
Towards Circular Economy Business Models: Consumer Acceptance of Novel Services

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Abstract: There is a need to accelerate the change from the current linear economy towards a circular economy (CE), which is regenerative by intention and design. The transformation towards CE entails radical changes in the business environment. Thus, in CE-based business model (BM) innovation, we need to understand consumer preferences, their everyday life, and the role of material objects. We here build a preliminary framework based on consumer practices and the product–service system (PSS) literature. We also present the results of a small survey investigating consumers’ opinions about BMs based on services, which was carried out (n=239) at the Housing Fair in Finland in 2015. The findings indicated consumers’ past experiences were most strongly related to conventional service use, such as a car utilisation, though consumers also indicated interest in trying other CE-based services. Consumers seem to more easily adopt a BM that does not require dramatic changes in their practices.

Keywords: Keywords: circular economy, business models, consumer, survey, services

1 Introduction

Motivation and research gap

The ‘circular economy’ (CE) has gathered a lot of attention in recent years from academia as well companies offering a practical alternative to the current linear economic model. The need for CE is evident as the significant portion of non-renewable resources is diminishing and the price volatility of natural resources is increasing (EMF 2012). Current trends—such as increasing consumption, new generations of consumers, urbanisation and employment, tightening legislation, and technological leaps—are accelerating the transformation towards CE. Nevertheless, innovation often remains piecemeal or incremental, rather than being transformational, fundamental and system wide. While global environmental, social, political, and technological trends continue to shift the foundations of our current business models, incremental innovation will become less effective in enabling companies, industries and whole economies to adapt and succeed. This has drawn attention to the urgent need for radical system-wide innovation to transform the processes of value creation (EMF, 2012).

CE sets strong expectations on consumers, who will play a key role as enablers of the circular economy. Since future business models will be radically different compared to previous models, consumers are expected not only to adopt new models but also to change their current habits. A good example of such a change is leasing, hiring and sharing of products, as opposed to direct ownership. In order to make these models attractive to consumers, we need to understand consumer preferences more deeply, consumers’ everyday lives, and the role that material objects play in their lives. In this paper we build a preliminary framework for understanding consumers, based on consumer practices and the product–service system (PSS) literature.

Research questions

The aim of this study is to increase our understanding of Finnish consumers while innovating circular business models.

We address this main question through the following inquiries:

1. What are consumers’ opinions and experiences regarding hiring, leasing and sharing of some traditional consumer products in different price categories?
2. What kinds of factors explain why consumers might prefer services (hiring, leasing and sharing) in favour of owning products?
3. What are the preferred payment models when hiring, leasing and sharing?

2 Literature

Business model innovation in CE

New ideas and technologies are commercialized by companies through their business models (Chesbrough, 2010). Radical innovations and disruptive business models are needed in order to move towards the circular economy model (Boons et al., 2013). On the other hand, there is an evident need to base new business models on an in-depth understanding of consumers. There are excellent examples of disruptive business models

based on a sharing economy (SE), such as Uber and Airbnb, which have successfully created and implemented new value offering for consumers. The sharing economy and service business have been identified not only as trends that support the transformation towards CE, but also as a source of vast, as yet untapped opportunities for existing companies as well as new players.

There is an extensive literature on business model innovation (BMI). In turn, sustainable business model innovation (SBMI) combines the ideas of sustainable business thinking and business model innovation. Rather than concentrate purely on creating economic value, the SBMI literature concentrates on considering benefits from societal and environmental perspectives and creating value for a broader range of stakeholders (Boons & Lüdeke-Freund, 2013). In the SBMI literature, one of the main discussions has centred on identifying different archetypes of sustainable strategies for companies, such as promoting eco-efficiency, creating value from waste, and delivering functionality rather than ownership (Bocken, 2014). There are also several studies in the SBMI literature presenting concrete company cases of forerunners in this field, such as Interface Inc (Stubbs & Cocklin, 2008) and Toyota (Porter & Derry, 2012).

The sustainable business model (SBM) and the circular business model (CBM) are closely related literature streams and they can be regarded as a subcategory of business models. CBMs can be defined as the rationale of how an organization creates, delivers and captures value with and within closed product material loops (Mentink, 2014). The idea is that a CBM does not need to close the material loops by itself within its internal system boundaries, but can also be part of a system of BMs that together close a material loop in order to achieve circularity (Mentink, 2014). Yet in reality, due to physical and practical constraints, there exist neither 100% circular BMs nor 100% linear BMs.

Currently, many companies are dealing with the same issue: How to transform their business models from linear towards circular models and to be sustainable. The question is highly relevant to society, businesses, and the environment. Up to now, adoption of CE-based business models has been low among companies (Sommer, 2012). In the literature on CE, the focus has been on identifying characteristics of circular business models based on longevity, renewability, reuse, repair, upgrade, refurbishment, capacity sharing, and dematerialization (Accenture, 2014). Yet, the literature on CE has been lacking especially in relation to novel business opportunities. Furthermore, although, studies and discussion are plentiful, we still lack a holistic understanding of CBMs, while research is also needed on the wider social and political changes required to make CE-based businesses mainstream (Bocken et al., 2014).

Consumer practices

In order to be successful, new CE-based business models need to be attractive to consumers. Empirical studies are needed on the relationships between consumer practices, temporalities and life events if the challenge of transformation towards CEs is to be met in a profitable way. Consumers do have the desire to consume in a sustainable way if they have easy opportunities and tools to make better consumption choices through consumer markets (Lammi et al., 2011). Still, a consumption-based lifestyle is deeply entrenched in society; people's attachments to material things precedes the post-war age of affluence (Trentmann, 2009) and are performed in the media and other public discussion. Consumer practices, habits and routines do not always match with their positive view of environmental issues. Especially those critical transitional life events

(e.g. changing one's residence, getting marriage, childbirth, divorce, death etc.) bring forth material incorporation, adaptation and abandonment (Aalto & Varjonen, 2014). Moreover, these life events create discontinuity both in regard to practices and also one's material attachments.

Transforming routines and habits has been recognised as a key target in achieving long-lasting effects in the markets. Research has already looked at how people come to form habits, how appropriate novelties appear, and what are the procedures that collectivize these (Ylikauhaluoma et al., 2013; Shove et al., 2012). Business models that do not remind consumers of existing models are likely to experience resistance; it is easier to gain acceptance of a new practice when it closely resembles other practices that are already common (see e.g. Mylan, 2015). A good example would be Airbnb – consumers are already used to booking hotels online and so going to Airbnb entails a very similar booking practice to ordinary hotel booking.

In this paper we concentrate on different consumer services as substitutes for the traditional ownership of products. Consumers engage in practices like laundering, driving to the countryside for a holiday, or dressing up for special occasions. They do not necessarily need to own a washing machine, a car, or special attire; rather, their need is to wash their cloths, get to the countryside easily, and to dress suitable for special occasions. Thus, the basic idea is that instead of buying products, the better solution may be to buy a service that gives access to a certain product when needed. For companies, a business offering services instead of products is by its nature a different kind of business. If companies offer services and they own the products they have an incentive to ensure that the products have a long service life, are used intensively and that they are cost- and material-effective (Tukker & Tischner, 2006). Furthermore, companies need to build up a service offering that will be attractive to consumers, including through new revenue models (monthly payment, pay per use etc.). In order to offer superior value, the service has to be easy to use, cost-effective, low-risk and it has to at least match existing practices; that is, new services are easily adapted if they are aligned with ongoing dynamics and perhaps even linked to existing practices (Mylan, 2015).

Consumers in the Product–Service Systems literature

The literature on PSS has focused on exploring the basic nature of the transition from a product-centric organisation to a service or value proposition -centric organisation. Since selling a product with its functionalities differs significantly from selling a service offering based on customer value, PSSs have sought a deeper understanding of the servitisation process in B2B and B2C contexts (Roy & Cheruvu, 2009). Thus, the PSS literature can be defined as is '*a mix of tangible products and intangible services designed and combined so that they are jointly capable of fulfilling final customer needs*' (Tukker and Tischner, 2006).

While B2C markets and environmental or commercial consequences have been widely discussed in the PSS literature, there are fewer studies focused on a consumer perspective, especially on individual consumers (Mont & Plepys, 2003). However, consumer acceptance plays a key role in creating a successful service offering. In previous empirical studies, authors have listed the factors in Table 1 affect consumer acceptance (modified from Rexfelt & Hjort af Ornäs, 2009).

Table 1 Factors influencing acceptance of services (modified from Rexfelt & Hjort af Ornäs, 2009).

Factors influencing the acceptance of services		
Category	Factor	Author
Price	Perceived fixed and variable costs, insight in total life-cycle costs	Meijkamp, 2000; Mont, 2004b; Schrader, 1999);
	Price of products, costly most successful	Littig, 2000; Mont, 2004a; Schrader, 1999
Product /service	Perceived relative advantages compared to alternatives	Littig, 2000; Meijkamp, 2000; Mont, 2004a; Schrader, 1999; Ornäs, 2009
	Availability wherever and whenever needed, convenience	Meijkamp, 2000; Schrader, 1999
	Transaction costs (time and money)	Meijkamp, 2000; Schrader, 1999
	Quality of the PSS, reliability	Meijkamp, 2000
Consumer	Habits as an obstacle to acceptance	Meijkamp, 2000
	Issue of ownership	Littig, 2000
	Environmental attitudes, may have relatively little importance	Littig, 2000; Meijkamp, 2000
Relationship with company	Reputation, image	Mont, 2004b; Schrader, 1999
	Uncertainties risks, costs and responsibility)	Mont, 2004b
	Communication between supplier and consumer	Mont, 2004b

3 Research design

Survey approach

Different approaches were considered when seeking to answer the research questions. Given the lack of prior studies in the field, our approach was to investigate the phenomenon by means of a survey, so as to study a larger number of consumers than would be possible with interviews.

A survey was designed to investigate consumer opinions about business models that are relevant in the context of the circular economy. The questions dealt with the following themes: consumer preferences towards hiring different consumer products (including also their preferences for the most convenient payment method), consumers' previous experiences of CE-based business models, consumers' aims for future actions related to CE business models, and consumers' rationalizations of the reasons why they would prefer hiring instead of owning.

Basic demographic information was sought on respondents' age, municipality of residence, education, gender and income level, and a questionnaire with six questions:

1. Would you consider, in the future, renting instead of owning one of the following items?
2. What reasons would persuade you to rent a washing machine instead of owning it?
3. How would you prefer to pay for the rental of a washing machine?
4. Have you used one of the following services?
5. Would you be willing to try one of the listed services in the future?
6. What reasons would lead you to use any of the listed services?

The survey was conducted at the Housing Fair in a newly built area in the city of Vantaa from July–August 2015 and it generated 240 responses. The questions to respondents were presented in the form of a printed questionnaire at the site of smart community space prototype demonstration at the Housing Fair. Assistance and background information was offered to the respondents on request at the time of filling out the questionnaire. Due to space limitations at the site a maximum of five persons could complete the questionnaire at any one time. There was no mention of the prototype concept site or of the survey in the official Fair program. The site was situated en route to a popular apartment building attraction at the Fair. Admission to the fair entailed a fee.

4 Findings

Study results

Of the 240 respondents, 149 were women; age distributions are shown in Figure 1. The Housing Fair appeals to aspiring home owners and thus predictably younger people are overrepresented when compared to the age distribution of the general population in Finland (OSF, 2015). Respondents' municipality of residence are shown in Figure 2. The Housing Fair was held in the municipality of Vantaa, which is part of the capital region of Finland, which also includes the municipalities of Helsinki, Espoo and Kauniainen. As can be seen, these municipalities (Kauniainen is a very small municipality and so is included in 'other') make up a large majority of the respondents, with the rest of Finland being represented by roughly 32% of respondents, whereas 80% of the general population do not live in the capital region (OSF, 2009).

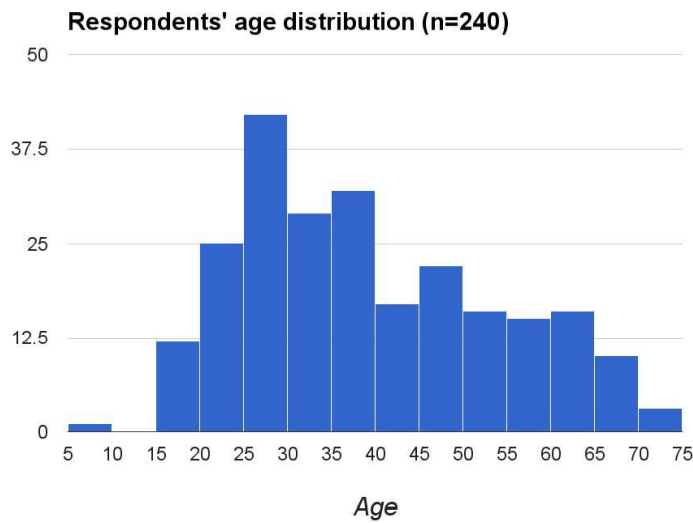


Figure 1 The age distribution of the respondents in the survey.

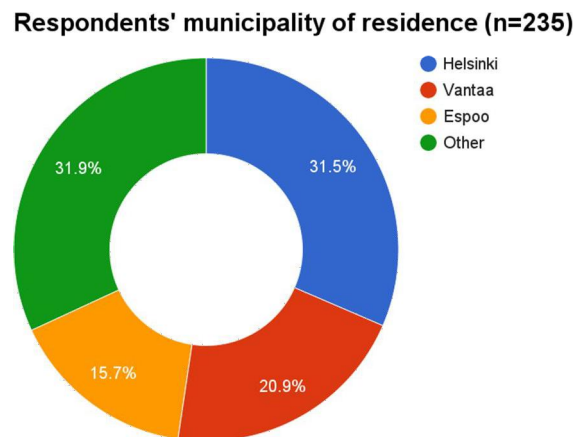


Figure 2 The distribution of the municipality of residence of the respondents in the survey.

The first question in the questionnaire assessed consumers' willingness to use renting as an alternative to outright ownership in the case of a car, hobby equipment (e.g. ice skates, snowboards), a washing machine, and everyday clothing. A free-text entry option was also provided. The question was answered by selecting a number from 1 to 5 (not willing to rent–very willing to rent). In the analysis, responses were collapsed into three categories: No (1,2), Maybe (3) and Yes (4,5). The answers given are shown in Figure 3.

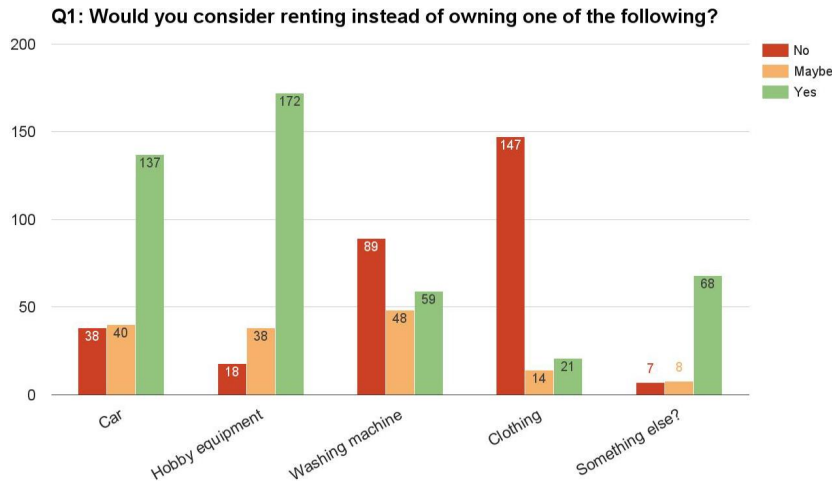


Figure 3 Responses to question 1 of the survey.

Consumers seemed to be very willing to rent if the business model is familiar or usage is infrequent (car rental, hobby equipment), but showed considerable aversion in the case of everyday clothing. This may be due to the personal nature of clothing or the unfamiliar business models of this use case. Renting a washing machine is also an example of a new type of business model, though without the personal aspect associated with clothing, and here the answers were very widespread, though leaning towards slightly positive when yes and maybe answers are summarised. A car is also an example of an expensive product category, which might add to the attraction of renting over owning.

The second question assessed possible motivating factors (environmental concerns, easier maintenance, better wash results due to easier access to upscale models, smaller risk due to existence of a maintenance contract) for consumers to switch to a lease-based ownership model for a washing machine. The answers were given similarly to question 1, and are tabulated in a similar manner. Figure 4 shows the distribution of the results.

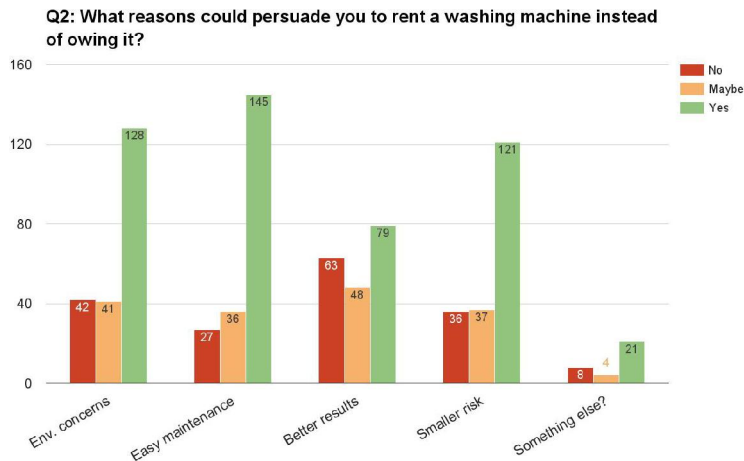


Figure 4 Responses to question 2 of the survey.

A washing machine is a utility appliance that is not commonly leased by consumers. As can be seen, maintenance concerns would be the prime motivating factors, while access to upscale models and the promise of better wash results are clearly not as important as the better energy efficiency and environmental friendliness that those models would be expected to provide.

Question 3 concerned the preferred method of payment in the case of a leased washing machine and the results are (n=235): Pay per usage (27.2%), fixed monthly fee (37.9%) and the option for traditional ownership (34.9%). These results correspond well with the responses in the washing machine category of question 1 of the survey.

Questions 4 and 5 assessed consumers' prior use of and future willingness to use circular economy services, such as renting an apartment from another consumer (e.g. AirBnB), swapping apartments (e.g. Home Exchange), ride-sharing services (e.g. Uber, Lyft), delivery services (e.g. PiggyBaggy) and car rentals (e.g. CityCarClub). The question was answered by selecting any number of services that the respondent had previously used (question 4) and was willing to use in the future (question 5), we provide an extra "Any of the above" category to show the absolute fraction of people who selected at least one of the services. Figures 5 and 6 show the tabulated results for questions 4 and 5, respectively.

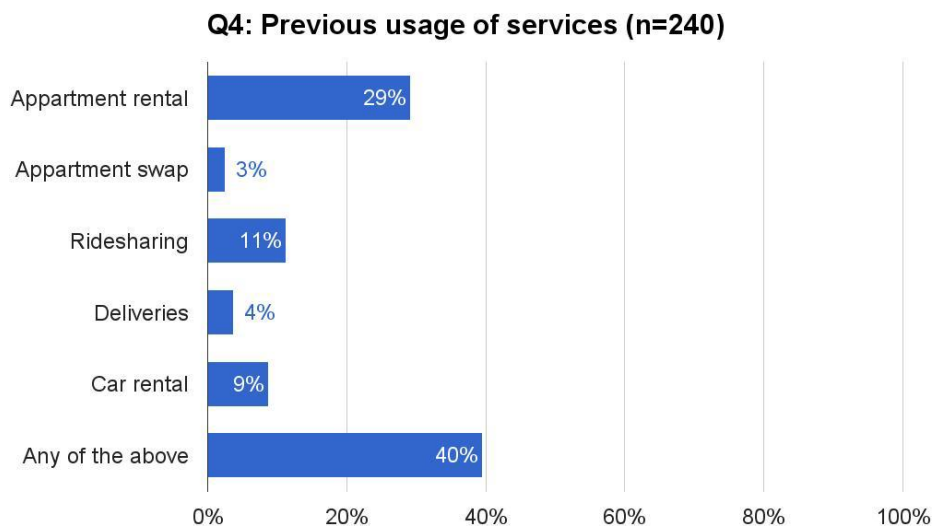


Figure 5 Responses to question 4 of the survey.

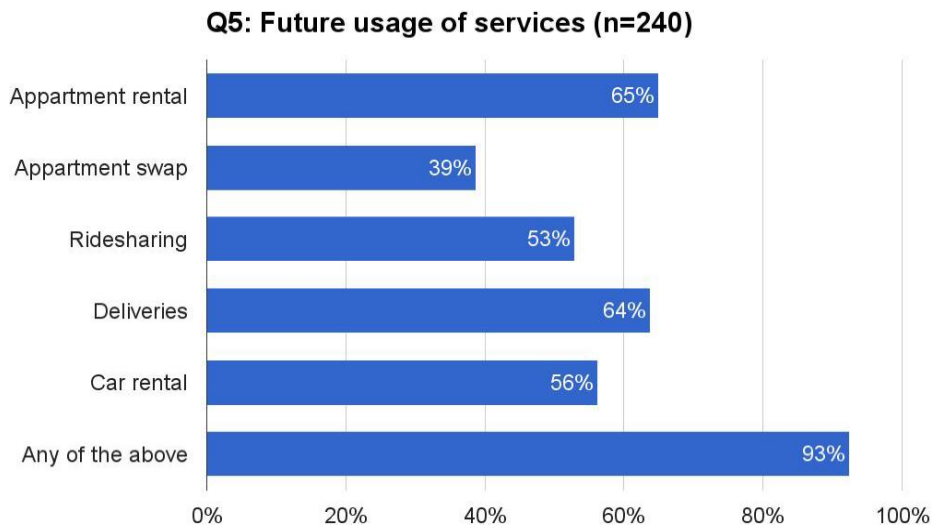


Figure 6 Responses to question 5 of the survey.

Figure 6 shows that a surprisingly large number of people have used short-term apartment rental services such as AirBnB, at least when compared to the ridesharing category, which is a service category with a much higher media visibility (in part due to the frequent controversies around Uber). In Figure 6 we can see that consumers see themselves as very likely to use CE services in the future, with over 90% selecting at least one of the available options.

An interesting question is whether consumers are more likely to see themselves using CE services once they have already used them. In essence this would indicate whether they found actual value from their previous experience with a given service. In order to see this effect, we divided the responses to question 5 into two groups based on whether the respondent had answered affirmatively or not to question 4 in a given category. The results of this grouping are shown in Figure 7. It can be seen that there is such an effect and it is consistently and significantly ($p < 0.01$) present in all categories.

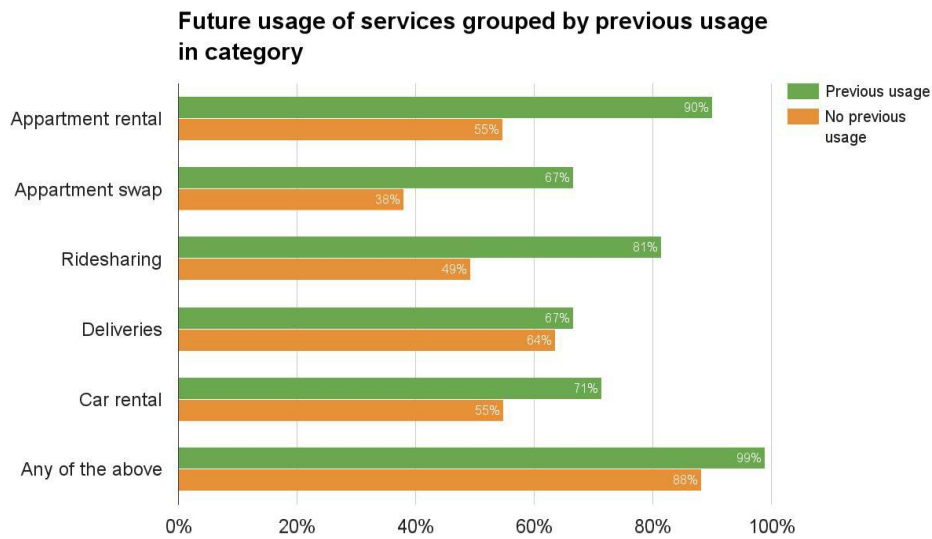


Figure 7 Responses to question 5 of the survey divided into two groups based on respondents' response to question 4.

Question 6 assessed the possible motivating factors (time savings, environmental concerns, affordability, supporting other people, better / different service experience) that would lead consumers to use CE services. The question was answered and results tabulated in the same way as for questions 1 and 2; results are shown in Figure 8.

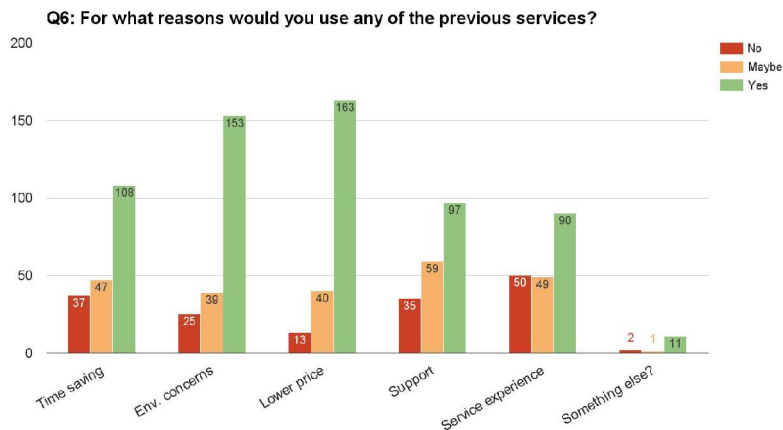


Figure 8 Responses to question 6 of the survey.

Figure 8 shows that pricing concerns are the main motivating factor, with environmental concerns a close second.

5 Discussion

The study findings show that consumers used circular-economy (CE) services only marginally, but expressed a high likelihood for using such services in the future. Respondents who had previously used CE services also seemed to be more interested in using them in the future compared to those who had not yet tried them. Previous studies have shown that people accept new practices more easily if they are aligned to old ones (e.g. Mylan 2015, Shove et al. 2012). Based on our findings, we propose that CE-based business models are not only attractive for consumers who want to try something new, but they would be successful at creating real value for consumers compared to other alternatives.

In the study we were interested in the influence of consumer practices and the ease of using new services, both of which have been regarded as important factors in the previous literature (see e.g. Mylan 2015). Our study confirmed this viewpoint: A significant proportion of respondents had already tried apartment rental services and swapping and they also had plans to use these services in the future. Moreover, when asked about the importance of different factors, time savings and easy maintenance were listed by consumers.

In our study, environmental issues were also found to have influenced the consumer-decision making process. Although these were not the most important factors, the interest was slightly more than has been seen than in previous studies (Littig, 2000; Meijkamp, 2000).

It is quite natural that high prices for products might add to consumer interest towards service-based models that do not need as high an investment and which are quite flexible and based on current need. In this regard, our findings on renting a car confirmed previous findings (Littig, 2000; Mont, 2004a; Schrader, 1999). Consumers also stressed the importance of cheaper prices as an important factor in choosing to rent over ownership, which would be understandable in the case of tools that are seldom in use, as an example. The results also slightly indicate that at least in the case of a washing machine, consumers prefer a fixed monthly payment rather than a pay per use model. One of the reasons might be that pay per use is a rather unfamiliar model for consumers. Thus, they might consider it more expensive or an otherwise more complicated payment method.

Our study used several examples of the sharing economy business model, such as ride-sharing and house rental and swapping. Since these exchanges happen between two consumers, the personality of the relationship is stressed. Thus, we also asked about the importance of support as an influencing factor for choosing a CE-based business model. This factor also seemed to affect service adoption, although it was not among the most important factors.

Limitations

The Housing Fair took place in the City of Vantaa and a majority of participants were from the capital region of Finland. Therefore, smaller cities and rural areas are only marginally represented in the results. Additionally, the Housing Fair was held during the holiday season in Finland, which might possibly distort the results, as respondents on holiday might respond differently to those who might be working. Finally, the age distribution of respondents does not match the age profile of the general population; in particular, the elderly, for whom CE services can be more important, were severely underrepresented.

A visitor to the Housing Fair pays an entrance fee and can be expected to have an interest in and the financial capability of acquiring real-estate in the near future. The survey participants are a subset of this already limited group, which creates bias in the results. Due to the Housing Fair having required an admission fee and time being at a premium, the survey was necessarily very concise and focused only on a limited set of questions.

As SE and CE services are not yet widely in use, their form and function may have been unclear and abstract to many of the respondents. Moreover, in the absence of prior experience of these novel services, a respondent's answers are based on impressions and assumptions. Even though assistance was provided at the time of answering the survey, respondents may have been subjected to confirmation bias or were cautious about revealing their lack of knowledge publicly, i.e. to other respondents at the stall who were also completing the survey.

The reliability of the results could be improved in the future by extending the inquiry window beyond the holiday period and replicating the survey in smaller cities and rural areas. To estimate the impact of services being unfamiliar to respondents and related questions being abstract, results from this study could be compared with responses received from actual service users and with measured use in trials conducted in various locations.

6 Conclusions and further study paths

This study sheds light on consumer understanding of CE especially in relation to novel consumer services, including C2C services. In addition, the study also indicates consumer preferences towards different payment models. As such this study contributes to deepening understanding in CE business models, while bridging the literature on sustainable business model innovation, circular economy business model innovation, and consumer studies. The study serves both academia and practitioners in providing relevant and concrete understanding of consumers' preferences, which would help in creating CE business models that are attractive in the eyes of consumers.

Our study indicated that past experiences of CE-based services were related to conventional use cases, such as car utilisation, although interest was shown in broadening the variety of services used in the future. Of the services presented, hobby equipment and car rentals were found to be of most interest to consumers.

Based on the study, we propose three significant factors that are of interest to consumers regarding the services provided within the circular economy: ease of use, decreased environmental impact, and reduced cost. Consumers also seem to more easily adopt a business model that does not require a dramatic change in their practices. In CE business model innovation, these factors should be taken into account especially in the elements related to the consumer value proposition and the revenue model. Consumers might also need extra education and incentives if new innovative business models are to be attractive to them. One such path would be to offer a step-by-step adoption of new practices.

This study acts a path opener for CE-based business models and a deeper understanding of consumers as active participants of CE. Possible future directions from here could include, for example, understanding different revenue and incentive models of CE-based business models. We also need to better understand how consumers might adopt new business models faster, with one possibility being to more actively involve consumers in the business model innovation process.

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Q5b	Apartment Swap	Ridesharing	Deliveries	Car rental	Row Totals
Previous Use	4 (8.60) [2.46]	22 (11.75) [8.94]	6 (14.16) [4.70]	15 (12.49) [0.50]	47
No previous use	89 (84.40) [0.25]	105 (115.25) [0.91]	147 (138.84) [0.48]	120 (122.51) [0.05]	461
Column Totals	93	127	153	135	508 (Total)

$\chi^2 = 18.3016$, degrees of freedom $k = 3$, $p = 0.000381$ Result significant at $p < 0.01$. In the table the three values x (y) [z] are x =number of responses in category, y =expected number in category, z =contribution to χ^2 from category.