

Exploring the consumers' behaviour towards storing, repairing and second-hand purchasing of mobile phones in Greece.

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Abstract

The proliferation of waste electrical and electronic equipment (WEEE) poses a significant environmental challenge, driven by technological advancements and reduced production costs. In particular, mobile phones have gained tremendous popularity worldwide, but their short lifespan has significantly contributed to the exacerbated electronic waste crisis. In this paper, a study on the behavior of Greek consumers towards storage, replacing, repairing and second-hand purchasing of mobile phones is presented.

Keywords: WEEE, consumer behaviour, storing, repair, second hand

1. Introduction

The advent of mobile phones sparked a revolutionary shift in communication patterns, initially serving as a status symbol for a privileged few. However, in the 21st century, they have evolved into ubiquitous electronic devices, becoming an integral part of everyday life. Regrettably, the rapid pace of technological advancements, coupled with planned obsolescence and the surging consumer demand for cutting-edge products, has given rise to a substantial volume of electronic waste, specifically in the form of discarded mobile phones (Guarnieri et al., 2022). These retired mobile phones, which may pose significant reusability potential but are disposed of at low recovery rates, contribute disproportionately to environmental impacts and health hazards due to the potential presence of heavy metal contaminants (Li et al., 2022).

Consumer attitude and behaviour plays a pivotal role in the effective management and disposal of electronic waste. Although proper household waste management is often considered an unspoken norm in industrialized nations, the perception surrounding e-waste streams remains distinct (Islam et al., 2021). Lack of awareness regarding the magnitude of the e-waste generation issue may lead to accumulating surplus electronic devices within households (Parajuly et al., 2019). Therefore, it is imperative to raise public awareness and foster responsible e-waste management practices.

2. Methodology

2.1 The survey

In order to investigate consumers' behaviour in Greece, a cross-sectional survey was conducted in February 2023. The survey was anonymous, participation was voluntary and in order to recruit participants, the computer-assisted telephone interview (CATI) technique was employed.

2.2 Data collection

Information was collected via interview-based questionnaires. The first part of the questionnaire was designed to collect the respondents' sociodemographic information, such as gender, age, education level, family size, employment type, income, and location. This part was followed by five additional sections focusing on mobile phone ownership, storage, repair habits, second-hand purchases, and consumer awareness. Before the primary survey, a pilot survey was conducted to address any potential misunderstandings and make necessary adjustments to the questionnaire.

2.3 Statistical analysis

The statistical analyses were performed using IBM SPSS Statistics software version 26. Post-stratification weights by gender and age of the respondents were applied in order to ensure the representation of the actual population based on the Census 2011. All statistical analyses were conducted on weighted data. Categorical variables are presented as absolute and relative frequencies. Pearson chi-square tests were employed to analyze the between-group differences in categorical sociodemographic variables among respondents who reported owning and not owning a mobile phone device. In cases where the assumptions were not met, exact p-values were estimated using Fischer's exact test or 10,000 Monte Carlo permutations. All reported p-values were two-sided and compared with a significance level of 5%.

3. Results

3.1 Sociodemographic characteristics of the responders

Table 1 shows the sociodemographic data of the participants, including those who have a mobile phone (i.e., Owners) and those who does not (i.e., non-owners). It also presents a comparison of sociodemographic variables between the two groups in the same table.

Table 1. Socio-demographic characteristics of respondents.

Sociodemographic variables	Total		Owners		Non-owners		p-Value ^d
	N	%	N	%	N	%	
Gender of respondent							0.393 ^a
Women	544	51.1	533	50.9	11	61.0	
Men	520	48.9	513	49.1	7	39.0	
Age of respondent							<0.001 ^b
17-24 years old	138	13.0	138	13.2	0	0	
25-34 years old	165	15.5	165	15.7	0	0	
35-44 years old	135	12.7	135	12.9	0	0	
45-54 years old	241	22.6	239	22.8	2	10.2	
55-64 years old	171	16.1	167	16.0	4	22.6	
≥ 65 years old	215	20.2	203	19.4	12	67.2	
Educational level of respondent							0.004 ^b
Did not graduate primary education	1	0.001	0	0	1	2.8	
Primary education	48	4.6	45	4.3	3	16.6	
Lower secondary education	59	5.5	58	5.5	1	5.5	
Upper secondary education	335	31.6	327	31.5	7	38.4	
Post-secondary non-tertiary education	89	8.4	88	8.5	2	8.3	
Bachelor's degree or its equivalent	389	36.7	384	36.9	5	25.6	
Master's degree or its equivalent or a doctoral degree	139	13.1	139	13.3	1	2.8	
Employment type of respondent							0.042 ^b
Public sector employee	134	12.7	132	12.7	3	14.3	
Private sector employee	254	24.0	254	24.5	0	0	
Retired public sector employee	102	9.6	97	9.3	4	22.4	
Retired private sector employee	125	11.8	119	11.4	6	33.5	
Self-employed (vocational training)	40	3.8	39	3.8	4	5.8	
Self-employed (academic education)	64	6.0	64	6.1	0	0	
Merchant/ Business owner	40	3.8	40	3.9	0	0	
Housewife	71	6.7	70	6.7	1	5.5	
Unemployed	87	8.2	84	8.1	3	15.7	
Student	93	8.8	93	9.0	0	0	
Farmer	19	1.7	18	1.7	1	2.8	
Other	29	2.8	29	2.8	0	0	
Financial status of respondent							0.286 ^b
I do not have enough money to live on	32	3.1	31	3.1	1	5.5	
I obtain daily necessities with difficulty	311	29.9	302	29.6	9	49.4	
I obtain daily necessities but I struggle to have savings	469	45.1	465	45.5	5	25.4	
I have enough money to live on	227	21.8	223	21.8	4	19.6	
Household size							0.016 ^b
1 member	118	11.1	109	10.5	8	44.1	
2 members	327	31.0	322	31.0	6	30.7	
3 members	212	20.1	210	20.2	2	11.1	
4 members	293	27.7	291	28.0	2	11.3	
5 members	89	8.5	89	8.6	1	2.8	
6 members	13	1.2	13	1.2	0	0	
≥ 7 members	4	0.4	4	0.4	0	0	
Housing ownership							0.453 ^b
Owned	824	78.8	808	78.7	15	89.2	
Rented	215	20.5	213	20.7	2	10.8	
Other	6	0.6	6	0.6	0	0	
Urbanity							0.390 ^c
Urban	792	75.6	780	75.8	11	67.4	
Rural	255	24.4	249	24.2	6	32.6	
Households by NUTS2 regions							0.996 ^b
Attica	349	33.1	342	32.9	7	40.7	
Macedonia	225	21.3	221	21.3	3	17.6	
Thrace	37	3.5	36	3.4	1	5.9	
Thessaly	90	8.5	88	8.5	2	12.0	
Epirus	30	2.9	30	2.9	0	0	
Central Greece	85	8.0	83	8.0	2	2.9	
Peloponnese	104	9.9	103	10.0	1	2.9	
Aegean islands	57	5.4	56	5.4	1	2.9	
Ionian islands	21	2.0	21	2.1	0	0	
Crete	58	5.5	57	5.5	1	2.9	

Two-tailed *p*-values obtained from Pearson's chi-square tests to compare categorical sociodemographic variables between two subsamples. ^a Asymptotic *p*-values were calculated. ^b The Monte Carlo method with 10,000 samples was employed. ^c The Fischer exact test was utilized.

3.2 Replacement cycle

The median value for the variable representing the "age of last replaced device" was determined to be 3 (2, 5) years. This indicates that 50.0% of respondents reported utilizing their mobile phones for a period of up to three years before replacing them. This timeframe aligns with the typical lifespan of compact electronic devices such as mobile phones, which generally falls below five years (Cox et al., 2013).

3.3 Storing habits

The accumulation of electronic devices within households is influenced by various factors, including lack of

awareness about proper disposal of WEEE, perceived value of the product, and emotional attachment to the item (Nowakowski, 2019). In this survey, a significant portion of respondents, specifically 47.1% ($N=240$) (Figure 1), reported retaining their old mobile phones at home. This phenomenon occurs due to mobile phone's perceived potential for reuse as backup (50,1%, $N=121$) or an extra (5,4%, $N=13$), due to sentimental value (11%, $N=27$), or just because they do not know what to do with it (13,6%, $N=33$) (Figure 2). Also, consumers often view these devices as valuable for others, either in terms of reselling or donation (6,5%, $N=16$).

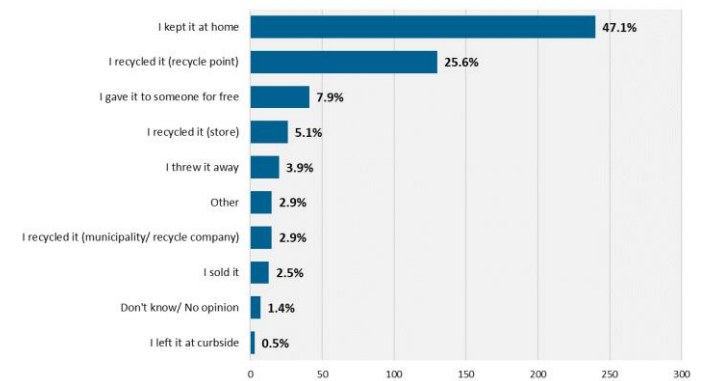


Figure 1. Handling of replaced device

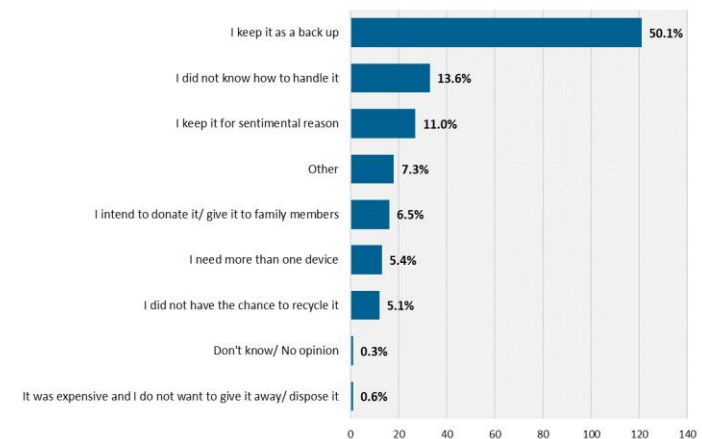


Figure 2. Reasons for keeping the old mobile devices at home.

Among households that own a mobile phone, it was discovered that 58.8% ($N=613$) have two to three actively used mobile phones at home, while 24.6% ($N=256$) possess more than three devices.

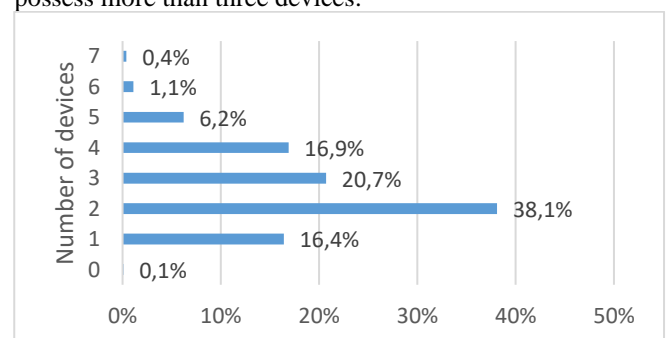


Figure 3. Number of mobile phone devices currently in use per household

Surprisingly, a significant majority of households, approximately 77% (N=803), reported not keeping dysfunctional mobile phones in the drawer, while only 16% (N=167) retained one to two dysfunctional mobile phones at home.

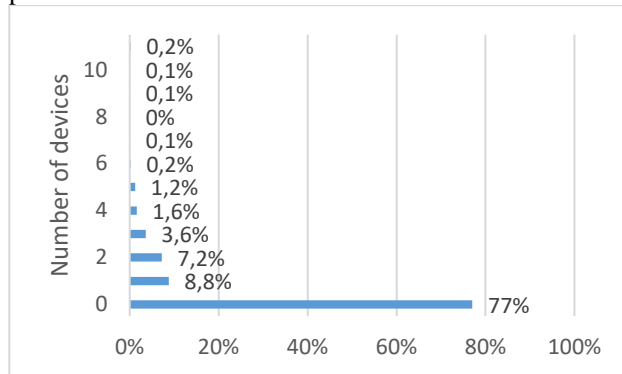


Figure 4. Number of mobile phone devices currently dysfunctional per household

Furthermore, the analysis of the data indicates that 67.6% (N=707) of households do not keep their inactive mobile phones (phones that were replaced although they were still functional) at home, with only 24.8% (N=260) having one to two inactive mobile phones stored.

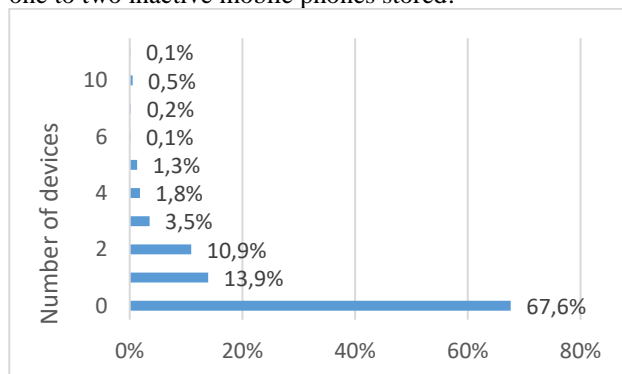


Figure 5. Number of mobile phone devices currently inactive per household

3.4 Repair behavior

The procedure of repairing devices is frequently hindered by parameters such as intricate disassembly and assembly procedures, costly repairs, time-consuming processes, limited availability of spare parts, and insufficient manufacturer support for repair protocols (Bovea et al., 2017). In the context of Greece, consumers were surveyed regarding their engagement in mobile phone repairs:

- 58.4% (N=611) find the cost of repairing their mobile phones is inefficient.
- 42.3% (N=443) believe that the repair process for such devices is complex and time-consuming.
- 65.9% (N=690) consider it is not worth repairing their device if it is outdated technology.

- Only 26.1% (N=273) opt for extended warranties when purchasing new mobile phones.
- 60.5% (N=633) consider satisfactory repair costs up to 20% of the device's original price.
- 59.4% (N=622) trust their device after it has been repaired.
- 67.5% believe (N=706) that the difficulty in finding a professional to repair their devices affects their decision to repair them.

3.5 Consumers' perception about second-hand devices

Greek consumers are quite reluctant towards the purchase and utilization of second-hand mobile phones, as indicated by their intentions. The investigation of their intentions reveals that a considerable percentage (74.1%, N=775) express a reluctance to buy pre-owned devices. Among these respondents, the primary reason (78.2% - N=606) is "lack of trust in the quality of second-hand devices".

3.6 Consumers' awareness

The final couple of questions of this survey aim to identify consumers' awareness regarding WEEE. The responses indicate that the public is well-informed about the importance of properly handling, with 90% (N=942) recognizing that WEEE is a specific type of waste requiring appropriate disposal. Additionally, it is positive that only 8.7% (N=91) of respondents admitted having thrown a device in the rubbish bin at some point.

4. Conclusion

In brief, this study aimed to investigate the behaviour of Greek consumers towards the storage, replacement, repair, and second-hand purchases of mobile phones. The findings indicated that most Greek consumers are aware of the environmental impact of WEEE. Greek consumers seem to make an effort to recycle their old mobile phones devices or keep them with the perspective to reuse them in near future. However, the significant lack of motivation regarding repair, the reluctance towards second-hand devices, and inadequate storage practices, even from a small portion of the Greek population, do not contribute to a circular future and need reconsideration. Raising public awareness and implementing effective preparing for reuse practices are crucial for decelerating the rapidly increasing e-waste issue.

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