

Expanded abstract

Citizen participation in circular economy systems for textile waste: an initial approach

The fashion textile sector occupies a notable position in global consumption. Its importance began to increase beginning in 1990 due to the expansion of the new “fast fashion” business model, with an increase in the number of fashion seasons being one of the main changes related to this model. On the one hand, it resulted in the idea of “here today, gone tomorrow”, and on the other, in the consumer perception of clothes as being out of style and not appealing, subsequently being discarded. Consequently, consumers visit shops more often and purchase clothing more frequently, thereby shortening the clothing life cycle. The result is a dynamic of hyper-consumption of clothing, which has created a serious environmental problem.

This environmental problem is related to not only production but also final consumption. The production systems of the textile industry make it one of the most polluting on the planet (related to the use of toxic chemicals, huge quantities of water and energy and high amounts of waste and discharges). Moreover, consumers perceive of clothing as a disposable product whose destination is a landfill. This problem exemplifies the need to evolve from the current linear economy model to a circular economy model based on the 3 Rs (Reduce, Reuse, Recycle). The 3 Rs must be applied throughout the entire cycle of production, consumption and resource return, meaning that the end consumer’s role is essential. Consumers must reduce their consumption of clothing, extend the replacement period and participate in clothing waste collection systems so that clothes can be recycled and reused.

Nevertheless, the consumption and manufacturing of clothing continues to rise. Forecasts for 2030 show that global average clothing consumption will be nearly 12 kg/inhabitant/year, of which only 1,8 kg/inhabitant/year will be recycled (15,2% recycling rate). In Spain, the situation is worse: it is estimated that annually nearly 990,000 tons of textiles end up in landfills. The post-consumption recycling rate is low (10-12%) and is under the European Union average (20%). And it is far from the 55% target established by the National Framework Plan for Waste Management for 2025. One of the keys to reaching this objective and to developing the circular economy in this sector is the study of consumer behaviour related to textile waste, as well as the importance given to the elimination of textiles and consumer knowledge about the possible destinations of textile waste.

This study has several objectives. First, it seeks to determine the level of participation by the residents of a large Spanish city in the available separate collection systems, especially for textile waste. Second, it analyses the behaviour of residents who do extend the useful life of their clothes, therefore determining the destination of their clothes and analysing their opinions. Finally, it seeks to determine if there are groups of residents who can be differentiated according to their socio-demographic characteristics and by their behaviours. The study thus

seeks to make an initial approach to the subject, given the scarce knowledge that exists. To do so, the study also aims to establish the level of participation in and knowledge of the different systems.

The methodology is based on an analysis of the information obtained through a personal survey. The field work was performed in Zaragoza (Spain). Zaragoza is the capital city of the Autonomous Community of Aragón, where 51,3% of the Aragonese population resides. According to the latest available data, 2,4 kg/inhabitant/year of textile was collected in Zaragoza in 2019. This waste is collected through various systems, which include those belonging charitable organizations, notably Cáritas and Tiebel. These organizations have around 200 metal containers distributed throughout the city, differentiated by their colour. They manage, sort and appropriately recycle the clothing and textiles placed in their containers, thereby preventing items from going to landfills.

The survey was conducted between September and October 2019, coinciding with the “summer-to-winter” clothing season change, when wardrobes are cleaned out and the likelihood of generating textile waste and considering what to do with it would be higher. Non-probabilistic sampling was used, consequently obtaining a sample of 311 individuals.

The survey was structured into three blocks: i) general recycling behaviour for different types of domestic waste; ii) clothes recycling behaviour, collection systems and opinions about the destination of clothing textile waste; and iii) socio-demographic characteristics. Using this information, a descriptive analysis is conducted of the sample’s behaviour regarding general recycling, clothes recycling and knowledge of existing alternatives. The corresponding comparisons are made through a contingency tables analysis with the Chi-square test to identify socio-demographic profiles. Finally, a cluster analysis is performed to determine the existence of different groups according to their opinions about clothes recycling.

The results allow responding to the research objectives. The results clearly show high participation by the residents of Zaragoza in separate collection programmes. Women are observed to recycle more than men, regardless of the type of waste, and those between 18 and 25 years of age recycle more than those over 25. Moreover, individuals who recycle plastic seem to have a better “recycling” behaviour regarding all other waste. Specifically regarding clothes, landfills are the main destination, although extending the useful life by giving clothes to friends and relatives is notable, as well as the use of containers of charitable organizations. The containers of each organization are clearly identified by the respondents.

The socio-demographic profiles of the respondents, considering the destination of used clothes, reveal that those who frequently throw away clothes with the rubbish are men with a monthly income exceeding 3000 euros. Moreover, those who state that they recycle clothes usually do so in the following ways, by order of importance: giving them to friends or relatives, depositing them in metal recycling containers or taking them to a household waste recycling centre or to the local church.

Respondents who use street containers usually deposit less than 5 bags per year, always using the same container. They state that they deposit clothes in good condition, shoes and household textiles. Only 23,3% state that they deposit unusable clothes/textiles, thereby pre-

venting them from going to the landfill. Regarding the main opinions about aspects related to the destination of used clothes, the high average assessment given to “By depositing clothes, I collaborate in protecting the environment” is notable; as well as the low average assessment given to “I don’t care what is done with delivered clothes”; and the high assessment of the charitable use of this clothing by “selling it in the third world or at charitable organization shops”.

Finally, the cluster analysis clearly shows the existence of two groups. The most numerous group includes those who are the least aware regarding clothes recycling, and the least numerous group includes those who are most concerned about the destination of textile waste. The first group is integrated by people over 50 years of age, workers and retirees with a monthly income under 1500 euros; and the second by people under 25 years of age and students where the monthly income of the family unit is between 1500 and 3000 euros. There are no differences in the variables related to sex, education level or family unit size.

The main conclusions of the study indicate that, despite the good initial situation, the separate collection of textiles can be improved. To do this, increasing the number of collection points is key, given that it improves access to the system by the city’s residents. The charitable nature of the organizations that manage this waste collection seems to incentivise recycling behaviour, given the knowledge and acceptance of the work performed by such organizations. One of the main conclusions with the greatest applicability is the need to clarify the type of waste that should be deposited in containers. The majority of the waste deposited in them can continue to be used, thereby extending the useful life. But the waste that is not deemed to be “usable” is not placed in containers. This waste is thrown out with general rubbish, ending up in a landfill. Consequently, this waste is not incorporated as a resource in the closed loops of the circular economy. It is therefore necessary to develop the associated communication campaigns. This will allow increasing the collection rates of textile waste and closing the loop through the adequate recycling of all textiles.

There are numerous possibilities for future research, including studies of the barriers and drivers that favour the participation of residents in the separate textile collection model. In order to be able to adequately segment citizens, there must be an analysis of the elements that affect the attitude and intentions of individuals regarding participation in different systems for extending the useful life of clothes, as well as an analysis of how the characteristics of consumers have an effect. To do so, the main limitations of this study must be corrected, including the need for greater control of the sample by establishing a stratified probability sampling.