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قياس العلاقة بين ادراك المستهلكين لتنمية البيئة المستدامة و سلوك اعادة التدوير مع وجود خصائصهم كمتغير معدل

Measuring Consumers' Perception of Environmental Sustainability on Recycling Behavior with the Moderating Role of their Characteristics

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المستخلص:

البحث المقدم يتناول معرفة امكانية تاثير الادراك بتنمية البيئة المستدامة على سلوك صديق للبيئة و هو سلوك اعادة التدوير بالاضافة الى دراسة تاثير خصائص المستهلك الديمغرافية و النفسية على العلاقة بين تاثير الوعى و الادراك لتنمية البيئة المستدامة على سلوك اعادة التدوير.

وذلك لأهمية تحقيق تنمية البيئة المستدامة لأن الفشل في الوصل لها قد يسبب مشاكل عديدة في مصر و العالم. هذه المشاكل تكون في صورة مشاكل تحدث في البيئة التي قد تصل الي الجفاف ،الزلازل ، البراكين و تكس المواد الصلبة المستخدمة و التي قد يصعب علي الأرض تحملها. بالإضافة الي ذلك قد تحرم الأجيال القادمة من حق الاستفادة بالموارد الطبيعية و ذلك لندرتها.

ايضا تعتبر تنمية البيئة المستدامة هي عبارة عن حلقة في تنفيذ الاستدامة بشكل عام. وذلك لأن تحقيق الاستدامة لن تتم الا بالوصول الي الاستدامة الاقتصادية و الاجتماعية بالإضافة الي تنمية البيئة المستدامة و لذلك لا يوجد استغناء عن تنمية البيئة المستدامة.

دراسة علاقة الإدراك بتنمية البيئة المستدامة على سلوك اعادة التدوير سوف يساهم في معرفة المواطن عن قرب و إمكانية تعديل السلوك عن طريق الوعى بتنمية البيئة المستدامة بالإضافة إلى معرفة خصائص المواطن و ذلك للوصول له بطريقة أفضل.

بحث مدى تأثير خصائص المستهلك الديمغرافية و النفسية كمتغير معدل على العلاقة بين الوعى باهمية تنمية البيئة المستدامة و سلوك اعادة التدوير إضافة لمعرفة تفاصيل دقيقة عن المستهلك و مدي تغير العلاقة بتغير الخصائص.

وفقاً لنتائج البحث، أظهرت النتائج ان تأثير الإدراك بتنمية البيئة المستدامة على سلوك اعادة التدوير علاقة ايجابية. بمعنى وجد الباحث ان العلاقة ايجابية اي يوجد تأثير على السلوك و لكن تأثير ضعيف.

اخيراً توصل الباحث أن تأثير بعض المتغيرات المعدلة الديمغرافية و النفسية تأثر على قوة العلاقة بين الادراك بتنمية البيئة المستدامة و سلوك اعادة التدوير ولكن التأثير ضعيف.

الكلمات المفتاحية:

تنمية البيئة المستدامة، الإدراك، خصائص المستهلك، الخصائص الديمغرافية، الخصائص النفسية.

Abstract:

The globe is facing a tremendous challenge which is the ability to attain sustainability in general and environmental sustainability in specific. This pressing issue is evident especially due to the projected population exceeding nine billion and per capita buying power expected to exceed double by 2050. Furthermore, 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.

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 massive 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.

As a result, waste management in Egypt is crucial, which could be achieved through reducing, reusing, recycling, and recovery of solid waste. Waste management can't be achieved unless people are involved in the process. This involvement can take place in the form of participating in pro-environmental behavior such as recycling. Hence it is important to determine their perception of environmental sustainability, this will in return, induce a change in their behavior toward the environment.

After testing the impact of the perception of environmental sustainability as an independent variable on recycling behavior as a dependent variable. The researcher concluded that the target population who tend to perceive the benefits of sustaining the environment and the risks associated if they acted otherwise, do participate in recycling behavior yet the participation is weak.

Last, the researcher reached the conclusion that certain demographic and psychographic moderating factors do affect the strength of the relationship, yet the impact is insignificant.

Keywords:

Environmental sustainability, Perception, Consumer Characteristics, Demographic characteristics, Psychographic characteristics, Recycling.

1. Introduction:

Now we live in an era that some call the “Plastic Age” as the globe is facing a huge plastic problem, due to the high volume of plastic products that are around 350 million tons per year according to Plastic Europe, 2018. Plastic disposal is causing terrestrial and aquatic ecosystem pollution. Technical approaches are not enough to deal with the plastic problem, to develop effective solutions insights on perceptions and other factors are pre-requisite, to applying efficient strategies such as recycling. According to research on different papers belonging to different social sciences as marketing, consumer studies, psychology, and educational science in different countries. It has been deduced that a large number of people can perceive the risk of using plastic on the environment and their health. (Heidbreder, et al. 2019)

2. Importance of Environmental Sustainability:

The term sustainability is not regarded as a novel term or concept, yet the application of the term requires attention globally. (Enders, and Remig, 2015)

The definition of the term sustainability is considered ambiguous. It is also perceived that there is no single definition of the term sustainability. Yet others have argued that it depends on how it's used. (Mensah, et al. 2012).

The term sustainability cannot be viewed as a topic related to a single discipline since it is argued that it draws and is related to several disciplines. These disciplines are social scientific and humanistic disciplines. It draws from several sciences like law, political science, sociology, economics, theology, psychology, and physiology. It is also evident that its application has an impact on societal change, justice, and governance. (Enders, and Remig, 2015)

Con Von Carlowitz first developed the concept of sustainability in the seventeenth century in Europe; he was the director of Saxony's Supreme office of mines in Freiberg, and published his book "Economical Silvi Culture; or instructions on the raising of wild trees, that is related to the concept of sustainability. (Grober, 2012).

Carlowitz didn't define the mentioned concept in his book, yet he presented the idea that the natural resources are depleting and humans 'shouldn't act against nature. Instead, humans should try to properly manage and preserve natural resources. (Grober, 2012).

In the upcoming figure (1), sustainability refers to the presence of three interrelated aspects or components. Environmental sustainability; involves the preservation of natural resources, which is accomplished by avoiding the over-use of renewable and non-renewable. Moreover, maintaining the bio-diversity, a stable atmosphere, and other ecosystem functions. The other component is social sustainability and is accomplished only when an equal distribution of social services takes place as education, political accountability and participation, medical care, and gender equality. While economic sustainability refers to managing government and external debt, through an adequate production of goods and services and avoiding any imbalance that could harm the primary and secondary industries. (Madyana, and Yunita, 2015)

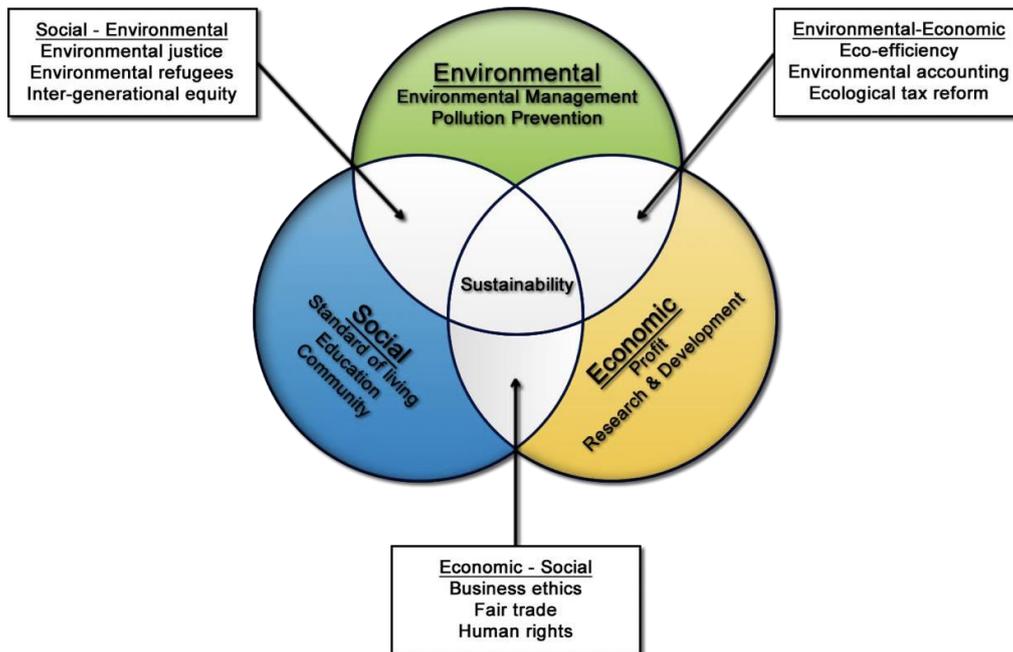


Figure (1) The Three Spheres of Sustainability

Source: Madyana, and Yunita, 2015

The World Bank first referred to environmental sustainability in 1992, as being “environmentally responsible”, then the concept of environmental sustainability was developed. (Molden, et al., 2012)

Environmental sustainability is not only troubled with proper use of raw materials to fulfill current needs and avoid depletion, but also with the sink that shouldn't exceed a certain acceptable level to avoid any harm to humankind. (Molden, et al., 2012)

Sustainable development in general and environmental sustainability in specific has entered a new era of data-driven environmental decision making, this is due to its significance and global threat due to overlooking environmental sustainability. Consequently, empirical approaches to protecting and sustaining the environment are constantly being developed to aid in determining problems, tracking trends, identifying best practices to avoid failure to sustain the environment and optimizing gains for investment in environmental management. (Wendling, et al., 2018)

Environmental Performance Index (EPI) is one of these approaches that act as a performance indicator covering ecosystem vitality and environmental health. For that reason, it is regarded as a reference for the state of sustainability around the globe. It demonstrates how far a country is from attaining sustainability therefore, aids in decision making globally. (Wendling, et al., 2018)

According to EPI in 2018, the Middle East and North African (MENA) countries are dispersed through the middle of 2018 global ranking. Egypt has the rank of 66 out of 180 countries in its ability to sustain the environment. Egypt's score is 61.21, where zero is the worst score and 100 is referred to as the best score. Egypt's score reflects the necessity to dedicate a gigantic effort to aid in environmental sustainability in Egypt. Putting effort to enhance environmental sustainability in Egypt will in return improve public health and ecosystem vitality that will certainly affect other aspects of sustainability and Egypt's overall performance. (Wendling, et al., 2018)

In order to sustain the environment, the globe should engage in solid waste management, since the degradation that occurs to the environment occurs due to improper resource consumption and waste management. (Ghazvinei, et al., 2017)

Solid waste management is becoming a gigantic problem over the past few decades, due to economic growth and population size increase. Solid waste has affected not only the environment but also the quality of life and public health. (Al Salem, et al., 2018)

Municipal solid waste (MSW) is referred to as the undesired materials, discarded and used products, which are the outcome of human activity within households and localities. The majority of wastes generated are from the household and commercial sectors. Solid waste includes different kinds of elements such as compostable organics, hazardous waste, used batteries, recyclables, and finally household solid waste. (Al Salem, et al., 2018)

It has been noticed that solid waste is increasing in areas such as the Middle East and North Africa (MENA) region, due to the occurring economic growth and population increase. Therefore, the authorities must develop sustainable practices, strategies, and solid waste management projects, especially since solid waste management can diversify national income and reduce dependency on the non-renewable resources in the (MENA) region. (Al Salem, et al., 2018)

To undertake proper waste management, the authorities need to encourage, “reduction, reuse, recycle and recovery” of solid waste through promotion programs. (Al Salem, et al., 2018)

3. Perception of Environmental Sustainability:

In order to learn something about the reality that we encounter, it is necessary to understand the way this reality is captured. At that time, it is possible to understand how people perceive different stimuli around them. We engage in perception to see reality and for many, it is actually reality. "To look and see is not the same and seeing contains itself a belief that reality is what I am seeing." But unfortunately, it is not given proper attention in research. (Demuth, 2013)

Perception of environmental sustainability; refers to the knowledge or feeling about the environment, and the act of understanding the environment as a result of visual, auditory, and experience with the environment as well as information disclosure. (Du, 2018)

Risk perception is a core attribute that influences human behavior toward risk events. Environmental risk perception refers to people's personal intuitive judgment regarding environmental issues. That constitutes certain characteristics; such as the probability of occurrence, degree of injury, and uncertainty. Furthermore, individual responses due to perceived risk and their responses depend on the level of aggressiveness of the risk. These responses vary; could be envisioned, contention concession, or problem solving. In other words, perceived environmental risk could lead to different actions first radical environmental behavior that can take the form of protests, second environmental concern behavior that may take place as discussing environmental issues with friends and relative last environmental protection behavior. (Gaos, S, et al., 2019)

While perceived environmental value has the tendency to affect the path from perceived environmental risk to behavioral responses, since it shifts attention from risk to materialism; in other words, perceiving the added value of behaving in a pro-environmental manner. These values include material and safety needs as well as other post-materialism such as belongingness, self-expression,

and quality of life that could also lead to the enhancement of perceived environmental risks. (Gaos, S, et al., 2019)

Research has proven that there is a perception-behavior link. In other words, 'perception is linked to behavior and the activation of perceptual representation evokes the corresponding action'. This means that the stimulus that we are exposed to will affect our perception, which in return can have an impact on our behavior. Moreover, it was also noted that "self-focused attention" or increased attention to oneself, leads to activating the tendency to act in a particular manner. Meaning that if a person perceives that his behavior has a desirable significant impact, he is more likely to take part in such behavior. (Dijksterhuis, and Bargh, 2001)

Although environmental sustainability campaigns lead to change in behavior, it doesn't necessarily translate into increased adoption of recycling or reuse of materials. This is due to the public's inability to perceive the link between proper waste disposal behavior and its' consequences as climate change and local flooding. In other words, the public fails to perceive the risks associated with their failure to engage in pro-environment behavior as recycling. (MORI, 2002)

Perceived value is one of the attributes that affect behavior. Also, it is referred to as a person's belief concerning the effectiveness of a particular behavior in reducing the probability of the occurrence of negative outcomes. Furthermore, it is defined as the valuation of the benefits associated due to obtaining a particular product or service or engaging in a particular relationship. (Ramayah, and Rahbar, 2013)

Therefore, it is declared that the perceived benefits and costs of joining a pro-environment behavior or supporting environmental sustainability will contribute to engaging in a pro-environment behavior such as recycling. Accordingly, perception about the environment is likely to affect behavior towards the environment. (Ramayah, and Rahbar, 2013)

It has also been proved by research that there is a positive relationship between the perceived consequences of behavior towards the environment and participating in a pro-environment behavior. (Kollmuss, and Agyeman, 2002)

A weak perception of sustainability takes place when there is a perception that the welfare is not dependent on a certain form of capital; in the sense that natural capital could be substituted with manufactured capital in case, in case natural capital is depleted. On the other hand, a strong perception of sustainability happens when there is a perception that the welfare could be affected by the drainage of natural resources and that the substitution of natural capital by manufactured capital is extremely limited and that the natural capital has its unique contribution to the welfare of the population. (Ekins, 2011)

Measuring perception of environmental sustainability is a complicated task. Yet there is a technique that could be used to determine the perceived risks and threats to sustainability. This can take place through qualitative and semi- qualitative techniques. One way to measure perception is through (IRT) Item response theory; "set of models that represent the probability that an individual will correctly answer an item, the item level of latent traits and characteristics". Understating perception of sustainability aids the local governance to estimate how a population perceives sustainability, in developing programs that could increase the perception of benefits and costs of environmental

sustainability of the target population (Vincenzi, et al., 2018)

In order to limit the increase to below 2 degrees centigrade global temperature as per Paris agreement according to the United Nations Framework Convention on Climate Change (UNFCCC) report in 2015. The reduction of the greenhouse effect is a prerequisite, consequently, several pieces of research took place to determine whether perceived environmental benefits and risks can move target citizens to participate in pro-environmental behavior. It was found out that perception is a foundation for attitudes: which is the tendency to behave in a particular manner. Besides, if people have favorable perceptions and believe to have desirable consequences at that time, they will have a positive evaluation of a behavior. While if people have an unfavorable perception, and believe that they will receive an undesirable outcome, at that time, they will form a negative attitude towards a behavior. As per this research, it was deduced that perceived environmental benefits and perceived environmental risks have an impact on participation in pro-environmental behavior. In other words, people are motivated to participate in pro-environmental behavior as the purchase of electronic vehicles in China, when they are able to perceive the benefits it causes to protect the environment and avoid the risks of behaving otherwise. (Zang, and Bai, and Shang, 2018)

China has recently made a circular reform that included sustainability education within liberal studies as one of the core facets of globalization since it can affect the upcoming generations' perception and knowledge towards sustaining the environment. A researcher was interested in determining whether this reform could increase the pro-environmental behavior of students in Hong Kong or the result could be neutral. Therefore, quantitative and qualitative research was carried out on students in Hong Kong who study sustainability informal education. It was found that studying sustainability has a direct impact on the perception of environmental sustainability. The perception of environmental sustainability was affected by sustainability education since it affected the students' "eschatological imagination"; which refers to future orientation and action-orientation towards sustainability. (Savelyeva, and Doglas, 2017)

In other words, sustainability education has an impact on pro-environmental behavior as donation or volunteer to environmental groups, or reduce the usage of water, and electricity, or getting involved in recycling. Yet it has a greater impact on the student's perception of their engagement in environmental sustainability since it affects their set of self-realization and self-construction of common expectations related to their future. As a result, act in a pro-environmental manner towards their environment, to live a better life. (Savelyeva, and Doglas, 2017)

Research was conducted in the United States of America to determine people's perception of environmentally sustainable behavior. It was found that the laypeople's perception of the environment and the related behavior differs from experts' perceptions. It was found that laypeople's perception of environmental sustainable or pro-environmental behavior is not clear. In other words, they do not have a clear understanding of the impact of their behavior on the environment. I was found out that laypeople would participate in a pro-environment behavior for several perceived factors. If they perceive a financial saving benefit due to sustaining the environment as turning off lights while not in use, this behavior has a less negative impact on the environment compared to installing a low flow showerhead. Also, the perceived benefit as admiration and respect from friends and families affect their perception of certain pro-environment behavior over others. Meaning that there is a perceived risk of behaving otherwise, which could lead to social rejection. The last factor that affects the perceived importance of sustaining the environment through participating in certain pro-environment behavior over others is the perceived health and safety risk of behaving otherwise. (Barnes, and Jade,

2018)

Lay people participate in certain pro-environment behavior that they perceive as affecting the environment the most a result affects their health and safety as having a home garden, planting a tree, and maintaining correct car tire pressure. Compared to other pro-environment behavior that could have a greater impact on the environment as purchasing second-hand clothing. As a result, a blind spot is obviously present. The public is not able to perceive the weight of different associated risks of certain behavior on the environment. Therefore, they are doing certain pro-environment behavior that they perceive the associated risk of not doing. Consequently, to affect lay people's perception of environmentally sustainable behavior and the weight of risk associated with their behavior, targeted intervention is a must. Targeted interventions could take place in the form of educating the public regarding the weight of risks and benefits associated with particular behavior on the environment welfare. (Barnes, and Jade, 2018)

Application in some Countries:

Residents' perception of the impact of their pro-environment behavior as recycling has a crucial role in determining their behavior and attitude. As a result, several pieces of research tackle this area, by understanding the level of importance they give to recycling as well as their beliefs and intentions. In areas such as Scott, Ontario, Canada, and Laramie, it was found that around 97% of respondents perceive the importance of recycling and the risks associated with acting otherwise as a pro-environment behavior. Yet it was mentioned by respondents that non-recyclers lack knowledge regarding the consequences of non-recycling as well as lack of participation in recycling planning and the absence of economic incentives adds to the problem of not participating in recycling. (Bom, U and Belbase, S and Bibvriven, R. 2017)

Bangladesh is one of the countries that is facing extremely unhealthy conditions due to improper solid waste management. As a result, the Department of Environment in Bangladesh undertook a 3Rs project; reduce, reuse, and recycle, to make people perceive the risks of non-recycling and help them to reduce, reuse, and recycle. Three waste bins were distributed among 22,400 families in Chittagong city. The response of families differed in different areas, some were positive and others were negative towards the separation of waste. The introduction of the recycling waste bins was not enough to allow people in Bangladesh to perceive the risks of non-recycling on the environment. As a result, according to the research, more cooperation is required with the Department of Environment and Local Communities to communicate the benefits of pro-environment behavior as recycling to change people's perception and guarantee participation. (Ivy, N and Uddin, M and Hossain, M. 2013)

A study was conducted in Brazil to assess the population's environmental sustainability perception. It was found out that the target populations who "Agree a little" with being bothered by garbage thrown on streets have "low sustainability perception". Meaning that this target population required environmental knowledge to increase their perception of environmental risks. Also, the target population that strongly agreed that they were bothered by garbage, but didn't include recycled materials in their daily life has "Median sustainability perception". This target also required environmental knowledge to increase their perception of environmental risks. The last group of the target population has a "strong sustainability perception" because they are extremely bothered by garbage and, they include recycled materials in their daily life, moreover they strongly agree that they

should provide guidance to their friends and family concerning environmental issues. (Vincenzi, et al., 2018)

A study was conducted at a university in Malaysia, targeting first-year engineering students, in order to determine their perception of sustainable development. The study concluded that most students are clueless about the concept of sustainable development. Yet the other minority is aware of the concepts, perceives its importance, and believes that they should take care of nature. These students that are able to perceive the benefits and costs of environmental sustainability mentioned that they are receptive to activities such as recycling, green technology, and earth hour. (Sheikh, et al., 2012)

Macau has recently been facing challenges in environmental sustainability. Macau is facing air, water, and noise pollution in addition to the solid waste management problem. Knowing that 75.34% of the respondents indicated their perception that solid waste is a reason for their inability to sustain the environment and control the above-mentioned factors that affect the environment negatively. Although 75.34 % of the respondents perceive the environmental problems that Macau is facing and the risks associated, yet half of them admitted not participating in recycling and other pro-environment behavior and admitted their failure to participate in sustaining the environment. As per the research, it was noted that education and publicity concerning the issue of interest are vital to shaping the residents' attitude towards the environment, as a result, behave in an environmentally responsible manner. (Song, et al. 2019)

Pakistan especially Lahore city faces a solid waste management problem. Pakistan has a population of over 160 million, although Pakistan has practices of solid waste collection, yet only 60 % of the generated waste is collected, and 90 % of this waste is disposed of in open spots. Resulting in waste alongside the streets and roads. There is a correlation between education and the perception of the risk of solid waste according to the research. Since 42.7 % of the well-educated citizens in Lahore perceive the risk of not participating in recycling as a result they don't dump their waste and they participate in recycling. As a result, education on solid waste management is recommended at the school level. Where such education should start at a very young age through the use of paintings or cartoons to understand the issue effectively. (Haider, et al., 2015)

The perception of the risks of not participating in pro-environmental behavior is crucial to increasing participation. The Americans can perceive these risks as a result the majority participating in recycling. Yet the Americans' behavior in four domains as household energy use, transportation choices, food sources, and consumer products are regarded as the least sustainable. When asked about these particular domains, the Americans tried to find out reasons. Unfortunately, all their answers, showed an individualized culture of Americans are not trying to help in climate change and other environmental problems, due to the culture that encourages them to distance themselves from collective actions. As a result, perception of the risk of not sustaining the environment is crucial to motivate participation, yet other barriers as culture could stay in the way of achieving such an objective. (Markle, 2014)

4. Consumer Characteristics and Perception of Environmental Sustainability

Research conducted in Mexico on young people aged 11-16 shows that their perception of environmental risk is high, and this deduction was based on the probability of their exposure to deprived neighborhoods and vulnerability that increased their perception of environmental risks as

waste, air pollution, and hazardous items. Yet this age group lack perception of invisible risks as natural fluoridation of the groundwater as a result risk communication perception was recommended for this age group to perceive not only the obvious risks but also the invisible ones. (Borner, et al., 2017)

The research took place in Merida, Mexico in order to determine the perception of risk on the environment due to contaminated water as a result of the use of detergents, to the extent that the sewage treatment systems may fail to solve this problem. This treated water could be used to irrigate the soil, which is very harmful to the soil if it contains surfactants. As well as the treated water or the karstic aquifers are sources of drinking water for about 25 % of the world population. Unfortunately, karstic aquifers are subjected to contamination. (Martinez, et al., 2013)

Respondents from a different ages, gender, income, education, and occupation groups were asked. And it was found out that females scored high in risk perception; meaning that females are able to perceive the risk on the environment more than males. It was also mentioned that young people with higher education scored high in risk perception, yet they failed to recognize specific issues such as the disposal of sludge. On the other hand, income attribute, it was mentioned that poor communities tend to perceive the risk on the environment due to their close contact with risks associated, which doesn't happen in richer communities. (Martinez, et al., 2013)

Previous research showed a relationship between the perception of environmental risk and the tendency to adopt a green lifestyle or assume responsibility towards the environment. The research was done with Lithuanian citizens, using the face-to-face interview. It was concluded that people who are guided by normative goals are more likely to perceive the problems that can occur to the environment in case they act in an unfriendly manner. (Liobikiene and Juknys, 2016)

Furthermore, as a result of the perception, they tend to adopt a green lifestyle as a psychographic factor; through switching off lights when unnecessary, using energy-saving bulbs, sort waste, washcloths in the washing machine only when full, bring their bag when going shopping and turn off the tap while brushing their teeth. (Liobikiene and Juknys, 2016)

According to research, a recent study proved a relationship between a sense of belonging or, in other words living a collectivistic culture and the perception of benefits and risks of environmental sustainability or in other words, ecological print. Where citizens who believe in collectivism or a sense of belonging values affect their anthropogenic perception. (Komatsu, H and Rappleye, and Silova, 2019)

Citizens that are driven by a sense of belonging perceive the benefits that they can produce as well as the risks that they can cause to the environment since they believe that each one has an ecological footprint meaning that they perceive that their behavior towards the environment will have an impact on the environment. (Komatsu, H and Rappleye, and Silova, 2019)

On the contrary, individuals who lack a sense of belonging and believe in individualism fail to perceive their ecological footprint. Meaning that they fail to perceive the benefits and risks of their actions towards sustaining the environment. (Komatsu, Rappleye, and Silova, 2019)

It has been mentioned in previous research in China and Netherlands that locus of control as an

attribute in psychographic characteristics affects a person's perception of benefits and risk of sustaining the environment. In other words, individuals who have an internal locus of control perceive their power of causing improvement or deterioration to the environment, and they have mentioned individuals with an "internal locus of control" as a result of this perception an influence their behavior takes place. Those individuals tend to behave in a pro-environmental manner; this is the case in China and the Netherlands. (Yang, and Weber, 2019)

While individuals with "external locus of control" fail to perceive the benefits and risks that they can cause to the environment, they are named as individuals with an external locus of control. They perceive that other entities are key actors for environmental conservation. These people tend to accept extra costs imposed by the government to sustain the environment, yet they fail to perceive the positive and negative consequences that can occur to the environment due to their behavior. (Yang, and Weber, 2019)

To conclude personal perceived control or internal locus of control affects people's perception of the benefits and risks of sustaining the environment or perceived environmental impact through their actions towards the environment. (Yang, and Weber, 2019)

5. Consumer Characteristics and Recycling Behavior

Several researchers researched the correlation between demographic characteristics and participation in pro-environment behavior. There are several suggestions made by several researchers, some suggest that there is a positive correlation between age and environmental sensitivity and behavior, on the other hand, others suggest that there is no correlation, while others suggest that there is a negative correlation. (Paco, et al., 2009).

Furthermore, previous research suggested that females are more likely to join pro- environment behavior and that they are more aware and care more for the environment than males. It was also mentioned that females are more likely to engage in the separation of packages for recycling purposes. On the other hand, these results were not always the outcome of all research studying this issue. Some researchers suggested that both males and females participate equally in environmentalist groups and activities related to natural resources conservation. (Paco, et al., 2009)

It was stated that the higher the level of education the more knowledgeable the target market is concerning environmental issues, but higher education levels didn't translate to more participation in pro-environment behavior. (Kollumss, and Agyeman, 2002).

Other researchers argued that there is a positive relationship between the level of education and pro-environment behavior as walking for the environment and reducing car usage, yet it was not confirmed by other studies. (Mainier, et al. 1997) y

On the other hand, some studies noted that there is a positive relationship between the level of education and pro-environment behavior. (Roberts, 1996)

Yet a researcher mentioned that the correlation between the level of education and pro-environment behavior is negative. (Samdahl, and Robertson, 1989)

Income is a demographic variable that has a positive relationship with environmental sensitivity. Some researchers justify this positive relationship due to the ability to bear the extra cost and engage in pro-environment behavior and support green cause as buying green products. (Paco, et al., 2009)

While psychographic characteristics include an attribute as personality, which is regarded as a factor that affects an individual sensitivity towards the environment and engaging in pro-environment practices. (Ince, 2018)

The American Psychology Association defines personality (APA) as the “individual differences in characteristics patterns of thinking, feeling and behaving”. In addition, our social values, memories, and the relationship that we have with other shape our personalities. (APA, 2017)

Locus of control is a personality trait that refers to one’s perception of his ability to bring about change through his behavior. It has been proven by research that individuals who have an internal locus of control; perceive that his behavior can bring about change, therefore are more likely to engage in a pro-environment behavior and act ecologically. (Kollumss, and Agyeman, 2002)

While individuals with an external locus of control; are individuals who perceive that their actions are insignificant, they don't perceive themselves as powerful people and that only powerful people could only bring change. Individuals with an external locus of control are less likely to engage in pro-environment behavior and are less likely to act ecologically since they perceive that their contribution won't make much difference. (Kollumss, and Agyeman, 2002)

Proactive personality is a personality trait that refers to someone who likes to challenge his current status rather than accepting it or adapting to it in a passive way. (Yean, et al., 2013)

It also refers to individuals that are not constrained by situational forces and who cause environmental change. Besides, it was mentioned that proactive personalities are more likely to engage in constructive change and proactive initiatives. (Malloy, 2015)

Another personality variable that has been researched in several studies is alienation; it refers to individuals feeling of isolation from his or her community, culture, or society. It was mentioned in the previous reach that it has an impact on the individual's tendency to participate in pro-environment behavior. (Paco, et al., 2009)

It was mentioned that the more feeling of alienation, the less likely an individual is likely to engage in pro-environment behavior. (Paco, et al., 2009)

Lifestyle is regarded as a psychographic variable that is commonly used as something that needs to be changed if we want to achieve sustainable development. Lifestyle has several definitions, some define lifestyle as how you live your life, while others define it as a sum of health-related factors such as tobacco, alcohol, sugar, drugs, and fat. Others defined lifestyle as to how you move around, what you wear, travel or live, how you furnish, what you watch, and read, your choice of education, and the like. (Jensen, 2007)

Green consumers are regarded as a lifestyle that involves a list of behaviors that are done to promote positive environmental effects. Green consumers are likely to pay more cost to purchase products that

are more environmentally friendly. For example, purchasing organic products and appliances with energy star labels. Additionally, they are more likely to participate in particular pro-environment behavior as turning off electric appliances when unnecessary to save energy and taking short showers in order to save water. (Sachdeva, et al., 2015)

It is also mentioned that green consumers are more likely to get involved in pro-environment behavior as habitual recycling. It is also noted that green consumerism has a modest impact on environmental sustainability, yet it was also mentioned that green consumers could shift their behavior from individuals to a family or community decision-maker or other units of actors. At that time green consumers will have a major impact on sustainable development in the future. (Sachdeva, et al., 2015)

Values are regarded as psychographic characteristics that guide human behavior. Values are defined as conceptions or beliefs that construe something as preferable or desirable. (Thome, 2015)

Although some researchers were able to detect a value-action gap when it comes to pro-environment behavior, other researchers were able to prove that people who gave great importance to internal orientation values are more likely to take part in pro-environment behavior. This pro-environment behavior includes the tendency to purchase ecological food, compared to people giving great importance to external orientation values. Internal orientation values refer to values related to self-respect, self-realization, and happiness, while external orientation values refer to values related to the sense of belonging and being respected by others. (Paco, et al., 2009)

6. Problem Statement:

After the extensive reading in environmental sustainability that is shown in the literature review, it is concluded that sustainability is regarded as a global challenge generally speaking and environmental sustainability is a pressing global issue specifically speaking.

The problem is growing and requires immediate action is this due to the fact that not only the globe is facing shortage in non-renewable resource as fossils as well as shortage in water and food supplies. But also, a population growth that is expected to reach the double by 2050. (Lui, et al., 2018)

Furthermore, its was mentioned that sustainability includes three interrelated attributes; environment, economic and social. Meaning that other attributes cannot be attained unless the county is able to achieve environmental sustainability. (Madyana, and Yunita, 2015)

The whole globe is affected by the current situation of failure to achieve environmental sustainability. As a result, Egypt is affected by the consequences of environmental unsustainability, although it is regarded as a country with the least incurring emissions globally. Yet it is still unable to manage its waste in order to reach an environmentally sustainable state. Egypt's inability to manage its waste has added to the increase of gas emissions and illness caused to it's citizens. (Egyptian Environmental Affairs Agency.2016)

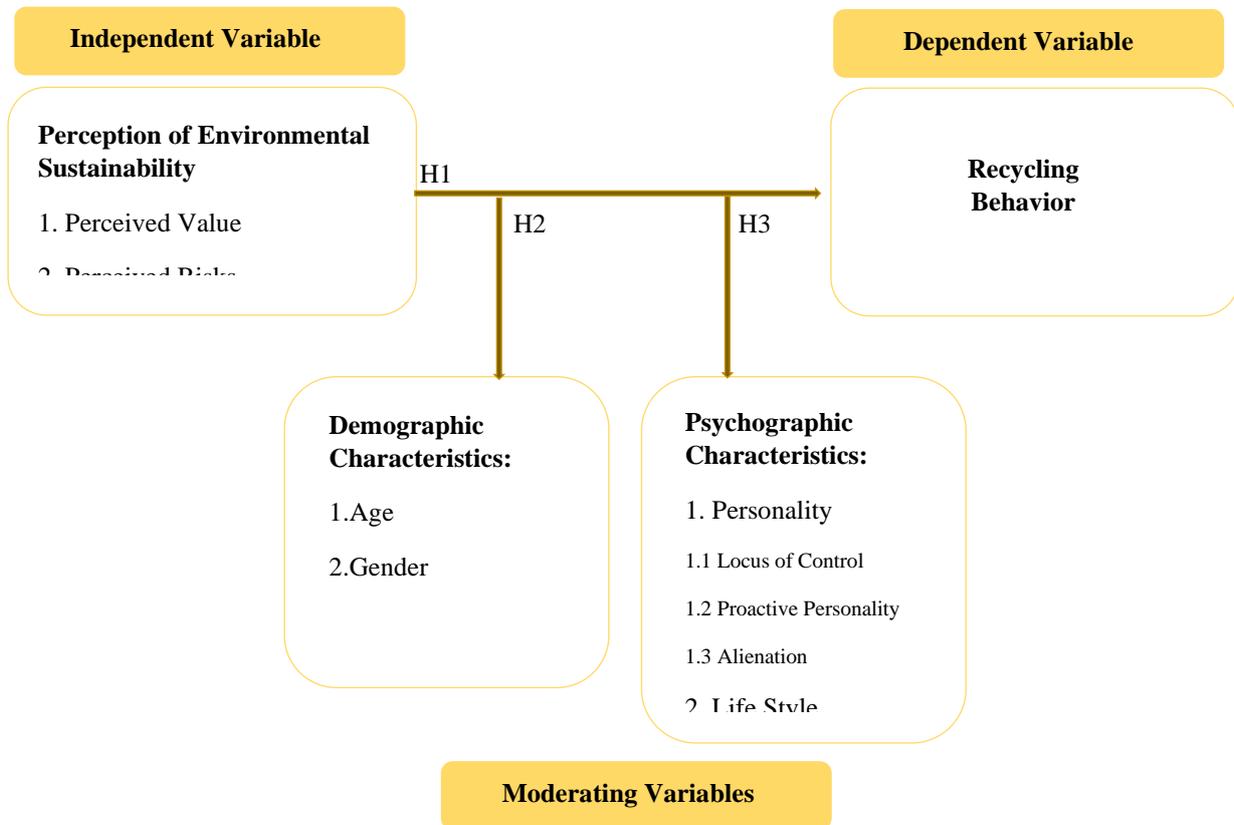
There are several approaches in order to reach environmental sustainability on of them is through waste management. Furthermore, waste management could be achieved through citizen's participation in several favorable behavior as reduce, reuse, recycle, and recovery of solid waste. (Al Salem, et al, 2018)

A country that is determined to induce change in its citizen's behavior through participation in recycling behavior as a way to attain environmental sustainability. Needs to increase their perception of environmental sustainability, since perception of values and risks occurring to the environment can cause increase in participation. (Ince, 2018)

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

To measure the level of significance of consumers' perception of environmental sustainability on recycling behavior with the moderating role of their characteristics. As a result, determine how citizens perceive the risks occurring to the environment in case of not participating in a sustainable behavior as recycling. Furthermore, determine and the perceived added value to the environment due to participation in an environmentally sustainable behavior as recycling. In addition, determine the significance of consumer characteristics on the relationship. That in turn can help determine the necessity of the need to segment and target specific group sharing certain characteristics, based on the finding and tailor a possible marketing communication for each group. All for the need to get citizens involved in recycling behavior.

7. Research Model:



Source: Developed by Researcher

8. Hypotheses:

H1. There is a significant positive relationship between Perception of Environmental Sustainability and Recycling Behavior.

- Consumers' Perceived Value of Environmental Sustainability has a significant positive relationship with Recycling Behavior.
- Consumers' Perceived Risks of Environment Unsustainability have 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' Perception of Environmental Sustainability and Recycling Behavior.

- Age has a significant positive difference on the relationship.
- Gender has a significant positive difference on the relationship.
- Education has a significant positive difference 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' Perception of Environmental Sustainability and Recycling Behavior.

- Citizens' personality has significant positive difference on the relationship.
- Citizens' 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 Design

First, 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 such as transparent and trustworthy governmental agencies in addition to international agencies, as well as scientific journals websites. (Martins, et al. 2018)

Second, primary data collection that was carried out by the researcher is for descriptive purposes, which was 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 of greater objectivity and less research interference. The researcher used a single cross-sectional design since the 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 perception of environmental sustainability cannot be detected.

10. 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.

11. 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 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 in 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 of the target population. The researcher placed an elaboration with exact number of populations 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 to Egypt, since not all governorates would be approached.

12. Findings:

In order to determine whether Perception of Environmental Sustainability affects Recycling behavior and in order to test whether consumer characteristics as Demographic and Psychographic characteristics can show an affect on the relationship between "Perception 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 (398 Valid responses) are as follows in table (1):

The researcher describes the research variables as:

1. Independent variable: Perception of Environmental Sustainability.
2. Dependent variable: Recycling Behavior.
3. Moderating variables.: Demographic Characteristics.
: Psychographic Characteristics.

Table (1) Research Population Demographic Characteristics

Gender					
Males			Females		
210			188		
Age					
19-Oct	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
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 carried out a central tendency or mean test, in order to test the tendency of agreement or disagreement of the research variables. According to the below table (2) table mean value of "Perception" variable is 4.1226 which is greater than 3. As a result, the respondents tend to perceive the risks associated with not sustaining the environment as well as the benefits that could occur in case of sustaining it. On the other hand, the mean value of the "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 the "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 perceive the benefits of environmental sustainability and the risks associated with acting otherwise. As well as tend to agree or possess certain psychographic characteristics as certain personality traits (locus of Control, proactive personality), adoption of green life style, and internal and external oriented values.

Table (2) Mean Value for Research Variables

	<i>N</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Standard Error Mean</i>
<i>Perception</i>	398	4.1226	0.52007	0.02607
<i>Recycling</i>	398	1.753	0.93076	0.04666
<i>Psychographics</i>	398	4.3357	0.49357	0.02474

Source: Developed by Researcher based on SPSS Output

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 how strong a linear relationship is 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 and 3 have a significant difference on the relationships between Perception of Environmental Sustainability and Recycling Behavior. This test will give the researcher a sign whether to proceed with further tests or not.

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

The last test carried out is correlation coefficient for each sub group in each group in the demographic characteristics to determine the degree of impact each has on the relationship between perception of environmental sustainability and recycling behavior.

Table (3) Coefficient of Determination for Hypothesis (1)

<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. Error of The estimate</i>
0.177	0.031	0.029	0.91723

a. Predictors: (constant), Perception

Source: Developed by Researcher based on SPSS Output

Table (4) ANOVA for Hypothesis (1)

	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>f</i>	<i>Sig.</i>
Regression	10.769	1	10.769	12.801	0.000
Residual	333.161	396	0.841		
Total	343.930	397			

a. Dependent variable: Recycling

b. Predictors: (Constant) Perception

Source: Developed by Researcher based on SPSS Output

Table (5) Coefficients for Hypothesis (1)

	<i>Unstandardized</i>	<i>Std. Error</i>	<i>Standardized</i>	<i>t</i>	<i>Sig.</i>
	<i>Coefficients B</i>		<i>Coefficient Beta</i>		
<i>Constant</i>	0.583	0.334		1.744	0.082
<i>Perception</i>	0.275	0.078	0.174	3.526	0.000

a. Dependent variable: Recycling

Source: Developed by Researcher based on SPSS Output

In hypothesis 1, Perception of Environmental Sustainability as an independent variable has a positive yet a weak impact the tendency to participate in Recycling Behavior, since correlation coefficient (R) is 17.7 % and coefficient of determination (R^2) is 3.1 % according to table (3). The P-value of the F-test is 0.000 meaning that the overall model is significant, according to table (4). Furthermore, referring to table (5), the null hypothesis is rejected since Perception of Environmental Sustainability and Recycling Behavior has a significant positive relationship because the P-value of the F-test is 0.000. Meaning that Perception of Environmental Sustainability as an independent variable has a noticeable impact on Recycling Behavior as a dependent variable.

In hypothesis 2 and according to the upcoming table (6) Age as moderator tends to positively affect the relationship between the perception of environmental sustainability and recycling behavior. Where age group (30-39) years has the highest impact on the relationship compared to the other age groups since it accounts for 7.4% followed by (20-29) years; 6%, then (10-19) years; 2.6% and (40-49) years; 0.8% and the least impact on the relationship is age group (50 and above);0.4% according to the coefficient of determination (R^2).

Table (6) Coefficient of determination Age (Demographic Characteristics)

Age	R	R^2	Adjusted R Square	Std. Error of the Estimate
10-19	0.162	0.026	0.016	0.75610
20-29	0.246	0.060	0.050	0.78880
30-39	0.273	0.074	0.062	1.00371
40-49	0.090	0.008	-0.010	0.94334
50 and above	0.063	0.004	-0.009	1.02233

Source: Developed by Researcher based on SPSS Output

Table (7) below shows according to the coefficient of determination (R^2), that females tend to have a greater impact on the relationship between perception of environmental sustainability and recycling behavior as it accounts for 5.8 % while males affect the relationship by 0.5%.

Table (7) Coefficient of determination Gender (Demographic Characteristics)

Gender	R	R^2	Adjusted R Square	Std. Error of the Estimate
Male	0.071	0.005	0.000	0.87819
Female	0.242	0.058	0.053	0.93998

Source: Developed by Researcher based on SPSS Output

The upcoming table (8) shows that primary education group has the highest impact on the relationship between perception of environmental sustainability and recycling behavior, it is 21%. In the second place comes secondary group 3.3 % followed by postgraduate studies 3 % then university graduate 2% and preparatory comes in the last place that is 1.4 % according to the coefficient of determination (R^2).

Table (8) Coefficient of determination Education (Demographic Characteristics)

Education	R	R ²	Adjusted R Square	Std. Error of the Estimate
Primary	0.460	0.212	-0.051	0.83712
Preparatory	0.119	0.014	-0.025	0.53803
Secondary	0.183	0.033	0.014	0.69665
University	0.147	0.022	0.017	0.94804
Post graduate studies	0.175	0.030	0.022	0.99256

Source: Developed by Researcher based on SPSS Output

The following table (9) shows that income group (2,000-5,999) has the highest impact on the relationship between perception of environmental sustainability and recycling behavior that accounts for 11.3 %. Then income group (16,000-20,999) follows that is 6.2%, followed by (6,000-9,999) ;2.9% then (less than 1,999); 0.9% and income group (21,000 and above) comes last ;0.2%.

Table (9) Coefficient of determination Income (Demographic Characteristics)

Income (EGP)	R	R ²	Adjusted R Square	Std. Error of the Estimate
Less than 1,999	0.096	0.009	-0.002	0.83928
2,000-5,999	0.337	0.113	0.106	0.84791
6,000-9,999	0.171	0.029	0.009	0.78343
10,000-15,999	0.088	0.008	-0.010	1.07672
16,000-20,999	0.249	0.062	0.030	0.86113
21,000 and above	0.040	0.002	-0.022	1.04892

Source: Developed by Researcher based on SPSS Output

Furthermore, in hypothesis 2, the researcher found out that the overall Age(correlation coefficient (R) is 26.8 % and coefficient of determination (R²) is 7 %), Gender(correlation coefficient (R) is 24 % and coefficient of determination (R²) is 6 %), Education(correlation coefficient (R) is 3.1 % and coefficient of determination (R²) is 2.3 %) and Income (correlation coefficient (R) is 24% and coefficient of determination (R²) is 5 %) all have a weak impact on the relationship between Perception of Environmental Sustainability and Recycling Behavior. Gender is the only moderating variable that has a significant difference at 90% on the relationship between Perception of

Environmental Sustainability and Recycling Behavior, since it's P-value of the t-test is 0.100. On the contrary the rest moderating variables Age, Education and Income have an insignificant difference or doesn't have a noticeable impact on the relationship between Perception of Environmental Sustainability and Recycling Behavior. This is due to their P-value of the t-test which is 0.280, 0.873 and 0.228 consecutively.

Table (10) Psychographic variables Coefficient of determination

	R	R ²	Adjusted R Square	Std. Error of the Estimate
<i>Personality</i>	0.182	0.033	0.026	0.91875
<i>Values</i>	0.199	0.040	0.032	0.91563
<i>Adoption of Green life style</i>	0.330	0.109	0.102	0.88204

Source: Developed by Researcher based on SPSS Output

The outcome from hypothesis 3 as shown in table (10) shows that both Personality (correlation coefficient (R) is 18.2 % and coefficient of determination (R²) is 3.3 %) and Values (correlation coefficient (R) is 19 % and coefficient of determination (R²) is 4 %) have a very weak impact on the relationship between Perception of Environmental Sustainability and Recycling Behavior. While Adoption of Green Life Style (correlation coefficient (R) is 33 % and coefficient of determination (R²) is 10.9 %) has a weak impact on the relationship. Furthermore, the three Psychographic moderating variables Personality, Adoption of Green Life Style, and Values have an insignificant difference or do not have a noticeable impact on the relationship. This is due to their P-value of the t-test which is 0.479, 0.188, and 0.768 consecutively.

13. Conclusion:

In order to explore the reasons behind the poor participation in environmental sustainability in general and recycling behavior in specific. The researcher carried out quantitative descriptive research.

The outcome shows that the target population tends to perceive the added value due to environmental sustainability and the risks associated with doing otherwise. Also, the researcher tested the possibility of entering moderating factors as demographic and psychographic factors and how they can affect the strength of the relationship between the Perception of Environmental sustainability and Recycling Behavior.

As a result, the researcher found out that the Perception of Environmental Sustainability affected the tendency to participate in Recycling Behavior but the impact is weak. Furthermore, the moderating factors also 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 as mentioned in the exploratory research done by the researcher and in previous studies found in the theoretical background.

14.Recommendations and Practical Contribution:

The research is a practical addition as it allowed exploring the reasons behind participation in recycling behavior and the weight of their impact. Furthermore, an addition to marketing since, it has uncovered that spending only in raising citizen's perception of the added value of sustaining the environment and the risks of environmental sustainability alone is not sufficient to attain the desired goal. This is due to that the return on investment on campaigns won't be extremely rewarding.

Furthermore, the research uncovered that tailoring specific communication messages to target certain consumer characteristics won't be of a great impact. As a result, effort and money could be saved in finding other reasons to increase participation rather than spending it on segmenting and target specific citizens that share certain common characteristics. This is due to the findings that most consumer characteristics have a weak impact on the relationship.

Correspondingly, further exploration research and testing of other factors that might affect the tendency to participate in recycling behavior need to be uncovered. These factors may include financial benefits or rewards that could be non-monetary as points in ration cards provided by the government or monetary in the form of cash. Moreover, environmental education is crucial as it will allow in having a clear perception of the current and expected environmental conditions if citizens continue to disregard pro-environment behavior such as recycling.

In addition, the government could encourage participation by citizens' involvement in recycling behavior by arranging recycling competitions and giving out prizes. It is also recommended that upcoming research uncover how to attain environmental sustainability through finding new techniques to implement reuse and recovery of existing products, as well as reducing consumption that will all lead to a cleaner and sustainable environment that we could live in happily and serve us and the upcoming generations as well .

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