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Keywords: Consumption; Replacement; Civil society; Sufficiency; Social interaction.

Abstract: Research on the lifetime of electronics has so far hardly investigated the role and influence of “third-party” stakeholders like NGOs, political agencies, consumer rights associations and lobby groups on the public discourses and expectations regarding lifetimes. These stakeholders do often lobby for particular goals like preserving consumer rights or fostering eco-efficiency and sufficiency. They influence for example political decisions making concerning lifetime regulation or consumers self-perception. We first conducted eleven problem-centered interviews with representatives of different organizations and associations in Germany. In a second phase, we compared their perspectives with the results from problem-centered interviews with users of electronics. The results show that many third-party stakeholders tend to underestimate the complexity of everyday life, and reduce user practices to rational information-processing and decision-making (following a homo economicus model) as well as to status seeking. In contrast, the user interviews revealed that the use of products is part of everyday life routines. The users primarily expect that their devices work properly, and they do not want to spend too much time and energy seeking for information. We found in the interviews that users often "outsource" decisions about which device to use or whether a repair is worth it, by asking relatives or friends for help. While third-party stakeholders understand the social dimension of using technology primarily as a matter of social distinction, comparison and competition, we found that social cooperation and reciprocity is far more important for usage practices. Thus, we argue for a new perspective in the promotion of product longevity which recognizes and strengthens the “homo cooperativus” instead of the homo economicus.

1 Introduction

Research on the actors that exert an influence on the lifespan of electronic devices has focused primarily on product designers and how they inscribe lifetimes into their products (e.g., Design for Longevity), or it investigated the role of users or business models. In contrast, nongovernmental organizations, political agencies, consumer rights associations and lobby groups, which may play an important role as mediators in the socio-material construction of product lifetimes, have been rarely investigated so far. These actors, which we call *"third-party stakeholders”*, often follow specific goals, such as protecting consumer rights or promoting eco-efficient products and sufficient consumption. Their actions are guided by implicit theories about how markets work, how consumers behave, or how social change occurs. These third-party stakeholders influence the public discourse on product lifetimes by giving interviews as experts for product lifetimes. They publish statements on current issues, design and commission research projects, organize information campaigns and influence political decision-making processes by making use of their position and networks. Therefore, we were interested in the perspective of these third-party stakeholders on product lifetimes and the consumers’ role in promoting or reducing longevity. The goal was on the one hand to identify differences and similarities between these third-party stakeholders. In a second step, we compare their views on users with users’ self-descriptions in order to identify blind spots and issues that deserve more attention from the stakeholders in the future.

2 Methods

A qualitative approach was chosen in order to capture the perspectives of third-party stakeholders on the lifetimes of devices and on users as broadly as possible. Eleven problem-centered interviews were conducted with representatives from environmental protection organizations (like Greenpeace and WWF), consumer protection associations and product testing agencies (like Verbraucherzentrale Nordrhein-Westphalen, Stiftung Warentest), governmental agencies (like the German Environmental Agencies) and a manufacturers' association in Germany. The interviews took

place in summer 2020 via video phone calls, and lasted about 70 minutes. The interviews focused on the perception of the causes and drivers of obsolescence in the area of electronic devices and the role of users. The transcripts were analyzed using content analysis (Mayring, 2015). The answers were compared for similarities and differences.
In a second step, the statements of the third-party stakeholders were compared with the perspective of users themselves. Basis for the comparison were 15 problem-centered interviews with users conducted in 2017 – 19 in a previous project phase. The interviews lasted 90 min each, and were conducted at the respondents' homes in Germany. The topics covered the social practices of electronics consumption and their relation to product lifetimes. The data were analyzed using grounded theory (Bryant & Charmaz, 2011), since the focus of the research process at that time was to develop a model to explain user behavior. The results of this previous research have already been published (Hipp, 2020).

3 How do third-party stakeholders perceive the issue of product lifetimes?

The following section describes the awareness and perception of the third-party stakeholders concerning the problems, the causes and drivers of short lifetimes, as well as their views on possible solutions and future avenues.
All third-party stakeholders interviewed consider the fact that electronic devices are often used for shorter periods than possible as problematic. The third-party stakeholders agree that it makes sense to extend the lifetimes of products in order to reduce social and environmental impacts. They have different opinions about the urgency they assign to this issue compared to other sustainability challenges. Differences can be seen in the assessment of whether the use time of electronic devices generally tends to decrease or to stagnate (at a low level) depending on the type of device.
Product design and manufacturers are seen as main responsible for product lifetimes. In some cases, the design of high-quality products is perceived to depend on the customers' willingness to accept higher prices. In the case of household appliances, lifespan is linked in particular to whether it is financially worthwhile to repair them. In the case of information and communication technology (ICT), the main focus is on whether functioning devices are exchanged for new releases, which are associated with greater prestige. From the perspective of the interviewees, main drivers for short product lifetimes are shortcomings in product design due to time and cost pressures in the production process, which in turn are increasing due to growing global competition. In addition, technological trends like miniaturization, digitalization and the standardization of components and tools are recognized to promote premature product replacement because, as a result, devices are either more susceptible to defects or more difficult to repair. The interviewees perceive a lack of governmental intervention for longer living products, and assume that, instead many behavioral incentives favor premature product replacement. New low costs purchases and comparatively high repair prices favor new acquisitions, which are additionally facilitated by easy to perform online shopping.
Unanimously, the third-party stakeholders expect stronger governmental control and intervention. The most effective measures are considered to be an extension of the guarantee and warranty periods and product lifetime labels. The majority also call for product design regulations. Regarding users, the assessment of how users can influence product lifetimes at all and how practices that favor durability can be promoted is linked to the user image.
Most third-party stakeholders are optimistic that the lifetimes of electronics in the EU will increase, as policy makers have embraced the issue and an increasing awareness is observed among the population. A distinction is often made between different product groups. In the case of smartphones, for example, longer product lifetimes are expected because the innovation cycle is becoming slower. However, the ascribed urgency to prolong product lifetimes sometimes leads to criticism that the process is too slow in total.
Overall, it turned out that the third-party stakeholders have a broad common sense in regard to their view of the issue of product life. However, their perspective is also linked to their own professional position. Political institutions focus on processes of lawmaking at different levels. Consumer protection representatives call for more consumer rights. The manufacturer association is in favor of

rights that provide planning security in the long term, meanwhile environmental protection associations, on the other hand, complain that existing laws are hardly followed by companies and that monitoring is lacking.

4 What is the third-party stakeholders' image of product users?

The perspectives on product users vary greatly among third-party stakeholders. Some third-party stakeholders understand all consumption practices as motivated or steered by monetary considerations and costs, others draw a complex picture instead that not only considers different motivations and differentiates between product and user types, but also realize the multi-causality and embeddedness of human action. We identified eight aspects to characterize users based on different theories or concepts about how people "function." The aspects relate to different dimensions like motivational intentions, emotions and behavioral principles, and are each linked to specific starting points on how to promote long lifetimes. Third-party stakeholders combine and contrast the aspects in different ways.

Figure 1 shows an overview of the eight identified aspects systematized into a two-dimensional matrix. The horizontal axis indicates the attributed typical length of lifetimes associated with the aspect. The vertical axis marks the potential influenceability of the user through interventions according to third-party stakeholders. The further to the right an aspect is located, the longer the typical lifetime of the product, and the further up an aspect is located, the easier it is to extend the lifetime through interventions that target consumers.

Table 1 characterizes the eight aspects of third-party stakeholder perceptions and the associated starting points for promoting long product life times. *Behavioral costs* and *knowledge* were mentioned by all third-party stakeholders. The interviewees frequently mentioned that consumers should learn more about the benefits to make them conduct the desired action: *"If you want to get people, you have to tell people how much money they're saving"*. Furthermore, all of the interviewees expect users to prematurely replace equipment because of their *status and*

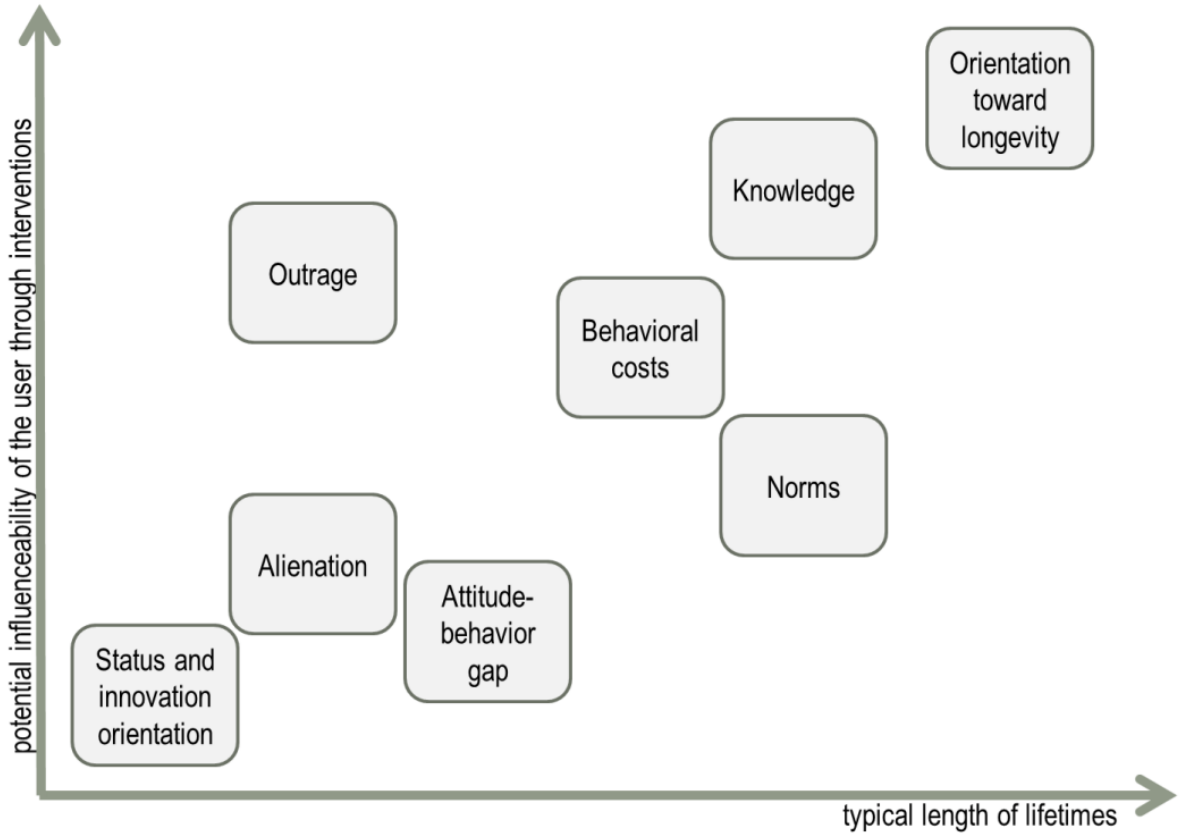

Figure 1. Aspects of user images and connected influenceability and prouct lifetime © own illustration.

innovation orientation. While some see this behavior as legitimate, others criticize it, and connect this sort of orientation to alienation between users and their real needs. This alienation is seen as caused by marketing and overwork: *"We should (...) not reward ourselves with things for doing work we don't want to do (...). Then we don't need the substitute drug of consumption."* Whether sufficiency is seen as unrealistic or necessary is coupled to the image of technology, and thus to the question of whether technology is seen as a prerequisite for quality of life or whether a reduction in technical equipment is seen as desirable.

Some third-party stakeholders emphasize that some users already try to use devices as long as possible (*orientation toward longevity*). This was partly traced back to socialization through the parental home and school, and thus linked to norms, as it corresponds to the human image of a homo sociologicus (Dahrendorf, 1964).

Some complained that the market does not meet their needs: "*But I actually don't know any manufacturer who obviously advertises that they produce durable and robust."* Users with a strong interest in longevity are sometimes credited with being *outraged* when devices break sooner than expected, sometimes linking this to the narrative of planned obsolescence (Packard, 1960; Slade, 2006). Other third-party stakeholders, however, attribute a lack of supply of durable products to low demand, justifying it by saying that *"consumers crave innovation"* and that *"ultimately, price is the main deciding factor"* and *"quality [...] is a matter of price*."

5. How do third-party stakeholders' views correspond to the users' everyday life?

The third-party stakeholders' images of users were compared with the results of the user interviews. A main result was that the third-party stakeholders seem to underestimate the complexity of everyday life. Their image of human conduct and agency is predominantly

Aspect	Description	Starting point for intervention
Behavioral costs	Homo economicus: rational comparison of benefits and costs (price, effort and time)	Cost-benefit analysis on life cycle costs, increase behavioral costs for short life and decrease for long life, internalization of external costs
Knowledge	Logical action based on one's own competences or on the basis of one's own knowledge	Providing information, repair competence, basic technical understanding and knowledge of social and ecological impacts
Status and innovation orientation	Striving for social distinction through prestigious devices, enthusiasm for innovations	Few potentials for change are seen, status through durable products or sometimes, promoting the sale of used devices to enable a second life of replaced product
Orientation toward longevity	Intention to use devices for as long as possible and corresponding behaviors; motives: product loyalty, appreciation of the old, saving money, sustainability	Making durable and repairable devices available, lifetime labeling, sharing offers, repair services
Outrage	Negative affective reaction to technical failures; belief in "planned obsolescence", criticism of "throw away culture"	Make repair instructions and services available, repair café; institutionalize feedback to manufacturers, call for boycotts
Norms	norms and values shape actions, contrasting "in the past = long useful lives" and "today = short useful lives"	Familial and institutional socialization; revival of traditional values: valuing and caring for things, image campaign
Alienation	Human being as alienated from own needs and from devices, consumption as compensation for lack of social interaction	Time prosperity, deceleration and sufficiency, "smartphone detox" and self-reflection, promotion of product attachment
Attitude-behavior gap	High environmental consciousness paired with low environmental behavior	Sometimes no starting points are seen due to feeling of powerlessness; others use target group models

Table 1. Aspect of user images and associated starting points for promoting product longevity

based on a homo economicus model (Wilson & Dixon, 2014), whereas the relevance of price seems to be overestimated compared to other criteria such as time and effort. In the interviews with users, the expected effort was often mentioned as a limiting factor hindering the maintenance or the repair of a product, especially if everyday life is busy. For example, one user describes throwing away a partial broken device with the expression *"another problem less".* The third-party stakeholders often rely on the communication of more or better information to support consumers, but they underestimate the time and effort involved in lifetime-enhancing practices. Providing information does not automatically influence action, as studies show (Spurling et al., 2013). They also tend to forget that information on the social and environmental consequences of short product lifetimes might be valuable in purchase situations but are not relevant to the conduct of everyday life and the everyday usage of product. Here it is more important to have functional products available and to know, in case of disfunction, how to get it fixed as quick and easy as possible. The willingness of users to actively seek information and acquire competences seems to be taken for granted by most third-party stakeholders. We found that a large share of users also tends to *"outsource"* these practices and leave decisions about their own devices to members of their family or friends. The investigation of everyday usages of electronics revealed the social embeddedness of the related practices. People do not only talk about their products, they help or support and rely on each other, particularly in case of problems and malfunctions. They do not only share products, but also their practical know-how, their experiences and competences. Thus, it is important to consider the setting and social embeddedness of social practices and how forms of cooperation and mutual support sustain the usage of products.

According to the third-party stakeholders, users replace their functioning devices primarily because they associate a more modern device with a higher symbolic value, that could enhance their own status in society. However, the distinctive value of replacements hardly played a role in the investigation of everyday lifes. Most devices are not part of interactions between peoples at all. The replacement of functioning devices was mainly due to limits in comfort of use.

The third-party stakeholders divided the condition of devices into *"working", "defective but repairable"* or *"completely defective and not repairable"*. The investigation of everyday usages revealed moreover, that device conditions are dynamic and could be better described as a process: Even perfectly functioning, but old devices can be devalued due to their shorter expected lifetime. In addition, small partial defects (e. g., a button that no longer works), decreasing performance (e.g., lower battery capacity) and infrequent failures (e.g., random reboot) as well as aesthetic wear can lead to a successive devaluation of the device, even if the basic functions are still mostly usable. How long a user wants to put up with these seems to have high relevance for longevity. Furthermore, most of these devices were sold as second hand or passed on to family and friends.

6 Discussion

Overall, third-party stakeholders seem to reduce the social, interactive dimension of everyday consumption and use of electronic devices to its distinctive value. Social competitiveness and comparison is seen as the main driver for electronics consumption, particularly for new purchases and early replacements. An investigation of everyday lives and social practices of electronics consumption suggests instead that technology is primarily used to make everyday life easier. Thus, functional value and functionality are much more important than symbolic value. In their effort to keep their everyday helpers as functional as possible, users rely on their social surroundings, on social support and mutual help. Thus, the *"social"* aspect of technology use is not about competition, it is about cooperation. We argue that recognition of how the use of devices is embedded in social interactions, in forms of cooperation and in social reciprocity could be an interesting and promising starting point for promoting longevity-enhancing practices. Policy or civil strategies should be more directly linked to the social ties and mutual support that already exist in society among users for technical matters. The basis for this could be the model of a homo cooperativus (Rogall, 2002) instead of a homo economicus, which is also open to shared, sufficiency-based forms of product use.

7 Conclusions

From our perspective, product lifetimes are not a fact or a characteristic of an object but a process that unfolds throughout the whole product biography, and which is influenced by many aspects and actors. In this paper, we highlighted the implicit or indirect role of those third-party stakeholders that exert influence on public discourses and the public awareness on perception of product lifetimes. Their perceptions of the conduct and agency of users, as well as their understanding of how change happens, are very significant in this realm. We identified underlying models of change, and the human conduct that possibly guide their public or policy interventions, information or image campaigns are based on theoretical assumptions – regardless of whether these are reflected or not. If the homo economicus remains a dominant model in the perception of users, the interventions risk to fail in the long run, since they are not able to significantly connect to the everyday life of users. Whether the homo cooperativus is a more successful model for designing interventions remains to be seen and studied more thoroughly in future research. However, when third-party stakeholders want to influence consumer practices, a reflective and target group adaptive approach may be able to more effectively reduce scatter effects that occur through try-and-error attempts to reach consumers, and in turn to save costs and time for the third-party stakeholders.

Acknowledgments

Funding for this research as a part of the project “Obsolescence as a Challenge for Sustainability” was granted by the German Federal Ministry of Education and Research within the framework “Research for Sustainability (FONA)”.

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