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**دور خصائص المستهلك علي العلاقة بين الوعي بتنمية البيئة المستدامة و سلوك إعادة التدوير في مصر**

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# The Role of Consumer Characteristics on the relationship between their Awareness of Environmental Sustainability and Recycling Behavior in Egypt

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## المستخلص :

البحث المقدم يتناول معرفة دراسة تاثير خصائص المستهلك الديمغرافية و النفسية على العلاقة بين تاثير الوعى بتنمية البيئة المستدامة على سلوك اعادة التدوير.

و تعتبر مشكلة عدم تحقيق الاستدامة فى العموم و الاستدامة فى تنمية البيئة على الاخص، خطر يهدد العالم فى العموم و مصر بالاخص. وذلك لان عدم الاهتمام بتنمية البيئة المستدامة يشكل تهديد واضح على الموارد الغير متجددة بالاضافة الى التسبب فى ندرة المياه و المواد الغذائية ايضا قد تتسبب فى الامراض المزمنة للانسان بشكل عام و لذلك قد تحرم الاجيال القادمة من امكانية استخدام الموارد بالإضافة الى الحرمان من المعيشة الكريمة. وهذا لان تنمية البيئة المستدامة هى عبارة عن حلقة فى تحقيق الاستدامة بشكل عام. لان الاستدامة تتكون من الاستدامة الاقتصادية و الاجتماعية بالإضافة الى تنمية البيئة المستدامة.

جميع هذه الاسباب كانت الحافز لاكتشاف تاثير وعى المواطن لتنمية البيئة المستدامة على سلوك اعادة التدوير و الذي قد يؤثر فى الحفاظ على البيئة التي بدونها لن يكون هناك و جود للإنسان او اى كان حى.

يعد البحث إضافة علمية لاستكشاف الأسباب الكامنة وراء المشاركة فى سلوك اعادة التدوير. لذلك بعد معرفة ان يوجد تأثير على سلوك اعادة التدوير من خلال زيادة الوعى بأهمية تنمية البيئة المستدامة حتى و ان كانت ضعيفة لكنها تستحق الاهتمام من خلال التوعية بين وسائل التسويق المختلفة و لكن مع العلم أنها وحدها لا تكفي لزيادة المشاركة بل يوجد أساليب أخرى تم اكتشافها من البحث الميداني الاستكشافي و هو من خلال التحفيز المادي أيضاً.

## الكلمات المفتاحية:

تنمية البيئة المستدامة، الوعي، خصائص المستهلك، الخصائص الديمغرافية، الخصائص النفسية، سلوك اعادة التدوير.

## Abstract:

Sustainability is regarded as a global challenge in general and environmental sustainability is a pressing global issue in specific. It was noted that the globe is facing a projected population exceeding nine billion, and per capita buying power is expected to exceed double by 2050.

Unfortunately, the globe is facing water scarcity, shortages in the food supply, fossil, energy and the need to protect human health. These challenges demand sustainable development.

Hence Environmental Sustainability is regarded as significantly important since it is perceived that it is the core attribute to all human beings and that there is a necessity to strive to maintain it. Consequently, in order to attain sustainability, achieving environmental sustainability is a pre-requisite along with social and economic sustainability.

The Arab Republic of Egypt being part of the globe; is facing the same challenges and has the same pressing need for sustainable development in general and environmental sustainability precisely. Although Egypt is regarded as one of the least countries adding to the global emissions yet, it is one of the most counties affected by it. Besides, Egypt is facing a gigantic problem in its inability to manage its waste, which in turn hinders its ability to aid in environmental sustainability. Egypt's inability to aid in environmental sustainability affects its citizens; since it is the reason behind illness, gas emissions, and the like.

In order to aid in waste management, several approaches could take place to reduce, reuse, recycle, and recover of solid waste. Additionally, in order to get people involved in a pro-environment behavior, like recycling, it is important to determine their awareness of environmental sustainability, this will in return induce a change in their behavior towards the environment.

According to the research findings the researcher found that Awareness of Environmental Sustainability as an independent variable has a positive yet weak impact on Recycling Behavior as a dependent variable. Meaning that the target population is aware of the importance of sustaining the environment and that it positively affects their tendency to participate in recycling behavior yet weak participation takes place.

Furthermore, the researcher reached the conclusion that certain demographic and psychographic moderating factors do affect the strength of the relationship, between awareness of environmental sustainability and recycling behavior, yet the impact is insignificant.

## Keywords:

## 1. Introduction:

Awareness of environmental sustainability refers to the recognition of the needs and consequences of actions for an object. In other words, it's about recognizing the need for acting in a pro-environment manner toward the environment and recognizing the consequences of behavior that act against the environment or harm it in any way. Awareness of environmental sustainability should take place since recognizing the environmental concerns is no longer regarded as a luxury and the nations should recognize that the costs of ignoring environmental protection are high and unaffordable and that the progress towards solving environmental problems will lead to present and future growth and prosperity. (Singh, et al. 2014)

On the other hand, lack of awareness of environmental sustainability, will in turn affect sustainable consumption and proper disposal of resources. As a result, a lack of awareness of environmental sustainability will probably affect people's behavior towards waste management. Consequently, they won't be likely to engage in a pro-environment behavior or an approach to waste management as recycling. Therefore, increasing people's awareness is likely to aid in avoiding such consequences, especially that it was proven that awareness campaigns could drive behavior change. (Singh, et at., 2014)

According to previous research, it has been proven that one of the variables that affected the probability of participation in recycling behavior is the awareness of the environment and the importance of conserving it. (Ramayah, and Rahbar, 2013)

## 2. Environmental Sustainability:

The globe has been experiencing immense development in a variety of sectors over the past decade and is still taking place. This development was not free of cost since, it has led to unfavorable consequences such as the deterioration of our environment. This deterioration showed itself in the form of natural disasters and climate change. As a result the call for sustainable development is crucial for not only human prosperity but also for existence. (Klarin, 2018)

The application of sustainability or sustainable development will help in meeting basic human needs, while achieving equality for current and future generations. This can take place through attaining the three spheres of sustainability that are interdependent on each other. First environmental sustainability; refers to the proper management and protection of natural resources and the eco-system. Second economic sustainability; is concerned with achieving revenues and investments. The third sphere is social sustainability and it refers to ensuring equality, human rights and education, healthcare and all standards that ensure a quality life. (UNSDN, 2013)

Although environmental sustainability is indispensable for human existence yet, several countries are not even close to it. As a result, act as a burden on the whole globe. (Klarin, 2018)

The main problem related to failure to sustain the environment is the lack of its application. Hence, it is crucial that scientists and social actors cooperate to promote a sustainable lifestyle that can in return reduce the negative force on the environment that in turn causes disasters. (Egyptian Environmental Affairs Agency, 2016)

Egypt is one of the countries that unfortunately faces challenges in sustainability due to the pressure incurred by environmental, economic and social sustainability. (Egyptian Environmental Affairs Agency, 2016)

One of the constraints to attaining sustainability is the failure to reach environmental sustainability. Furthermore, one of the challenges to attaining environmental sustainability is waste. Waste in Egypt doesn't only impact the environment but also causes diseases and harms humans. (Mohamed, and Ibrahim, 2016)

One approach to deal with waste is through recycling. Where recycling has to do with the recovery of useful materials as glass, plastic, paper and metal. (Fahim, and Gomaa, 2014)

According to a table (1) it's obvious that Egypt had a high rate of different types of waste in 2016. Where the solid municipal waste is 21,810,000 tons. Moreover, according to figure (1) o0n 12 % of the solid municipal waste is recycled, which is regarded as a very low percentage. (Egyptian Environmental Affairs Agency, 2016)

Furthermore, according to Environmental Performance Index (EPI) in 2018 the middle East and North African (MENA) countries are dispersed through the middle of 2018 ranking. Egypt has the rank of 66 out of 180 countries in its ability to sustain the environment (Wendling et al., 2018)

As a result, His Excellence President Abd-El Fatah El Sisi hosted the fourteenth meeting of the conference of the parties to the Convention on Biological Diversity in Sharm El Sheikh and Sponsors the 2030 vision developed by the Ministry of the Environment, in order to attain environmental sustainability. As well as highlighting the importance of research in areas related to environmental sustainability and increasing citizens' awareness of such issues in order to promote pro-environmental behavior. (Egyptian Environmental affairs Agency, 2016)

Table (1) Quantity of Waste Generated Annually in Egypt

| Type of Waste | Quantity Generated Annually (Million Tons) |
|---|---|
| Solid Municipal Waste | 21 |
| Agricultural Waste | 31 |
| Demolition and Construction Waste | 5.8 |
| Industrial Waste | 4.9 |
| Hazardous Waste | 0.54 |
| Healthcare Waste | 0.52 |
| Sludge Residues | 2 |
| Waste Disposal of Canals and Ditches | 25 |
| **Total** | **90.76** |

Source: (Egyptian Environmental Affairs Agency, 2016)

Source: (Egyptian Environmental Affairs Agency, 2016)
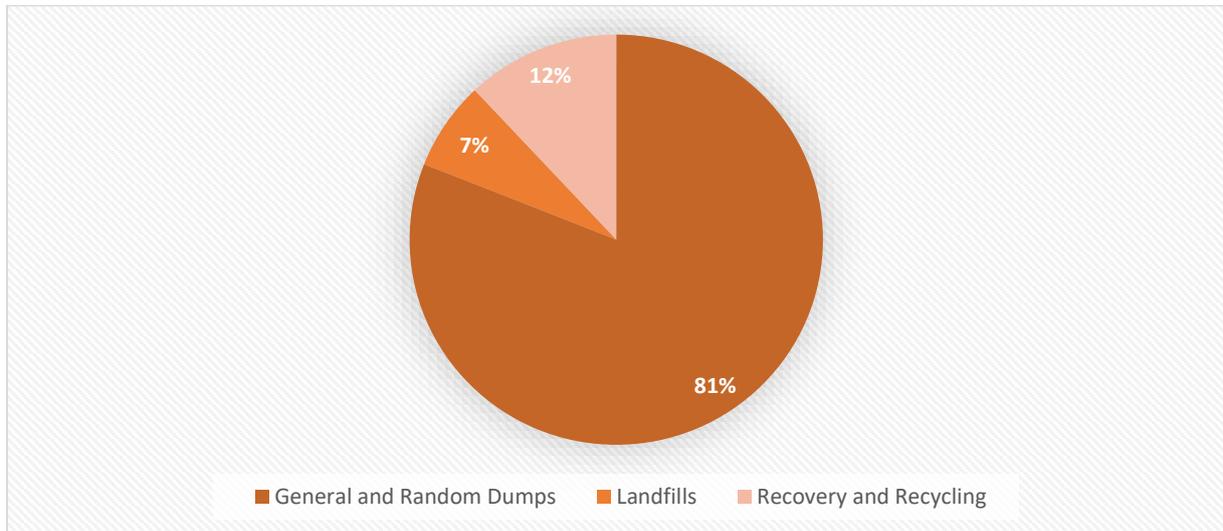


Figure (1) Final Disposal Methods of Waste in Egypt

Source: (Egyptian Environmental Affairs Agency, 2016)

## 3. Awareness of Environmental Sustainability and Recycling Behavior:

Environmental awareness is referred to as the awareness of environmental issues and participation in an environmental organization. (Altin, et al., 2012)

Awareness of environmental sustainability is also related to realizing the need and consequences of action for the object in need; meaning that recognizing that taking care of environmental issues is no longer regarded as a luxury but a necessity for future growth and overcoming long-term costs. (ECLA, 2000)

Previous research took place on 62 developing countries, shows that awareness of environmental sustainability affects the quality of the environment, regardless the stage of development that a country exists in. According to this research both theoretical background and empirical findings, suggest the crucial need for raising public awareness and promoting understanding of the consequences of pollution and climate change that are caused by not sustaining the environment. (Chen, Huang and Lin, 2019)

While other research mentioned that the level of awareness of environmental sustainability is affected by a country's development stage. According to the research, a relationship exists between cognitive ability and wealth. Furthermore, an increase in cognitive level by one standard deviation leads to an increase in awareness of environmental concerns and climate change. By 19 %. This research took place on a sample of 119 nations from 2005 to 2015. (Salahodjaev, 2018)

Malaysia is one of the countries that was facing a very low rank in the Environmental Performance Index (EPI) where it was 51 in 2014 due to its failure to sustain the environment. As a result, the government pinpointed four environmental concerns that require to be tackled; waste management, climate change, water and air pollution. The Malaysian government succeeds to raise its citizens' awareness of environmental sustainability due to its awareness programs as 'Recycle for Nature', 'No

Plastic bags', 'One State One River Program' and 'Towards Smart Energy Culture'. (Mei and Wai and Ahmad, 2016)

Malaysian citizens started to participate in sustaining the environment, yet not all of the aware citizens participated. This is due to inconvenience reasons such as the inconvenience of car-pooling. As a result, the Malaysia government took other actions by promoting money-saving and financial return approaches therefore; Malaysian citizens reduced their fresh water consumption (Mei and Wai and Ahmad, 2016)

Moreover, a systematic review with a meta-analysis of validated field intervention shows that awareness of environmental sustainability promotes recycling behavior. It also noted that the total urban waste generation is two billion tons per year and is expected to grow by 20 % in 2100. Respectively, the only way to deal with it is not only through having processing facilities, collection infrastructure and legislation but also by citizens' cooperation. Citizen cooperation will allow separation at home consequently a large weight is given to increasing their awareness of environmental sustainability to get job done. (Varotto and Spagnoli, 2017)

One of the developing countries that succeeded in the application of awareness of environmental sustainability to achieve environmental sustainability favorable outcomes is Nepal. Nepal succeeded in increasing waste recovery to 30% and the remaining 70% is disposed of safely. This is due to developing citizens' awareness to reduce, reuse and recycle waste. This objective was achieved through employing and training waste management staff and organizing competitions in waste recycling. (Ibrahim and Mohamed, 2016)

Moreover, Bangladesh is one of the developing countries that believed that awareness of environmental sustainability could affect public behavior towards the environment. Bangladesh perceived the need for educating the public about the consequences of their behavior towards the environment to encourage the public's engagement in pro-environment behavior. Bangladesh perceived the great need for this kind of awareness due to its high density of population, which was a major reason for the severe environmental degradation. Besides, it had a lot of poor and dying due to arsenic contamination that is present in Bangladesh's villages and poor urban areas, and citizens of these areas are exposed to poisonous air due to waste. Bangladesh's awareness of environmental sustainability took place through formal education; where separate courses are provided at primary and secondary levels. In addition, training teachers on such a significant issue took place. Moreover, increasing the media coverage on environmental education. (Salequzzaman, and Stocker, 2001)

Furthermore, Malaysia is a Far East country that could enormously benefit from recycling since around 30% of its domestic waste in 2006 is recyclable as a result could aid in environmental sustainability through recycling instead of being disposed of at the landfills. Noting that if Malaysia persists in disposing of its waste in landfills this could elevate greenhouse emissions by 50% in 2020, as per the national waste management department. That in return can reduce soil fertility and harm the earth in general. As a result, awareness is crucial to induce behavior change. It was found out that the efforts in Malaysia to increase awareness reached 99% yet only 68.6% of 7,000 respondents were committed to participating. This finding shows the importance of awareness of environmental sustainability as a factor that induces a pro-environment behavior change. Other factors that increase recycling commitment of 'aware but lazy' target market is family and friends' influence, while programs were demonstrating how to store and handle recyclables and the availability of recycling facilities are effective for 'aware but find it difficult' target market. (Daud and Jekria, 2016)

Solid waste management is a gigantic problem in Nigeria, especially in urban areas. To the extent that certain areas as Port-Harcourt South Nigeria was named "Garden city" in 1970, but unfortunately, now it's known as "Garbage City". The waste problem is increasing in Nigeria due to waste disposal

in landfills but also in other non-landfills, in cases of closed landfills. Citizens in Nigeria generate around 0.56-kilo grams of waste per capita per day, where this waste is improperly managed to the extent that waste is visible in parts of the cities, on roads, and within neighborhoods and around residential areas. According to research, Nigeria has reached this state due to a lack of awareness, lack of proper management, and inadequate funds. (Abd'Razak, et.al, 2017)

Furthermore, according to research conducted by Lagos State Solid, Waste Management Authority in 2002 only 47.8% are committed to recycling. Another research mentioned that the attributes that differed recyclers from non-recyclers in Kaduna are environmental awareness, environmental preservation, monetary rewards, and resource cost. Therefore, environmental awareness can play a role in increasing participation in recycling. (Abd'Razak, et.al, 2017)

## 4. Consumer Characteristics and Awareness of Environmental Sustainability:

## 4.1 Importance of Consumer Characteristics for the Research:

Building awareness regarding the significance of environmental sustainability requires learning the population characteristics. Developing a profile of the targeted citizen would ease the process of learning about them; how they think and how to approach them. Furthermore, aids in pinpointing the characteristics that affect the relationship between awareness and perception of environmental sustainability and recycling behavior. Hence improving communication and delivering the communication message. (Field, and Tuna, 2015)

According to research demographic and personality are defined as personal factors that correlate with environmental sustainability (Ince, 2018)

Referring to a previous research in the United States of America, it concluded that certain demographic characteristics affect the tendency to participate in sustaining the environment in general and recycling in specific. One of the factors mentioned is income, where the study noted that the higher the income the more the tendency to care about the environment and participate in recycling. (Seacat and Boileau, 2018)

## 4.2 Consumer Characteristics and Awareness of Environmental sustainability:

In order to build proper awareness regarding environmental sustainability and encourage pro-environment behavior ,such as recycling. It is extremely crucial to learn population characteristics that are likely to participate or avoid a particular behavior. Developing such a profile could play a significant role in behavior change campaigns since, it will allow proper design and targeting for the desired communication message. (Field, and Tunna, 2015)

Demographic characteristics describe the market in terms of certain variables such as age, gender, income, education, family size, and social class. On the other hand, psychographic characteristic describes the market in terms of variables like personality, and values. (Belch, and Belch, 2004)

While psychographic characteristics refers to characteristics as personality, lifestyle, and values. It is significant to rely on psychographic characteristics since when combined with demographic characteristics it aids in a better understanding of the target population. (Belch and Belch, 2000)

Personality and demographic characteristics are defined as personal factors that correlate with

environmental sustainability. (Ince, 2018)

A research took place among secondary school students to determine their level of environmental awareness. It was concluded that 75.8% of high school students mentioned their disappointment with air and river pollution. It was also found that the level of environmental awareness of female secondary students is higher than male students. (Hassan and Noordin and Sulaiman, 2010)

As a result, according to this research, the level of awareness for secondary education level as a demographic characteristic is high since 75.8 %, and the age group attending secondary education 15 to 19 years is also high, but females' awareness was high compared to males in this age group. (Hassan and Noordin and Sulaiman, 2010) According to research conducted on postgraduate students of the Dharwad region. It was concluded that females in Bangalore metro city have higher environmental awareness compared to males. However, the results also show that the effect of gender on environmental awareness is minimized due to education level. (Shivakumara, et al., 2015)

In the sense the higher the education level the more the probability of not having differences in gender awareness towards the environment. (Shivakumara, et al., 2015)

On the other hand, research that took place in Germany and Russia showed that females had higher environmental awareness compared to males. (Szagun and Pavlov, 1995)

According to research in Malaysia, it was noted that 77.6 % of Malaysian youth showed positive concern for the environment, yet they don't follow a green lifestyle, although 69.8% of the Malaysian youth are willing to adopt a green lifestyle. (Abd Rahim, et al., 2012) .

As a result, the Malaysian government-sponsored awareness campaigns in order not just to motivate the Malaysian youth as an age group to have concern for the environment but also, to adopt a green lifestyle that would be part of their psychographic traits. (Abd Rahim, et al., 2012)

It was also mentioned in another research that although consumers might be aware and concerned about environmental welfare yet, they hesitate to adopt a green lifestyle, as purchasing green products and other green behavior in general. (Singh and Bansal 2012)

Research conducted on postgraduate students of the Dharwad region shows that females in Bangalore metro city have higher environmental awareness than males, yet awareness is minimized by the level of education; the lower the educational level the lower the level of awareness. (Shivakumara, et al., 2015)

Moreover, a published research shows that age affects the probability to act in an environmentally sustainable manner and make green-related choices. Due to the young's possession of more information and ability to search for information related to the environment. While highly educated and high-income individuals tend to be more ecologically conscious and participate in eco-friendly interventions. (Han, et al, 2011)

People who follow a green lifestyle as psychographic characteristics tend, to behave sustainably and have more potential for environmental protection. (Wang, et al., 2020)

Furthermore, people with proactive personalities tend to participate in environmental related behavior, due to their environmental awareness. A low sense of belonging as an external orientation value has a negative relationship with the tendency to participate in sustainable behavior, while people with a high sense of belonging do not mind incurring more cost and engage, I recycling behavior. (Schultz, et al., 2019)

## 5. Exploratory Research:

The researcher was interested in learning more insights regarding environmental sustainability and whether awareness of citizens regarding this issue can affect their recycling behavior. In addition, whether consumer characteristics can affect the strength of the relationship or not in Egypt. As a result, the researcher carried out three exploratory researches each aim to learn insights from different targets.

The first exploratory research was in Smart Village International Schools. It was in the form of a structured face-to-face interview with Ms. Nadine Farouk; Events and Public Relations manager at the school. The objective of the interview was to uncover their experience with recycling. Unfortunately, it was noted that there was very low student participation in recycling, as a few number of students threw their recyclables in the correct labeled recycling bin located in the school's playground. As a result, the school decided to conduct awareness sessions by 'SEED' entity and encourage students to participate in a recycling competition organized by a non-governmental organization (NGO) called 'ECOZEUS' in order to increase their awareness of environmental sustainability.

The second exploratory research was at Egyptian Shooting Sporting Club, Dokki branch. It was in the form of a structured face-to-face interview with Dr. Mohamed Ghobashi to learn about their experience with recycling. Unfortunately it was concluded that a few number of members in the sporting club threw their recyclables in the labeled bin. That was disappointing from the Club's management point of view, since the members come from high income and education levels. It was mentioned that members who participated in recycling are mostly females in their mid-thirties and above. As a result, the sporting club decided to attach labels on all trees at the club mentioning their importance and origin in order to increase awareness of the environment as well as planning to set environment awareness plans.

The third exploratory research was carried out around kiosk purchasing recyclables or solid waste in Egypt, specifically in Masr el Gedida around Al Sebaak street's recycling kiosks and Aswan street recycling Kiosks. The researcher carried out this exploratory research to determine the reasons behind engaging in such a pro-environment behavior and to determine whether there is a relationship between the awareness of environmental sustainability and participation in recycling behavior. Also, determine whether the strength of the relationship increases or decreases due to the existence of certain demographic or psychographic characteristics.

The researcher gave out 40 surveys divided into 20 surveys targeting the area around Aswan Street and 20 targeting the area around Al-Sebaak Street. The researcher got to know that 80% of the target population around Aswan Kiosk is aware of the existence of the kiosk, yet only 60 % sell their recyclables or solid waste. While 70 % of the target population around Al-Sebaak Street is aware of the existence of the kiosk, yet only 50 % sell their recyclables or solid waste to the kiosk.

Reasons for not participating yet knowing the existence of the kiosks, according to the respondents, were mainly due to lack of interest, no time to visit recyclables, no time to separate recyclables and others said that they didn't know why they don't sell their recyclables. On the other hand, 70 % of the respondents that were unaware of the existence of the kiosks were willing to visit it and sell their recyclables, while 30 % said that they might visit the recycling kiosks.

It was obvious that the education level and income level of the population selling their recyclables to Aswan Kiosk are less than those selling their recyclables to Al-Sebaak Street, this might be due to the location of the kiosks.

According to the findings, the majority of the participants account for around 77 %, of those selling their recyclables to both kiosks come from a low income and education level. And the primary reason for selling their recyclables is due to financial return as a priority followed by their care for the environment. Since the respondents mentioned that these kiosks were the reason for living in a cleaner area and fewer diseases occurring to them because according to the respondents piles of waste surrounded their areas.

Moreover, the majority strongly agrees that engaging in pro-environment behavior as recycling will help sustain the environment and that the majority are aware and can perceive the consequences of their behavior. The majority strongly believes that they can aid in avoiding firebreaks, and reduce the impact of global warming and resource drainage.

Responses related to this target lifestyle and values show that their low-income level doesn't allow them to purchase organic food and energy-saving bulbs, on the other hand, the majority mentioned that they are keen on switching off unnecessary energy and consuming tap water wisely.

The last finding related to the low income and low education level, the age of the target selling their recyclables, 3 were children aged between 10-19 years and were sent by their patents, 4 youth and aged between 20-29 years and 10 people and their age range between 30 to 39 years. Besides, the participation of males out counted the females' participation, where the overall female participation of respondents in both areas were 3 females only.

The other category noticed according to findings, is the high-income category that earns 120,000 Egyptian pounds and above and comes from a high level of educational background, since they are all university graduates. This category is only 5 people from the total number of respondents. They are 2 males selling their recyclables to Aswan Street, 2 males and, one female selling their recyclables to Al-Sebaak Street, they account for 23% of the visitors. They all mentioned that they give out the money gained from selling their recyclables to charity or the helpers at the kiosks. They mentioned that the only reason they sold their recyclables is due to their awareness of the importance of environmental sustainability.

This category strongly agrees that their contribution can affect environmental sustainability and that this pro-environment behavior can aid in reducing global warming, fire breaks, waste, and diseases as well. In addition, they believe that their participation makes their friends and family proud of them and willing to engage in the same behavior.

Concerning their lifestyle, they mentioned that they sometimes purchase organic food, but always use energy-saving bulbs, closing unnecessary energy, and use tap water wisely. Four respondents of this category, age from 40-49 and one age from 30-39.

To conclude the major reason behind selling recyclables or solid waste is financial return followed by care for the environment. Moreover, the majority of the respondents come from a low income and low educational background. Males' participation out counts females' participation. In addition, the majority tries to reduce the consumption of energy and water to aid in environmental sustainability.

Table (2) shows the Characteristics of Respondents of the Third Exploratory Research as explain earlier.

Table (2) Characteristics of Respondents of the Third Exploratory Research

| Gender | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | 21 | | | 19 | | |
| Age | 10-19 | 20-29 | 30-39 | 40-49 | 50-above | |
| | 4 | 11 | 19 | 5 | 1 | |
| Income | 12,000-24,000 | 24,000-48,000 | 48,000-60,000 | 60,000-120,000 | 120,000-above | |
| | 13 | 10 | 6 | 7 | 4 | |
| Education | Illiterate | Primary graduate. | Secondary graduate. | University graduate. | Master | Doctoral |
| | 6 | 11 | 15 | 8 | 0 | 0 |

Source: Developed by the researcher.

## 6. Problem Statement:

According to the literature review and the exploratory researches undertaken by the researcher, it was concluded that sustainability is regarded as a global challenge generally speaking and environmental sustainability is a pressing global issue specifically speaking.

Furthermore, the globe is facing a projected population exceeding nine billion, and per capita buying power is expected to exceed double by 2050. While the globe is facing water scarcity, shortages in the food supply, fossil, energy, and the need to protect human health. These challenges demand sustainable development. (Lui, et al., 2018)

Environmental sustainability is regarded as significantly important since it is perceived that it is the core attribute to all human beings and that there is a necessity to strive to maintain it. (Goodland, and Ledec, 1987)

It was also mentioned that other attributes to sustainability; social and economic sustainability cannot take place unless environmental sustainability is attained. (Klarin, 2018)

The Arab Republic of Egypt being part of the globe is facing the same challenges and has the same pressing need for sustainable development in general and environmental sustainability specifically. Although Egypt is regarded as one of the least countries adding to the global emissions yet, it is one of the most affected counties. Besides, Egypt is facing a gigantic problem in its inability to manage its waste, which in turn hinders its ability to aid in environmental sustainability. Egypt's inability to aid in environmental sustainability affects it locally; since it is the reason behind the illness, gas emissions, and the like. (Egyptian Environmental Affairs Agency.2016)

To aid in waste management, which can help in environmental sustainability, several approaches could take place: reducing, reusing, recycling, and recovering solid waste. (Al Salem, et al, 2018)

In order to get people involved in pro-environment behavior, like recycling, it is important to determine their awareness of the importance of environmental sustainability, that in return can induce a change in their behavior towards the environment. (Ince, 2018)

Therefore, the research problem that the researcher is interested in search is as follows:

To study the role of consumer characteristics, on the relationship between awareness of the importance of environmental sustainability and recycling behavior. As a result, the researcher will be able to determine the level of impact that the awareness of the importance of environmental sustainability has on recycling behavior. In addition to determining consumer characteristics that can affect the strength of the relationship. As a result recommendations and action plans could be suggested to aid in environmental sustainability, in form of knowing which targets to approach and how as well in order to participate in recycling behavior through increasing their level of awareness of the importance of environmental sustainability or suggest other required courses of action that will be determined after analysis of the research survey findings.

## 7. Research Model:
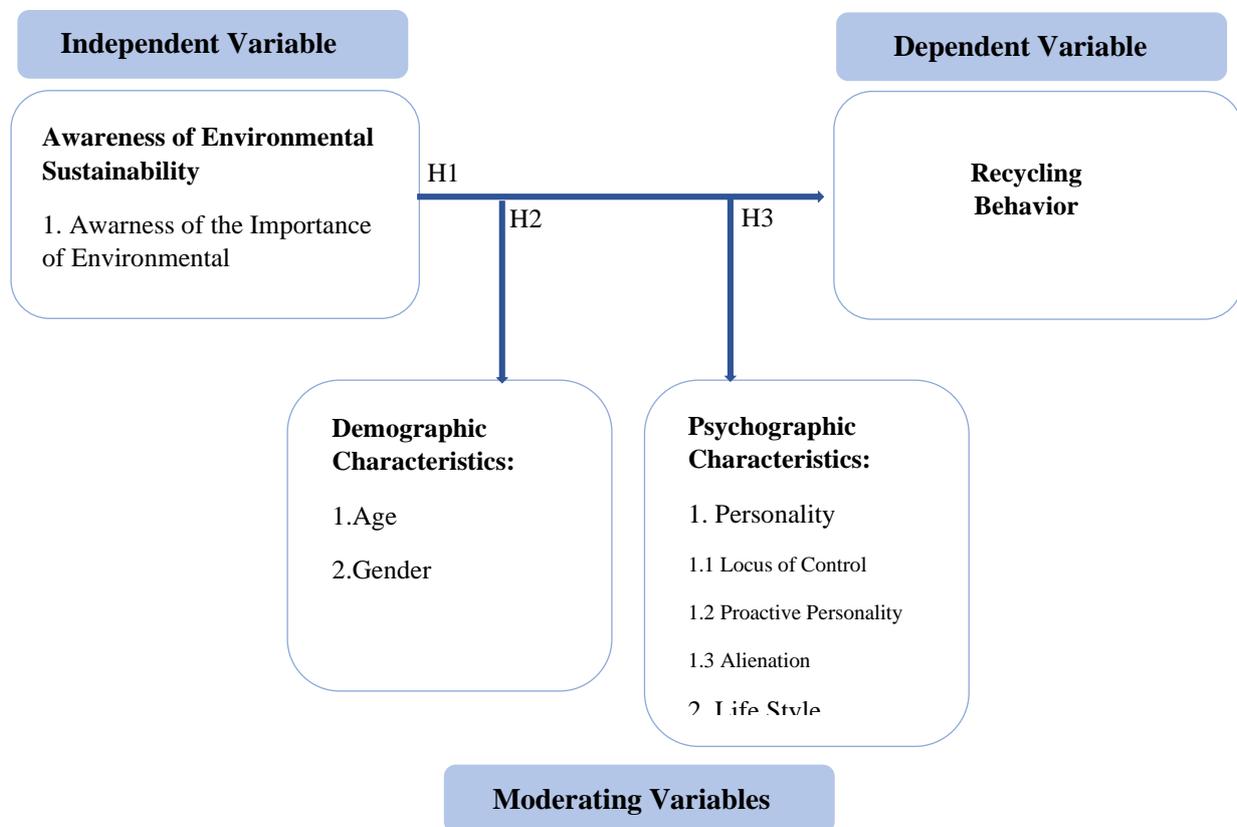


Figure (2) Final Disposal Methods of Waste in Egypt

Source: Developed by Researcher

## 8. Research Hypotheses:

H1. There is a significant positive relationship between consumers' Awareness of the level of importance of environmental sustainability and Recycling Behavior.

- A high level of awareness of the importance of Environmental Sustainability has a significant positive relationship with Recycling Behavior.
- A low of awareness of the importance of Environmental unsustainability has a significant positive relationship on Recycling Behavior.

H2. There is a significant positive difference of consumer Demographics as moderating variables on the relationship between consumers' level of Awareness of the importance of Environmental Sustainability and Recycling Behavior.

- Age has s significant positive difference on the relationship.
- Gender has a significant positive difference on the relationship.
- Education has a significant positive difference influence on the relationship.
- Income has a significant positive difference on the relationship.

H3. There is a significant positive difference of Consumer Psychographics as moderating variables on the relationship between consumers' level of Awareness of the importance of Environmental Sustainability and Recycling Behavior

- Citizens' personality has a significant positive difference on the relationship.
- Citizen's adoption of a green lifestyle has a significant positive difference on the relationship.
- Citizens' values have a significant positive difference on the relationship.

# 9. Research Scope

The scope of the research is to investigate the role of consumer characteristics; demographic and psychographic characteristics as moderating variables on the relationship between awareness of environmental sustainability and the probability of participating in recycling behavior in Egypt. The research focused specifically on shoppers found in shopping malls in Cairo and Giza precisely. Respondents were at least 10 years old, from different education, income, and gender groups, who possess different psychographic characteristics where a probability sample that was approached involved 400 respondents.

# 10. Research Design

Secondary data collection, took place through the collection of relevant information on the area of interest, by engaging in a thorough reading of previous literature derived from credible sources as transparent and trustworthy governmental agencies in addition to international agencies, as well as scientific journal websites. (Martins, et al. 2018)

Two Stages of primary data collection were of great importance for fulfilling the desired research goals. In the first stage, primary data collection was in the form of exploratory research, while in the second stage data collection was based on descriptive quantitative research that will address the research target population.

In the first stage, the primary data collection used was exploratory in nature, to uncover insights, describe the relationships, and predict the effect of one variable on another. Two exploratory tools were used; the first exploratory tool was a qualitative data collection method in the form of a face-to-face interview, where the questions used in the interviews were predetermined open-ended questions. While the second exploratory tool was a quantitative data collection method a structured questionnaire in the form of a survey that relies on the Likert scale and multiple-choice, was used to provide the groundwork for the research.

In the second stage, the primary data collection that was carried out by the researcher was for descriptive purposes, which was be used to provide information that could be useful in drawing

conclusions. The used descriptive-correlation research design is relevant to achieve the research objectives since it will help to investigate the relationships among variables. These variables are the independent, dependent, and moderating variables as mentioned earlier. Furthermore, allowed for testing the set hypothesis. Moreover, helped describe the characteristics of the target population. Furthermore, data could be analyzed mathematically and there is a high probability for greater objectivity and less research interference. The researcher used a single cross-sectional design, since information was collected once only, through a structured survey that uses a Likert scale and multiple-choice options. Therefore, any change in the level of awareness or perception of environmental sustainability cannot be detected.

## 11.Target Population

The target population of the study is citizens of Cairo and Giza since they are regarded as the governorates that contribute the highest amount of solid waste in the Arab Republic of Egypt, in addition to the advantage of high density that allowed approaching a large number of respondents.

Both genders, age groups from 10 years old and above, all educational levels, and all income levels are regarded as the target population.

The researcher targeted mall shoppers in Cairo and Giza governorates, the choice of malls as a target area is based on the advantages of high foot traffic that will allow easy access to a large number of respondents in a relatively safe place compared to streets.

## 12.Sample size and Procedures

The sample size that was approached by the structured survey, in the second stage of data collection, was 400 respondents (398 complete valid responses), given that the target population is 10,000,000 while the significance level is 95% and the error is 5%.

The respondents will be divided between Cairo and Giza governorates where the share of Cairo is around 52% of the target population, while the share of Giza is around 48%. The researcher has decided on these percentages due to the ratio of population found in each governorate, since Cairo's population is around 9,788,739 while Giza is 8,915,164 according to the Central Agency for Public Mobilization and Statistics year 2019.

Only 23 % of the malls found in Cairo will be targeted; 5 malls out of 21 malls will be targeted, and 47 % of malls found in Giza will be targeted; 9 out of 19 malls are regarded as a target for the Giza governorate. The reasons behind the choice of malls are mall size, foot traffic, and population diversity.

In the first data collection stage, the exploratory stage the first sample that was used in the qualitative data collection in the form of interviews, is a non-probability, purposive sample, since certain figures were selected. While the second sample that was used in the quantitative structured survey is probability-stratified since the respondents were targeted around the kiosks that purchase recyclables in Masr El Gedida.

While the second data collection stage that is done for descriptive purposes, the sample that will be approached with the structured quantitative survey is a probability sample.

A stratified sample was employed since the target population shall be divided into mall shoppers. Pre-determined malls were targeted based on the previously mentioned factors, and the respondents in each mall were approached in a random manner. Probability sampling aids in making sure that every

element in the population gets an equal chance of being chosen as a result it was applied in order to draw the sample.

The researcher relied on the Central Agency for Public Mobilization and Statistics, year 2019 to determine the population found in both Cairo and Giza governorates and their ratios to one another. As well as the population of, and the ratio of males to females found in Cairo and Giza governorates, moreover determine the population available in each age group and their ratios to one another in both previously motioned governorates.

After determining the population found in each stratum and their ratios to one another, the researcher drew the sample accordingly, in order to make sure that the sample drawn was representative to the target population.

The researcher placed an elaboration with exact number of the population available in each stratum in chapter five. As a result, the researcher was able to target the correct number of respondents according to their ratios to one another. As a result, the sample is regarded as a representative sample of Cairo and Giza governorates, but non-representative of Egypt, since not all governorates would be approached.

## 13.Findings:

## 12.1 Introduction:

In order to determine whether Awareness of Environmental Sustainability affects Recycling behavior and in order to test whether consumer characteristics as Demographic and Psychographic characteristics can show an effect on the relationship between "Awareness of Environmental Sustainability and Recycling behavior", the researcher carried out different tests.

The researcher used descriptive research in order to describe the target population in terms of demographic characteristics. Where demographic characteristics of the target population are as follows in the upcoming table (3):

- 398 valid responses.

## 12.2 Research Population Demographic Characteristics:

Table (3) Research Population Demographic Characteristics

| Gender | | | | |
|---|---|---|---|---|
| Males | | Females | | |
| 210 | | 188 | | |
| Age | | | | |
| 10-19 | 20-29 | 30-39 | 40-49 | 50 – above |
| 101 | 90 | 75 | 56 | 76 |
| Monthly Income (Egyptian Pound. EGP) | | | | |

| less than 1999 | 2000 – 5999 | 6000-9999 | 10,000 – 15,999 | 16,000 – 20,999 | 21,000 - more |
|---|---|---|---|---|---|
| 93 | 120 | 51 | 59 | 31 | 44 |

Table (3) Research Population Demographic Characteristics CONT.

| Education | | | | |
|---|---|---|---|---|
| Primary | Preparatory | Secondary | University | Post-graduate Studies |
| 5 | 27 | 51 | 202 | 113 |
| Geographic Location | | | | |
| Cairo | | | Giza | |
| 203 | | | 195 | |

Source: Developed by Researcher

The researcher describes the research variables as:

1. Independent variables : Awareness of Environmental Sustainability.

2. Dependent variable    : Recycling Behavior.

3. Moderating variables  : Demographic Characteristics
                         : Psychographic Characteristics.

## 12.3 Mean:

The researcher carried out central tendency or mean test, in order to test the tendency of agreement or disagreement of the research variables. According to the below table (4) table mean value for the variable "Awareness" is 4.2465; meaning that it is greater than 3 as a result the respondents tend to be aware of environmental sustainability, in other words then agree with the variables that reflects their awareness towards environmental sustainability.

On the other hand, the mean value of "Recycling" variable is 1.7513, which is less than 3; meaning that respondents are more likely not to participate in recycling behavior. While the mean value of "Psychographics" variable is 4.3357 meaning that respondents tend to agree on certain psychographic variables mentioned in the survey related to personality, green lifestyles and orientation values.

The outcomes show that the target population tends to be aware of the importance of environmental sustainability. As well as tend to agree or possess certain psychographic characteristics as certain

personality traits (locus of Control, proactive personality), adoption of a green lifestyle, and internal and external oriented values.

Table (4) Mean Value for Research Variables

|  | N | Mean | Standard Deviation | Standard Error Mean |
|---|---|---|---|---|
| **Awareness** | 398 | 4.2465 | 0.59048 | 0.02960 |
| **Recycling** | 398 | 1.753 | 0.93076 | 0.04666 |
| **Psychographics** | 398 | 4.3357 | 0.49357 | 0.02474 |

Source: Developed by Researcher

## 12.4 Testing Hypothesis:

The researcher also undertook regression analysis; in order to test the research hypothesis. First the researcher wanted to determine the coefficient correlation and coefficient of determination to understand the strength of the linear relationship and determine the degree to which the model explains the observed variation consecutively.

Furthermore, the researcher carried out ANOVA test in order to determine the P-value of the F-test that will help determine whether the independent variable in hypothesis 1 and whether the moderating variables from hypothesis 2 to 3 have a significant difference on the relationships between Awareness of Environmental Sustainability and Recycling Behavior. This test will give the researcher a sign of whether to proceed with further tests or not.

The last test carried out by the researcher, was T-tests in order to determine the P-value; which was the final indicator on whether to accept or reject the null hypothesis depending on whether the independent variables in hypothesis 1 has a significant relationship or not with the dependent variable. Moreover, determine whether the moderating variables in hypothesis 2 to 3 have a significant difference on the previously mentioned relationship between Awareness of Environmental Sustainability and Recycling Behavior or not.

Table (5) Hypothesis (1) Coefficient of Determination

| R | $R^2$ | Adjusted $R^2$ | Std. Error of The estimate |
|---|---|---|---|
| 0.174 | 0.030 | 0.028 | 0.91764 |

a.   Predictors: (constant), Awareness

Source: Developed by Researcher

Table (6) Hypothesis (1) ANOVA

| | Sum of Squares | df | Mean Square | f | Sig. |
|---|---|---|---|---|---|
| **Regression** | 10.471 | 1 | 10.471 | 12.435 | 0.000 |
| **Residual** | 333.459 | 396 | 0.842 | | |
| **Total** | 343.930 | 397 | | | |

a. Dependent variable: Recycling

b. Predictors: (Constant) Awareness

Source: Developed by Researcher

Table (7) Hypothesis (1) Coefficients

| | Unstandardized Coefficients B | Std. Error | Standardized Coefficient Beta | t | Sig. |
|---|---|---|---|---|---|
| **Constant** | 0.583 | 0.334 | | 1.744 | 0.082 |
| **Awareness** | 0.275 | 0.078 | 0.174 | 3.526 | 0.000 |

a. Dependent variable: Recycling

Source: Developed by Researcher

In hypothesis 1, Awareness of Environmental Sustainability as an independent variable has a positive yet a weak impact on the tendency to participate in Recycling Behavior, since correlation coefficient (R) is 17.4 % and coefficient of determination ($R^2$) is 3 % according to table (5). The P-value of the F-test is 0.000 meaning that the overall model is significant, according to table (6). Referring to table (7) the null hypothesis is rejected since Awareness of Environmental Sustainability and Recycling Behavior has a significant positive relationship, because P-value of F-test is 0.000. In other words, Awareness of Environmental Sustainability has a noticeable impact on the dependent variable Recycling Behavior.

After testing hypothesis 2, the researcher figured out that Age as a moderating variable has a positive yet a weak impact on the relationship between Awareness of Environmental Sustainability and Recycling Behavior. since the correlation coefficient (R) is 27.3 % and the coefficient of determination ($R^2$) is 7.4 %. On the other hand, the sub null hypothesis H3.1 is rejected since Age has

a noticeable effect or a significant difference on the relationship because the P-value of the t-test is 0.082. While Gender (correlation coefficient (R) is 22 % and coefficient of determination ($R^2$) is 5 %) , Education ( correlation coefficient (R) is 24.9 % and coefficient of determination ($R^2$) is 6.2 % ), and Income (correlation coefficient (R) is 26.1% and coefficient of determination ($R^2$) is 6.8 % ) as moderating variables have a positive weak impact on the relationship between Awareness of Environmental Sustainability and Recycling Behavior. But in sub hypotheses H3.2, H3.3 and H3.4 the null hypotheses are accepted since they have an insignificant difference or do not have a noticeable effect on the relationship. Their P-value of the t-test is 0.326, 0.194 and 0.177 consecutively

Testing hypothesis 3 shows that the three Psychographic moderating variables ; Personality (correlation coefficient (R)) is 3.1 % and coefficient of determination ($R^2$) is 2.3 % ), Adoption of Green Life Style (correlation coefficient (R)) is 33% and coefficient of determination ($R^2$) is 11 % ) and Values (correlation coefficient (R)) is 21 % and coefficient of determination ($R^2$) is 4.6 % ), have a weak impact on the relationship between Awareness of Environmental Sustainability and Recycling Behavior. In addition, the three moderating variables have insignificant differences on the relationship between Awareness of Environmental Sustainability and Recycling Behavior or do not have a noticeable impact on the relationship. This is due to their P-value of the t-test, which is 0.781, 0.105 and 0.332 consecutively.

## 14. Conclusion:

In order to explore the reasons behind the poor participation in environmental sustainability, and recycling behavior in specific. The researcher carried out three exploratory pieces of research. The first one targeted school students since, they are the future of Egypt. It was concluded from this exploratory research that students had very low participation in recycling behavior although they had recycling bins just in front of them in the school's playground. This shows the availability of the tool, which is the labeled recycling bins yet very low participation took place. Moreover, the researcher carried out another research at Shooting Club, this time was for exploring how other categories that include different age, education and income level react towards participation in recycling behavior.

The researcher learned that also Shooting Club members' participation in recycling was also very low, although the labeled recycling bins were available in many spots in the club.

On the other hand, participation in selling recyclable in kiosks purchasing solid waste in Masr El Gedida existed. Although 70 % of the target population around the kiosks knows that they exist yet 50 % only participated and sold their recyclables. Therefore, participation is regarded as below average. In addition, 77 % of those who participated come from low income and low education levels and they sell their recyclables primarily for the financial return followed by their care for environment.

As a result, the researcher wanted to determine whether a lack of awareness of the importance of environmental sustainability is the reason behind low participation or not.

But the researcher found out that the target population tend to agree on the importance of environmental sustainability. Also, the researcher tested the possibility of entering moderating factors as demographic and psychographic factors and how they can affect the relationship between Awareness of Environmental Sustainability and recycling Behavior.

As a result, the researcher found out that Awareness of Environmental Sustainability affected the tendency to participate in Recycling Behavior but the impact is weak. Furthermore, the moderating factors have a weak impact on the relationship. Therefore, there are other factors that could affect the tendency to participate in Recycling Behavior and therefore sustain the environment. These factors

could include financial benefits like the financial benefits that were present as a reward for the target population selling the recyclables at the kiosks in Masr El Gedida.

## 15.Recommendations and Practical Contribution:

The research is a practical addition to both exploring the reasons behind participation in recycling behavior and the weight of their impact. Furthermore, it is regarded as an addition to marketing as it has uncovered that spending only on raising awareness of the importance of environmental sustainability alone is not sufficient to attain the desired goal. This is due to the reason that the return on investment in awareness campaigns won't be extremely rewarding. Moreover, after testing the strength of the moderating demographic and Psychographic variables it was found that most of the variables have a positive yet weak impact on the strength of the relationship; meaning that putting effort to target a certain demographic or psychographic factor won't be rewarding as well. This finding is totally different from outcomes found in published research applied in counties other than Egypt. As a result, targeting certain demographic or psychographic variables need not take place nor targeting using different techniques for increasing awareness of the importance of environmental sustainability and how it affects recycling behavior.

As a result, the researcher recommends based on the findings in exploratory research and descriptive research. That the provision of motivating tools could increase the tendency to participate in recycling behavior as happened at the recycling kiosks in Cairo. The motivation could be in the form of financial motivation; such as the provision of direct cash or points on the citizens' ration cards that will allow them to purchase what they need from the governmental outlets that sell essential commodities.

As a result, further exploration research and testing other factors that might affect the tendency to participate in recycling behavior is crucial. These factors may include providing environmental education in schools and engaging the young generations in recycling activities so that it would become part of their daily routine. In addition, the government should act as a role model in participating in environmental sustainability practices and communicate its actions to the public. At the end of the day, the most important objective is to live in a clean sustained environment. This objective could take place not only through practicing in recycling behavior but also through reducing consumption, reusing, or recovering products.

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