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Consumer perspectives on arranging circular economy in Finland

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ABSTRACT

The article identifies consumer perspectives related to the activities that facilitate circular economy transitions across major consumption domains. Building on insights from surveys on the circular economy, we review consumer perspectives in the key consumption domains of food, housing, and transport, as well as consumer electronics. Our focus is on the responsibility for organizing the reuse of products and services, the preferred procedures for extending the lifespan of products and services, and the ways to acquire products and services. Analyzing responses from a representative survey of the population in Finland in 2018 ($n = 1555$), we argue that consumers' perspectives vary significantly across the domains examined. The responsibility for reuse is attributed mainly to consumers themselves, particularly in housing and consumer electronics. Personal activities are also highlighted in the extension of product and service lifespans in the domains of consumer electronics and transportation. As for acquisitions, the respondents overwhelmingly favored ownership over services or sharing. Further, statistically significant differences due to gender, age, education, income level, and household size were observed. The results indicate that domain-specific strategies to promote circularity that consider consumers' backgrounds are likely to attract a better response from consumers than an all-encompassing approach.

Introduction

Consumers and consumption are attracting increasing attention in the development of the circular economy. Consumers play their part in the evolving business models within the field (Tukker 2015; Manninen et al. 2018) and consumption itself has adverse environmental effects. Food, housing, transportation, and consumer electronics are domains that account for a sizeable share of these negative consequences of consumption. They are also domains in which consumers can make a difference in transitions toward a more sustainable society (Kerkhof, Nonhebel, and Moll 2009; Spangenberg and Lorek 2002). Nevertheless, a deeper interest in consumption in the context of sustainability transitions reaches beyond the preferences of individuals and existing market arrangements (Welch and Southerton 2019) . Sustainable development and the accompanying transition processes benefit from forward-looking assessment while accounting for multiple viewpoints and diversity (Kemp and Martens 2007).

Although there are some well-justified doubts about the environmental benefits of circular economy (Geissdoerfer et al. 2017), circularity has nevertheless become a popular concept in promoting sustainability. It is associated with devising ways to replace the prevalent "linear" economy model, which has been criticized for accentuating the exploitation of new raw materials and contributing heavily to waste. While reduction of waste generated in industrial production receives a great deal of attention in debates on the circular economy, consumers' interests are also directed toward recycling, reuse, and other ways of achieving better sustainability (Ghisellini, Cialani, and Ulgiati 2016). Consumers are active actors in such discussions on sustainability, and the dynamics of demand are key issues in making consumption more sustainable (Welch and Southerton 2019). Scholars have examined consumer viewpoints on a larger scale through surveys that explore a range of perspectives from particular goods to remanufacturing processes and material footprints (Ottelin, Cetinay, and Behrens 2020; Wieser and Tröger 2018; Hazen et al. 2012).

While these attempts are useful in many ways, they often fail to reach the level of comprehensiveness required to assess the potential for systemic change and the role of socioeconomic differences between consumer groups in a representative manner. In this article, we first discuss consumer

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perspectives on the transitions toward circular economy in the consumption domains of food, housing, transportation, and consumer electronics. We then map the contours of previous research on the different ways in which consumers relate to various characteristics attributed to the circular economy. This is followed by a description of the data and methods in our research design, which is based on a representative consumer survey carried out in Finland in 2018. Our results are reported in two sets of analytical tables, which first present the descriptive distribution of survey responses and are followed by more explanatory regression tables with sociodemographic analysis. In the concluding discussion, we bring together the various consumer perspectives and argue for domain-specific policy and business strategies to further sustainability transitions.

Circularity for sustainability transitions

The concept of circular economy targets improves sustainability by offering an alternative to a "linear" economy that processes new raw materials and results in waste. While the use of recycled materials and reuse of secondary material flows is common in prevailing economic systems, the concept of circularity takes the idea further. There are numerous competing definitions of circular economy, most of which emphasize economic prosperity and environmental quality (Kirchherr, Reike, and Hekkert 2017). Notions such as "cradle to cradle," restoration, and regeneration stress "closing the loop" of production and consumption and making the economy environmentally self-contained. At the same time, the concept of circular economy can also be considered a sociotechnical imaginary (Fratini, Georg, and Jørgensen 2019), which functions as a vehicle to promote sustainability transitions (Ghisellini, Cialani, and Ulgiati 2016). Such transitions are called for due to unsustainable consumption and production in a number of domains, such as electricity, heating, buildings, mobility, and agrofood (Köhler et al. 2019).

Alongside capacity for recycling and remanufacturing of products and a supportive regulatory framework, consumer behavior is a key element in a functional circular economy (Geissdoerfer et al. 2017; Ghisellini, Cialani, and Ulgiati 2016). For instance, the Ellen MacArthur Foundation (2015), which has been a renowned promoter of the concept, sees two major ways in which consumers connect to a circular economy: as consumers of the resources of the biosphere and as users of products and services. Consumer activities such as sharing, maintaining, reusing, refurbishing, and recycling connects to industrial processes of manufacturing of products and parts as well as service provision, which aim to minimize systematic leakages and negative externalities.

While the concept of circular economy connects consumers to better sustainability, it gives little guidance on how to account for differences between established industries and consumption domains. Scholars and practitioners alike have addressed this research gap by examining industries and domains separately, but this does not enable comparative or more comprehensive analysis. Hence, in this article, we examine consumers' perspectives on organizing circularity with regard to the separate consumption domains of food, housing, transportation, and consumer electronics. These domains are significant because together they account for the majority of greenhouse-gas emissions (Ivanova et al. 2016; Geels 2019; Nissinen et al. 2015; Hertwich et al. 2010). All these domains are experiencing transition processes, many of which relate to energy transitions and the datafication of technology in a contemporary consumer society (Matschoss and Repo 2020; Micheli et al. 2020). Transportation, in particular, is experiencing rapid changes, as the electric automobile is accompanied by a considerable range of light electric vehicles such as bicycles, microcars, three-wheelers, mopeds, and scooters (Hasselqvist and Hesselgren 2019; Hyvönen, Repo, and Lammi 2016). The housing stock, in turn, has transitions potential to become significantly more sustainable due to new renewable energy sources and energy-efficient renovation (Hvelplund et al. 2019; Lauttamäki and Hyysalo 2019; Horne 2018). Consumer electronics are a cause of serious sustainability concerns but there is also potential for embedding circularity by design (Laurenti et al. 2015). Transitions in the food industry, on the other hand, are diverse albeit crucial from the perspective of global sustainability (El Bilali 2019).

Surveys have proven to be a useful way to assess how consumers attribute responsibility in issues related to the circular economy. These studies have examined specific consumer attitudes (Lakatos et al. 2018), focused on particular products such as the mobile phone (Wieser and Tröger 2018) and remanufactured goods (Wang and Hazen 2016). While issues such as these can change market arrangements, more systemic approaches are required to achieve sustainability transitions. Further, many research designs are exploratory in the sense that they aim to contribute to evolving issues with limited consumer samples, and fall short of being representative at the population level.

Medium-sized surveys in terms of the number of respondents have been used to examine the potential uptake of the circular economy. For instance,

Stoian et al. (2018) assembled a sample of 469 Romanian respondents in their study of factors related to buying decisions of products with recycled content. Similarly, Lakatos et al. (2018) examined attitudes toward sustainable production, consumption, and waste generation with a sample of 642 respondents. Nainggolan et al. (2019) analyzed the waste-sorting behavior of households with a sample of 1011 individuals. Background factors and attitudes are indeed important metrics to consider in facilitating the development of a circular economy, but they would benefit from attention to more practical concerns. For example, Bovea et al. (2018) provide an interesting overview of consumer preferences for circularity in product design and labeling with a sample of 662 individuals from the Spanish city of Castellón de la Plana.

The sample size is important from the perspective of representativeness, but exploratory research designs also matter in an evolving field such as the circular economy (see Camacho-Otero, Boks, and Pettersen 2018). With this aim in mind, Cherry and Pidgeon (2018) engaged 53 consumers in deliberative workshops, with participants representing diverse backgrounds to assess the sensitive relationship between the ownership and use of product-service systems. Similar experimental research designs have also been used in surveys. Gazzola et al. (2020) examined the adoption of sustainability practices in the field of fashion using a large survey based on mixed-method sampling accentuated for youngsters and women ($n = 1238$). Likewise, Jena and Sarmah (2015) examined returns of used products in a survey with 358 respondents consisting of students and "others" in their development of a theoretical model of consumers' intention to return used products. Wang and Hazen (2016) also relied on an experimental survey design in their final sample of 264 students to assess consumers' intention to purchase remanufactured products. Kuah and Wang (2020) concluded that acceptance of recycling and remanufacturing is low in several Asian countries from a survey based on a mixture of convenience and snowball sampling ($n = 584$). In Italy, Borrello et al. (2017) performed a large-scale survey on consumer engagement in reducing food waste with 1270 respondents using a choice-experimental design and considering preferences and tradeoffs in monetary terms.

Mobile phones are of particular interest in surveys on the circular economy, and certainly, merit attention as they are technological products that almost all consumers possess and use on a daily basis. In a large-scale survey in Austria, Wieser and Tröger (2018) identified perceived obsolescence rather than a desire for novelty as the reason for the replacement of mobile phones. In line with this, Mugge, Jockin, and Bocken (2017) observed that the market for refurbished smartphones can be successful and Türkeli et al. (2019) saw that the market is becoming increasingly competitive. In interview-based studies, van Weelden, Mugge, and Bakker (2016) examined consumer acceptance of refurbished mobile phones, and Poppelaars et al. (2018) investigated acceptance of access-based consumption of smartphones. While the environmental impacts of mobile phones are significant due to their production processes and materials, nevertheless they do not constitute an entire consumer domain. Further, it is unclear to what extent these results can be applied to other products and markets as the mobile phone is a very personal communication product. In an experimental survey with a convenience sample of 146 respondents, Atlason, Giacalone, and Parajuly (2017) addressed this issue by demonstrating that user preferences for electronic appliances align well with the concept of the circular economy. Kasulaitis, Babbitt, and Krock (2019), in turn, highlighted the material impacts and recovery potential of electronics.

Remanufacturing is a recurring topic in consumer surveys. A common and contested idea is that consumers see remanufactured products as being of inferior quality when compared to regular products. Hazen et al. (2012) argued, based on a survey of 379 university students familiar with remanufactured consumer products, that ambiguity in the remanufacturing process enhances consumer perceptions of lower quality and reduces willingness to pay for remanufactured items. Similarly, in a survey addressing the connection between consumers' environmental consciousness and the selling of remanufactured products, de Vicente Bittar (2018) found that remanufactured products should be offered at lower prices than regular products and that a consumer's environmental consciousness does not affect the purchase decision. Pisitsankkhakarn and Vassanadumrongdee (2020) concluded that attitudes and subjective norms are important for intentions to purchase remanufactured automotive products in Thailand ($n = 200$). Remanufacturing, accordingly, appears to be seen as promising in studies and by industry, but to which consumers are unresponsive or to which they have a negative attitude.

Our review identifies a research gap in how major consumption domains are analyzed as part of circular economy transitions. Accordingly, our main contribution lies in how consumers think that circular economy should be arranged across key consumption domains. Further, we use a representative sample of the Finnish adult population, which

significantly improves the generalizability of results in comparison to existing research. Our survey, while representative of the Finnish population, is, to the best of our knowledge, the first to examine the opinions of consumers on how to arrange a circular economy in the key consumer domains of food, housing, and transportation as well as consumer electronics.

Data and methods

The data were collected among adult consumers in Finland, a country where the circular economy has been high on public-policy and business-development agendas for several years (Repo et al. 2018; Anttonen et al. 2018). In recognition of this, Sitra, the Finnish Innovation Fund, received an award from the World Economic Forum in the public-sector category in 2018 (WEF 2018). In an international comparison, Finns are well aware of what circularity means (Harju-Autti 2016) and are generally quite well prepared to answer survey questions on the topic, although a more systemic change toward circular economy is still largely incomplete.

The data for this research were collected by the Finnish marketing company Taloustutkimus Oy on May 14–16, 2018. The company used an online survey of a pool of 40,000 Finns between ages 18 and 79. The sample includes 1555 respondents and is representative of the Finnish adult population in terms of gender, age, income, education, and household size. For the analyses, data weights were added. The weighted data correspond to population subgroups of approximately 4.5 million Finns (total population is 5.5 million).

A set of standard socioeconomic variables was used as background variables: age, gender, education, income, and size of household. Age being the only genuinely continuous variable, we decided to reduce it into three categories of equal size for ease of interpretation. Income was originally coded in several increments, which were collapsed into three categories. Education and household size were treated similarly. Table 1 presents the distribution of these variables after recoding.

The survey included three sets of questions probing everyday-consumer activities in the realm of the circular economy. The first of these sets inquired about responsibility for organizing the reuse of products and services belonging to the main domains (food, housing, transport, consumer electronics) of consumption ("In your opinion, whose responsibility is it to organize the reuse of the following products and services?"). The response categories were "retailers (e.g., manufacturers, stores, importers)"; "industry operators (e.g., vehicle

Table 1. Distribution of background variables in the sample (%).

Gender	
Men	49.8
Women	50.2
Age group	
19–37	33.0
38–58	34.6
59–79	32.4
Education	
Basic	8.8
Secondary	53.2
Tertiary	38.0
Annual household income	
Low (<€30,000)	34.0
Middle (€30,001 to €60,000)	38.2
High (>€60,000)	27.8
Household size	
Single	29.8
Double	42.1
Three or more	28.1

demolition)"; "third-sector actors (e.g., NGOs, social enterprises)"; "public sector (e.g., cities, state)"; "mine."

The second set of questions sought to solicit respondents' views on extending lifespans of products and services belonging to the four main domains of consumption ("What would be your preferred way to extend the lifespan of the following products and services?"). The response categories were "by service (e.g., have it repaired)"; "by third-sector actors (e.g., NGOs, social enterprises)"; "by public sector (e.g., cities, state)"; "do it myself."

The third set of questions concerned acquiring products and services in the aforementioned domains ("What is your preferred way to obtain the following products and services?"). The response categories were "service (e.g., rentals)"; "buy as used (e.g., surplus food from grocery stores)"; "joint purchase (including shared use)"; "buy as new"; "public service." This set is particularly relevant for theory because consumers are rarely studied as actors enabling circular economy transitions (Kirchherr, Reike, and Hekkert 2017).

Using the background variables, we performed multinomial logistic regression analyses to examine systematic covariation that may underlie consumer responses. Two technical issues should be noted here. First, as logistic regression is based on cross-tabulation of all variable categories, there is a high risk of having several empty cells or cells with very few observations. These low-frequency cells may be problematic to fit into the regression models. The risk is obviously higher in models with multiple-category response variables, which is the case here. To alleviate the problem, we excluded categories with less than 10% of the respondents from the analyses. This increased the homogeneity of the data without reducing variance too much. The excluded categories are shown in bold type in Table 2.

Table 2. Distributions of consumer responses in the sample (%).

In your opinion, whose responsibility is it to organize reuse of the following products and services?

	Retailers	Specialized companies	Third sector	Public sector	Mine	Total %
Food	22	10	12	12	44	100
Housing	21	14	1	11	53	100
Transportation	11	40	1	34	14	100
Consumer electronics	53	29	1	4	12	100
Average	26.75	23.25	3.75	15.25	30.75	

What would be your preferred way to extend the lifespan of the following products and services?

	Service	Third sector	Public sector	Do it myself	Total %
Food	4	15	10	71	100
Housing	53	2	3	42	100
Transportation	57	1	25	17	100
Consumer electronics	75	5	4	16	100
Average	47.25	5.75	10.5	36.5	

What is your preferred way to obtain the following products and services?

	Service	Buy as used	Joint purchase	Buy as new	Public service	Total %
Food	3	17	4	71	6	100
Housing	33	29	2	34	3	100
Transportation	7	35	5	23	31	100
Consumer electronics	2	10	2	84	2	100
Average	11.25	22.75	3.25	53.0	10.5	

Cells with bolded figures were removed from the analyses.

Second, for simplicity, only the most significant results are reported. Here we used two criteria. First, to be included in the tables the regression coefficients had to be above 0.05. Second, we used a cutoff point for the odds ratios. For the variable category to be considered of analytical interest, it had to show a probability approximately twice as high or twice as low as the probability of the reference category. This somewhat arbitrary operation has merit in simplifying the interpretation of logistic regression tables, which tend to produce quite complex results, especially when analyzing response variables with multiple categories. It also avoids the danger of assigning too much value to minor differences in probabilities. In social sciences, odds ratios are often small as the research designs are rarely capable of capturing all the real-world variance affecting an outcome. Hence, selecting only larger odds ratios is helpful in maintaining the focus on those factors that are potentially most relevant in explanations.

Results: explaining consumer perspectives

In Table 2, we report the overall distribution of answers to the survey questions. We see how Finnish consumers attribute responsibility in organizing the reuse of products and services to market actors, such as retail shops and industry operators, and also to consumers themselves. The latter is especially true in the field of housing (53%). Only in transportation (e.g., the reuse of motor vehicles) is the public sector given a significant role (34%). Third-sector organizations have a marginal part to play overall except in food circulation, where 12% of the respondents thought that these organizations should mainly be responsible. The fact that half of the respondents thought retailers and specialized companies should be charged with organizing reuse can be explained partly by mandatory legislation on producers' responsibility to recycle bottles, electrical appliances, and the like.

The consumer responses on extending product and service lifespans are divided into two main categories: either extension takes place through commercial services or the consumers choose to deploy their own devices to continue using a worn product. Between these two main categories, there is a clear division regarding food and other products and services. More than 70% of Finnish consumers store their food or otherwise reserve foodstuffs for further use by themselves (but still almost one-third would let other actors or organizations take care of this task). The pattern is reversed when we look at consumer electronics. In housing and transportation, we also see a shift toward commercial services. This is easily explained by the lack of skills that are usually required in repairing an electronic device or a car. The same quite often applies in homes as far as, for instance, electric wiring or heating systems are concerned.

An even stronger divide can perhaps be seen when consumers are asked about their favorite manner of obtaining products and services in the four main areas of consumption. Approximately 75% of the respondents report that they prefer owning products (53% would buy a new product, 23% a used product). Services, such as renting, leasing, or

pay per use, are not particularly prevalent, except for housing (rentals) and transportation (public services). Joint ownership is particularly unpopular among Finns. Next, we will look at the socioeconomic determinants of consumer perspectives.

Attribution of responsibility

Attribution of responsibility for organizing reuse is an important aspect in understanding sustainable consumption as it indicates consumers' expectations about their own roles in comparison to the roles of other actors. In other words, attribution of responsibility is a guide to the division of labor in product circulation. A central observation in Table 3 is the significant part played by the age variable in the domains of consumption (food, housing, consumer electronics). The youngest age group (18–37 years) is set apart from the oldest age group (this also applies to the middle-aged group in food circulation). The regression coefficients are positive, which means that the youngest group is more likely to refrain from self-attribution of responsibility (that being the reference category) when compared to the oldest age group. This is particularly evident in the domain of food ($OR_{retailers} = 3.098$; $OR_{spec. companies} = 3.266$). In the housing and consumer electronics domains, the odds ratios for the youngest group

Table 3. In your opinion, whose responsibility is it to organize reuse of the following products and services?

	B	S.E.	Wald	df	Sig.	Exp(B)
Food ($n = 1389$), ref. "mine"						
Retailers						
Intercept	−1.656	0.16	106.89	1	0.000	
Age 18–37	1.131	0.12	89.341	1	0.000	3.098
Age 38–58	0.675	0.119	32.065	1	0.000	1.964
Specialized companies						
Intercept	−2.225	0.21	112.223	1	0.000	
Age 18–37	1.184	0.161	54.22	1	0.000	3.266
Primary education	−0.895	0.293	9.355	1	0.002	0.409
Housing ($n = 1372$), ref. "mine"						
Retailers						
Intercept	−1.226	0.155	62.389	1	0.000	
Age 18–37	0.935	0.114	67.039	1	0.000	2.548
Specialized companies						
Intercept	−1.199	0.172	48.647	1	0.000	
Age 18–37	0.673	0.136	24.607	1	0.000	1.960
Primary education	−1.024	0.265	14.958	1	0.000	0.359
Public sector						
Intercept	−2.389	0.214	124.992	1	0.000	
Low income	0.924	0.175	27.890	1	0.000	2.520
Two-person household	0.720	0.168	18.360	1	0.000	2.054
Transportation ($n = 1372$), ref. "mine"						
Specialized companies						
Intercept	1.117	0.181	37.944	1	0.000	
Primary education	−1.011	0.193	27.464	1	0.000	0.364
Consumer electronics ($n = 1216$), ref. "mine"						
Retailers						
Intercept	−1.234	0.157	61.986	1	0.000	
Age 18–37	0.938	0.115	67.101	1	0.000	2.556
Specialized companies						
Intercept	−1.178	0.173	46.355	1	0.000	
Age 18–37	0.660	0.136	23.503	1	0.000	1.936
Primary education	−1.034	0.265	15.183	1	0.000	0.355

attributing responsibility to retailers are also quite high (~2.5).

We also observe that when it comes to specialized companies level of education seems to matter in all domains of consumption, yet the effect of education is reversed in comparison to age. Consumers with the least amount of formal education are more likely to assign responsibility to themselves than groups with higher levels of education ($0.355 < OR_{prim. edu} < 0.409$). One should note that this relationship, together with the effect of age, applies only to specialized companies. Otherwise, education plays no role in the attribution of responsibility.

Low income and household size have an effect on housing reuse. The lowest income group has an odds ratio of 2.5 when it comes to attributing responsibility to public-sector organizations, meaning that consumers belonging to this group have a quite strong inclination to shift responsibility away from themselves (to the public sector) when compared to the highest income group. Two-person households show the same tendency in comparison to larger households.

Preferred ways to extend product lifespan

Extending the lifespan of products may be accomplished through several methods – by storing, servicing, recycling, or remanufacturing. In Table 4, we report consumer perspectives of the various ways of extending product lifespan. In every major domain of consumption (food, housing, transportation, consumer electronics), the reference category is "do it myself." All other alternatives involve an outside agent (private service, public service, third-sector organization).

Again, age cuts across almost all major domains. Compared with the oldest age group, people belonging to the youngest age group are significantly more likely to extend lifespans themselves instead of resorting to different services ($OR_{food} = 0.490$; $OR_{transportation} = 0.413$; $OR_{consumer electronics} = 0.222$). In the domain of housing, age disappears as a significant variable. Gender is an important factor in the domains of food, transportation, and consumer electronics. Men are more willing than women to let public-service providers take care of the preserving, recycling, or redistributing of leftover food ($OR = 2.163$). When it comes to extending the lifespan of vehicles and electronic devices, men are more likely than women to engage in this activity themselves ($OR_{transportation} = 0.458$; $OR_{consumer electronics} = 0.267$). The third significant variable here is the size of the household. People living in one-person households prefer services to do-it-yourself

Table 4. What would be your preferred way to extend the lifespan of the following products and services?

	B	Std. Error	Wald	df	Sig.	Exp(B)
Food (n = 1333), ref. "do it myself"						
Public service						
Intercept	−2.236	0.2	125.455	1	0.000	
Men	0.772	0.12	41.653	1	0.000	2.163
Age 18–37	−0.714	0.16	19.897	1	0.000	0.490
Housing (n = 1326), ref. "do it myself"						
Private service						
Intercept	0.245	0.12	4.16	1	0.041	
One-person household	0.726	0.11	43.232	1	0.000	2.066
Transportation (n = 1367), ref. "do it myself"						
Private service						
Intercept	2.463	0.173	201.617	1	0.000	
Age 18–37	−0.883	0.125	49.862	1	0.000	0.413
Public service						
Intercept	1.262	0.199	40.044	1	0.000	
Men	−0.782	0.109	51.551	1	0.000	0.458
Age 18–37	−0.958	0.142	45.667	1	0.000	0.384
One-person household	0.708	0.168	17.641	1	0.000	2.029
Consumer electronics (n = 1243), ref. "do it myself"						
Private service						
Intercept	3.388	0.194	303.919	1	0.000	
Men	−1.319	0.11	144.7	1	0.000	0.267
Age 18–37	−1.503	0.143	111.222	1	0.000	0.222

methods. The probability that they will order upgrades, renovation, or other improvements of living quarters from private-service companies is twice the probability of larger households doing the same (OR = 2.066). When it comes to transportation, one-person households prefer public services (OR = 2.029).

Renting or buying goods?

Table 5 presents regression results for consumer perspectives of acquiring products and services in the four main domains of consumption. Here we used "buying a new product" as the reference category.

Age appears again as the dominant variable in all domains. Together with age, income figures strongly in the analyses (excluding buying a used means of transportation). Except for the domain of food, belonging to the youngest generation predicts a movement away from buying new products. This is especially the case in the domain of housing: the youngest age group's probability of renting apartments from the private market rather than buying new ones is five times higher than the probability for the oldest age group to do so. We find the same situation in the case of buying used accommodation. The difference of probabilities between age groups is somewhat smaller in the domains of transportation and consumer electronics, although still 3–4 times larger for the youngest group. It should be observed here that in almost all cases the middle-aged group also differed from the oldest age group (>59 years of age), leaving the age variable somewhat unspecific, although the odds ratios diminish toward the middle-aged group.

Table 5. What is your preferred way to obtain the following products and services?

	B	Std. Error	Wald	df	Sig.	Exp(B)
Food (n = 1214), ref. "buy as new"						
Buy as used						
Intercept	−1.505	0.164	84.575	1	0.000	
Age 18–37	−0.869	0.122	50.635	1	0.000	0.419
Low income	0.949	0.149	40.728	1	0.000	2.582
Housing (n = 1330), ref. "buy as new"						
Private service						
Intercept	−2.13	0.166	165.227	1	0.000	
Age 18–37	1.687	0.123	188.036	1	0.000	5.403
Age 38–58	0.901	0.115	61.422	1	0.000	2.461
Primary education	0.741	0.18	16.915	1	0.000	2.098
Low income	1.541	0.147	109.417	1	0.000	4.669
Middle income	0.846	0.123	46.972	1	0.000	2.330
Buy as used						
Intercept	−1.085	0.148	53.643	1	0.000	
Age 18–37	1.616	0.126	165.206	1	0.000	5.034
Age 38–58	1.093	0.111	96.567	1	0.000	2.984
Low income	1.137	0.157	52.419	1	0.000	3.117
Transportation (n = 1234), ref. "buy as new"						
Buy as used						
Intercept	−0.374	0.160	5.453	1	0.020	
Age 18–37	1.324	0.135	96.721	1	0.000	3.760
Age 38–58	0.894	0.117	57.948	1		
Public service						
Intercept	−0.364	0.171	4.499	1	0.034	
Men	−1.034	0.102	102.518	1	0.000	0.356
Age 18–37	1.115	0.138	64.836	1	0.000	3.049
Low income	1.425	0.165	74.607	1	0.000	4.158
One-person household	0.835	0.165	25.57	1	0.000	2.304
Consumer electronics (n = 1304), ref. "buy as new"						
Buy as used						
Intercept	−3.197	0.224	204.116	1	0.000	
Age 18–37	1.083	0.162	44.575	1	0.000	2.954
Age 38–58	0.724	0.169	18.436	1	0.000	2.062
Low income	0.972	0.186	27.441	1	0.000	2.643
Middle income	0.818	0.163	25.065	1	0.000	2.265

Income is almost as prevalent as age in explaining variance in the preferences for obtaining goods. Low income predicts buying used goods, rentals, and using public services. This is particularly true in the domains of housing and transportation. Low income increases the probability of obtaining housing through the rental market almost five times in

Table 6. Summary of socioeconomic determinants of consumer perspectives in the four domains of consumption (only the strongest explanatory categories reported; reference categories excluded).

	Men	Age 18–37	Primary education	Low income	1-person household	2-person household
Domain of food						
Attribution of responsibility		Retailers, specialized companies	Own responsibility			
Extending lifespans	Public sector	Do it myself				
Preferred ways to obtain		Buy as new		Buy as used		
Domain of housing						
Attribution of responsibility		Retailers, specialized companies	Own responsibility	Public sector		Public sector
Extending lifespans					Private service	
Preferred ways to obtain		Buy as used, private service	Private service	Buy as used, private service		
Domain of transportation						
Attribution of responsibility			Own responsibility			
Extending lifespans	Do it myself	Do it myself			Public service	
Preferred ways to obtain	Buy as new	Buy as used, public service		Public service	Public service	
Domain of consumer electronics						
Attribution of responsibility		Retailers, specialized companies	Own responsibility			
Extending lifespans	Do it myself	Do it myself				
Preferred ways to obtain		Buy as used		Buy as used		

comparison with the highest income group ($OR_{private\ service} = 4.669$) and four times for using public transportation ($OR_{public\ service} = 4.158$).

Gender, education, and household size are somewhat weaker predictors. People with only basic education have twice the probability to live in a rental apartment than people with tertiary education ($OR_{private\ service} = 2.098$). Living in a one-person household increases the probability of using public transportation in contrast to large households ($OR_{public\ service} = 2.304$), while men have almost three times greater probability of buying a new means of transportation than women.

Discussion

Our data from Finland suggest that consumers' ideas about organizing a circular economy on the level of daily life are not uniform and that they vary according to the domain of consumption. For example, consumers show more self-reliance in some domains, while being more willing to use services in others. Also, consumers' socioeconomic backgrounds relate to consumer activities in varying ways across the domains. We found that respondents' gender, age, education, income, and household size affected how they expressed inclinations for organizing a circular economy. Perhaps not so surprisingly, some commonly advocated circular practices, such as sharing or service economy, turned out to be quite marginal in a society that has traditionally valued self-reliance and a do-it-yourself attitude (Haavisto 2014; Eriksson and Vogt 2013).

Studies on recycling have often concluded that socioeconomic variables such as age are weak predictors of environmentally sustainable behavior (López-Mosquera, Lera-López, and Sánchez 2015; Martin, Williams, and Clark 2006). This may apply to recycling, which, at least in the industrialized west, is fairly well organized and widely accepted, and sustained across different social groups. However, with regard to ideas about responsibility or other activities that enhance circularity in consumption, there seem to be socioeconomic variables that have particular explanatory value. Indeed, consumers' choices, in general, are known to relate to subjective well-being, socioeconomic status, and social class (Zavisca and Gerber 2016; Allen 2008). Table 6 summarizes the socioeconomic determinants of consumer perspectives in the four consumption domains examined. Differences are quite evident and they are discussed below separately for each consumption domain.

In the food domain, the strongest explanatory factors were age and education. Younger respondents (18–37 years old) are likely to shift responsibility for the reuse of leftover food to retailers and specialized companies, whereas primary educational level predicts attribution of responsibility to oneself. Self-reliance is a special way for consumers to participate in production in a free-market society, but it manifests itself differently in different social groups. Low educational levels may reflect limited knowledge of available ways to deal with the reuse of food.

When it comes to extending the lifespan of foodstuffs, the members of the young generation prefer

to do it themselves. This may be related to their willingness to buy food as new, which creates a kind of cultural distance from the idea of reusing food supplies. In recent studies, young consumers have been observed to be a significant source of food waste (Nikolaus, Nickols-Richardson, and Ellison 2018). Personal ideas about food safety, taste, and freshness indeed affect consumption practices (Schanes, Dobernig, and Gözet 2018) and young consumers seem to have a stronger tendency to avoid leftover food or foodstuffs past the best before date. The opposite is true among low-income consumers, most likely out of necessity.

Finally, men more than women prefer to let the public sector take care of extending the lifespan of food. Recent surveys show that, despite the high share of women in the workforce, in Finland cooking is still predominantly a female domestic activity (Pääkkönen and Hanifi 2011), which partly explains men's attitudes in this case.

In the housing domain, the primary explanatory variables are age, education, and income. Just as in the food domain, young age predicts delegating responsibility for reuse of housing to private actors and low levels of education to oneself. Low-income consumers attribute responsibility to the public sector. Housing constitutes a market that is characterized by a multitude of actors and in which the public sector contributes to both economic accessibility and sustainability. It is quite intuitive to infer that consumers with limited financial means emphasize the actor on which they often depend for their housing needs.

When it comes to extending the lifespan of housing facilities, we find it difficult to explain the inclination of one-person households to use private services. Extending the lifespan of housing facilities is not clearly related to the interests or lifestyles of this heterogeneous group, which comprises 44% of all households in Finland (Statistics Finland 2019). In contrast, buying from the secondary market ("buy as used") and relying on private services is favored by younger respondents and those with low income, reflecting current practices (e.g., public housing or temporary housing solutions for students).

In the transportation domain, respondents' gender, age, and income correlate with consumer perspectives. Extending product lifespans and modes of acquisition comes forth quite clearly. Men and young people, in particular, prefer to extend the lifespans of products and services themselves ("do it myself"). Consumer studies suggest that these results can be viewed from two contrasting perspectives. Doing something oneself as a necessity due to lack of resources, such as money, knowledge, or

experience is quite different from "craftsmanship" that aims for expression in consumption (Campbell 2005). In this respect, we interpret the survey results originating from young respondents as more of a reflection of necessity. Responses from men, in turn, may relate more to self-expression and perhaps even to expressions of "domestic masculinity" (Moisio, Arnould, and Gentry 2013). Men liking to buy new means of transportation is a documented consumer phenomenon and is especially noticeable in times of rapid technological change, such as the electrification and automation of transport, which provide new opportunities to fulfill these desires (Morton, Anable, and Nelson 2017; Hohenberger, Spörrle, and Welpe 2016).

Public services are favored in transportation by low-income respondents as well as one-person households and younger generations, which reflects financial necessity or life-course factors (see Campbell 2005). Again, the one-person households present a small mystery as this dominant group among the Finnish households has no clear profile in terms of interests or lifestyles.

In the consumer-electronics domain, gender, age, education, and income are the strongest predictors. They behave in a familiar and intuitive fashion. In attribution of responsibility, young age is associated with retailers while low education and own responsibility form a pair. Men and young people like to extend the lifespan of electronics by themselves and young people and respondents with low income are more likely to buy used products.

Conclusions

Sustainability transitions address grand societal challenges (Köhler et al. 2019), and require changes in consumption and market arrangements that go beyond changes in consumers' attitudes, specific products, and better acceptance of remanufacturing, which have been frequent objects of interest in consumer-focused studies in the circular economy. Food, housing, transportation, and consumer electronics account for the major share of the environmental impacts of consumption (Nissinen et al. 2015), and hence warrant attention in making the economy more comprehensively circular. This article has examined consumer perspectives on renewing market arrangements in these domains by analyzing a representative survey of the population of Finland, a western industrialized economy in which circular economy has been on the policy and business agendas for some years. The survey was primarily motivated by the lack of comprehensive studies in the major domains of consumption. There exist several studies focusing on single fields

of industry or individual consumer products, yet our understanding is incomplete when it comes to basic consumer perspectives that affect the circular economy as a whole.

Consumers are undeniably able to see how a circular economy could be organized, covering arrangements relating to responsibility for reuse, organizing the extension of product lifespans, and alternative ways to acquire products and services across the consumption domains. For instance, responsibility for reuse in housing is assigned to consumers themselves, while in the domain of transportation, the public sector can play an important role. The extension of product and service lifespans is attributed to commercial services in the domains of consumer electronics, housing, and transportation, and to personal activities in the domain of food. Further, ownership is also strongly preferred over the use of services, which implies that a cultural shift toward collaborative consumption may take longer than expected or currently belong more to the realm of activities that predominantly take place online (see Belk 2014).

Young consumers differ from others in that they seem to have appropriated many of the ideas and practices developed over decades to make consumption more sustainable. Certainly, it is easier to extend established and accepted recycling practices to new fields when one does not need to reflect on times when systematically organized recycling was not prevalent. At the same time, younger generations tend to shy away from the idea of personal responsibility, whereas people with only basic education tend toward the opposite. In reference to earlier studies on related consumer behavior, such as recycling or climate-friendly consumption (e.g., Abbott, Nandeibam, and O'Shea 2011; López-Mosquera, Lera-López, and Sánchez 2015; Martin, Williams, and Clark 2006), it is important to note that seeing oneself as not responsible for organizing reuse does not mean that one is not ready to engage in sustainable consumption. Taking a used television set to a retailer for recycling indicates exactly this: the consumer's responsibility ends at the retailer's counter. The same applies to a car that is at the end of its life cycle (according to the European Union's end-of-life vehicles directive, 95% of the vehicle's weight must be reused and recovered). By contrast, self-attribution of responsibility in these situations may tell us more about the consumers' understanding of the chain of actors needed to make the reuse of products possible. Correspondingly, consumers with low income stand out in that they prefer publicly subsidized services. While this may be an outcome of financial necessity, it could also be seen as an opportunity to combine the aspirations to develop a circular economy and social responsibility in parallel. In this sense, however, the results of our survey must be treated with caution.

Our findings indicate that consumer choice may not be an efficient method to make markets more circular. In a situation where consumers have few means of ensuring that products and services are truly circular, it is understandable that some consumers attribute responsibility for circularity to their providers. This challenges the notion of consumers as drivers of circular economy, and it is rather the general striving toward sustainable consumption that promotes circularity (see Evans, Welch, and Swaffield 2017). Finally, as consumer perspectives in circular economy vary across domains of consumption, it means that domain-specific policy and business strategies to influence consumer behavior should be favored over an all-encompassing approach.

While we can report that new insights into the relationship between consumption and circular economy are achievable (see Kirchherr, Reike, and Hekkert 2017), our study has certain limitations. Much has to do with the scope of the survey, which targeted categorical insights at a quite general level of inquiry. Further work could be conducted to address more detailed questions within and across the examined domains of consumption. Such work could also account for impacts as well as dynamics coming from rebound effects and changes in people's life stages (see Ottelin, Cetinay, and Behrens 2020). Further, it would be beneficial to consider consumers' access to the wide ranges of circularity offerings by accounting for their competencies and places of residence, for instance, which may affect views on organizing a circular economy.

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References

Abbott, A., S. Nandeibam, and L. O'Shea. 2011. "Explaining the Variation in Household Recycling Rates across the UK." *Ecological Economics* 70 (11): 2214–2223. doi:10.1016/j.ecolecon.2011.06.028.

Allen, C. 2008. *Housing Market Renewal and Social Class.* London: Routledge.

Anttonen, M., M. Lammi, J. Mykkänen, and P. Repo. 2018. "Circular Economy in the Triple Helix of Innovation Systems." *Sustainability* 10 (8): 2646. doi:10.3390/su10082646.

Atlason, R., D. Giacalone, and K. Parajuly. 2017. "Product Design in the Circular Economy: Users' Perception of End-of-Life Scenarios for Electrical and Electronic Appliances." *Journal of Cleaner Production* 168: 1059–1069. doi:10.1016/j.jclepro.2017.09.082.

Belk, R. 2014. "You Are What You Can Access: Sharing and Collaborative Consumption Online." *Journal of Business Research* 67 (8): 1595–1600. doi:10.1016/j.jbusres.2013.10.001.

Borrello, M., F. Caracciolo, A. Lombardi, A. Pascucci, and L. Cembalo. 2017. "Consumers' Perspective on Circular Economy Strategy for Reducing Food Waste." *Sustainability* 9 (1): 141. doi:10.3390/su9010141.

Bovea, M., V. Ibáñez-Forés, V. Pérez-Belis, P. Juan, M. Braulio-Gonzalo, and C. Díaz-Ávalos. 2018. "Incorporation of Circular Aspects into Product Design and Labelling: Consumer Preferences." *Sustainability* 10 (7): 2311. doi:10.3390/su10072311.

Camacho-Otero, J., C. Boks, and I. Pettersen. 2018. "Consumption in the Circular Economy: A Literature Review." *Sustainability* 10 (8): 2758. doi:10.3390/su10082758.

Campbell, C. 2005. "The Craft Consumer: Culture, Craft and Consumption in a Postmodern Society." *Journal of Consumer Culture* 5 (1): 23–42. doi:10.1177/1469540505049843.

Cherry, C., and N. Pidgeon. 2018. "Why is Ownership an Issue? Exploring Factors That Determine Public Acceptance of Product-Service Systems." *Sustainability* 10 (7): 2289. doi:10.3390/su10072289.

de Vicente Bittar, A. 2018. "Selling Remanufactured Products: Does Consumer Environmental Consciousness Matter?" *Journal of Cleaner Production* 181: 527–536. doi:10.1016/j.jclepro.2018.01.255.

El Bilali, H. 2019. "Research on Agro-Food Sustainability Transitions: A Systematic Review of Research Themes and an Analysis of Research Gaps." *Journal of Cleaner Production* 221: 353–364. doi:10.1016/j.jclepro.2019.02.232.

Ellen MacArthur Foundation. 2015. *Towards a Circular Economy: Business Rationale for an Accelerated Transition.* London: Ellen MacArthur Foundation.

Eriksson, K., and H. Vogt. 2013. "On Self-Service Democracy: Configurations of Individualizing Governance and Self-Directed Citizenship." *European Journal of Social Theory* 16 (2): 153–173. doi:10.1177/1368431012459693.

Evans, D., D. Welch, and J. Swaffield. 2017. "Constructing and Mobilizing 'the Consumer': Responsibility, Consumption and the Politics of Sustainability." *Environment and Planning A: Economy and Space* 49 (6): 1396–1412. doi:10.1177/0308518X17694030.

Fratini, C., S. Georg, and M. Jørgensen. 2019. "Exploring Circular Economy Imaginaries in European Cities: A Research Agenda for the Governance of Urban Sustainability Transitions." *Journal of Cleaner Production* 228: 974–989. doi:10.1016/j.jclepro.2019.04.193.

Gazzola, P., E. Pavione, R. Pezzetti, and D. Grechi. 2020. "Trends in the Fashion Industry. The Perception of Sustainability and Circular Economy: A Gender/Generation Quantitative Approach." *Sustainability* 12 (7): 2809. doi:10.3390/su12072809.

Geels, F. 2019. "Socio-Technical Transitions to Sustainability: A Review of Criticisms and Elaborations of the Multi-Level Perspective." *Current Opinion in Environmental Sustainability* 39: 187–201. doi:10.1016/j.cosust.2019.06.009.

Geissdoerfer, M., P. Savaget, N. Bocken, and E. Hultink. 2017. "The Circular Economy: A New Sustainability Paradigm?" *Journal of Cleaner Production* 143: 757–768. doi:10.1016/j.jclepro.2016.12.048.

Ghisellini, P., C. Cialani, and S. Ulgiati. 2016. "A Review on Circular Economy: The Expected Transition to a Balanced Interplay of Environmental and Economic Systems." *Journal of Cleaner Production* 114: 11–32. doi:10.1016/j.jclepro.2015.09.007.

Haavisto, I. 2014. *Neljäs Suomi: EVAn Arvo- ja Asennetutkimus 2014* [The Fourth Finland: Value and Attitude Study by EVA 2014]. Helsinki: Taloustieto.

Harju-Autti, P. 2016. "Global Cross-National Indicator of Environmental Awareness, and Environmental Worldviews in Organizations, Political Parties and Individuals." PhD Thesis, University of Oulu.

Hasselqvist, H., and M. Hesselgren. 2019. "Bridging Citizen and Stakeholder Perspectives of Sustainable Mobility through Practice-Oriented Design." *Sustainability: Science, Practice and Policy* 15 (1): 1–14. doi:10.1080/15487733.2018.1533781.

Hazen, B., R. Overstreet, L. Jones-Farmer, and H. Field. 2012. "The Role of Ambiguity Tolerance in Consumer Perception of Remanufactured Products." *International Journal of Production Economics* 135 (2): 781–790. doi:10.1016/j.ijpe.2011.10.011.

Hertwich, E., E. van der Voet, S. Suh, A. Tukker, M. Huijbregts, P. Kazmierczyk, M. Lenzen, J. McNeely, and Y. Moriguchi. 2010. *Assessing the Environmental Impacts of Consumption and Production: Priority Products and Materials.* Nairobi: United Nations Environment Programme.

Hohenberger, C., M. Spörrle, and I. Welpe. 2016. "How and Why Do Men and Women Differ in Their Willingness to Use Automated Cars? The Influence of Emotions across Different Age Groups." *Transportation Research Part A: Policy and Practice* 94: 374–385. doi:10.1016/j.tra.2016.09.022.

Horne, R. 2018. "Urban Low Carbon Transitions: Housing and Urban Change." In *Urban Sustainability Transitions: Theory and Practice of Urban Sustainability Transitions*, edited by T. Moore, F. de Haan, R. Horne, and B. Gleeson. Singapore: Springer.

Hvelplund, F., L. Krog, S. Nielsen, E. Terkelsen, and K. Madsen. 2019. "Policy Paradigms for Optimal Residential Heat Savings in a Transition to 100% Renewable Energy Systems." *Energy Policy* 134: 110944. doi:10.1016/j.enpol.2019.110944.

Hyvönen, K., P. Repo, and M. Lammi. 2016. "Light Electric Vehicles: Substitution and Future Uses." *Transportation Research Procedia* 19: 258–268. doi:10.1016/j.trpro.2016.12.085.

Ivanova, D., K. Stadler, K. Steen-Olsen, R. Wood, G. Vita, A. Tukker, and E. Hertwich. 2016. "Environmental Impact Assessment of Household Consumption." *Journal of Industrial Ecology* 20 (3): 526–536. doi:10.1111/jiec.12371.

Jena, S., and S. Sarmah. 2015. "Measurement of Consumers' Return Intention Index towards Returning the Used Products." *Journal of Cleaner Production* 108: 818–829. doi:10.1016/j.jclepro.2015.05.115.

Kasulaitis, B., C. Babbitt, and A. Krock. 2019. "Dematerialization and the Circular Economy: Comparing Strategies to Reduce Material Impacts of the Consumer Electronic Product Ecosystem." *Journal of Industrial Ecology* 23 (1): 119–132. doi:10.1111/jiec.12756.

Kemp, R., and P. Martens. 2007. "Sustainable Development: How to Manage Something That is Subjective and Never Can Be Achieved?" *Sustainability: Science, Practice and Policy* 3 (2): 5–14. doi:10.1080/15487733.2007.11907997.

Kerkhof, A., S. Nonhebel, and H. Moll. 2009. "Relating the Environmental Impact of Consumption to Household Expenditures: An Input–Output Analysis." *Ecological Economics* 68 (4): 1160–1170. doi:10.1016/j.ecolecon.2008.08.004.

Kirchherr, J., D. Reike, and M. Hekkert. 2017. "Conceptualizing the Circular Economy: An Analysis of 114 Definitions." *Resources, Conservation and Recycling* 127: 221–232. doi:10.1016/j.resconrec.2017.09.005.

Köhler, J., F. Geels, F. Kern, J. Markard, E. Onsongo, A. Wieczorek, F. Alkemade, et al. 2019. "An Agenda for Sustainability Transitions Research: State of the Art and Future Directions." *Environmental Innovation and Societal Transitions* 31: 1–32. doi:10.1016/j.eist.2019.01.004.

Kuah, A., and P. Wang. 2020. "Circular Economy and Consumer Acceptance: An Exploratory Study in East and Southeast Asia." *Journal of Cleaner Production* 247: 119097. doi:10.1016/j.jclepro.2019.119097.

Lakatos, E., L. Cioca, V. Dan, A. Ciomos, O. Crisan, and G. Barsan. 2018. "Studies and Investigation about the Attitude towards Sustainable Production, Consumption and Waste Generation in Line with Circular Economy in Romania." *Sustainability* 10 (3): 865. doi:10.3390/su10030865.

Laurenti, R., R. Sinha, J. Singh, and B. Frostell. 2015. "Some Pervasive Challenges to Sustainability by Design of Electronic Products: A Conceptual Discussion." *Journal of Cleaner Production* 108: 281–288. doi:10.1016/j.jclepro.2015.08.041.

Lauttamäki, V., and S. Hyysalo. 2019. "Empirical Application of the Multi-Level Perspective: Tracing the History of Ground-Source Heat Pumps Systems in Finland." *Sustainability: Science, Practice and Policy* 15 (1): 82–103. doi:10.1080/15487733.2019.1678372.

López-Mosquera, N., F. Lera-López, and M. Sánchez. 2015. "Key Factors to Explain Recycling, Car Use and Environmentally Responsible Purchase Behaviors: A Comparative Perspective." *Resources, Conservation and Recycling* 99: 29–39. doi:10.1016/j.resconrec.2015.03.007.

Manninen, K., S. Koskela, R. Antikainen, N. Bocken, H. Dahlbo, and A. Aminoff. 2018. "Do Circular Economy Business Models Capture Intended Environmental Value Propositions?" *Journal of Cleaner Production* 171: 413–422. doi:10.1016/j.jclepro.2017.10.003.

Martin, M., I. Williams, and M. Clark. 2006. "Social, Cultural and Structural Influences on Household Waste Recycling: A Case Study." *Resources, Conservation and Recycling* 48 (4): 357–395. doi:10.1016/j.resconrec.2005.09.005.

Matschoss, K., and P. Repo. 2020. "Forward-Looking Network Analysis of Ongoing Sustainability Transitions." *Technological Forecasting and Social Change* 161: 120288. doi:10.1016/j.techfore.2020.120288.

Micheli, M., M. Ponti, M. Craglia, and A. Berti Suman. 2020. "Emerging Models of Data Governance in the Age of Datafication." *Big Data & Society* 7 (2): 205395172094808. doi:10.1177/2053951720948087.

Moisio, R., E. Arnould, and J. Gentry. 2013. "Productive Consumption in the Class-Mediated Construction of Domestic Masculinity: Do-It-Yourself (DIY) Home Improvement in Men's Identity Work." *Journal of Consumer Research* 40 (2): 298–316. doi:10.1086/670238.

Morton, C., J. Anable, and J. Nelson. 2017. "Consumer Structure in the Emerging Market for Electric Vehicles: Identifying Market Segments Using Cluster Analysis." *International Journal of Sustainable Transportation* 11 (6): 443–459. doi:10.1080/15568318.2016.1266533.

Mugge, R., B. Jockin, and N. Bocken. 2017. "How to Sell Refurbished Smartphones? An Investigation of Different Customer Groups and Appropriate Incentives." *Journal of Cleaner Production* 147: 284–296. doi:10.1016/j.jclepro.2017.01.111.

Nainggolan, D., A. Pedersen, S. Smed, K. Zemo, B. Hasler, and M. Termansen. 2019. "Consumers in a Circular Economy: Economic Analysis of Household Waste Sorting Behaviour." *Ecological Economics* 166: 106402. doi:10.1016/j.ecolecon.2019.106402.

Nikolaus, C., S. Nickols-Richardson, and B. Ellison. 2018. "Wasted Food: A Qualitative Study of US Young Adults' Perceptions, Beliefs and Behaviors." *Appetite* 130: 70–78. doi:10.1016/j.appet.2018.07.026.

Nissinen, A., E. Heiskanen, A. Perrels, E. Berghäll, V. Liesimaa, and M. Mattinen. 2015. "Combinations of Policy Instruments to Decrease the Climate Impacts of Housing, Passenger Transport and Food in Finland." *Journal of Cleaner Production* 107: 455–466. doi:10.1016/j.jclepro.2014.08.095.

Ottelin, J., H. Cetinay, and P. Behrens. 2020. "Rebound Effects May Jeopardize the Resource Savings of Circular Consumption: Evidence from Household Material Footprints." *Environmental Research Letters* 15 (10): 104044. doi:10.1088/1748-9326/abaa78.

Pääkkönen, H., and R. Hanifi. 2011. *Changes of Time-Use in the 2000s*. Helsinki: Statistics Finland.

Pisitsankkhakarn, R., and S. Vassanadumrongdee. 2020. "Enhancing Purchase Intention in Circular Economy: An Empirical Evidence of Remanufactured Automotive Product in Thailand." *Resources, Conservation and Recycling* 156: 104702. doi:10.1016/j.resconrec.2020.104702.

Poppelaars, F., C. Bakker, and J. Van Engelen. 2018. "Does Access Trump Ownership? Exploring Consumer Acceptance of Access-Based Consumption in the Case of Smartphones." *Sustainability* 10 (7): 2133. doi:10.3390/su10072133.

Repo, P., M. Anttonen, J. Mykkänen, and M. Lammi. 2018. "Lack of Congruence between European Citizen Perspectives and Policies on Circular Economy." *European Journal of Sustainable Development* 7 (1): 249–264. doi:10.14207/ejsd.2018.v7n1p249.

Schanes, K., K. Dobernig, and B. Gözet. 2018. "Food Waste Matters: A Systematic Review of Household Food Waste Practices and Their Policy Implications." *Journal of Cleaner Production* 182: 978–991. doi:10.1016/j.jclepro.2018.02.030.

Spangenberg, J., and S. Lorek. 2002. "Environmentally Sustainable Household Consumption: From Aggregate Environmental Pressures to Priority Fields of Action." *Ecological Economics* 43 (2–3): 127–140. doi:10.1016/S0921-8009(02)00212-4.

Statistics Finland. 2019. *Dwellings and Housing Conditions*. Helsinki: Statistics Finland.

Stoian, C., O. Țugulea, L. Maha, and C. Ciobanu. 2018. "What is Different about Volunteers? A Study on Factors of Buying Decisions of Products with Recycled Content." *Sustainability* 10 (5): 1631. doi:10.3390/su10051631.

Tukker, A. 2015. "Product Services for a Resource-Efficient and Circular Economy: A Review." *Journal of Cleaner Production* 97: 76–91. doi:10.1016/j.jclepro.2013.11.049.

Türkeli, S., B. Huang, A. Stasik, and R. Kemp. 2019. "Circular Economy as a Glocal Business Activity: Mobile Phone Repair in The Netherlands, Poland and China." *Energies* 12 (3): 498. doi:10.3390/en12030498.

van Weelden, E., R. Mugge, and C. Bakker. 2016. "Paving the Way towards Circular Consumption: Exploring Consumer Acceptance of Refurbished Mobile Phones in the Dutch Market." *Journal of Cleaner Production* 113: 743–754. doi:10.1016/j.jclepro.2015.11.065.

Wang, Y., and B. Hazen. 2016. "Consumer Product Knowledge and Intention to Purchase Remanufactured Products." *International Journal of Production Economics* 181: 460–469. doi:10.1016/j.ijpe.2015.08.031.

Welch, D., and D. Southerton. 2019. "After Paris: Transitions for Sustainable Consumption." *Sustainability: Science, Practice and Policy* 15 (1): 31–44. doi:10.1080/15487733.2018.1560861.

Wieser, H., and N. Tröger. 2018. "Exploring the Inner Loops of the Circular Economy: Replacement, Repair, and Reuse of Mobile Phones in Austria." *Journal of Cleaner Production* 172: 3042–3055. doi:10.1016/j.jclepro.2017.11.106.

World Economic Forum (WEF). 2018. *The Circulars 2018 Yearbook*. Cologne: WEF.

Zavisca, J., and T. Gerber. 2016. "The Socioeconomic, Demographic, and Political Effects of Housing in Comparative Perspective." *Annual Review of Sociology* 42: 347–367. doi:10.1146/annurev-soc-081715-074333.