment is a vector of social status and performance (see Veblen, 1970), consumers imagine that because someone else has worn the garment before them, this projection is distorted, this performance is somehow biased.

This may show that qualitative methodologies bringing a confrontational aspect (such as FG) allow to highlight underlying deep factors (such as those related to the expression of a social status conveyed by specific objects) influencing the attitudes toward PSS, while barriers declared in a survey may remain shallower.

Refusing to share objects appears less as a barrier as such than as a way of expressing deeper, less conscious and potentially entangled constitutive ingredients. The latters form barriers that are more difficult to express, because less conscious (i.e related to the expression of a social status or society's perception).

This is probably the reason why several people in the FG agreed that the PSS offers should allow the same social performance as the classic offers, whereas these obstacles could have been simply identified as a lack of desire to share the use through the open-ended question.

4.1.3 Price

For all three sectors, price seems to be an obvious barrier. However, we observe that the price that participants consider to be right is not based on the same type of analysis for each offer. In the case of tools and objects, participants are used to comparing the price and the use they will make of the object before deciding whether to buy a good or poor-quality tool, and whether to rent it or borrow it. Thus, when the PSS offer is presented to them, the same type of comparison between price and expected use is made.

In the mobility FG, participants found it much more difficult to assess the value of a subscription and they limited themselves to comparing the pay-per-use offer with their current average usage. Depending on their current car usage, participants had different assessments of the price of the PSS offer.

Concerning clothing, discussions revealed that in the purchase decision, the weight of price is driven more by a representation of the price the consumer is willing to pay for a garment - a subjective, instinctive and spontaneous estimation of the "right" price (see Muylaert and Maréchal, 2022) - than a real "right price" that would rationally/objectively reflect the market value of the garment. For example, the analysis shows that although they are not always aware of it, some consumers evaluate whether the purchase of a garment is worthwhile not according to the object as such, but according to the social functions the garment fulfils (see Muylaert and Maréchal, 2022).

The financial aspect of PSS offers is one of the main categories of barriers identified in the literature on barriers to potential PSS adoption. Accordingly, the current literature highlights consumers having to pay *in proportion to the time of use* of the product as one of the main barriers (Catulli, 2012; Baumeister and Wangenheim, 2014; Lawson et al., 2016; Schaefers et al., 2016; Akbar et al., 2018). However, practice theory highlights that price is only one ingredient among other entangled ingredients. The FG analysis confirms this: consumers often weigh price against other ingredients of the sector-specific practice, such as the quality of the product, the expected use or the current average price paid for an equivalent use of the product.

Thus, for a PSS offer to be successful, it is not only the financial aspect of the offer that has to be addressed, but also the representation of the price in relation to quality, current use and expected use.

4.1.4 Dislike for subscription

As from the survey's results, the dislike for subscription is highlighted by the existing literature on adoption's barriers as the "*reluctance to enter into contractual commitment or regular payments*" (Tunn et al., 2021; on the subject, see also: Poppelaars et al. (2018); Lidenhammar (2015)). The qualitative methodology confirms participants' preference for pay-per-use rather than subscription-based payment. Participants explain this in two different ways. First, it is easier for them to calculate the attractiveness of the offer by comparing it to their current consumption practice in the case of pay-per-use. Consumers have a better idea of the price they are willing to pay for an occasional PSS service than for a recurring PSS service. Of course, this value assessed by consumers is subjective, semi-conscious and not always in line with the real value of the PSS service (Muylaert and Maréchal, 2022).

Second, participants seem more likely to occasionally test a PSS offer they are not familiar with than to commit to that PSS offer over time. The occasional and long-term PSS offer could be the same, participants would prefer the one without commitment, the one involving pay-per-use. Participants justify this by expressing a lack of confidence in the performance of the service over time, a fear that the service would no longer satisfy them in the long term. Analysed through the prism of SPT, these elements show that consumers are ready to test or experiment with PSS offers but not to make a long-term commitment, they are not ready to change their routine to adopt a new one linked to a PSS offer. What these consumers who prefer pay-per-use to subscription are expressing is that they are

not ready to change their consumption practice to move towards PSS offers. Subscription requires a substitution of the current consumption practice by a PSS consumption practice, otherwise it seems not profitable. Therefore, consumers are keen to test PSS offers, to complement their current consumption practices with PSS offers, but they are not ready for complete substitution.

4.1.5 Immediate availability

The barrier of availability and immediacy is already present in the literature (Baumeister and Wangenheim, 2014; Camacho-Otero et al., 2017; Tunn et al., 2021). In our survey, it is mentioned by the respondents for mobility and tools/objects but not for clothing. In the context of mobility, this can be explained by the fact that having a car parked in front of one's home allows to deal with all unexpected events, without planning trips in advance. Similarly, having the necessary tools for repairs in one's home allows to deal with emergencies or without any planning, which the PSS offer does not allow. However, for the clothing PSS offer, this barrier does not stand out, probably because there are fewer clothing emergencies and consumers are already used to spending time finding new clothes they want or need.

In this case, we can see that the obstacle is a function of the type of product, but it is above all dependent on the way participants use the product. Thus, for mobility and tools/objects, the unpredictable and non-programmable nature of certain journeys and repairs hinders participants from moving towards PSS offers. Conversely, female consumers are used to spending time to find a new item of clothing. The fact that it is not immediately available does not necessarily bother them. This illustrates that the barriers are sector specific, they depend on the performance contexts of current consumer practices.

4.1.6 Preference for ownership

In accordance with the barrier identified in the literature as "*external or internal negative feelings because of not owning the product such as lower social status, embarrassment and feeling of insecurity*" (Tunn et al., 2021; on the subject, see also: Tukker, 2015; Cherry and Pidgeon, 2018; Armstrong et al., 2015), participants expressed a preference for their current practices and thus for owning the product. But this preference for ownership appears to be a *meta-barrier* that results from a combination of the previously stated obstacles. Ownership remains preferred to the use of PSS by consumers since it does not require to disentangle the ingredients constituting current practices. Routinization seems to be too strong, and consumers do not find sufficient advantages in the PSS offer to move towards it.

For the mobility sector, participants prefer their current mobility practices because they provide them with more flexibility than the PSS offer (the choice of vehicles is not large, you have to book in advance, travel to the vehicles, *etc.*). Participants associate their current mobility practice with flexibility but also with freedom: they do not have any constraint in using their car whenever they want it. Such freedom frees them from having to make any effort to travel by car.

For clothing, consumers express a preference for their current practice of consuming clothing because they have taken some time to create their routine (e.g., by finding out the stores where clothes best fit their body type). Those who prefer to keep garments also express their attachment to the memories that clothes convey for them.

For the tool/object sector, besides the fact that ownership allows participants to face emergencies, it relieves them from booking tools/objects in advance. This requires less planification and provides more flexibility in the use of these tools and objects.

Understanding what is behind the preference for ownership therefore allows us to identify barriers that could be overcome more easily by use-oriented PSS suppliers than trying to directly tackle the preference for ownership itself. For example, offering an electric kick scooter in exchange for a mobility subscription to easily make the trips between home and the used vehicle, communicating on an increase in the number of vehicles in the stations, developing a database containing data on trips that could not be made because of a lack of vehicle or because they were too far away to respond to this problem. For clothing, providers could offer the option to buy the dresses that consumers have particularly liked or that they want to keep. Suppliers could also communicate on their offer by classifying them by morphology to show the consumers the stock according to the clothing type.

In sum, it appears from this first account of generic barriers that sector-based analysis is relevant not only because there exist sector-specific barriers (as will be shown in Section 4.2) but also because barriers that appear in each sector are explained by the specific practices of each sector. Thus, the suitable lever for a given barrier will differ across sectors because the entanglement of ingredients behind a generic barrier is specific to the routinization of practices in each sector.

4.2 Sector-specific barriers

Table 3 highlights that barriers' weights—percentage of occurrence of the barriers given by the respondents in the open-ended question—vary across sectors and that there may be barriers specific to each sector.

The percentages reflect the occurrence of the declared barrier as a ratio of the total amount of barriers declared, for each sector.

Particularly, consumers express the fact that the mobility PSS offer creates a feeling of dependence, a lack of freedom and an invasion into their privacy, which they do not experience by using vehicles they possess. This notion of privacy and freedom linked to ownership does not appear in barriers related to clothing and objects/tooling offers. It seems, therefore, that there is a symbolic barrier (as presented as one of the psychological barriers in the theoretical framework) on vehicle

TABLE 3 Barriers expressed by survey participants, ordered by their relative weights in the responses.

Mobility		Clothing		Tools/objects	
Immediate availa biIity/proximitty	18%	Ownership	19%	No use	18%
		Sharing use	16%	Price	17%
Not a target customer/do not need it	17%	Price	13%	Subscription	14%
		Morphology	13%	Ownership	11%
Price	15%	Not a target customer/do not need it	10%	Logistics	9%
Ownership	13%			Availability	7%
Privacy/Freedom	9%	Logistics	10%	Sharing use	5%
Specific context	8%	Subscription	8%	I do not know	5%
I do not know	4%	Fear of damage	6%	Stocks/ type of items	3%
Lack of flexibility	4%	I do not know	2%	Newness	3%
Types of cars	3%	Newness	2%	Quality	3%
Sharing use	3%	Online offer	1%	Fear of damage	3%
Subscription	2%	Proximity	2%	Accessibility	3%
n= 232		n= 326		n= 352	

Source: Authors' elaboration

ownership that has no counterpart in the two other sectors. This confirms the importance of considering these barriers linked to established practices to allow the emergence of barriers, here symbolic attachments, specific to each sector.

There is also a barrier specific to the clothing offer: morphology. Consumers face a barrier because they are not sure that clothes proposed in a PSS offer will fit their morphology. Once again, it is by analysing the context of existing clothing consumption that we can understand this barrier. Consumers who have difficulty finding clothes adapted to their morphology have more difficulty imagining a change of practice because they have taken time to find a practice that suits them (they have had difficulty finding stores or brands that offer clothes adapted to their morphology). And, because this current practice satisfies them, they do not consider starting a new process to find a practice that suits them with a new unknown offer.

This reinforces the assumptions that there are sector-specific barriers to the adoption of certain PSS offers. Hence the importance of using FG to better understand where these barriers come from and to consider ways to overcome them.

One of the elements that emerge from the FG is that the object of pleasure - what brings pleasure to consumers - is different in the three sectors. This implies that the lock-ins preventing practice change are also different. For clothing, the object of pleasure is the act of purchasing itself. It is by buying clothes that consumers reward themselves. Therefore, for this sector, the customer experience, the time spent in store, finding garments they like, can be a lever for the development of PSS offers. For mobility, and in particular cars, the pleasure is linked to owning a beautiful object, a high-performance object that brings freedom and comfort. This barrier is much more difficult to overcome but one solution could be offering a wider range of vehicles that would allow the user to experiment with a high-performance car. However, it should not be forgotten that responding to this barrier could make the PSS offers less sustainable, since they give access to a level of performance (car standing) that the consumer might not have had access to without this offer. In this case, the PSS offer would no longer have the sole function of making a journey but also of ensuring a performance. In the case of tools and objects, pleasure is linked to achievements, to the fruit of the use of the tool or object; the object is therefore less important in the product-service relationship than for clothing or mobility.

If the object of pleasure is different across sectors, the reasons for use and what leads to the type of consumption (purchase, rental, second hand or PSS) also differ in our three cases. When asked about their last clothing purchase, consumers are able to spontaneously give one, two or three elements - among the ingredients of the practice - that led them to buy a garment such as the price, quality or their relatives' advice. Consumers display varying sensitiveness to these ingredients. Thus, there are different possible entanglements of ingredients behind the practice of clothing consumption. These entanglements of elements that lead to the purchase are specific to each consumer and take the form of a sort of *semi-conscious trade-off* between ingredients (Muylaert and Maréchal, 2022). Most consumers present limited awareness of the elements that make up their trade-off (price, quality, proximity, *etc.*).

The FG also shows that this trade-off is not fully conscious in the case of impulse purchases and much more conscious in the case of necessity and planned purchases. In the case of mobility, participants compare the car much more to the alternatives: they justify using or not using public transport according to elements of the context that they seem to be aware of. Thus, these consumers have a much higher awareness of their trade-off and how to modify it according to the situation. This could be explained by the mobility already being based

on modality. Consumers already use different services and vehicles to meet their mobility needs. They already have to juggle between these services and products to find the best solution at each moment and for each trip. Note that this trade-off is located on the use of the car and not on its purchase, unlike clothing. As for objects and tools are concerned, consumers also seem to be much more aware of their trade-off since they already made benchmarks to determine whether it is better to buy good or less good quality, rent or borrow the objects and tools they need according to the use they are going to make of them. Here, the trade-off is indeed on the final consumption (the sale, renting or payment for use) as in the case of clothing. The reasons for the different awareness of these trade-offs probably lie in the object of pleasure being different from one product to another.

5 Discussion

In accordance with the SPT and the habitual practices approach, the results point out the entanglement of the ingredients of each practice and consequently the intertwining of the barriers. This is particularly evident given the proportion of people who are not able to explain why they are certain they would not go for the offers.

When participants perceive no (or only few) advantages to the offer (e.g., flexibility, immediacy, accessibility), they tend to find its price too high. This reveals that when the offer is not perceived as sufficiently attractive, it is not able to disentangle the ingredients constituting the habitual practices, and the (mis-) assessment of the price comes as one of the first manifestations of such lock-in. As a result, the subscription is systematically seen as too expensive, while pay-per-use is perceived as cheaper, even though it might be effectively more expensive than a subscription. As this shows, it is not the price as such that is too expensive, it is the price not being "worth the cost" for the participant to move towards this new offer.

As a managerial implication, the PSS-related offers should either 1) systematically propose a pay-per-use offer to consumers or 2) in the case of subscriptions, clearly demonstrate the existence of an additional service compared to a conventional sale offer. As a result, because the PSS-related offer would become more service-based (dematerialization of the product, greater emphasis on the service provided in the product-service relationship of the PSS) than simple rental, it would be more difficult for consumers to compare the PSS offer with the traditional sale of products.

Concerning the type of payment, under subscription, consumers perceive the offer as a potential substitute to what they own. They therefore make a trade-off between buying the product and subscribing to the offer. In this mental computation process, the product remains the focal point of the consumers, and associated services are often left out or undervalued. With pay-per-use, in contrast, consumers perceive the offer as complementary to what they own. Therefore, comparison with a purchase appears less meaningful to them. This is the case, for example, with an evening dress PSS offer, which would in any case have been worn only once. Conversely, when assessing the opportunity of subscribing to a clothing library, the cost of subscription will be weighed against its purchase equivalent. Pay-per-use therefore appears much more attractive, since it allows consumers to test a PSS offer without commitment, without drastically changing their consumption.

As a practical implication, a subscription-based PSS offer could possibly be made more flexible, allowing it, under certain conditions, to be turned into a pay-per-use offer. A Belgian bank-insurance company has been offering this principle together with a PSS mobility offer (shared car)[4]. Until now, the PSS offer only allowed subscriptions (because of the deposit required upon registration). For a higher price (including insurance in the partner bank), it is now possible to use this PSS offer on a pay-per-use basis.

This paper unveils a barrier which seems synergetic: the dislike for subscriptions. By comparing pay-per-use PSS offers and equivalent subscription-based offers in the three sectors of interest, both quantitative and qualitative methods show that consumers consistently prefer pay-per-use. The weight of the perceived barriers to a potential adoption increases if the offer is based on subscription. For good reason, subscription requires from consumers to change their routines and the commitment required by the offer is greater than in pay-per-use. As the routines are underpinned by an entanglement of ingredients constituting barriers to practice changes, breaking these routines requires to overcome barriers that are heavy and more intertwined than if the PSS offer satisfies a punctual need by pay-per-use.

We also notice that change is more difficult if the habit is more entangled with other practices. This is the case of car use or mobility that is linked to other practices such as those related to work, trips with children or animals, shopping, socializing - going out, *etc.* Therefore, a change in mobility practice also requires a change in these other practices such as shopping more often and/or closer to home, adapting the work-related habits, reinventing outings, *etc.* While in the case of tools, the practice is less entangled with other practices, so a change in practice only depends on the entanglement of the ingredients within the practice.

6 Conclusion

In addition to confirming the existence of generic barriers already highlighted by the literature on the obstacles to consumer adoption and retention of PSS offers (see Tunn et al., 2019, 2020, 2021), this paper highlights sector-specific obstacles that are linked to the entanglement of the ingredients of practices, using the habitual practices approach. Three sectors were studied: mobility, clothing and tooling.

4 https://www.kbcbrussels.be/retail/en/products/payments/self-banking/on-your-smartphone/mobile/cambio.html

While our survey and focus group highlight similar barriers to those already identified in the literature, they enrich the understanding of these barriers in their cross-sector variability and in their depth. Our study shows, indeed, that the explanatory factors of these barriers to practice changes as well as their relative importance, differ across the three sectors studied. The contribution of this article is therefore to highlight factors—and their entanglement—underpinning consumer's barriers to the adoption of PSS. Among the barriers observed, the payment scheme (pay-per-use vs. subscription) appear as particularly salient, as it crystallises the strength of ingredient's entanglement as a lock-in to practice change. This is why it has deserved a specific discussion.

The paper is not intended to generalize about barriers, but it shows that differences exist between types of products and between types of payment. As a managerial implication, a company that identifies the specific barriers linked to the sector of products or to the type of payment can modify its strategy to transform this barrier into a lever.

This study and the resulting analyses have several limitations. First, at the methodological level, the focus groups participants had a more homogeneous socioeconomic and cultural profile (belonging to middle-to high socio-economic classes) than the survey respondents (who were statistically representative of the Brussels Region Population). A second limitation is the lack of a statistical analysis to check the consistency of the responses. Both limitations imply that the results of the focus groups and of the survey cannot be generalized.

In addition, these focus groups were intended to explore the specific barriers to the types of products and payments and to understand the barriers linked to practice changes. Therefore, they could only be carried out in small groups, to allow for emulation and for sufficiently long speaking time for participants. This implies a very small number of participants (particularly for the focus group on tools and objects).

Finally, the question remains as to why precisely the change of practice is difficult for the consumer and why there is such a difference of barriers between pay-per-use and subscription-based PSS-offers. If this article provides some answer hypotheses, a more in-depth study seems relevant to strengthen the understanding of the factors underlying these different barriers. Such question opens a relevant research avenue since it appears as one of the crucial barriers in the deployment of PSS (Princen, 2002; Tanneret Wölfing Kast, 2003; Van Niel, 2014; Nairn and Spotswood, 2015; Héran, 2017; Joshiet Rahman, 2017; Héran, 2021; Moody et al., 2021).

Data availability statement

The datasets presented in this article are not readily available because the data were generated on the basis of interviews and a survey whose results belong to the authors. Requests to access the datasets should be directed to Coralie.muylaert@gmail.com.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

Conceptualization (CM, GT, PR, CR, RDH, KM); Data curation (CM, KM); Formal analysis (CM, KM); Funding acquisition (GT, PR, CR, KM); Investigation (CM, RDH); Methodology (CM, GT, PR, RDH, KM); Project administration (GT); Supervision (GT, PR, KM); Writing - original draft (CM, GT, PR, KM); Writing - review and editing (CM, GT, PR, CR, KM).

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fenvs.2022.1048554/full#supplementary-material

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