



Full length article

An empirical survey on the obsolescence of appliances in German households



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ABSTRACT

Obsolescence is the wearing out of technical appliances. Planned obsolescence is often seen as an economic strategy to improve sales by reducing the lifespan of these appliances. Although there are a lot of public discussions about planned obsolescence, there is a lack of data available to support or contradict this hypothesis. The objective of this survey is to collect quantitative data about the maintenance and discarding history of five household appliances throughout their lifecycle in private households in Germany. The survey is an internet-based questionnaire. A total of 1075 respondents were recruited in Germany and included in the evaluation.

What happens in this observed lifecycle is different in detail for the various appliances: More expensive products seem to last longer. Repairing products seems not to prolong the lifespan. Small appliances, such as kettles and hand mixers, are rarely repaired and are discarded, even if still functioning. Washing-machines and laptops are not always discarded, even if they are defective. Washing-machine lifespan depends – more than any other of the observed products – on the purchase price and usage frequency. Consumers' mind-set seems to be a limiting factor for the actual lifespan of technical appliances. It appears that lifespan cannot exceed consumers' expectations. Moreover, consumers are the link in the chain to extend the product lifecycle, because the reuse and deferred disposal can only be solved with their support. Obsolescence is not only an issue that should be addressed to the manufacturer, but also as a responsibility to the consumer.

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1. Introduction

Obsolescence is the wearing out of technical appliances. Planned obsolescence is usually seen as an economic strategy by the industry in order to improve sales. Consequently, the lifespan of appliances is intentionally reduced by implementing breaking points so that the appliances will break earlier (Bodenstein and Leuer, 1981; Bakker et al., 2014).

Slade (2006) describes first observations of planned obsolescence concerning the electric light bulb or car production of General Motors in the early 20th century. In the first case, the lifetime of the electric light bulb lasted for so long that its purchase decreased. Thereupon, the industry limited the lifespan of light bulbs.

According to Packard, who described subcategories of obsolescence as early as 1960, there are three types. Firstly, the obsolescence of quality is caused by a lack of quality of a compo-

nent or material. An example is the wire of the electric light bulb. Secondly, functional obsolescence is induced by innovations, new features and new interfaces. Thirdly, the obsolescence of desirability inspires the desire for trends, designs and lifestyles that force products to become old-fashioned. Advertising plays a major role in the obsolescence of desirability by creating needs and interests (Packard, 1960). This kind of obsolescence is also called psychological obsolescence (Cooper, 2004).

Although these definitions of obsolescence are still in use, new approaches attempt to make further specifications. Thus, the types of obsolescence are extended by economic obsolescence, i.e. a financial factor justifies disposal. Moreover, obsolescence is differentiated into absolute and relative obsolescence: absolute obsolescence means a total failure of the appliance, while relative obsolescence means that the appliance could still be used (Cooper, 2004).

Although obsolescence is often portrayed negatively, it also has a benefit. It may even be useful and sustainable. Great technical progress has resulted in current appliances being much more energy-efficient and using less water than old appliances. Resource consumption of old household appliances is less sus-

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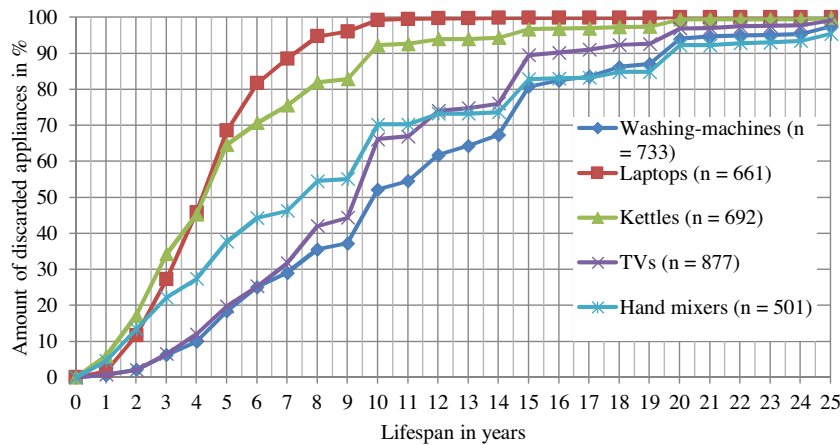


Fig. 1. Summed-up probabilities for appliances being discarded versus age.

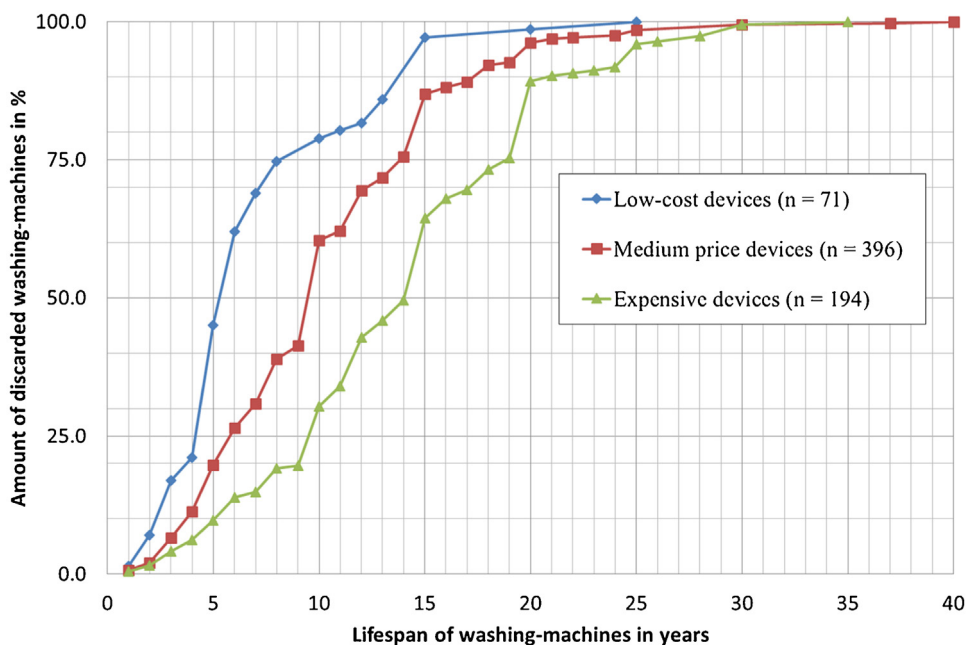


Fig. 2. Discarded washing-machines differentiated by price versus age.

tainable (Stamminger et al., 2005). The environmentally optimal lifespan of appliances can be calculated, taking into account the resource consumption for the production and the expected improvement of the next generation. Consequently, the optimal lifespan is limited and not as long as possible if the efficiency of new technology justifies replacement (Chalkley et al., 2003).

Obsolescence has been studied in scientific literature from various angles. Qi and Sawhill (2014) developed an analytical model to simulate the interplay of consumers and manufacturers. They found that technological progress does not necessarily lead to enhanced sales; if progress is too fast, consumers stop purchasing.

Lutz (2013) calculated the number of discarded appliances (air conditioners, heat-pumps, furnaces, boilers, water heaters, room air conditioners, refrigerators and freezers) based on information about supplies and appliances in use. The result is that a lot more old appliances are in use than expected. Those data are also needed when estimations about the electronic waste flow are carried out (Liu et al., 2006; Baldé et al., 2015; Petridis et al., 2015; Yedla, 2016; Yang et al., 2007).

Cox et al. (2013) conducted focus group interviews and analysed the habits of consumers. The behaviour is different if the appliances are *workhorses*, *investments* or *up-to-date* products. *Workhorses* are reliable over a long lifespan; *investments* are worth an investment because of their speciality; and *up-to-date* products include mobile phones, small appliances, clothes and furnishings, which are susceptible to being replaced for their looks and functional features. Consumers associate the latest products with personal success. The younger the users are, the shorter the lifespan of the products (Cox et al., 2013).

However, consumer behaviour is also a reason for the present problem of increasing amounts of electronic waste. As prices fall, consumers can buy appliances just for fun and not for necessity (Aladeojebi, 2013).

There are many conclusive research results, but there is still a lack of information in databases. This is the reason why obsolescence has come back into the focus of current research.

Because obsolescence is a phenomenon which may show differences depending on the product, five products were chosen as representatives of specific product groups. The laptop is repre-

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