PLATE
Product Lifetimes And The Environment

The "Making" of Product Lifetime: the Role of Consumer Practices and Perceptions for Longevity

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Abstract: In two studies we explored how electronic devices' use times are influenced or "made" by users and their (d)evaluation and usage practices. Research questions were: What meanings do users attribute to use time? How are these meanings linked to realized, expected and ideal use time? Is use time linked more to attitudes and meanings or to situational factors such as social and material setting? Communicative, symbolic and setting-related predictors of washing machines' and smartphones' use time were tested with multiple regressions. A preliminary online survey (*N*=2.000) explored communicative predictors. It was followed by a face-to-face interview survey (*N*=350) that further included social and material setting. In both studies, the attractiveness of newness was the strongest predictor both for the realized, expected and ideal use time of washing machines and smartphones. Study 2 identified device attachment and the personal norm for longevity as further predictors for longer ideal use times. Results suggest that attractiveness of newness can directly shorten use time, whereas personal norm or responsibility for longevity and the setting may be more distally linked to use time.

Introduction

Our current "metabolism" of electronic devices has detrimental consequences both by severely overstepping planetary boundaries in the case of resource or land use as well as CO_2-emissions, and due to bad working conditions and human rights violations in the process of production and disposal. A longer use phase of devices can reduce resource consumption. The lifetime of products is more than an average number; it is the result of a dynamic process on a at least two dimensions (see also Jaeger-Erben & Proske 2017, Proske & Jaeger-Erben 2019): The *material dimension* where material lifetime is determined by practices of design, creation, appropriation, usage, care, and disposal in systems of consumption and production. The *communicative or symbolic dimension* refers to the production of meaning (Jaeger-Erben & Hipp 2017): What is a product needed for? How is functionality perceived and expected? When is it perceived as antiquated and outmoded? Meanings are a constitutive part of all social practices, they socially justify actions and decisions and embed production and consumption practices in overarching cultural contexts (Schatzki, Knorr-Cetina, & Savigny, 2000; Warde 2005).

This paper focuses on how the realized or actual product use time (*material dimension*) and the expected or ideal use phase (*communicative dimension*) are affected by the user's perception of meaning. It is based on the assumption that users have a relevant influence on product use time by their choice of products, their usage and maintenance practices as well as by their evaluation and devaluation of a product (Hipp 2019, this volume).

Research shows that users often dispose of their electronic devices even if they still work. This can occur due to functional insufficiencies, due to economic or fashion-related reasons such as the attractiveness of new products, but also due to situational factors such as moving houses or changes in the context of use (Cooper, 2004; Granberg, 1997; Jaeger-Erben & Proske, 2017, Hipp 2019). Furthermore, personal norms and values, such as environmental concern, may also encourage or hinder decisions that lead to a longer useful product life (Antonides, 1991).

Yet, to what extent can these factors predict the realized use time of devices? The following paper seeks to answer this question on the basis of two surveys that focus on user experiences as well as behavioural, perceptual and knowledge-related determinants of

longevity. Whereas the first study had an explorative approach, elements of practice theory where applied in the second study.

Theoretical background and Research questions

Our basic conceptual proposition is that the determinants of product lifetimes need to be defined alongside a three-way relationship between design (i.e. designers including production/ producers), consumption (users) and the object. Consumer goods are seen as "becoming" in the course of their biography, a process where they are "neither finished nor inviolable forms at the points of production and acquisition, but […] continually evolving, positioned within and affected by an ongoing flow of […] practice." (Gregson et al. 2007. 250). We refer to the concept of Akrich (1992), who characterizes the "making" of a valuable object as a process of "inscribing" certain qualities, characteristics and functionalities into a product by the designer or producers and the process of "describing" an object by using it. While the inscription is formed by the designer's imaginaries about the user, the description is evolving in "real-time" usages in everyday lives. Like this, some inscribed qualities might not be used or useful, and some descriptive usages might obscure the intentions of the designers. Both, design and consumption are structured by the designer's and user's practical know-how of objects' technical and functional properties, their usage frameworks and contexts. On the side of the user, the everyday life as well as the cultural context are important. What are typical usage practices, what is done for product maintenance? What do consumers expect from their products concerning their use time? Based on different empirical findings as well as conceptual assumptions an exploratory survey (study 1) was developed that covered the communicative, symbolic and material dimension of consumption practices and tried to shed light on the relation between the perceptions of and experiences with use time, attitudes concerning the product responsibility of producers and users and attractiveness of newness.

Both study 1 and 2 focused on smartphones and washing machines as two contrasting products, based on the classification of Cox et al. (2013) who distinguished three classes of products: 'Up-to-date', 'Workhorse'' and 'Investment' products. While the acquisition decisions of 'up-to-date' products such as smartphones tend to be more often driven by appearance and technology changes, 'workhorse' products such as washing machines are prized primarily for their function and their reliability (Cox et al., 2013). Thus, we expected differences in the perceptions, meanings and experiences of users for these two product types.

1st study: Online survey

Method

Sample. The initial sample consisted of 2.000 participants, who were representative for the German population between 14 and 66 years of age.

Design & Procedure. The online survey took place in 2017, with recruitment over a panel institution and coupon reimbursement for participation. Participants were invited via the institution's platform and the sample was curated by screen-out conditions so that representativeness for age, education, income and gender was given.

Measures. The self-reported *realized use time (material practice)* of the previous electronic device was assessed by asking how many months the previous smartphone had been used, and how many years the previous washing machine had been used. The *expected use time (communicative practice)* for washing machines was assessed by inquiring how many years a washing machine should last; for smartphones, by how many months they should last. The *interest in gaining knowledge on prolonging use time* was measured as interest in topics related to user engagement in prolonging use phase with 5 items ranging from 1 = no interest to 3 = big interest, α = .85, e.g. 'how to maintain devices so they have a long lifetime', 'how and where to find repair services', 'how to repair devices myself'. *Attitudinal factors* were assembled in an exploratory fashion, based on previous research. 29 items were assessed by a 4-point Likert scale ranging from 1 = does not apply to 4 = fully applies. *Socio-demographic variables*. Age, education, household income, number of people in the household, gender.

Statistical analysis. Data were analysed using multiple regression in SPSS, with an explorative factor analysis determining attitudinal factors in the model. If necessary, variables were trunked, with outliers (< M + 3.29* SD) recoded to scores the highest value within this range (Tabachnick & Fidell, 2007).

Results

The outcome variables for the washing machine were $M(SD)$ = 10.13(5.39) years of use phase of the last washing machine (N=1519) and participants stated the expectation for use time for a washing machine to be 14.00(7.60) years (N = 1757). The last smartphone they had owned had lasted $M(SD)$ = 24.30(17.14) months (N=1472), however, they would prefer $M(SD)$ = 47.55(27.67) months (N = 1813) - four years - as expected use time.

To extract attitudinal factors, the items were analysed in an exploratory factor analysis (Varimax, rotated). Kaiser-Meyer-Olkin (KMO = .91) test verified the sampling adequacy for analysis. Six factors had Eigenvalues over 1, explaining 54% of the variance and were used in further analyses: responsibility for longevity attributed to the producer (10 items, α=.85, e.g. 'Producers of electronic devices should pay more attention to longevity when designing products.') and to the user (6 items, α =.74, e.g. 'consumers should be more careful with their products so they last longer.'), attractiveness of newness (7 items, α=.85, e.g. 'Having new devices is life quality to me.'), satisfaction with the status quo of product longevity in society (2 items; e.g. 'I am satisfied with my rights as a consumer.'), indifference about product longevity (2; e.g. 'I don't have time to maintain devices.') and the purchase criterion of longevity (2; e.g. 'I buy devices that are more expensive but last longer.').

Next, these antecedents, with the interest in prolonging use phase and socio-demographic control variables were entered in multiple regressions for each the realized use phase of the last product and the expected use phase for this product both for washing machine and the smartphone (tab. 2, Appendix 2). In all analyses, assumptions were fulfilled as independent errors (Durbin-Watson) and no multicollinearity (VIF < 10. Tolerance > 0.2, Bowerman & O'connell, 1990).

The realized phase of the last washing machine was negatively predicted by the attractiveness of newness, whereas the other factors were not linked to the use phase. Age positively predicted the use phase, and the number of people in the household negatively predicted the use phase. For the last smartphone, attractiveness of newness also had a negative association, user responsibility had a positive association, men were more likely to have a longer use phase, and the number of people in

the household was negatively linked to use phase.

Looking at the expected use phase of both washing machine and smartphone, again the attractiveness of newness was the strongest predictor: The more positive newness was for participants, the lower their expected use phase was. This effect was stronger for smartphones than washing machines. In both cases, responsibility attributed to the user was positively linked to the expected use phase. The interest in prolonging the use phase was only related to the expected use phase for smartphones, but not washing machines. The longevity purchase criterion was only associated with expected use phase of the washing machine. Age was associated with a longer expected use phase of smartphones but not washing machines, and the more people lived in the household, the shorter the expected use phase of the washing machine was.

2nd study: Face-to-face interviews

Next, the explorative results of the first study were put in context with practice theory, shifting the focus towards structural and societal factors (as proposed by Jaeger-Erben & Hipp, 2018). These included competence as well as the material and social setting for longevity and repair. Relevant attitudinal predictors from study 1 were subsumed under the practice theory element 'meaning'. Table 1 gives an overview on the factors considered in the second study, as well as their origin.

Dimensions and variables	Related research
Communicative dimension (Meaning)	
Expected or ideal use time	Wieser & Tröger (2015)
Attractiveness of newness	'Up-to-date' mindset, Cox et al (2013)
Responsibility of user/ producers; personal norm	Personal norm, Schwartz (1977); Stern et al (1999)
Purchase criterion longevity	'Investment' mindset, Cox et al (2013)
Indifference, status quo satisfaction	Amotivation, Pelletier et al (1999)
Indifference, status quo satisfaction	Amotivation, Pelletier et al (1999)
Material and behavioural dimension (Setting)	
Realized use phase	Jaeger-Erben & Hipp (2018)

Competence, practical knowledge on repair	Maintenance practice, Graham & Thrift (2007); Gregson, Metcalfe & Crewe (2009); Repair competence, Hielscher & Jaeger-Erben, this volume
Material and social setting	Shove et al (2012); Woodward (2013)

Table 1. Overview of dimensions and variables of the exploratory survey.

Method

Sample. The preliminary sample used for these analyses consisted of *N*=350 participants, who were recruited applying the ADM sampling system. Interviewees were at least 14 years old, with no upper age boundary. This sample was not representative, as data collection is ongoing; the total sample will be *N*=1000.

Study Design and Procedure. Participants were visited at their homes and were questioned in a face-to-face (f2f) interview in 2019.

Measures. The *realized use phase* was assessed as in study 1. The *ideal use phase* was assessed with the question 'If time and money were no concern, how often would you ideally want to replace the product?' Answer options were either a time period or 'I would prefer not to replace the product at all.'. As a dependent variable in analyses, all statements over 6 years and not wanting to replace the product were coded as 'more than 6 years'. Predictors were all examined by self-report on a

5-point Likert scale, mostly with the option of 'I don't know / does not apply to me'. These predictors are described in the appendix 1: attractiveness of newness, device attachment, personal norm for longevity, repair competence, social support, material and infrastructure setting. All constructs were assessed product-based, except the general personal norm for longevity.

Statistical analysis. Analyses were conducted as described in study 1.

Results

The realized use phase of the last washing machine (*N*=226) was *M*(*SD*) = 9.96(6.52) years, the ideal use phase (*N* = 322) was 5 years or less for 19 %, 6-10 years for 20 %, between 10 and 50 years for 4 %, and 55 % of participants stating they did not want to replace their washing machine for a new one at all as long as it still works. For the smartphone, the realized use phase of the last smartphone (*N* = 240) was *M*(*SD*) = 32.23(18.31) months, the ideal use phase (*N* = 329) less than a year for 15 %, 2 years for 30 %, between 3 and 10 years for 15 %, and 40 % of participants do not want to replace their phone.

As seen in fig.1, the personal norm and purchase criteria of longevity on average scored higher than attractiveness of product newness. Device attachment was higher for smartphones than washing machines, whereas participants' repair competence and material setting for repair was in general low.
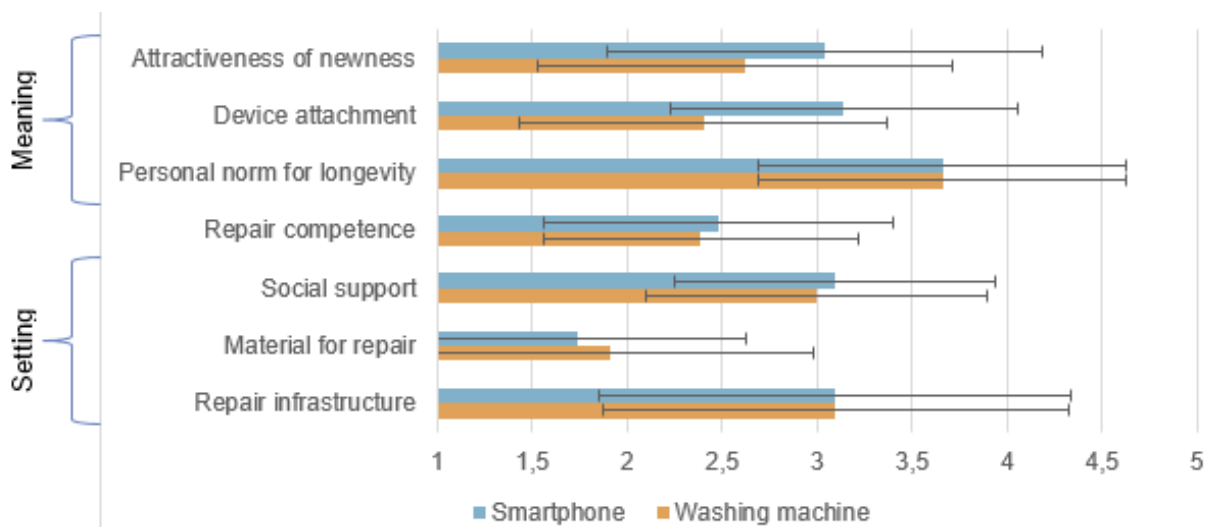

Figure 1. Frequencies of predictors for the two products smartphone and washing machine.
Notes. Interview: N = 334, Range: 1 = low, 5 = high. Error bars = +1/-1 standard deviation.

Assumptions for multiple regression (tab. 3, Appendix 2) were fulfilled (Durbin-Watson, multicollinearity). The realized use phase of washing machines was negatively predicted by the attractiveness of newness (β = -.17) and positively predicted by age (β = .22). For ideal use time, a negative link to attractiveness of newness (β = -.26) and a positive link to the device attachment was found (β = .19). Contrary to expectations, the material for repair negatively predicted the ideal use phase (β = -.18). Regarding smartphones, realized use phase (β = -.19) and ideal use phase (β = -.42), were also negatively associated with the attractiveness of newness. For its ideal use, a positive link to personal norm (β = .23), a positive link to income (β = .18) and a negative link to people in household was found (β = -.17).

Discussion

The use time of the last washing machines was about 10 years in both studies, compared to 12 years in a study by Wieser and Tröger (2015), for the last smartphone use time was lower in study 1 (2 years) than study 2 (2.6 years), compared to 2.7 years found by Wieser and Tröger (2015). The ideal and expected use times were higher than realized use times, showing that users have an interest in increasing product longevity. This also shows in fig.1, where the personal norm for longevity exceeds the attractiveness of newness.

Both the exploratory online survey and the f2f interviews find that overall, the attractiveness of owning new devices is the strongest predictor for both shorter realized and ideal use times of washing machines and smartphones. Further, the use time of smartphones was associated more strongly to the attractiveness of newness, than the washing machine's use time, verifying Cox's categorization into up-to-date and workhorse products (2013).

Additionally, in the online survey the perception of producer responsibility for longevity was linked to the expected use time, yet it had no connection to actual longevity of products. Interestingly, the longevity purchase criterion only correlated with the ideal use time of the last washing machine, but not the last smartphone, and realized use times were not associated at all. In the f2f survey, the personal norm for longevity could only predict the ideal use time of smartphones, whereas device attachment only predicted ideal use time of washing machines. Other factors, especially related to setting, were not linked directly to use times. A possible explanation may be that whereas users' wish to replace a product by a newer one directly shortens use time, the capability to keep a product as long as possible, as most users intended to do, is restrained by situational factors such as product qualities. These setting factors may be more distally linked to use time.

Conclusions

Overall, the attractiveness of owning new devices was the only predictor significant for all use times, realized (material practice) or ideal (communicative dimension). A practical implication to foster device longevity may be to pursue a more positive societal meaning of and attitude towards 'old' products.

Other predictors were more products-specific, such as the attachment to a specific device, personal norm for longevity or felt user responsibility, all of which were only linked to the expected or ideal use time. User intentions to keep their devices as long as possible do not seem to directly translate into longer realized use times, indicating behavioural barriers. To understand these results better, more research is needed.

Acknowledgments

References

Akrich, M. (1992). The De-scription of Technical Objects. In Bijker, W. & Law, & J. (Hrsg.), Shaping Technology/Building Society. Studies in Sociotechnical Change (S. 205–224). Abgerufen von https://halshs.archives-ouvertes.fr/halshs-00081744

Bowerman, B. L., & O'connell, R. T. (1990). Linear statistical models: An applied approach. Brooks: Cole.

Cox, J., Griffith, S., Giorgi, S., & King, G. (2013). Consumer understanding of product lifetimes. Resources, Conservation and Recycling, 79, 21–29. https://doi.org/10.1016/j.resconrec.2013.05.003

Graham, S., & Thrift, N. (2007). Out of Order: Understanding Repair and Maintenance. Theory, Culture & Society, 24(3), 1–25. https://doi.org/10.1177/0263276407075954

Gregson, N., Metcalfe, A., & Crewe, L. (2009). Practices of Object Maintenance and Repair: How consumers attend to consumer objects within the home. Journal of Consumer Culture, 9(2), 248–272. https://doi.org/10.1177/1469540509104376

Jaeger-Erben, M., & Hipp, T. (2018). Geplanter Verschleiß oder Wegwerfkonsum? Verantwortungsdiskurse und Produktverantwortung im Kontext kurzlebiger Konsumgüter. In N. Buschmann, A. Henkel, L. Hochmann, & N. Lüdtke (Hrsg.), Reflexive Responsibilisierung. Verantwortung für nachhaltige Entwicklung. (S. 373–394). Bielefeld: Transcript Verlag.

Pelletier, L. G., Dion, S., Tuson, K., & Green-Demers, I. (1999). Why Do People Fail to Adopt Environmental Protective Behaviors? Toward a Taxonomy of Environmental Amotivation1. Journal of Applied Social Psychology, 29(12), 2481–2504. https://doi.org/10.1111/j.1559-1816.1999.tb00122.x

Schifferstein, H. N. J., & Zwartkruis-Pelgrim, E. P. H. (2008). Consumer-Product Attachment: Measurement and Design Implications. International Journal of Design, 2(3), 1–13.

Schwartz, S. H. (1977). Normative Influences on Altruism1. In L. Berkowitz (Hrsg.), Advances in Experimental Social Psychology (Bd. 10, S. 221–279). Abgerufen von http://www.sciencedirect.com/science/article/pii/S0065260108603585

Shove, E., Pantzar, M., & Watson, M. (2012). The dynamics of social practice everyday life and how it changes. Abgerufen von http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=472457

Stern, P. C., Dietz, T., Abel, T. D., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. Human Ecology Review, 6(2), 81–97.

Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics (5th ed). Boston: Pearson/Allyn & Bacon.

Wieser, H., & Tröger, N. (2015). The Use-Time and Obsolescence of Durable Goods in the Age of Acceleration. An Empirical Investigation among Austrian Households. Abgerufen von https://www.arbeiterkammer.at/infopool/wien/Bericht_Produktnutzungsdauer.pdf

Woodward, I. (2013). Cultural sociology, materiality and object-relations. Reframing modes of cultural understanding through the study of things. International Academic Conference on Economic and Social Development, Moscow National Research University Higher School of Economics (HSE), 1–11.

Appendix 1: List of items study 2

Attractiveness of newness (Meaning; α_{wash} = .81, α_{phone} = .70)
It is important to me to use a device that is of the newest technology.
To own the newest model is life quality to me.
It feels great to have a brand new device.

Personal norm (Meaning; α = .81)
I feel obliged to use devices for a long time.
No matter what others do, my own values tell me not to throw away devices unnecessarily.
To buy a new device when the old one still works would give me a bad conscience.

Device attachment (Meaning, adapted from Schifferstein & Zwartkruis-Pelgrim (2008); α_{wash} = .76, α_{phone} = .77)
I am attached to the device that I own now.
My current device is very dear to me.
My current device has no special meaning for me (-).
My device is an object of utility that I don't mind replacing (-).

Competence (α_{wash} = .68, α_{phone} = .78)
I know how to care for and maintain my device.
I understand how my device is constituted and how it functions.
I know what to do if my device is not working.
I inform myself about the device in the media, internet or newspapers.

Social setting (α_{wash} = .71, α_{phone} = .69)
I can ask people from my surroundings about tips on how to care and maintain my device, so it will last longer.
I know nobody who I could ask for support if my device does not work (-).
People in my surroundings help me if necessary to repair or let repair the device.
I can ask people in my surroundings if repairing a device is worthwhile.

Material setting for self-repair
I have the necessary tools to be able to repair my device.
I have sufficient access to information with which I can repair my device.

Infrastructure repair service
In my vicinity there are enough providers that can repair my device.

Appendix 2: Full analyses study 1 & 2

Table 2. Study 1: Multiple regression analyses predicting the ideal and realized use phases

| | Washing machine | | | | | | | | | | Smartphone | | | | | | | | | |
| | Realized use phase | | | | | Expected use phase | | | | | Realized use phase | | | | | Expected use phase | | | | |
	B	SE	β	t	p	B	SE	β	t	p	B	SE	β	t	p	B	SE	β	t	p
(Constant)	5.07	1.34		3.78	<0.01	9.36	1.53		6.13	<0.01	10.98	4.32		2.54	0.01	5.15	6.47		0.8	0.43
Interest in prolonging use phase	0.30	0.23	0.03	1.31	0.19	0.13	0.27	0.01	0.49	0.62	-0.48	0.77	-0.02	-0.62	0.53	-2.33	1.14	**0.05**	-2.05	0.04
Responsibility attrib. to producer	-0.66	0.34	0.06	-1.97	0.05	-1.5	0.38	**0.11**	-3.92	<0.01	0.44	1.1	-0.01	0.40	0.69	-4.4	1.63	**0.08**	-2.7	0.01
Attractiveness of newness	0.72	0.24	**-0.09**	3.01	<0.01	1.37	0.28	**-0.14**	4.94	<0.01	3.98	0.8	**-0.16**	5.00	<0.01	11.52	1.17	**-0.27**	9.87	<0.01
Responsibility attributed to user	-0.03	0.33	0.00	-0.08	0.93	-0.13	0.38	0.01	-0.33	0.74	-2.78	1.04	**0.09**	-2.66	0.01	1.48	1.58	-0.03	0.94	0.35
Satisfaction with status quo	-0.35	0.21	0.04	-1.67	0.10	0.14	0.24	-0.01	0.57	0.57	-0.32	0.69	0.01	-0.46	0.65	1.20	1.02	-0.03	1.18	0.24
Indifference	0.34	0.21	-0.04	1.63	0.10	0.34	0.24	-0.04	1.44	0.15	0.89	0.68	-0.04	1.31	0.19	0.89	1.01	-0.02	0.87	0.38
Purchase criterion longevity	-0.18	0.20	0.02	-0.89	0.37	0.64	0.23	**0.07**	2.75	0.01	-0.2	0.66	0.01	-0.29	0.77	0.71	0.98	0.02	0.72	0.47
Age	0.08	0.01	**0.23**	8.23	<0.01	0.02	0.01	0.04	1.54	0.12	0.05	0.03	0.05	1.62	0.10	0.13	0.05	**0.07**	2.87	<0.01
Gender	0.09	0.26	0.01	0.36	0.72	-0.14	0.30	-0.01	-0.47	0.64	2.03	0.86	**0.06**	2.36	0.02	2.94	1.26	**0.05**	2.33	0.02
Education level	0.16	0.12	0.03	1.3	0.19	0.16	0.14	0.03	1.11	0.27	0.67	0.37	0.05	1.78	0.07	0.65	0.56	0.03	1.17	0.24
Household income	0.10	0.11	0.03	0.89	0.37	-0.05	0.12	-0.01	-0.40	0.69	0.22	0.34	0.02	0.63	0.53	0.22	0.51	0.01	0.44	0.66
Persons per household	-0.38	0.12	**-0.09**	-3.06	<0.01	-0.52	0.14	**-0.09**	-3.60	<0.01	-0.96	0.39	**-0.07**	-2.50	0.01	-0.57	0.59	-0.02	-0.95	0.34

Note. Washing machine Realized: N = 1519, R² = .11; Expected: N = 1519, R2 = .08. Smartphone Realized: N = 1472, R² = .06; Expected: N = 1472, R² = .11

Table 3. Study 2: Multiple regression analyses predicting the ideal and realized use phases

| | Washing machine | | | | | | | | | | Smartphone | | | | | | | | | |
| | Realized use phase | | | | | Ideal use phase | | | | | Realized use phase | | | | | Ideal use phase | | | | |
	b	SE	β	t	p	b	SE	β	t	p	b	SE	β	t	p	b	SE	β	t	p
(Constant)	4.62	4.21		1.10	0.27	9.91	1.94		5.11	<0.01	25.24	11.58		2.18	0.03	0.38	1.23		0.31	0.76
Attractiveness of newness	0.78	0.33	**-0.17**	2.35	0.02	0.73	0.17	**-0.26**	4.24	<0.01	3.04	1.27	**-0.19**	2.40	0.02	0.90	0.13	**-0.42**	6.83	<0.01
Device attachment	-0.51	0.40	0.10	-1.28	0.20	-0.60	0.21	**0.19**	-2.90	<0.01	-2.31	1.36	0.13	-1.70	0.09	0.18	0.14	-0.07	1.25	0.21
Personal norm for longevity	-0.36	0.40	0.07	-0.91	0.36	-0.35	0.19	0.11	-1.78	0.08	-2.43	1.39	0.14	-1.76	0.08	-0.60	0.15	**0.23**	-4.08	<0.01
Competence	-0.54	0.57	0.09	-0.94	0.35	-0.55	0.28	0.15	-1.97	0.05	0.68	1.72	-0.04	0.40	0.69	-0.13	0.18	0.05	-0.73	0.46
Social support	0.04	0.44	-0.01	0.09	0.93	-0.24	0.22	0.07	-1.12	0.26	1.71	1.74	-0.08	0.98	0.33	0.23	0.17	-0.08	1.38	0.17
Material for repair	0.33	0.43	-0.08	0.77	0.44	0.47	0.21	**-0.18**	2.26	0.02	0.08	1.60	0.00	0.05	0.96	0.02	0.18	-0.01	0.11	0.91
Infrastructure repair services	-0.27	0.29	0.07	-0.93	0.35	-0.17	0.15	0.07	-1.15	0.25	0.71	1.07	-0.05	0.67	0.51	0.17	0.11	-0.08	1.54	0.13
Age	0.08	0.03	**0.22**	2.75	0.01	-0.01	0.01	-0.03	-0.49	0.63	0.02	0.09	0.01	0.17	0.87	0.02	0.01	0.09	1.63	0.10
Gender	0.61	0.74	0.06	0.83	0.41	-0.20	0.36	-0.03	-0.55	0.58	-0.57	2.54	-0.02	-0.22	0.82	0.26	0.26	0.05	1.01	0.32
Education level	-0.11	0.38	-0.02	-0.29	0.77	0.21	0.19	0.07	1.13	0.26	-0.34	1.21	-0.02	-0.28	0.78	0.09	0.13	0.04	0.70	0.49
Household income	0.64	0.39	0.15	1.63	0.10	0.36	0.19	0.14	1.90	0.06	2.51	1.23	**0.18**	2.04	0.04	-0.02	0.13	-0.01	-0.15	0.88
People in household	-0.08	0.38	-0.02	-0.20	0.84	-0.26	0.18	-0.11	-1.44	0.15	-2.37	1.15	**-0.17**	-2.07	0.04	-0.09	0.12	-0.04	-0.73	0.46

Notes. Washing machine Realized: N = 206, R² = .12; Ideal: N = 284, R² = .15. Smartphone Realized: N = 214, R² = .12; Ideal: N = 284, R² = .36