Extended Abstract
6th PLATE 2025 Conference
Aalborg, Denmark, 2-4 July 2025

Have prospects for product life-spans improved? A comparison of trends in household appliances and electronic goods over 25 years

Tim Cooper[a], Matthew Watkins[b], Maryam Bathaei Javareshk[a,c], Thom Baguley[a]
a) Nottingham Trent University, Nottingham, United Kingdom
b) Loughborough University, Loughborough, United Kingdom
c) Cranfield University, Bedford, United Kingdom

Keywords: Electronic goods; Product life-times; Obsolescence; Historical trends; WEEE.

Introduction

The lack of firm evidence on trends in the life-span of consumer durables is especially unfortunate in the case of household appliances and electronic goods due to the scale and environmental impact of e-waste (Balde et al., 2024). Although some limited international data on product life-spans was identified over 40 years ago (OECD, 1982), research to generate data systematically across all types of household appliances and electronic goods was only undertaken much later.

During the 1990s the impending Waste Electrical and Electronic Equipment (WEEE) Directive prompted manufacturers and retailers to seek better information about the waste created by their products. A multi-stakeholder project team was formed and commissioned a survey of 'end-of-life' household appliances and electronic goods, which addressed life-spans. Their report, *Prospects for Household Appliances*, revealed that 57% of such products in people's homes were under 5 years old and their average (mean) age when discarded ranged from 4 years (for small appliances, mobile phones and toys) to 12 years (for electric cookers). Almost one half of respondents expressed dissatisfaction with product life-spans (Cooper & Mayers, 2000; Cooper, 2004).

The circular economy debate has increased interest in product longevity and prompted further European Union legislation (e.g. the Ecodesign for Sustainable Products Regulation) and, in the UK, a parliamentary report on electronic waste (Environmental Audit Committee, 2020). Consequently, a second UK survey was undertaken, in 2023, to identify trends in the life-span of household appliances and electronic goods, and to explore consumers' expectations, attitudes and behaviour concerning acquisition, repair and disposal, including life-span labelling.

This Extended Abstract compares data from the two UK surveys on the ownership of household appliances and electronic goods, their life-spans, and the extent of rental, reuse, borrowing and sharing. Future outputs will draw upon the substantial new database to address themes such as consumer expectations, public policy, demographic influences, design influences and repair.

Methodology

The two UK surveys each adopted a consumer-based approach but with a slightly different method: in 1998 face-to-face doorstep interviews with householders were undertaken, while in 2023 respondents from a consumer panel completed online questionnaires. The final sample size in each case was over 800 householders, and representative of the UK population by gender, age, ethnicity, social grade and region.

The questions in 2023 were designed to obtain data comparable to that from 1998, although some were reworded and others added or removed to reflect the historical context and desired focus. Product categories were maintained as far as possible while allowing for technological developments. Due to greater disaggregation there were up to 43 categories in 2023, compared to 15 in 1998. Data were cleaned, weighted and analysed using SPSS; cross-tabulated data were tested for significance using t tests.

Aside from modifications to the method and product categories, key limitations to the research are that the data were self-reported by consumers and may rely on memory.

Results and discussion

There was a substantial increase in ownership of household appliances and electronic goods, from a mean of 25 products per household in 1998 to 42 in 2023. The greatest growth was in computers and peripherals (from under 1 per household to over 5), mobile phones (from under 1 to nearly 3) and small appliances (from over 6 to around 12). This reflects changes in technology (e.g. laptops, tablets) and greater affluence, although the revised method may have resulted in more small appliances being identified.

The mean life-span of discarded items varied by product category; in 2023 it was typically 8 to 10 years for products such as electric cookers, washing machines and fridge freezers, 5 years for small appliances and 4 years for mobile phones. There was significant variation between wired and cordless products: wired models of DIY power tools, vacuum cleaners/carpet cleaners and garden power tools typically lasted longer than cordless models.

There was evidence of declining life-spans in some, but not all, product categories. The mean life-span for vacuum cleaners/carpet cleaners, televisions and electric cookers declined, while it increased for landline telephones, substantially, and small appliances, slightly. In other product categories little change was evident or direct comparisons were problematic.

The findings enhance the scarce evidence on historical life-span trends (Oguchi et al., 2010). International comparisons are not easy due to different data collection methods, product categorisation and waste management practices, and many national studies with life-span data have not addressed all types of household appliances and electronic goods. Rare exceptions from the Netherlands and Germany (cited in Bakker et al., 2014 and German Environment Agency, 2017) have suggested a downward trend, but a Japanese study concluded that life-spans have increased (Oguchi & Daigo, 2017). Further research is required.

Our survey also explored product acquisition. The proportion of second-hand items, whether purchased or given, was substantially higher in 2023 than 1998. By contrast, despite government interest in a shift from product ownership to rental, in 2023 fewer respondents reported that they had recently rented items (typically DIY power tools, garden power tools, washing machines, or vacuum cleaners/carpet cleaners) than in 1998.

There was, however, evidence from 2023 of borrowing and sharing by around a fifth of respondents (typically garden power tools, DIY power tools, vacuum cleaners/carpet cleaners, and monitors or printers/copiers/scanners). This indicates a certain degree of resource efficiency and social cohesion. Comparable data were not collected in 1998.

Conclusions

Ownership of household appliances and electronic goods in the UK, especially second-hand items, grew between 1998 and 2023, while rental declined. There is extensive borrowing and sharing.

The decrease in life-spans revealed in several product categories may have negative impacts on consumers and the environment, although the slight increase for small appliances may be beneficial. The trend towards cordless products is significant, as wired models typically last longer. The growth in product ownership and a failure to increase life-spans, overall, suggest that the consumption of household appliances and electronic goods remains environmentally unsustainable.

Our study exposed the methodological issues raised when collecting, analysing and comparing life-span data. It has provided valuable data to inform theoretical discussion concerning premature product obsolescence. International studies, with comparable data, are now needed to improve knowledge and understanding.

Acknowledgments

We are grateful for support from the EPSRC (grant reference EP/N022645/1), which enabled data collection.

References

Bakker C., Wang F., Huisman J. & den Hollander M. (2014). Products that go round: Exploring product life extension through design. *Journal of Cleaner Production*, 69, 10-16. https://doi.org/10.1016/j.jclepro.2014.01.028

Baldé, C.P. et al. (2024). *Global E-waste Monitor 2024*. Geneva/Bonn: International Telecommunication Union (ITU) and United Nations Institute for Training and Research (UNITAR). Retrieved from https://ewastemonitor.info/the-global-e-waste-monitor-2024/

Cooper, T. (2004). Inadequate life? Evidence of consumer attitudes to product obsolescence. *Journal of Consumer Policy*, 27(4), 421–449. https://doi.org/10.1007/s10603-004-2284-6

Cooper, T. & Mayers, K. (2000). *Prospects for Household Appliances*. Halifax Urban Mines. Retrieved from https://irep.ntu.ac.uk/id/eprint/6671/

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)

Environmental Audit Committee. (2020). *Electronic waste and the Circular Economy*. First Report of Session 2019–21, HC 220. Retrieved from https://committees.parliament.uk/work/170/electronic-waste-and-the-circular-economy/publications/

German Environment Agency. (2017). *Strategies against Obsolescence: Ensuring a minimum product lifetime and improving product service life as well as consumer information*. Retrieved from https://www.umweltbundesamt.de/en/publikationen/strategies-against-obsolescence-ensuring-a-minimum

OECD. (Organisation for Economic Co-operation and Development). (1982). *Product Durability and Product-Life Extension: Their contribution to solid waste management*. Paris: OECD.

Oguchi, M. & Daigo, I. (2017). Measuring the historical change in the actual lifetimes of consumer durables. *PLATE (Product Lifetimes and the Environment) conference. (*pp.319-323). Delft, Netherlands. DOI: 10.3233/978-1-61499-820-4-319

Oguchi, M., Murakami, S., Tasaki, T., Daigo, I. & Hashimoto, S. (2010). Lifespan of commodities, Part II: Methodologies for estimating lifespan distribution of commodities. *Journal of Industrial Ecology*, 14(4), 613–626. https://doi.org/10.1111/j.1530-9290.2010.00251.x

Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC