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## Waste Management

journal homepage: [www.elsevier.com/locate/wasman](http://www.elsevier.com/locate/wasman)

# A survey on consumers' attitude towards storing and end of life strategies of small information and communication technology devices in Spain

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## ARTICLE INFO

## Article history:

Received 17 July 2017

Revised 4 October 2017

Accepted 24 October 2017

Available online xxx

## Keywords:

Consumer attitude

Small electrical and electronic equipment

End-of-life

Repair

Second-hand

Storage

## ABSTRACT

This study analyses the current habits and practices towards the store, repair and second-hand purchase of small electrical and electronic devices belonging to the category of information and communication technology (ICT). To this end, a survey was designed and conducted with a representative sample size of 400 individuals through telephone interviews for the following categories: MP3/MP4, video camera, photo camera, mobile phone, tablet, e-book, laptop, hard disk drive, navigator-GPS, radio/radio alarm clock. According to the results obtained, there is a tendency to store disused small ICT devices at home. On average for all the small ICT categories analysed, 73.91% of the respondents store disused small ICT devices at home. Related to the habits towards the repair and second-hand purchase of small ICT devices, 65.5% and 87.6% of the respondents have never taken to repair and have never purchased second-hand, respectively, small ICT devices. This paper provides useful and hitherto unavailable information about the current habits of discarding and reusing ICT devices. It can be concluded that there is a need to implement awareness-raising campaigns to encourage these practices, which are necessary to reach the minimum goals established regarding preparation for reuse set out in the Directive 2012/19/EU for the category small electrical and electronic equipment.

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## 1. Introduction

The principles of circular economy (The Ellen Macarthur Foundation, 2013; COM 614, 2015; COM 33, 2017) are aimed at ensuring that products, materials and resources are kept in circulation for as long as possible, while reducing waste generation through the application of strategies to extend their useful life, such as repair and reuse, among others.

This approach is particularly relevant in the case of electrical and electronic equipment (EEE) because of its rapid innovation and substitution cycle, which leads to accelerated growth of the amount of waste, and also due to the wide variety of components and materials that characterize its composition (Cui and Forsberg, 2003). For this reason, Directive 2012/19/EU promotes the prevention and reduction of waste electrical and electronic equipment (WEEE), prioritizing strategies such as reuse or repair versus other forms of recovery, such as recycling. However, these repair and reuse habits have not yet been assimilated on a regular and wide-

spread basis by the agents involved in the life cycle of the EEE (Bovea et al., 2017).

The attitude of consumers is a key element in this process, as they are directly responsible for the different decisions that affect the end of the useful life of such products (Gorauskienė, 2008). There are different causes that prevent the recovery of obsolete EEE. On the one hand, the accelerated progress of technology pushes consumers to replace their EEE which is still in good working condition by other devices with new functionalities (Babbitt et al. 2009), and the old ones are then generally kept at home, rather than being submitted to reuse or recycling processes (Chancerel, 2010; Gutiérrez et al., 2010; Ongondo and Williams, 2011a, 2011b; Pérez-Belis et al., 2013; Polák and Drápalová, 2012). On the other hand, EEE that has stopped working is often disposed of by incorporating it into the recycling cycle, although it could be repaired. While the willingness of consumers to repair EEE is increasing (Scott and Weaver, 2014), there are still barriers that deter consumers from fixing or reusing them. According to King et al. (2006), the cost of repair is one of the main reasons that prevent consumers from repairing their EEE more frequently, while hygienic factors and the perception of poor quality are the reasons

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that discourage consumers from buying second-hand devices (Lyndhurst, 2011; Fisher et al., 2008).

Regarding consumer electronics included in the category of small information and communication technology (ICT) equipment (mobile phones, MP3/MP4 players, tablets, etc.), their small size means that they are frequently incorrectly deposited in household waste bins, instead of at specific collection points for WEEE (Dimitrakakis et al., 2009). In addition, because of their economic or sentimental value, many of them end up being stored at home (Cairns, 2005) and at present it is unusual to repair them if they break (Hennies and Stamminger, 2016) or for them to be taken for reuse. Therefore, this consumer behaviour is not in line with the sustainable consumption promoted by the European waste policy framework (Directive 2012/19/EU), by ecodesign (Directive 2009/125/EC) or by the principles of the circular economy (The Ellen Macarthur Foundation, 2013; COM 614, 2015; COM 33, 2017).

In order to identify the current habits of consumers when selecting the end of life strategy for small ICT equipment, this study presents the results obtained from a survey focused on analysing aspects related to the identification of the most frequent devices in homes and their use, the habits of consumers regarding their substitution, repair or second-hand purchase, etc. Results are obtained from a representative sample from the town of Castellón de la Plana (Spain).

The WEEE policy framework in Europe promotes practices that extend the lifetime of EEE, mainly based on repair and second-hand markets. As consumer behaviour is the main success factor for this promotion, it is also interesting to identify the profile of those consumers who are more or less likely to adopt such behaviour. This can be useful for targeting future awareness campaigns towards suitable audiences with the aim of promoting practices such as repairing and second-hand purchases, as strategies for extending the lifetime of small ICT equipment.

2. Background

Before designing the survey to identify the habits of consumers related to the strategies regarding the end of life of small ICT equipment, it is interesting to analyse the literature related to this field. Table 1 reports the main topics found in the literature along with the studies framed within each one. All these studies present results from surveys focused on obtaining data about consumer behaviour related to different aspects of the life cycle of EEE. Information has been obtained mainly by using face-to-face surveys or internet surveys.

According to the topics reported in Table 1, the literature on “Ownership of EEE” is related to aspects such as the number of devices at home or the number of devices for personal use or years of use; “storing unused/broken EEE” deals with aspects related to

Table 1 Topics included in the literature. (See below-mentioned references for further information.)

	Sabbaghi et al.(2017)	Islam et al. (2016)	Miller et al. (2016)	Milovantseva, (2016)	Ylä-Mella et al. (2015)	Chi et al. (2014)	Afroz et al. (2013)	Dwivedy and Mittal (2013)	Lau et al. (2013)	Milovantseva and Saphores (2013a)	Milovantseva and Saphores (2013b)	Dindarian et al. (2012)	Fraige et al.(2012)	Li et al.(2012)	Manomaiwibol and Vassanadumrongdee (2012)	Saphores et al. (2012)	Song et al. (2012)	Bouvier and Wagner (2011)	Chung et al. (2011)	Gutiérrez et al. (2011)	Ongondo and Williams (2011a)	Ongondo and Williams (2011b)	Saphores and Milovantseva (2011)	Wang et al. (2011)	Gutiérrez et al. (2010)	Jang and Kim (2010)	Nixon et al. (2009)	Ninrom et al. (2009)	Saphores et al. (2009)	Saphores et al. (2007)	Hansmann et al. (2006)	Huang et al. (2006)	Saphores et al. (2006)	Darby and Obara (2005)	Karagiannidis et al. (2005)			
Ownership		•			•	•		•					•	•			•	•	•	•					•												•	
Replacing			•									•																										
Storing										•	•																											
Disposal		•			•						•						•					•																
Small household ICT*	1,2,3,4,5,7		1,6	1	1	2,3,5	4			5	1,5		1,2,4,5	1,4	1,3,5,6			5,6	4, 5,8		1	1	5	5	1	1	1,2,4,5,6	1			1,4,							

1) mobile phone; 2) printer; 3) photo-cameras; 4) laptop; 5) TV; 6) peripheral accessories; 7) game console  
 \*no external dimension more than 50 cm

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