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**SOCIAL PERSPECTIVE OF SUSTAINABLE CONSUMPTION: A
CASE STUDY FOR TOOTHPASTE BOXES**

**SÜRDÜRÜLEBİLİR TÜKETİMİN SOSYAL BOYUTU DIŞ MACUNU KUTULARI
ÜZERİNE VAKA ÇALIŞMASI**

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Abstract

With the rapid population growth and consumption habits, the importance of waste disposal is increasing. Packaging wastes constitute a large share of these wastes.

Based on the Zero Waste Regulation applied in our country, by examining the studies done in our country and the world, sorting the wastes of individuals over the toothpaste boxes selected as a sample, contribute to the economy, how they look at processes in terms of being sensitive to the environment, how they act individually, it was aimed to understand how they establish a connection between the concepts, it has been tried to gain impressions on how to contribute to the zero waste target through forward-looking statements of intent.

As a result of the study, it was observed that 90.7% of the participants viewed the removal of the toothpaste boxes positively or partially. It has been understood that the level of awareness on sustainable development, sustainable economy, and circular economy is not high; It has been determined that there are deficiencies in the directing of individuals. In the light of these obtained data, inferences were tried to be made on what could be done and suggestions were presented.

Keywords: Packaging waste reduction, social aspect, sustainable consumption, toothpaste boxes

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Özet

Hızlı nüfus artışı ve tüketim alışkanlıkları ile atık bertarafının önemi artmaktadır. Bu atıklar içinde ambalaj atıkları büyük bir payı oluşturmaktadır.

Ülkemizde uygulanan Sıfır Atık Yönetmeliğine istinaden, ülkemizde ve dünyada yapılmış çalışmalar incelenerek, örneklem olarak seçilen diş macunu kutuları üzerinden bireylerin atıkların ayrıştırılması, ekonomiye katkı sağlanması, çevreye duyarlı olma konularında süreçlere nasıl baktığı, bireysel olarak nasıl hareket ettikleri, kavramlar arasında nasıl bağ kurduklarının anlaşılması hedeflenmiş, ileri dönük niyet beyanları üzerinden sıfır atık hedefine nasıl katkı sağlanabileceği konusunda izlenimler edinilmeye çalışılmıştır.

Çalışma sonucunda, diş macunu kutularının kaldırılmasına, katılımcıların %90,7 oranında olumlu veya kısmen olumlu baktığı gözlenmiştir. Sürdürülebilir kalkınma, sürdürülebilir ekonomi ve döngüsel ekonomi konusunda bilinç düzeyinin yüksek olmadığı anlaşılmış; bireylerin yönlendirilmesinde eksikler olduğu tespit edilmiştir. Elde edilen bu veriler ışığında neler yapılabileceği üzerine çıkarımlar yapılmaya çalışılmış ve öneriler sunulmuştur.

Anahtar Kelimeler: Atık azaltımı, toplumsal boyut, sürdürülebilir tüketim, diş macunu kutuları

1. Introduction

The history of humanity, with its extraordinary developments in various phases, has made great progress, especially in the last 100 years, as a result, the world population which has been gradually increasing over thousands of years and the built environment that has grown under its influence, has grown at an incredible rate and the existing resources of the world have begun to be insufficient, moreover, the future generations' reserve resources are also endangered. This situation has become a matter of importance at the level of states, and universal definitions and policies have begun to be developed in this regard.

In the world, ideas have been developed for purposes such as the management of resources, controlling the increasing consumption, and the effective use of reserves. "Sustainable development" defined by the UN Brundtland Report in 1987 proposes a development model that takes place without compromising the possibilities of future generations to meet the needs of the present (WCED, 1987). Sustainable development aims to sustain life and increase the quality of life within the carrying capacity of the existing population's supportive ecosystems. At the Rio Earth Summit in 1992, a sustainable development action plan was signed by the UN member states and the process has gained momentum on a global scale.

Sustainability consists of three important pillars such as social, economic, and environmental for providing the efficient and effective use of resources and social sustainability in the future. The depletion of resources in the world has begun to affect not only future generations, but also the current population. The circular economy, which is the search for a solution to this situation, has been thought against the situation that both creates difficulties for continuity and creates too much waste that nature cannot decompose, which emerges with the economy order that proceeds in one direction with the acquisition, processing, use and finally disposal of resources as waste. In this system, the aim is not to destroy the resource as the final stage but to ensure its transformation and reuse. In this way, it is aimed to prevent the depletion of resources and to prevent nature from becoming a huge garbage dump. In our country, especially in recent years, the issue of recycling at the level of local governments has started to take priority. At the last stage, it is tried to draw the attention of all segments of the society to this direction with a more comprehensive understanding.

In the developing process of sustainable development for more than 30 years, attention was drawn to the depletion of resources and then the destruction created in nature, and priority was given to studies like recycling, waste disposal etc. in this direction (Henshaw et al., 1996; Choe and Fraser, 1998) and continue to be given importance (Tejaswini et al., 2022; Santander et al., 2022). When we look at today, we are faced with the fact that recycling alone will not be enough, as the world population and consumption continue to increase, so that one side of the scale has upset the balance. After the Second World War, increasing population, developing technology, and transportation facilities have caused consumption to reach incredible dimensions, although it is not needed, it has taken place in human psychology that it is a need with the effect of the created environment. However, today, the importance of energy and resource use has begun to be understood as nature responds in various ways. For this reason, it is known that what needs to be done is to reduce unnecessary consumption and prevent waste generation and developing policies at the level of states in this direction, investments are made in this field, and funds are created.

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Our country is also focusing on this issue, and the establishment of the Zero Waste Management System within the scope of the "Zero Waste Project" carried out by the Ministry of Environment and Urbanization; The Zero Waste Regulation, which was prepared with the aim of adopting, implementing and making the zero waste vision permanent throughout the country and transitioning to a zero-waste management system throughout our country by 2023, entered into force on 12.07.2019 (ÇŞB, 2019). As a matter of fact, the investments to be made in this field will have much higher economic returns apart from the contributions they will provide to nature. Waste collection in Turkey is carried out by municipalities, and according to the Municipal Waste Statistics survey of 2018, waste services were provided in 1395 out of 1399 municipalities, and it was determined that 32 million 209 thousand tons of waste were collected (TÜİK, 2019). Within the scope of packaging waste collection activities, 1 million 844 thousand 244 tons of waste was collected for 2019. With the processing of these wastes, 484 thousand tons of plastic packaging, 233 thousand 630 tons of glass packaging, and 821 thousand 117 tons of paper packaging waste were recycled (ÇŞB, 2020). Considering the recycling of waste, 67.2% of the collected waste in 2018 was sent to sanitary landfills, 20.2% to municipal dumps, and 0.4% to compost facilities, while 0.2% was sent to other disposal methods and 11.9% of these wastes were sent to other recycling facilities (TÜİK, 2019). Within the scope of the Zero Waste Project, the nationwide waste recycling rate of 35 percent and the total recycling rate of plastic packaging wastes as 55 percent have been set as the target for 2023 (URL-1, 2021).

Every stage of a product, which starts from its source as a raw material and ends as a waste, appears as extra energy, resource, time, and economic cost. However, planning these processes in advance, making production to the required extent, and preventing the formation of waste from the beginning is the greatest contribution that can be made to the economy. From a different point of view, with a foresighted behavior, not including a non-functional product or an unused product in this cycle from the very beginning will contribute to saving in all the above-mentioned items.

Today, the purpose of producing the products offered to the consumer for different purposes and the necessity of production will be understood result of research and analysis. The benefit value of the product will be revealed by asking the questions why these products are produced and how much they are necessary. When the studies conducted for this purpose are examined, it is seen that one of the most effective studies took place in Iceland and many toothpastes appear to be sold in this country without any outer packaging (URL-2). In India, which has an annual toothpaste consumption of over 20,000 tons, Unilever is considering reducing packaging and selling bare products (URL-2). Toothpaste is a consumption item that requires constant use and appeals to all segments of society. With this, the fact that the first thing to do after purchasing the product is to dispose of the cardboard package surrounding it gives the idea that it is a good review item in terms of the utility value mentioned above.

In the current study, it is aimed to carry out a study that reveals the preferences of the users over the toothpaste boxes, which is a product used in common all over the world, as an example for the reduction of packaging waste. The current study, it is aimed to carry out a study that reveals the preferences of the users over the toothpaste boxes, which is a product used in common all over the world, as an example for the reduction of packaging waste; When the toothpaste boxes are removed from the production item with the approval of the society, data will be obtained on what the gains will be in terms of preventing waste generation

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and how much they will be accepted by the society; Simultaneously, the opinions of the relevant manufacturers, which are contacted in writing, will be consulted and a preliminary idea will be formed on what needs to be done in waste management.

2. Methodology

The online survey method was used in the study due to both the epidemic conditions and the ease of access provided by technology. A total of 460 people, whose profiles were determined according to gender, age range, education level, marital status, and income status, participated in the online survey between April 17 and June 23, 2021, and comparative analyses of user habits made.

The content of the questions directed to the users is primarily aimed at understanding the level of knowledge of the users about the concepts of zero waste management, sustainable economy, sustainable development, and circular economy, and in the following questions waste separation, the amount of toothpaste usage and the extent to which they apply the transformation of toothpaste boxes in their own lives, and what they think about forward-looking removing boxes of toothpaste.

According to the determined user profile (gender, age, education, income status, etc.) and distribution of user tendency, the data collected using the survey method by examining with statistical analysis, information and comparative analysis were tried to be made. From the results obtained, inferences were made based on numerical data and observation.

Interviews were held with the producer companies (Colgate, Splat ve Oral-B), which is another pillar of the study, via e-mail, and information about their views and studies on this subject was tried to be obtained.

3. Findings

3.1 Demographic Findings

In the first part of the survey, questions were asked about the personal characteristics and situations of the participants, and a balanced distribution of the participants was aimed for the results to catch up with the Turkey average. For this reason, it has been ensured that the gender distribution of the participants is in line with the Turkey average, in line with the rates taken from the population data of TURKSTAT (2020). The demographic findings of participants are shown in Table 1.

Table 1. Demographic findings of participants

| Participant | N | % |
|--------------------|----------|----------|
| Gender Status | | |
| Gender | N | % |
| Women | 232 | 50.4 |

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| Participant | N | % |
|--------------------|----------|----------|
| Men | 228 | 49.6 |
| Total | 460 | 100.0 |

| Age Distribution | | |
|-------------------------|----------|----------|
| Age | N | % |
| 0-17 | 6 | 1.3 |
| 18-24 | 190 | 41.3 |
| 25-34 | 141 | 30.7 |
| 35-44 | 80 | 17.4 |
| 45-54 | 29 | 6.3 |
| 55-64 | 12 | 2.6 |
| 65 and 65+ | 2 | 0.4 |
| Total | 460 | 100.0 |

| Education Status | | |
|-------------------------|----------|----------|
| Education | N | % |
| Primary School | 11 | 2.4 |
| High School | 40 | 8.7 |
| University | 305 | 66.3 |
| Postgraduate | 68 | 14.8 |
| PhD | 29 | 6.3 |
| Student | 4 | 0.9 |
| Two-year Degree | 2 | 0.4 |
| Non-educated | 1 | 0.2 |
| Total | 460 | 100.0 |

| Marital Status | | |
|-----------------------|----------|----------|
| Marital Status | N | % |
| Married | 128 | 27.8 |
| Single | 332 | 72.2 |
| Total | 460 | 100.0 |

| Income Status | | |
|----------------------|----------|----------|
| Income | N | % |
| 0-1000 TL | 140 | 30.4 |
| 1001-2000 TL | 46 | 10.0 |
| 2001-3000 TL | 42 | 9.1 |
| 3001-5000 TL | 81 | 17.6 |
| 5001 and 5001+ | 150 | 32.6 |
| Unstable | 1 | 0.2 |
| Total | 460 | 100.0 |

As seen from Table 1, the gender of the participants was almost equal (50.4% of the participants are women and 49.6% are men). Considering the age distributions, it has been determined that the median age value, which is 32.7 in Turkey (TURKSTAT,2020a), is in the range of 25-34, in line with the median age value of the survey participants. While 41.3% of the participants constitute the most crowded group with the 18-24 age group, the 25-34 age group

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follows them with 30.7%. In all age groups; 35-44 age range 17.4%; 45-54 age range 6.3%; 55-64 age range 2.6%; 0-17 age range is 1.3% and 65+ 0.4%.

When the educational status is examined, according to TUIK data, in the table prepared by Mehmet Asal, 63% of the country's population is illiterate, literate, primary or secondary school graduates; It is seen that 37% of them have education at high school, university, graduate or doctorate level (URL-3). When the education level of the people who participated in the survey is examined, it is seen that 66.3% have university education, 14.8% master's degree, and 6.3% doctorate level education. It can be thought that this situation raises the level of awareness about the subject.

When the marital status of the survey participants is examined, it is seen that the single people dominate with 72.2%, while the married people are 27.8%.

When the participants are examined in terms of their income, it is seen that 30.4% between 0-1000 TL, 10% between 1001-2000 TL, and 9.1% between 2001-3000 TL, have an income below the minimum wage - some of them are students- and this section corresponds to 49.5% of the total number of participants; it is seen that 17.6% have an income of 3001-5000 TL, above the minimum wage, and 32.6% have an income of 5001 and above. In Turkey, it has been determined that the monthly average household disposable income is 5 thousand 779 TL according to the results of 2020 (TURKSTAT, 2020b). In this respect, it is seen that the income level of the participants is close to the Turkey average.

3.2. Findings on Awareness

In the second stage, there were questions asked to understand the level of consciousness of the participants regarding conceptual expressions.

The answer given to the question "Do you know about Zero-waste management?" was predominantly (59.1%) stated as "I partially know". While 29.6% of the participants answered as "I know", 11.3% of the participants stated, "I don't know". Accordingly, it was seen that 88.7% of the participants had minimal knowledge about the subject (Table 2). For this question, healthy answers were obtained from a total of 416 participants (among 460 participants).

Table 2. Knowledge of zero-waste management

| <i>Do you know about zero-waste management?</i> | | | | | | |
|---|--------|------|------------------|-------|--------------|------|
| | I know | | I know partially | | I don't know | |
| Participants | N | % | N | % | N | % |
| | 123 | 29.6 | 246 | 59.1 | 47 | 11.3 |
| Gender | | | | | | |
| Women | 65 | 15.6 | 119 | 28.6 | 11 | 2.65 |
| Men | 58 | 14 | 127 | 30.5 | 36 | 8.65 |
| Marital Status | | | | | | |
| Married | 45 | 10.8 | 71 | 17.05 | 8 | 1.9 |
| Single | 78 | 18.8 | 175 | 42.05 | 39 | 9.4 |
| Age | | | | | | |
| 0-17 | 1 | 0.2 | 4 | 0.9 | 1 | 0.2 |
| 18-24 | 31 | 7.5 | 96 | 23.1 | 29 | 7 |

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| | | | | | | |
|------------------|------------|-------------|------------|-------------|-----------|-------------|
| 25-34 | 43 | 10.4 | 80 | 19.3 | 11 | 2.6 |
| 35-44 | 38 | 9.1 | 39 | 9.4 | 2 | 0.5 |
| 45-54 | 8 | 1.9 | 17 | 4 | 2 | 0.5 |
| 55-64 | 2 | 0.5 | 8 | 1.9 | 2 | 0.5 |
| 65 and 65+ | - | 0 | 2 | 0.5 | - | - |
| Education | | | | | | |
| Primary School | 2 | 0.5 | 8 | 1.9 | 1 | 0.2 |
| High School | 5 | 1.2 | 25 | 6 | 7 | 1.7 |
| University | 64 | 15.4 | 175 | 42.1 | 35 | 8.5 |
| Postgraduate | 34 | 8.2 | 23 | 5.5 | 3 | 0.7 |
| PhD | 18 | 4.3 | 10 | 2.4 | - | - |
| Student | - | - | 3 | 0.7 | 1 | 0.2 |
| Two-year Degree | - | - | 2 | 0.5 | - | - |
| Non-educated | - | - | - | - | - | - |
| Income | | | | | | |
| 0-1000 TL | 21 | 5 | 72 | 17.3 | 20 | 4.8 |
| 1001-2000 TL | 8 | 1.9 | 25 | 6 | 9 | 2.2 |
| 2001-3000 TL | 9 | 2.2 | 22 | 5.3 | 7 | 1.7 |
| 3001-5000 TL | 15 | 3.6 | 55 | 13.2 | 5 | 1.2 |
| 5001 and 5001+ | 70 | 16.9 | 71 | 17.1 | 6 | 1.4 |
| Unstable | - | - | 1 | 0.2 | - | - |
| Total | 123 | 29.6 | 246 | 59.1 | 47 | 11.3 |

When the answers given to the related question are examined, the level of knowledge about the subject is higher in female participants than in male participants. When the age groups are examined, it has been observed that almost all age groups know zero waste management, even partially, and the number of people who give the answer "I know" increases as the education level goes from primary school to doctoral level. The percentage of knowing the subject of the participants with an income level of 5001 and above is higher than the participants with a lower income level.

The answer to the question "Do you know about the sustainable economy and sustainable development?", which is another concept, was given the highest rate with 50.7%, "I know partially". 32% of the participants responded as "I know" and 17.3% as "I don't know". A large majority with 82.7% stated that they knew the subject (Table 3).

Table 3. Knowledge of sustainable economy and sustainable development

| <i>Do you know about sustainable economy and sustainable development?</i> | | | | | | |
|---|--------|------|------------------|------|--------------|------|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| | 147 | 32 | 233 | 50.7 | 80 | 17.3 |
| Gender | | | | | | |
| Women | 70 | 15.2 | 115 | 25 | 47 | 10.2 |
| Men | 77 | 16.8 | 118 | 25.7 | 33 | 7.1 |

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| <i>Do you know about sustainable economy and sustainable development?</i> | | | | | | |
|---|------------|-----------|------------------|-------------|--------------|-------------|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| Marital Status | | | | | | |
| Married | 52 | 11.3 | 59 | 12.85 | 63 | 13.6 |
| Single | 95 | 20.7 | 174 | 37.85 | 17 | 3.7 |
| Age | | | | | | |
| 0-17 | 2 | 0.5 | 1 | 0.2 | 3 | 0.6 |
| 18-24 | 47 | 10.2 | 102 | 22.2 | 41 | 8.9 |
| 25-34 | 47 | 10.2 | 74 | 16.1 | 20 | 4.3 |
| 35-44 | 40 | 8.7 | 36 | 7.8 | 4 | 0.9 |
| 45-54 | 10 | 2.2 | 11 | 2.4 | 8 | 1.8 |
| 55-64 | 1 | 0.2 | 8 | 1.8 | 3 | 0.6 |
| 65 and 65+ | - | 0 | 1 | 0.2 | 1 | 0.2 |
| Education | | | | | | |
| Primary School | 3 | 0.7 | 3 | 0.7 | 5 | 1.1 |
| High School | 6 | 1.3 | 22 | 4.8 | 12 | 2.6 |
| University | 87 | 18.9 | 167 | 36.3 | 51 | 11.1 |
| Postgraduate | 29 | 6.3 | 30 | 6.5 | 9 | 1.9 |
| PhD | 20 | 4.4 | 9 | 1.9 | - | - |
| Student | 2 | 0.4 | - | - | 2 | 0.4 |
| Two-year Degree | - | - | 2 | 0.5 | - | - |
| Non-educated | - | - | - | - | 1 | 0.2 |
| Income | | | | | | |
| 0-1000 TL | 36 | 7.8 | 72 | 15.7 | 32 | 7 |
| 1001-2000 TL | 7 | 1.5 | 27 | 5.9 | 12 | 2.6 |
| 2001-3000 TL | 12 | 2.6 | 16 | 3.5 | 14 | 2.9 |
| 3001-5000 TL | 25 | 5.5 | 46 | 10 | 10 | 2.2 |
| 5001 and 5001+ | 67 | 14.6 | 71 | 15.4 | 12 | 2.6 |
| Unstable | - | - | 1 | 0.2 | - | - |
| Total | 147 | 32 | 233 | 50.7 | 80 | 17.3 |

Considering the answers given to the question "Do you know about the circular economy?", 40.2% of the answers stated as "I partially know" and 38.7% of the answers stated as "I don't know" gave close results, and 21.1% followed by stated as "I know". It is understood that the participants who stated that they had knowledge about the subject with 61.3% had less knowledge about the 'circular economy' compared to the concepts of 'zero waste' and 'sustainable economy and sustainable development' in the previous questions. The reason for this situation can be shown as the fact that the formation of public opinion on zero waste and sustainability was based on earlier and the infrastructure of social awareness was created. As a matter of fact, the fact that political figures drew attention to this issue on various platforms may have contributed to this result. The "Zero Waste Project", which started in 2017 and was supported by Emine Erdoğan, stands out as a state-sponsored study on this subject (URL-4). It was observed that female participants had less knowledge than male participants. All of the

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participants in the 0-17 age group stated that they did not know about the circular economy. However, the percentage of having knowledge about the subject is quite low in groups over the age of 45. The level of consciousness is higher in the age groups of 25-34 and 35-44. When the education level and income level are examined, there are no distinctive differences.

Statistical data on the state of knowing the circular economy are shown in Table 4.

Table 4. Knowledge of circular economy

| <i>Do you know about the circular economy?</i> | | | | | | |
|--|--------|------|------------------|------|--------------|------|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| | 97 | 21.1 | 185 | 40.2 | 178 | 38.7 |
| Gender | | | | | | |
| Women | 45 | 9.8 | 87 | 18.9 | 100 | 21.7 |
| Men | 52 | 11.3 | 98 | 21.3 | 78 | 17 |
| Marital Status | | | | | | |
| Married | 37 | 8.1 | 55 | 12 | 36 | 7.8 |
| Single | 60 | 13 | 130 | 28.3 | 142 | 30.9 |
| Age | | | | | | |
| 0-17 | - | - | - | - | 6 | 1.3 |
| 18-24 | 30 | 6.5 | 69 | 15 | 91 | 19.8 |
| 25-34 | 29 | 6.3 | 66 | 14.3 | 46 | 10 |
| 35-44 | 28 | 6.1 | 34 | 7.4 | 18 | 3.9 |
| 45-54 | 9 | 1.9 | 8 | 1.7 | 12 | 2.6 |
| 55-64 | 1 | 0.3 | 7 | 1.5 | 4 | 0.9 |
| 65 and 65+ | - | 0 | 1 | 0.3 | 1 | 0.2 |
| Education | | | | | | |
| Primary School | 4 | 0.9 | 3 | 0.7 | 4 | 0.9 |
| High School | 6 | 1.3 | 19 | 4.1 | 15 | 3.3 |
| University | 51 | 11.1 | 129 | 28 | 125 | 27.1 |
| Postgraduate | 22 | 4.8 | 23 | 5 | 23 | 5 |
| PhD | 14 | 3 | 9 | 1.9 | 6 | 1.3 |
| Student | - | - | - | - | 4 | 0.9 |
| Two-year Degree | - | - | 2 | 0.5 | - | - |
| Non-educated | - | - | - | - | 1 | 0.2 |
| Income | | | | | | |
| 0-1000 TL | 29 | 6.3 | 50 | 10.9 | 61 | 13.3 |
| 1001-2000 TL | 6 | 1.3 | 19 | 4.2 | 21 | 4.5 |
| 2001-3000 TL | 5 | 1.1 | 13 | 2.8 | 24 | 5.2 |
| 3001-5000 TL | 16 | 3.5 | 39 | 8.4 | 26 | 5.7 |
| 5001 and 5001+ | 41 | 8.9 | 63 | 13.7 | 46 | 10 |
| Unstable | - | - | 1 | 0.2 | - | - |

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| <i>Do you know about the circular economy?</i> | | | | | | |
|--|-----------|-------------|------------------|-------------|--------------|-------------|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| Total | 97 | 21.1 | 185 | 40.2 | 178 | 38.7 |

The last conceptual question asked to the participants, "Do you have information about what packaging wastes are and how they are recycled?" was answered by 50.9%, mostly as "partially know" and 39.8% as "I know". The rate of those who answered "I don't know" to the question was 9.3%. The percentage of participants who know that they have knowledge about the subject was at the highest level, with 90.7%, since it is a process (waste and waste recycling) that has been tried to be carried out in our country for many years and is supported by more effective studies today.

Statistical data on the state of Knowledge of packaging waste and recycling are shown in Table 5.

Table 5. Knowledge of packaging waste and recycling

| <i>Do you have information about what packaging waste is and how it is recycled?</i> | | | | | | |
|--|--------|------|------------------|------|--------------|-----|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| | 183 | 39.8 | 234 | 50.9 | 43 | 9.3 |
| Gender | | | | | | |
| Women | 84 | 18.3 | 125 | 27.2 | 23 | 5 |
| Men | 99 | 21.5 | 109 | 23.7 | 20 | 4.3 |
| Marital Status | | | | | | |
| Married | 56 | 12.2 | 63 | 13.7 | 9 | 1.9 |
| Single | 127 | 27.6 | 171 | 37.2 | 34 | 7.4 |
| Age | | | | | | |
| 0-17 | 4 | 0.9 | - | - | 2 | 0.4 |
| 18-24 | 66 | 14.3 | 104 | 22.6 | 20 | 4.3 |
| 25-34 | 51 | 11.1 | 75 | 16.3 | 15 | 3.3 |
| 35-44 | 47 | 10.2 | 30 | 6.5 | 3 | 0.7 |
| 45-54 | 9 | 1.9 | 19 | 4.1 | 1 | 0.2 |
| 55-64 | 5 | 1.1 | 5 | 1.1 | 2 | 0.4 |
| 65 and 65+ | 1 | 0.3 | 1 | 0.3 | - | - |
| Education | | | | | | |
| Primary School | 4 | 0.9 | 5 | 1.1 | 2 | 0.4 |
| High School | 16 | 3.5 | 22 | 4.8 | 2 | 0.4 |
| University | 111 | 24.1 | 163 | 35.5 | 31 | 6.7 |
| Postgraduate | 32 | 7 | 31 | 6.7 | 5 | 1.1 |
| PhD | 17 | 3.7 | 11 | 2.4 | 1 | 0.3 |
| Student | 2 | 0.4 | - | - | 2 | 0.4 |
| Two-year Degree | 1 | 0.2 | 1 | 0.2 | - | - |
| Non-educated | - | - | 1 | 0.2 | - | - |

| <i>Do you have information about what packaging waste is and how it is recycled?</i> | | | | | | |
|--|------------|-------------|------------------|-------------|--------------|------------|
| Participants | I know | | I know partially | | I don't know | |
| | N | % | N | % | N | % |
| Income | | | | | | |
| 0-1000 TL | 54 | 11.7 | 73 | 15.9 | 13 | 2.8 |
| 1001-2000 TL | 13 | 2.8 | 28 | 6.1 | 5 | 1.1 |
| 2001-3000 TL | 11 | 2.4 | 22 | 4.8 | 9 | 1.9 |
| 3001-5000 TL | 30 | 6.5 | 47 | 10.2 | 4 | 0.9 |
| 5001 and 5001+ | 74 | 16.1 | 64 | 13.9 | 12 | 2.6 |
| Unstable | 1 | 0.3 | - | - | - | - |
| Total | 183 | 39.8 | 234 | 50.9 | 43 | 9.3 |

3.3. Findings on Waste Separation

In the next group of questions, the participants were asked questions about the separation of wastes, toothpaste boxes, and inferences were made about their behaviors. In this context, the answer to the question about "Would you sorting your waste in your social life?" was answered mainly (48.3%) as "I partially sort", and secondly, "yes, I sort " with 32.8%. Participants who stated that they did not sort waste were determined as 18.9%.

Statistical data on the state of Knowledge of separating waste are shown in Table 6.

Table 6. Knowledge of separating waste

| <i>Do you sorting your waste in your social life?</i> | | | | | | |
|---|-------------|------|------------------|------|-------------|------|
| Participants | Yes. I sort | | I partially sort | | No. I don't | |
| | N | % | N | % | N | % |
| | 151 | 32.8 | 222 | 48.3 | 87 | 18.9 |
| Gender | | | | | | |
| Women | 78 | 17 | 112 | 24.4 | 42 | 9.1 |
| Men | 73 | 15.8 | 110 | 23.9 | 45 | 9.8 |
| Marital Status | | | | | | |
| Married | 54 | 11.8 | 49 | 10.7 | 25 | 5.4 |
| Single | 97 | 21 | 173 | 37.6 | 62 | 13.5 |
| Age | | | | | | |
| 0-17 | 3 | 0.7 | 3 | 0.7 | - | - |
| 18-24 | 43 | 9.3 | 102 | 22.1 | 45 | 9.8 |
| 25-34 | 39 | 8.5 | 77 | 16.7 | 25 | 5.4 |
| 35-44 | 46 | 10 | 25 | 5.4 | 9 | 1.9 |
| 45-54 | 13 | 2.8 | 10 | 2.2 | 6 | 1.3 |
| 55-64 | 6 | 1.3 | 4 | 0.9 | 2 | 0.5 |
| 65 and 65+ | 1 | 0.2 | 1 | 0.3 | - | - |
| Education | | | | | | |
| Primary School | 5 | 1.1 | 3 | 0.7 | 3 | 0.7 |

| <i>Do you sorting your waste in your social life?</i> | | | | | | |
|---|-------------|-------------|------------------|-------------|-------------|-------------|
| | Yes. I sort | | I partially sort | | No. I don't | |
| Participants | N | % | N | % | N | % |
| High School | 15 | 3.3 | 20 | 4.3 | 5 | 1.1 |
| University | 72 | 15.7 | 164 | 35.7 | 69 | 15 |
| Postgraduate | 38 | 8.3 | 21 | 4.6 | 9 | 1.9 |
| PhD | 18 | 3.8 | 10 | 2.2 | 1 | 0.2 |
| Student | 2 | 0.4 | 2 | 0.4 | - | - |
| Two-year Degree | - | - | 2 | 0.4 | - | - |
| Non-educated | 1 | 0.2 | - | - | - | - |
| Income | | | | | | |
| 0-1000 TL | 28 | 6 | 80 | 17.4 | 32 | 7 |
| 1001-2000 TL | 9 | 1.9 | 28 | 6.1 | 9 | 1.9 |
| 2001-3000 TL | 16 | 3.5 | 15 | 3.3 | 11 | 2.4 |
| 3001-5000 TL | 27 | 5.9 | 39 | 8.5 | 15 | 3.3 |
| 5001 and 5001+ | 71 | 15.5 | 59 | 12.8 | 20 | 4.3 |
| Unstable | - | - | 1 | 0.2 | - | - |
| Total | 151 | 32.8 | 222 | 48.3 | 87 | 18.9 |

Users who know or partially know about packaging wastes and recycling them mostly state that they sort or partially sort the waste. However, there is also a small minority who state that they have knowledge but do not sort their waste. It is seen that these people do not have significant differences according to gender, age group, and income level, but there are participants with high education levels (master and university). This shows that having knowledge in society is not a sufficient criterion to gain a sense of responsibility and suggests that other deterrent measures are needed.

However, it is understood that the most effective group among the participants in both knowing the concepts and sorting wastes for recycling are those with doctoral education.

"How often do you buy toothpaste?", which is one of the questions about the toothpaste boxes that are the subject of the research. The answer to the question was 36.7% "once in every two months", 35% "once a month" and 18.5% "once every three months. Statical data on the state of Frequency of buying toothpaste are shown in Table 7. However, according to 2019 data, it has been announced that the annual amount of toothpaste per capita in Turkey is 100 g (1.2 pieces on average), and this situation is far behind Europe (URL-5). Accordingly, it can be thought that an average of 98,400,000 (82,000,000x1.2) toothpaste boxes annually become waste in our country.

Table 7. Frequency of buying toothpaste

| <i>How often do you buy toothpaste?</i> | | | | | | |
|---|-------|------|-----|------|-------|------|
| | Women | | Men | | Total | |
| Frequency | N | % | N | % | N | % |
| Once in a month | 77 | 16.7 | 84 | 18.3 | 161 | 35 |
| Once every two months | 89 | 19.3 | 80 | 17.4 | 169 | 36.7 |
| Once every three months | 43 | 9.3 | 42 | 9.1 | 85 | 18.5 |
| Once in six months | 18 | 3.9 | 14 | 3 | 32 | 6.9 |

| <i>How often do you buy toothpaste?</i> | | | | | | |
|---|------------|-------------|------------|-------------|------------|------------|
| Frequency | Women | | Men | | Total | |
| | N | % | N | % | N | % |
| Once a year | - | - | 4 | 0.9 | 4 | 0.9 |
| When it run out | 2 | 0.5 | 2 | 0.5 | 4 | 0.9 |
| Twice in a month | 1 | 0.2 | - | - | 1 | 0.2 |
| Other | 2 | 0.5 | 2 | 0.5 | 4 | 0.9 |
| Total | 232 | 50.4 | 228 | 49.6 | 460 | 100 |

85% of the participants, who stated that they buy toothpaste once a month, 80% of those who buy it every two months, 85% of those who buy it every three months, and 67.5% of those who buy it less frequently, stated that they partially sort or sort the waste in their social life.

In the continuation, to the question "What do you do with the box after buying toothpaste?", 64.8% of the participants answered, "I throw it in the trash". This ratio reveals how important the recovery of recyclable waste is. The rate of those who sorting for recycling remained at 29.6%.

Table 8. Condition of toothpaste boxes

| <i>What do you do with the box after buying toothpaste?</i> | | | | | | |
|---|------------|-------------|------------|-------------|------------|------------|
| Action | Women | | Men | | Total | |
| | N | % | N | % | N | % |
| I throw it in the trash | 144 | 31.3 | 154 | 33.5 | 298 | 64.8 |
| I sort for recycling | 79 | 17.2 | 57 | 12.4 | 136 | 29.6 |
| I keep in the box | 9 | 1.9 | 17 | 3.7 | 26 | 5.6 |
| Total | 232 | 50.4 | 228 | 49.6 | 460 | 100 |

In addition to the evaluation made according to the frequency of buying toothpaste above, it is a contrast that the participants mostly throw away the boxes of toothpaste, despite the high percentage of waste separation.

When the participants were asked, "What do you think the toothpaste box is used for?", 57% answered, "for marketing technique". On the other hand, 39.6% of the participants stated that they think the boxes are used for protection. Very few answers were given in the form of ease of storage and arranging. Accordingly, the participants mostly agree that the use of toothpaste boxes is not a necessity. Statical data are shown in Table 9.

Table 9. About the purpose of use of toothpaste boxes

| <i>What do you think the toothpaste box is used for?</i> | | | | | | |
|--|------------|-------------|------------|-------------|------------|------------|
| Purpose | Women | | Men | | Total | |
| | N | % | N | % | N | % |
| For marketing technique | 137 | 29.7 | 126 | 27.3 | 263 | 57 |
| Used for protection | 92 | 20 | 90 | 19.6 | 182 | 39.6 |
| Both | - | - | 3 | 0.7 | 3 | 0.7 |
| Storage and arranging | 1 | 0.3 | 7 | 1.5 | 8 | 1.8 |
| For visual purposes | - | - | 1 | 0.2 | 1 | 0.2 |
| Other | 2 | 0.5 | 1 | 0.2 | 3 | 0.7 |
| Total | 232 | 50.4 | 228 | 49.6 | 460 | 100 |

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"In terms of a sustainable economy, how would you look at the decision to be taken to the removal of the toothpaste boxes?" Those who answered "positively" were 68.5%, followed by "partially positive" with 22.2%. The ratio of those who were partially negative, or negative was 9.3% in total. Considering the answers given, it is understood that most of the participants (90.7%) have the idea of removal of the toothpaste boxes. Statical data are shown in Table 10.

Female participants are slightly more positive about the removal of toothpaste boxes. Considering the age, education, and income status; it is understood that there is no significant difference. It was observed that those who gave negative answers generally stated that they did not know about the concepts and that these people stated that they threw away the toothpaste boxes to a large extent. It is thought that this situation arises from the lack of consciousness.

Table 10. Opinions on removing boxes of toothpaste

| <i>In terms of a sustainable economy, how would you look at the decision to be taken to the removal of the toothpaste boxes?</i> | | | | | | |
|--|------------|-------------|------------|-------------|------------|------------|
| Opinion | Women | | Men | | Total | |
| | N | % | N | % | N | % |
| Positively | 165 | 35.9 | 150 | 32.6 | 315 | 68.5 |
| Partially positive | 47 | 10.2 | 55 | 12 | 102 | 22.2 |
| Partially negative | 9 | 1.9 | 13 | 2.8 | 22 | 4.7 |
| Negative | 11 | 2.4 | 10 | 2.1 | 21 | 4.6 |
| Total | 232 | 50.4 | 228 | 49.6 | 460 | 100 |

However, 90% of the participants who stated that they threw away the toothpaste boxes stated that they viewed the removal of the boxes positively. This situation is important in terms of showing that the failure of individual waste management can be resolved with the support of individuals, together with the measures to be taken at the level of the state and private sector of sustainable development and circular economy policies.

When the participants were asked about the reasons for their positive or negative reactions, positive statements were such as prevention of waste generation and waste of resources, prevention of environmental pollution and protection of nature, reduction of costs and contribution to the economy, negative reactions were stated due to hygiene conditions, no damage to the product and the necessity of logistics / stock management.

Participants mostly (62.4%) answered "state-private sector individuals" to the question "Who can remove the toothpaste boxes, if it is possible?". While 22.4% expect the state to lead in this regard; On the other hand, 12.6% stated that the private sector has a duty. The participants who attributed responsibility to individuals in this regard remained at 2.6%. Statical data are shown in Table 11.

Table 11. Who can remove the toothpaste boxes?

| <i>Who can remove the toothpaste boxes if it is possible?</i> | | | | | | |
|---|-------|-----|-----|------|-------|------|
| Who | Women | | Men | | Total | |
| | N | % | N | % | N | % |
| State | 43 | 9.3 | 60 | 13.1 | 103 | 22.4 |
| Private sector | 27 | 5.9 | 31 | 6.7 | 58 | 12.6 |

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| | | | | | | |
|------------------------------|------------|-------------|------------|-------------|------------|------------|
| Individuals | 6 | 1.3 | 6 | 1.3 | 12 | 2.6 |
| State-private sec.- individ. | 156 | 33.9 | 131 | 28.5 | 287 | 62.4 |
| Total | 232 | 50.4 | 228 | 49.6 | 460 | 100 |

While the participants, who stated that individuals have responsibilities, were men and women equally; While male participants are more in those who state that only the state is responsible, female participants are ahead of those who state that the state-private sector-individuals are responsible. Those who are positive about the removal of the boxes think that this can be done mostly by the state-private sector-individuals. All of those who think that the private sector has a responsibility stated that they were partially or completely positive about a decision to remove the boxes. Accordingly, it can be concluded that the decisions to be taken by the manufacturers will be binding on the consumer.

Finally, according to the answers given to the question "Would you consider buying your toothpaste without a box?", the rate of those who gave a positive opinion was 85%, only a small fraction of 15% responded negatively. This situation leads to the conclusion that it would be more beneficial not to participate in the production process of the boxes that are thrown away as waste without being recycled and this will be accepted by the consumer.

Table 12. Opinions about buying toothpaste without a box

| <i>Would you consider buying your toothpaste without a box?</i> | | | | |
|---|----------|------|----------|------|
| Participants | Positive | | Negative | |
| | N | % | N | % |
| | 391 | 85 | 69 | 15 |
| Gender | | | | |
| Women | 200 | 43.5 | 32 | 7 |
| Men | 191 | 41.5 | 37 | 8 |
| Marital Status | | | | |
| Married | 107 | 23.3 | 21 | 4.6 |
| Single | 284 | 61.7 | 48 | 10.4 |
| Age | | | | |
| 0-17 | 6 | 1.3 | - | - |
| 18-24 | 159 | 34.6 | 31 | 6.7 |
| 25-34 | 120 | 26.1 | 21 | 4.6 |
| 35-44 | 67 | 14.6 | 13 | 2.8 |
| 45-54 | 25 | 5.4 | 4 | 0.9 |
| 55-64 | 12 | 2.6 | - | - |
| 65 and 65+ | 2 | 0.4 | - | - |
| Education | | | | |
| Primary School | 9 | 1.9 | 2 | 0.5 |
| High School | 32 | 7 | 8 | 1.7 |
| University | 258 | 56.1 | 47 | 10.2 |
| Postgraduate | 58 | 12.6 | 10 | 2.2 |
| PhD | 28 | 6.1 | 1 | 0.2 |

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| <i>Would you consider buying your toothpaste without a box?</i> | | | | |
|---|------------|-----------|-----------|-----------|
| | Positive | | Negative | |
| Participants | N | % | N | % |
| Student | 4 | 0.9 | - | - |
| Two-year Degree | 2 | 0.4 | - | - |
| Non-educated | - | - | 1 | 0.2 |
| Income | | | | |
| 0-1000 TL | 116 | 25.2 | 24 | 5.2 |
| 1001-2000 TL | 40 | 8.7 | 6 | 1.3 |
| 2001-3000 TL | 35 | 7.6 | 7 | 1.5 |
| 3001-5000 TL | 69 | 15 | 12 | 2.6 |
| 5001 and 5001+ | 130 | 28.3 | 20 | 4.4 |
| Unstable | 1 | 0.2 | - | - |
| Total | 391 | 85 | 69 | 15 |

It is seen that a very high majority (91%) of those who partially or completely positive response to the decision to remove the boxes consider buying their toothpaste without boxes. However, it is revealed that 60% of the people who do not consider buying their toothpaste without boxes, throw away the toothpaste boxes. Although it is known that the awareness of responsibility is a priority if permanent measures are not taken, indicates that there will be losses in the recycling of wastes.

Apart from the survey phase, the opinions of the manufacturers contacted were asked, and Colgate, one of these companies, turned down the request.

Splat company, in its reply, stated that they consciously preferred the product packaging and that the packaging is recyclable. She stated that the use of packaging is a communication tool and information about the product that cannot be put into the tube is conveyed, as they do not advertise the product, but instead, they need the use of packaging because they carry out various charitable projects.

However, the company stated that they support sustainable development approaches, therefore they are working to reduce the use of packaging, and even unboxed sales have started in many countries. However, it was also stated that in order to carry this process to different dimensions, a lot of work should be done with retail store chains and their support should be necessary.

Oral-B company, on the other hand, stated that it would return to the relevant question, but did not respond within the specified process.

4. Discussion

In the light of the survey study and the information obtained from the relevant companies, it was understood that the subject of zero waste and waste is a process known and even supported by a large part of society. However, it has been concluded that the concepts of sustainable development, sustainable economy, and circular economy are less well-known by society since they are mostly discussed at the academic and policy level.

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When it is desired to make a comparison in terms of society profile, it has been understood that factors such as gender, age group, education level and income status are not very distinctive. In contrast, *Gendall et al.* made different conclusions in the study by 1995. The impacts of age, gender, and education on scientific and environmental knowledge were similar in all six countries. Men had higher levels of knowledge than women, younger people had higher levels of knowledge than older people, and higher levels of schooling meant higher levels of knowledge. However, the effects of age and gender are minor, and education is the most important factor of scientific and environmental knowledge. It is thought that the effect of the results (society profile) of this study, which was done a quarter of a century ago, on the awareness of the concepts is not a distinctive feature in our study. When more recent studies are examined, it is seen that there are studies that show that gender has an effect on environmental attitudes and behavior (Aksoy & Karatekin, 2011,), and there are studies that suggest that it has no effect (Koçarslan et al., 2017).

It is seen that the approaches to the subject are almost the same at the level of men and women, knowing the concepts in the 18-24 and 25-34 age groups which constitute the majority, and partially knowing the concepts in the 35-44. Again, the fact that this is one of the issues that draw more attention today, it is understood that awareness is higher in younger generations because it has become a subject that is frequently emphasized in social media, school, etc.

Another striking situation in the participant tendencies is that individuals with a low level of education (primary school, high school) have an effect on their lack of knowledge in their actions. It has been determined that individuals with a high level of education (university, graduate) have the opposite tendency, even if they have knowledge. This situation reveals the fact that awareness can be increased by providing information and the issue of recycling will be accepted by wider circles. However, another conclusion can be made that obtaining information alone will not be sufficient, and that different measures are needed. In this case, it is understood that measures such as incentive and punishment system should be taken. The use of returnable products, which is one of the methods applied in Scandinavian countries in this regard, might be provided in all products recycled in our country. Even, by making radical pricing such as one-to-one in product and packaging pricing, people might be subjected to compulsory incentives.

Although the study was conducted with a limited number of participants, the data obtained are important in terms of showing the general approach of society. There are many packaging wastes that are recycled. However, the main goal is to provide the desired correlation between zero waste and circular economy, without the need for recycling, without putting material on the production line. For this reason, toothpaste boxes which are a consumer-intensive common use product, make a good starting point. As a matter of fact, it has been determined that consumers see it as an unnecessary product item with no benefit value. It is the determination of all product items that are thought to create unnecessary waste with the feasibility studies to be carried out by the private sector, by providing incentives and supervision by the state and removing them from production in line with the demands of individuals.

For this purpose, in the feasibility reports to be prepared, energy to be saved, raw materials, logistics, etc. is to present the items one by one on the basis of all products. The

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study is incomplete in this aspect, as the relevant companies do not want to share this data because it is confidential information. Necessary feasibility reports can be prepared by cooperating with the state-private sector.

Conclusion

To reveal the approaches of consumers on the reduction of packaging waste in our country, a questionnaire was applied to 460 participants and their awareness and behaviors were examined. In particular, consumers' approaches to the use of toothpaste boxes were examined on a pilot scale. Obtained results are presented below,

- When the awareness of the participants was examined, it was determined that they were aware of 88.7% zero waste management, 82.7% sustainable development and sustainable economy, 61.3% circular economy, and 90.7% packaging waste and recycling.
- When the behaviors of the participants regarding the sorting of waste were examined, it was determined that 81.1% of them separated the waste.
- 90.7% of the participants were positive about not using toothpaste boxes.
- While those who approach positively put forward reasons such as preventing waste generation, preventing waste of resources, preventing environmental pollution, protecting nature, reducing costs and contributing to the economy; Those who approached negatively put forward reasons such as hygiene conditions, no damage to the product and the necessity of logistics / stock management.

In the light of the study based on the data and observations obtained, it is recommended to carefully examine the studies that have been done and are being carried out in the world and to make legal arrangements. All segments of society need to be educated in detail about the concepts and processes. The process should not be limited to the transfer of information, but by establishing continuous control mechanisms, it should be ensured that all stakeholders fulfill their duties. It is hoped that this study will guide decision-makers and practitioners.

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