Behavioral Analysis of Single-use Plastic Consumption in Cairo

Factors that influence the current behavior use of single-use plastic bags and factors that might encourage pro-environmental behavior change.

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for the Requirement of the Degree of Master of Science
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Disclaimer

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09/06/2020

Laura María Diaz Ospina

Signature

Dedication

To my family and my friends in Colombia.
To Pachamama (Mother Earth).

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Firstly, I would like to thank life for giving me the opportunity to have this priceless adventure that has taught me some much, that has let me experience different cultures, be surrounded by wonderful people, and most important that has allowed me to grow in all aspects of my life.

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Laura Maria Diaz Ospina

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Abstract

Plastic pollution is a huge environmental problem facing Cairo. The overconsumption of single-use plastics and the inadequate disposal of them are significant contributors to the problem. The aim of this research is to unveil the behaviors that Cairenes have towards single-use plastic bags (SUPB) and the factors that encourage and discourage the use of these items. The research analyzed the environmental awareness of Cairenes and their willingness to adopt pro-environmental behaviors. The methodology used in this research is based on the Theory of Planned Behavior and S.H.I.F.T Framework that identifies factors which influence sustainable behavior. Later, those factors are applied to the data collection through an online survey and interview with stakeholders. The results demonstrated that people are environmentally conscious and willing to change their behavior, yet they consume a considerable amount of SUPB. It is found that there is a gap between what people say and how they act. This can be triggered through different factors such as social influence, tangibility, positive emotion, and policies. These factors can potentially influence the reduction of SUPB in Cairo and encourage the adoption of a pro-environmental behavior.

Keywords: Cairo, Egypt, single-use plastic bags, behavior, behavioral change, pro-environmental behavior, environmental awareness, theory of planned behavior, S.H.I.F.T fwramework

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List of Acronyms

NGOs Non-Governmental Organizations
RB: Reusable Bag
OWID: Our World In Data Organization
PBC: Perceived behavioral control
SUP: Single-Use Plastic
SUPB: Single-Use Plastic Bags
SWM: Solid Waste Management
TF: Theoretical framework
TPB: Theory of Planned Behavior

Figure 1. Plastic pollution on Cairo's streets
Source: The Author

1. Introduction

"Plastic isn't the problem. It's what we do with it."
- Erik Solheim, Head of UN Environment

Cities produce waste through economic growth and overconsumption of resources and goods. Often, they cannot deal with the amount of waste that is being produced, especially plastic waste. Nowadays, plastic pollution is the biggest environmental issue that humanity is facing (Parker, 2019). Most of it is a result of the unrestricted consumption of single-use plastic (SUP) and the inadequate disposal of it. SUP are considered convenient items for the fast rhythm of urban lifestyle. This drives to a throw-away society where the norm is to produce and consume items that are used just once or for a short period of time and then they are discarded. This is causing a huge burden for the urban and natural environment and the economic and social spheres. The most commonly found SUP in the environment are disposable plastic bags, cutlery and cups, cigarette butts, straws, coffee stirrers, soda and water bottles, and food packaging (UN Environment, 2018b).

Egypt is the leading contributor of plastic waste in the Arab world (Nader, 2019) and is ranked as the biggest plastic polluter in the Mediterranean (WWF, 2019). The country consumes around 5.4 million tons of plastic per year (Ritchie & Roser, 2020) and approximately 14 billion plastic bags (CEDARE, 2019). Egyptian plastic waste is a local problem with regional and global implications.

For Cairo, this problem is proportional to its dimensions. Current policies

and waste management systems do not properly address the growing problem of plastic overconsumption and waste. This is evident in the accumulation of plastic waste, especially single-use plastic bags (SUPB), on the streets, in historical and tourist places, and in water ways. SUPB are one of the most common plastic litter found on the streets, mainly because they are massively consumed on a daily basis, are for free to the consumer, and they are not easy to recycle. This research focused on the reasons behind the Cairenes behavior towards SUPB and the factors that both encourage and discourage their use by analyzing their environmental awareness and their willingness to change their behaviors.

Currently, the country is experiencing an awakening phase of environmental awareness (Shaban & El-Bassiouny, 2015) spurred mainly by efforts from non-governmental organizations (NGOs), and civil society. Still there is a huge need for a broader change in habits at a societal level. The results of this research indicate that there is a gap between the intention of people to change their behavior and the execution of it. The level of awareness and a positive attitude are predictors for a behavioral change towards a pro-environmental behavior (PEB). Additionally, there are more factors that are recommended to apply that might influence the behavior of Cairenes.

There is a lack of studies about behavior towards SUP in the Middle East. This research can make a significant contribution to academia and influence the local and regional stakeholders. This study is also looking to cope with the environmental degradation of Cairo and is aligned with the Sustainable Development Goals' (SDG) 12th goal, that promotes sustainable consumption and production to achieve sustainable cities (UN, 2020).

This thesis is divided in six chapters. It begins with introducing the topic and the methodology of the research. The second chapter presents the theoretical framework (TF). The third chapter gives an overview of the context and the implication of plastic on Cairo. Chapter four introduces the findings from the data collection. The fifth chapter brings together the TF and the findings through a discussion. Lastly, chapter six provides recommendations and the overall conclusions.

1.1 Aim and Objectives

Aim

The aim of this research is to analyze the current behavior of Cairenes towards SUPB and to create recommendations that could be used to induce behavior change in Cairenes that leads to a reduction in their consumption of SUPB.

Objectives

To unveil Cairenes' behaviors related to SUPB use and the factors that influence those behaviors.

To evaluate the level of Cairenes' environmental awareness.

To analyze Cairenes' willingness to change habits on the consumption of SUPB.

To create recommendations for stakeholders in how to influence Cairenes' behaviors.

1.2 Research Questions

RQ1: Which factors influence Cairenes current behaviors and relationships with single-use plastic bags?

RQ2: Which factors can influence behavioral change towards a pro-environmental behavior through the reduced consumption of single-use plastic bags?

It is expected to find that the massive amount of plastic waste being produced is the result of the disengagement of a large portion of Cairo's society from the environmental impact of the SUPB consumption. It is assumed that the reasons for that behavior are tied to the lack of awareness, consumption habits, and the normalization of the use of SUP and SUPB in daily life.

1.3 Research Methodology

The research was carried out in different stages using a non-linear process. It focused on studying the behavior of Cairenes SUPB use and how to reduce it. Concepts and theories related to consumption behavior, PEB, behavioral change and plastic are discussed within the literature review. From the literature review the TF was created, parallely the research questions were formulated and changed more than once.

Qualitative and quantitative data was collected to form a broad view of the SUPB situation in Cairo. Concepts from the TF were applied to the data collection methods. Thus, an understanding of the context was significant in this thesis, which was built through primary and secondary data sources. The analysis was conducted manually without software on the collected data.

1.3.1 Data Collection Methodology

The approach used methodological triangulation. This uses a mixture of methods to collect data that enhances the understanding of a phenomena while providing confirmation of the results through the different methods, increasing their validity. Thus, the qualitative data helps to clarify and complement the quantitative data (Shaban & El-Bassiouny, 2015).

This study was based on a qualitative approach using observation participation and in-depth interviews coupled with quantitative methods from surveys. The latter was created based on the results from the interviews and concepts from the TF. The data was collected through several hours of observation and interaction, nine interviews with stakeholders were made in person, by phone, and through online video call, in March and April 2020, and 132 responses were gathered through an online survey in May and June 2020.

The author analyzed the data collected from the surveys, which included charts and tables in google forms. Transcripts from the interviews were coded manually by themes and patterns. Then the results were compared and analysed through the lens of the TF.

Qualitative Study

A qualitative approach can be useful for understanding human behavior in the real environment. It is also helpful in analyzing how people interpreted a phenomena.

- Participation Observation

Participation observation allows the researcher to gather authentic data on Cairenes' behavior. The researcher inserts herself into the environment to experience, trace, and observe the behavior of people in a closer way while they are in their natural settings (McLeod, 2015).

Observations were based on the dynamics and behavior of plastics bags consumption. For this research people were divided into two groups, SUPB users and distributors, and were observed during their regular grocery shopping in supermarkets and street vegetable markets. Small social experiments were conducted after the observation to test the reaction of the people about the rejection of SUPB and the use of reusable bags (RBs) in supermarkets and the re-use of SUPB in bulk stores. In parallel, short conversations were conducted in English. The data was gathered through notes and photographs.

Unstructured observations were taken based on the daily routine of the researcher, and generally occurred in the neighborhoods of Heliopolis[1], Abbasiya[2], and downtown[3]. The data was collected in the preliminary stage of this project when the districts for the case of study were not defined yet. This will be better explained in the limitations section.

- In-Depth Semi-Structured Interviews

It enables the researcher to gather detailed data while focusing on the interviewees' own perspectives. This method is flexible and can result in significant information emerging about the topic (Bryman, 2012). In this case, the interviews give a macro overview of the problem in Cairo.

---

1 Middle-upper income
2 Low middle-income
3 Mixed income

A total of nine stakeholders[4] from different spheres were interviewed in English. Four were from NGOs and start-ups, three were researchers, and two were from the government. The interviews lasted between 45 min to 2 hours and all were recorded and transcribed.

The main topics of the interviews were the history of the plastic in Egypt, the plastic waste production, impacts, behavior and habits of the people, level of awareness, initiatives and campaigns, policies and regulations, and the government's and the NGOs' approach to the SUPB problems.

Quantitative Study

This approach focuses on collecting measurable data and generalizing it among groups of people to explain a particular phenomenon.

-Online Survey

It allow the gathering of specific information that can be standardized and coded. The survey maximizes the reliability and validity of measurements of key concepts from the TF and it is based on the researcher‘s concern (Bryman, 2012). The survey gives a micro view of the problem from a specific sample. The study from Lopez, J. (2015) about the social perception of SUP in Bali and sustainable consumption in Egypt from Shaban & El-Bassiouny (2015) were used as a reference for the survey. These studies have a similar approach and topic to this thesis.

The survey was created with google forms and distributed online through social media. It could not be conducted on-site due to the COVID-19 outbreak. The sample methods used were convenience and snowball, where the researcher relied on her friends and associates in different organizations. Those people at the same time sent the survey to their friends and acquaintances. This influenced the results of the survey. The data collected was from a sample that shared similar demographic aspects. Therefore, it is not a representative sample.

4 See appendix for the list of the interviewees and the questions of the interviews.

-Structure of the survey

The questionnaire included a small introduction of the purpose of the study and consisted in 21 multiple choice questions, some of which allowed for limited written in response when the available choices did not suit them. The survey was divided in five parts:

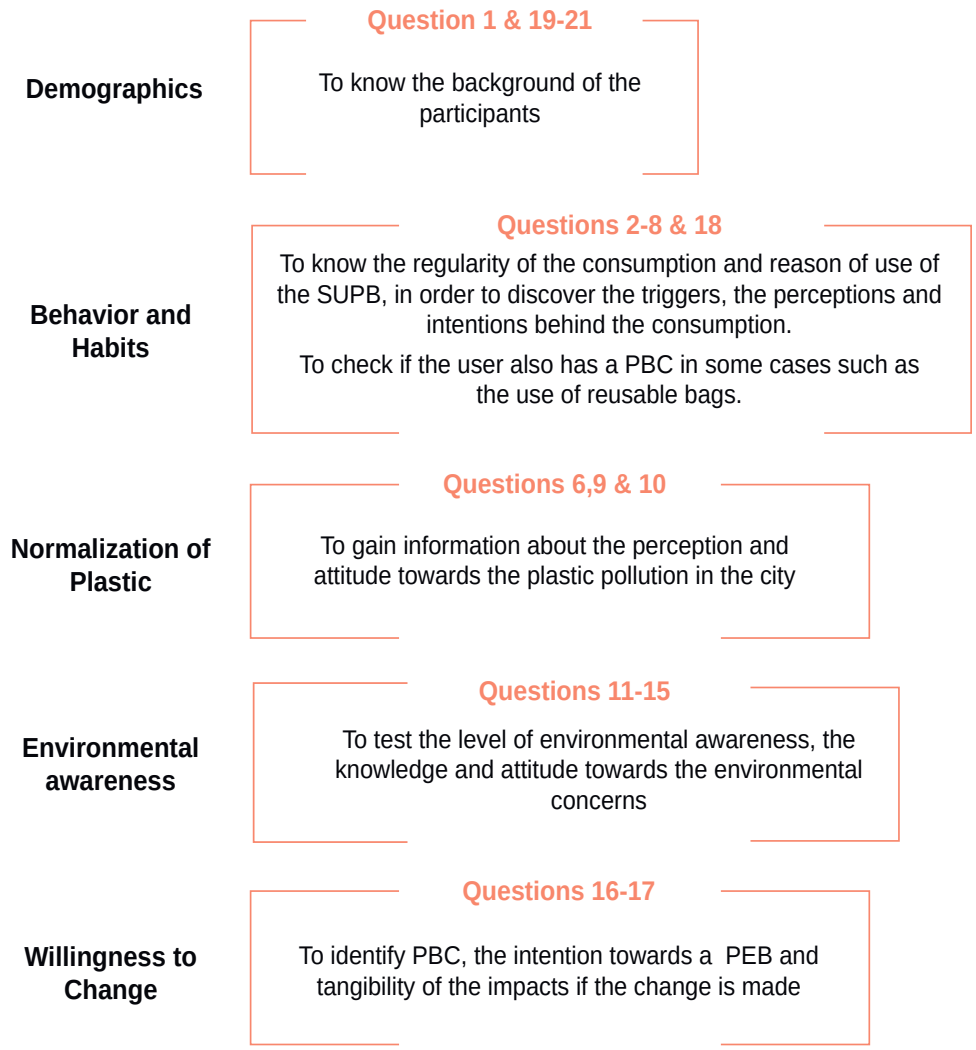

Figure 2. Purpose of each group of question of the online survey
Source: The Author

1.4 Limitations

The biggest limitation that the researcher faced was the outbreak of COVID-19, followed by culture barriers, language, the size of the city, and time constraints. In the beginning the proposed neighborhoods for the study were: Zamalek[5], Nasr city[6] and Abbasya[7]. But they were barely targeted due to the first limitation mentioned above. The whole strategy for the data collection changed and most of it was moved to online strategies except for the observation method. The latter had to rely on the data collected previously, because it was not possible for the researcher to go out and make the observation in the chosen districts. Another limitation was the language because the author does not speak Arabic. Communication was difficult, especially with the vendors and clerks. The gathering of visual data was not easy due to the context and culture.

Time constraint and the pandemic situation prevented interviews with the commercial sector even though they were identified as a key stakeholder. The survey was taken online and the face to face part was dismissed. The proposed neighborhoods were not reachable and the results were homogenized regarding demographics[8] This could happen because the sample was convenient. The survey did not cover all the different ages groups probably because older people are not used to taking online surveys and are not active online. Another reason is that the survey was distributed by friends of the author and the survey just circulated among people with a similar background. Additionally, the survey was in English and not everyone can understand that language. Because of these factors, the author determined the sample is not a good representation of the population of Cairo. It represents just a minimum part and specific sector of Cairo's society.

The data collection and the interpretation could be biased by the researcher considering her own experience in the context, her sensitivity toward environmental topics, not being able to speak the local language, and being a cultural outsider.

5 Expats district and middle-upper level income
6 Middle level income9
7 Middle-lower level income
8 Age, education and socio-economic level

2. Theoretical Framework

Figure 3. The world in a plastic bag
Source: Jcomp. Retrieved from https://www.freepik.com/photos/business

This chapter had been constructed through review of academic literature, reports, and articles. It is divided into two main sections. The first section offers a background on the topics and concepts related to the problem of consumption and the environmental impacts of single-use plastic bags (SUPB). It includes the definition of environment, the main characteristics of SUPB as the polluted element studied, and the waste hierarchy framework. Section two encompasses the main focus of this study: the factors that influence people to adopt pro-environmental behavior (PEB) through behavioral changes. Those factors are under four different aspects and theories that were adapted by the author. The aspects and theories are demographics determinants, existing measures to reduce SUPB, the theory of planned behavior (TPB), and the S.H.I.F.T framework. These last two share concepts that are similar.

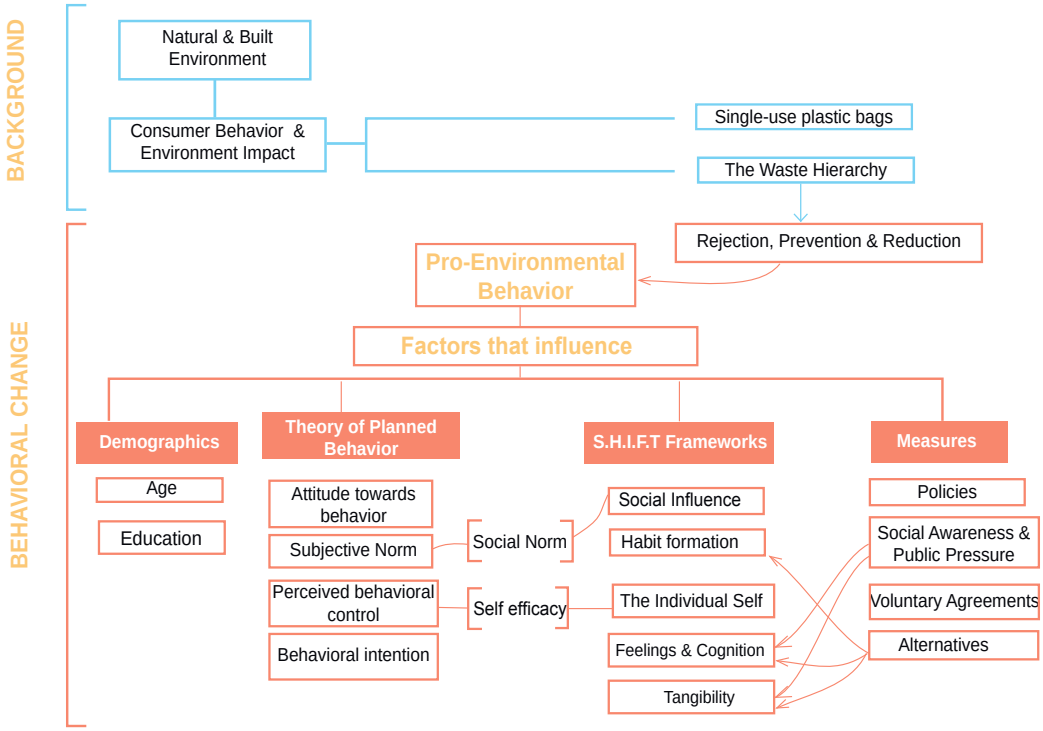

Figure 4. Theoretical Framework: The relations between concepts
Source: The Author

2.1. Background on the consumption problem

"In nature there is no such thing as waste. In nature nothing is wasted; everything is re-cycle"

- David Suzuki, Academic and Environmental Activist

2.1.1 Natural and Built Environment

Natural environment refers to the non-human-made surroundings and includes all things, living and non-living, such as flora and fauna, climate, and natural resources among others (Johnson, D. L., et al, 1997). In contrast, the built environment indicates the spaces and areas that have been transformed and influenced by humans such as cities ("Built environment", 2019). In this research, the term "environment" by itself refers to both built and natural environments due to the fact that both are affected by the consumption and mismanagement of SUPB.

2.1.2 Consumer Behavior and Environment Impact

To understand consumer behavior it is necessary to first define the phenomenon where the behavior occurs. Consumerism, broadly defined as "a social and economical order that encourages the acquisition of goods and services in ever-increasing amounts" (Mahajan, 2015). Mosconi et al (2014) refers to consumer behaviors as the processes that individuals use to select, maintain, and dispose of products or services in order to satisfy their needs and the impacts that this has on the people's life and on society. This is influenced through marketing and the current linear economical system.

White, K. et al (2019, p. 23) states that "traditional marketing encourages an endless cycle of requests for satisfying needs and wants as if the resources were abundant." This results in the excessive and rapid consumption and disposal of goods. Promotion of a consumption mindset is the main driver of negative environmental repercussions (Csikszentmihalyi, 2000). This leads to throw-away societies, where the norm is that these societies over-consume and produce short-lived products that are often used just once. This model keeps producing more and more (Lopez, 2015). Which suggests that natural resources are overexploited to satisfy the society's demand for disposable products (Ibid). Thus generating a huge environmental impact through the extraction of raw material and the waste that is produced after the disposal of the goods.

According to Wu & Chen (2014) the main consequence of over-consumption is the destruction of the environment. Moreover, the implications of "uneven consumption" was stated by Ripple et al (2017, p. 1026) in the World Scientists' Warning to Humanity: A Second Notice.

> *"We are jeopardizing our future by not reining in our intense but geographically and demographically uneven material consumption. . . By failing to adequately limit population growth, reassess the role of an economy rooted in growth, reduce greenhouse gases, incentivize renewable energy, protect habitat, restore ecosystems, curb pollution, halt defaunation, and constrain invasive alien species, humanity is not taking the urgent steps needed to safeguard our imperilled biosphere"*

Since society consists of individuals, the consumption pattern of each individual affects not just the whole society (Lopez, J., 2015), but the environment also, putting huge pressure on it. As a result, society and economy are facing consequences that are partly related to behavioral consumption, such as, climate change, pollution, environmental degradation, and the increase of social inequality and poverty (White, K. et al 2019). Thus, individual consumer behavior has a key role to play in the protection of environment (Wu & Chen, 2014) and society.

2.1.3 Single-Use Plastic Bags (SUPB)

> *How can a disposable product be made of a material that is indestructible?*
>
> *- Tanya Streeter, world champion freediver & environmental activist*

Figure 5. Leakage of plastic bags in the ocean
Source: Brian Yurasits.
Retrieved from https://unsplash.com/photos/qSOADa7byjs

A Single-use plastic (SUP) is an item designed to be used once and is rarely recycled (UN Environment, 2018b). Fifty percent of all the plastic produced is for single-use items such as packaging and disposable products (Hopewell et al, 2009). Society's overreliance on SUP and lack of sustainable waste management solutions make SUP prone to end up as environmental pollution (UN Environment, 2018b).

SUPB is the scope of this research since they are easily accessible, free, and heavily used on a daily basis in Cairo. Therefore, they are one of the most common SUP litter on the streets of the city, as well as beverage bottles and food packaging.

The term "single-use plastic bag" includes "all the carrier bags that are supplied with the intention that they are to be used once, to carry goods away from the point of sale… and they are made out of thin plastic " (Barnes, D., 2012, p.4). They are produced mainly from fossil fuel-based chemicals, a non-renewable resource (Lindwall, 2020).

The first shopping plastic bag was designed in 1965 by the engineer Sten Thulin (Weston, 2019). The one-piece bag shape known as a t-shirt was patented under the Swedish company Celloplast (UN Environment 2018c). Thulin believed at the time that plastic bags would be a long-term solution and replace single-use paper bags and their negative environmental impact (Weston, 2019). Plastic bags started to gradually replace paper and cloth bags in Europe. By 1979 plastic bags were used in 80% of the European market (Ibid). By the beginning of the '80s, plastic bags were introduced in the United States. After approximately a decade, plastic bags replaced almost all paper bags worldwide (UN Environment 2018c).

Nowadays, it is estimated that approximately five trillion plastic carrier bags are consumed worldwide each year. That is around 10 million SUPB per minute and 160,000 a second (The world counts, 2020; UN Environment, 2018b). Astonishing, when you take into account that the average use of plastic bags is between 12 to 20 minutes (UN Environment & Mediterranean Action Plan, 2019; The world counts, 2020).

The use and reuse of the SUPB depends on the destination. According to Nolan ITU (2002) SUPB used outdoors or away from home are likely to be discarded after the first use, for example take-away food bags. SUPB whose final destination is a home are likely to be reused as liner bags, lunch bags, reused for supermarket or other shops, general carry bags, etc. (Lopez, J., 2015). It is estimated that approximately 60% of the bags taken home are reused (Nolan ITU 2002). However, if they are used more than once, most of them will end up incinerated, in landfills, or littered.

SUPB can also be unintentionally leaked into the environment due to their parachute shape and lightweight resulting in them being easily blown away by the wind (Lopez, J., 2015). SUPB finds their way to the sea, rivers, and land environments while just a small percentage (1%-5%) is recycled (UN Environment & Mediterranean Action Plan, 2019; The world counts, 2020). The durability of the SUPB can take between 400 and 1000 years to break down creating negative consequences for the environment and society (UN Environment & Mediterranean Action Plan, 2019; The world counts, 2020; UN Environment, 2018b).

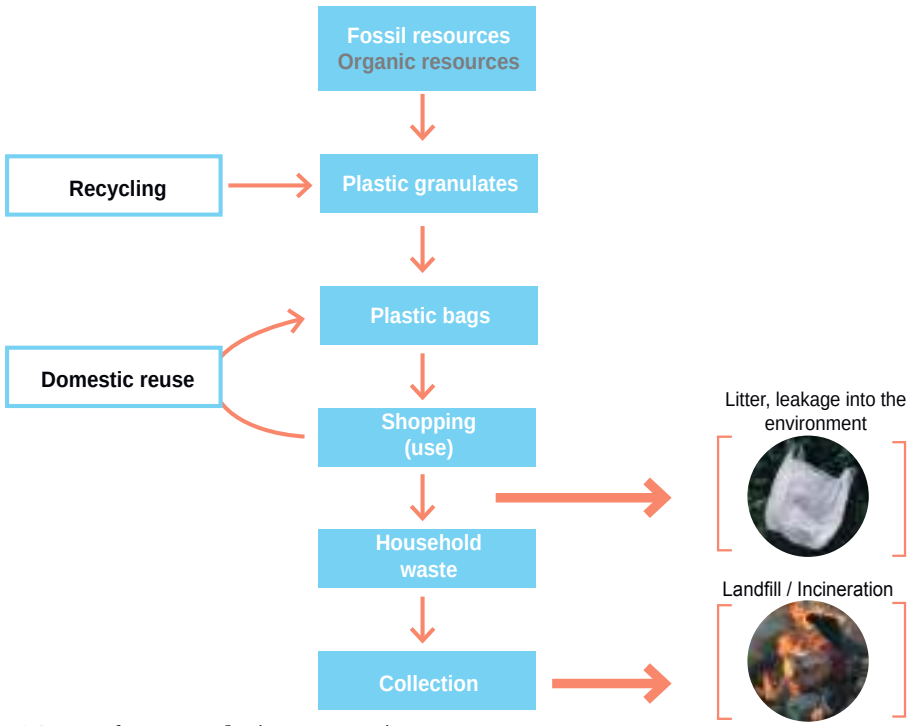

Figure 6. SUPB product-to-waste flow in MENA countries
Source: UN Environment & Mediterranean Action Plan, 2019. Adapted by Author
Photos: Jcomp. Retrieved from https://www.freepik.com/photos/nature
Somsak Suwanput. Retrieved from https://www.thejakartapost.com/life/2018/03/31 burning-plastic-waste-harmful-to-health.html

Impacts

Plastic pollution has one of the biggest and most visible anthropogenic impacts on the planet. It can be found in any part of the world, causing huge problems in the environment and in the health and socio-economic spheres.

According to the *Single-Use Plastic Report* from the UN Environment, SUP highly pollutes the environment and is difficult to recycle (2018b). The extraction of the raw material for their production leads to a depletion of natural resources and contributes to climate change (Lindwall, 2020). Moreover, they are not biodegradable, instead, they break down into smaller pieces (microplastics) that remain in the environment and release toxins (UN Environment, 2018b). While microplastics are not immediately visible, they accumulate in the environment, especially in the ocean.[9]

SUPB contaminates soil and water. They often accumulate in ecosystems, to include areas with sparse human populations such as deserts, jungles, shorelines, and bodies of water. It has also been found on remote, uninhabited islands and in the ocean depths (Barnes et al, 2009). SUPB are a threat to the life of animals on both land and marine ecosystems (wildlife and livestock), that suffer from ingestion, entanglement, injury, death and habitat degradation (WWF, 2019; Nolan ITU, 2002). A significant amount of plastic bags have been found blocking the stomachs and airways of different species such as birds, fish, turtles, and marine mammals (UN Environment & Mediterranean Action Plan, 2019). Marine animals are the most affected by SUPB because they confuse the plastic bags with food.

Plastic ingested by animals releases toxins into the animal (Ruxton, J. & Leipzig, A., 2016). This can lead to health threats to humans who later ingest the animal for food and also through drinking water (WWF, 2019). The absorption of toxic chemicals released from plastics through items that are used on a daily basis such as SUPB, plastic bottles, food packaging, and personal care items are also toxic to human health (Brighty et al, 2017). These toxins interfere with reproduction, metabolism, and other biological functions (Ruxton, J. & Leipzig, A., 2016).
SUPB also contributes to public health hazards by creating artificial pools

9 "The Great Garbage Patch" located in the North Pacific, is a concentration of plastic waste that contains not just macro pieces of plastic but a considerable amount of microplastic in both, on the surface and at the bottom of the sea (National Geographic Society, 2019).

that serve as potential breeding grounds for mosquitoes and pests (Clapp & Swanston, 2009). Increasing the transmission of diseases such as Malaria (UN Environment, 2018b). In low income countries plastic bags are burned for cooking and heating, releasing toxic emissions and harmful gases (UN Environment, 2018b).

Besides the environmental and health impacts, plastic bags pollution has socio-economic implications linked to the well being of the people. SUPB contributes to the visual pollution in public spaces (Clapp & Swanston, 2009). This can lead to the "loss of aesthetic values" that have a negative impact on social and economic activities especially in the tourism sector (UN Environment & Mediterranean Action Plan, 2019). Plastic pollution can contribute to decreased tourism due to unclean landmarks, beaches, and streets. On the other hand, tourists generate enormous quantities of SUP waste burdening ill-equipped local municipalities to manage in an efficient way. This can lead to irresponsible management and uncollected waste. As a consequence, the tourism industry is economically affected[10] by clean-up costs and a decrease in tourism (WWF, 2019). Additionally, maritime trade and fisheries are also significantly affected by the plastic debris of the sea (Espanol, 2019). In urban environments SUPB

Figure 7. Bird entangle in a plastic bag
Source: John Cancalosi/ National Geographic
Retrieve from https://www-staging.nationalgeographic.com/news/2016/03/060315-storks-food-animals-science-urban-food/

Figure 8 .Plastic pollution on the beach
Source:Brian Yurasits.
Retrieve fromhttps://unsplash.com/photos/IvWEUvMwmlg

10 Plastic pollution just in the Asia-Pacific region costs the tourism, fishing, and shipping industries $1.3 billion per year. In Europe, it is estimated that €630 million per year is spent on coast and beach clean-up (UN Environment, 2018b). Also it is estimated that the economical damage in marine ecosystems can be valued at around $13 billion every year. (Ibid)

can block sewers, drains, and waterways causing flooding and exasperating natural disasters (Tough, 2007), further degrading infrastructure, private property, and people's livelihood (Ibid).

2.1.4 The Waste Hierarchy

"The Best Practicable Environmental Option" is a guide that takes both social and economic costs into account (Hansen et al, 2002). The framework is a pyramid that prioritizes between the most and the least favorable actions to reduce and manage waste as a model for sustainable development. It states that the waste problem should be solved with an integrative approach that focuses more on the root of the problem rather than on the disposal stage (Ibid). To extend, the waste production is related to issues of "consumption patterns, lifestyle, jobs and income levels, as well as a host of other socio-economic and cultural factors" (Ibid, p.19)

Figure 9. The Waste Hierarchy
Source: Hansen et al, 2002. Adapted by Author

Reject - prevent and reduce are the bases of the pyramid and the starting point of this thesis. It states that the most effective waste management is when waste is not produced or at least the generation of waste is minimized as much as possible. This can be achieved through the decrease in the consumption of unnecessary things through behavioral change.

2.2. Behavioral Change

"The planet doesn't need money, it needs behavioral change"
- Sonam Wangchuk, Engineer, Innovator and Education Reformist

2.2.1 Pro-Environmental Behavior (PEB)

According to Kieżel et al (2019) it is the behavior of a person that contributes to the preservation of the environment. This leads to performing actions that reduce damage to the environment (Steg & Vlek, 2009) as well reducing the consumption of natural resources through the lifecycle of a product, service, or behavior (White, K. et al, 2019). These actions provide benefits not just for the person that executes the behavior but for other people and the biosphere. These actions can range from saving energy, decreasing plastic consumption, increasing recycling, and even extend to environmental activism. However, the result of the changes induced by PEB can not be perceived immediately and often the individuals are not directly affected by them. The tangible impacts of PEB take time to be realized because environmental issues are complex and difficult to solve (Leary et al, 2011,)[11].

Kollmuss & Agyeman (2002) states that the PEB seeks to make people consciously aware of their environmental impacts while encouraging them to adopt environmentally friendly behaviors in the natural and built world. In contrast to the other authors, Kollmuss & Agyeman take into consideration the urban environment. This is important because these behaviors have an impact on the city dynamics and can influence policies.

Different influential factors that are known to affect both positively and negatively the engagement of an individual in a PEB are the following: demographic factors (age, gender, and education level), external factors (institutional, economic, social, and cultural), and internal factors (motivation, environmental knowledge, awareness, values, attitudes, emotion, locus of control, responsibilities, and priorities) (Kollmuss & Agyeman, 2002). A variable to take in account within PEB is environmental concern. This can help to understand the spectrum of the factors that influences a person's orientation towards different sustainable behaviors (Muralidharan & Sheehan, 2016).

11 Cited in Macovei, 2020 p. 15

Additionally, Macovei (2015) highlights that the behavioral change towards PEB should be aligned with the lifestyle of the person even if the behavioral change is long term focused. It should be convenient in the short term in order for the people to be interested in adopting it in the first place.

The biggest challenge for PEB adoption is it is often perceived by people as having a cost for themselves. Sustainable actions are often viewed as requiring more effort, costly, low quality, and time consuming (Luchs & Kumar, 2017). In parallel, sustainable behavior brings positive social and environmental outcomes that are external to the individual and evokes a feeling of pride (Ibid). Therefore, it indicates that PEB adoption reflects people's concern for the environment, the community, and future generations over their own self-interest (White, K. et al, 2019).

Chan (1999) states that green consumption behavior can also be understood as a PEB. It is connected to environmental awareness and behavioral intentions. Therefore, green consciousness, environmental education, promotion of environmental protection, and sustainable consumption by the authorities such as the government and NGOs are effective predictors that led to a PEB.

It is important to point out that "sustainable behavior" and "PEB"are used interchangeably in this research.

2.2.2 Demographic Factors

Age

"As people grow, their needs, knowledge, and environmental sensitivity change" (Kieżel et al, 2019 p. 5). Some authors such as Shen & pSaijo (2008)[12], argued that older people care more about the environment. In contrast, Cottrell (2003) states that younger people show a huge sense of responsibility to the environment. A tendency that is well documented nowadays by mass and social media. Therefore, Kieżel et al (2019) state that young adults are the group that shows the biggest interest in environmental causes. This is supported by a study done by Nielsen Global Corporate Sustainability Report (2015) that showed that 73% of people who are willing to pay extra for sustainable products

12 Cited in Kieżel et al, 2019, p.5

are millennials[13]. A similar tendency was found in Generation Z[14]. Different authors have diverse perceptions related to the age gap and the development of the PEB. Age can be considered an important factor. However, it is influenced by other determinants such as culture, social media, gender, education, and socio-economic background.

Education

A person's level of education can play a determinative role in the development of PEB. The relationships between the educational level and environmental concern has been widely documented in academia (Cottrell, 2003). "More educated people tend to be more concerned for the environment and more willing to adhere to pro-environmental behaviors." (Kieżel et al, 2019). Gilg et al (2005) claim that young people with high education are more likely to participate in sustainable actions. The longer the education the more extensive the knowledge about environmental issues. In contrast, Kollmuss & Agyeman(2002) state that more education is not directly correlated to increased PEB. Other demographics findings show that younger, more liberal, and educated individuals are more likely to commit to PEB (Kieżel et al, 2019; Gilg et al, 2005; Cottrell, 2003).

2.2.3 Theory of Planned Behavior (TPB)

The TPB was created by the social psychologist Icek Ajzen in 1991. TPB is designed to explain and predict an individual's behavior in a specific context (Ajzen, 1991). It proposes that the individual's behavioral intentions and actions are influenced by their attitude towards a behavior, subject norms, and perceived behavioral control (PBC) (Ibid). It states that the best way to predict behavior is by asking the people if they are willing to behave in the desired way. As Macovei (2015) explains better "The intention expresses itself in behavior providing that it is physically possible to perform the behavior or if unexpected barriers do not stand in the way."

13 People between 21 and 38 years old

14 People under 20 years old

TPB has been applied in fields such as healthcare, advertising, educational behavior, and sexual behavior. As well, TPB has been widely used to predict PEB related to energy consumption, recycling, water conservation, green purchasing, among others (Kieżel et al, 2019).

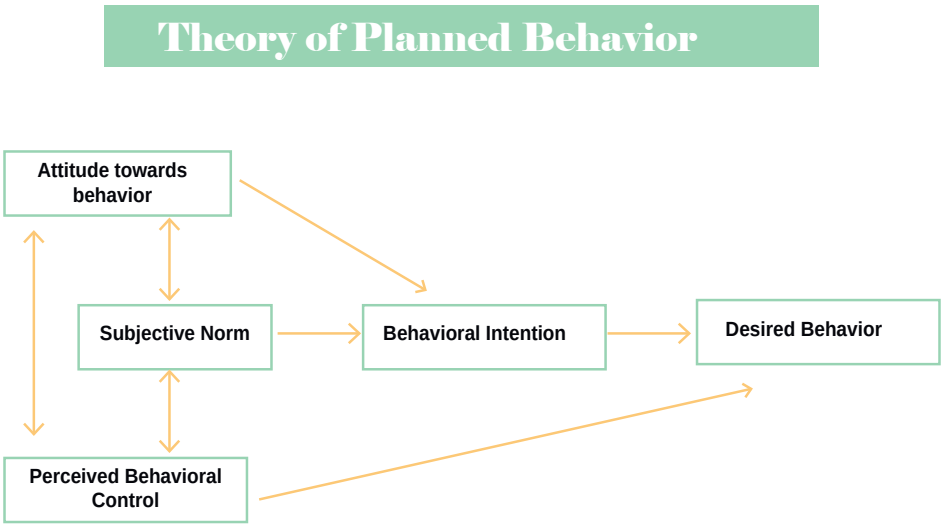

Figure 10. Theory of Planned Behavior – TPB
Source: Ajzen, 1991. Adapted by Author

Determinants of TPB

Attitude Towards Behavior

What does an individual think about performing a certain behavior?

"The degree to which a person has a favorable or unfavorable evaluation of the behavior in question." (Ajzen, 1991, p.188). This means that the individual's behavior intention is influenced by their attitude towards it. Attitude and behavior can be interpreted as what people say and believe and the actions they take. According to Kollmuss & Agyeman (2002), even though people show a positive attitude toward sustainable behavior they often do not act in a sustainable manner. This inconsistency is one of the biggest challenges to promoting PEB. A person can say, "I believe that it is right to use less plastic bags. " But that does not mean they will follow through with reducing their use of plastic bags. This is supported by d'Astous and Legendre, 2009[15] who state that there is a "...significant difference between what consumers say about the

15 Cited in Lopez, J., 2015, p.12

importance of consumption-related ethical issues and their actual behavior."

Subjective Norm

What do others think about an individual performing a certain behavior?

"The perceived social pressure to perform or not to perform the behavior." (Ajzen, 1991, p.188). Subjective norm is related to the individual's belief about the appropriateness of engaging in certain behavior based on the approval, disapproval, and opinion of the people in their immediate social network (Macovei, 2020). It is also related to the cultural context.

Ajzen(1991) indicates that the functions of the subjective norm are social pressure and compliance motivation. Therefore, predicting the behavior of someone should include considering the beliefs of the people that are in that person's social network. The social network can include peers, family, friends, and neighbors. An individual can commit to a behavior because their friends support it and have already adopted this behavior.

Subjective norms can also be understood as the social norms that govern within a specific context. Those are also shared with the S.H.I.F.T framework where the social norms and their types have an expanded explanation (see section Social influence, p.31)

Perceived Behavioral Control (PBC)

Can an individual perform a certain behavior?

Ajzen (1991) refers to the PBC as the ease or the difficulty to engage in a certain behavior. It is determined both by past experience and anticipated impediments or obstacles. The PBC involves non-motivational or situational factors, such as the availability of opportunities and resources i.e., money, knowledge, time, and collaboration from others. According to Macovei (2020, p.18) this determines "...the real degree of control over behavior." Macovei emphasizes that if the other variables do not change "...the intention to behave in a certain way is the central variable that determines the actual behavior."

PBC is formed by control strength and control belief. The former is the level of influence by resources, opportunities, or obstacles, in order to complete or not complete a behavior (Ajzen,1991). The latter is the belief of an individual

in the factors that can facilitate or impede the performance of the behavior. Additionally, Rotter (1954)[16]considered control belief to be the conviction that specific behavior is feasible. It is also interpreted as self-efficacy in the S.H.I.F.T framework (see section The individual self, p.36).

PBC applies to the engagement of a PEB. Macovei (2020) states, people with a high PBC are more inclined to adopt a sustainable behavior. Although, if the effort related to performing the behavior is high it can become a barrier for adoption. An example of an adoption barrier under the PEB of lessening plastic consumption would be an individual not having within walking distance of their home a bulk food store versus a normal grocery store to buy plastic free groceries. The individual would need to expend more time and effort to access the bulk food store while overriding the natural desire for convenience provided by the regular grocery store in close proximity.

Attitudes, subjective norms, and PBC lead to the intention and desire to perform a behavior.

Behavioral Intention

Behavioral Intention is the willingness of an individual to perform a behavior. It is influenced by the above factors: attitude toward the behavior, subjective norm, and PBC. Each factor is balanced for its importance in relation to the behavior and the population of interest (Ajzen, 1991). Ajzen (1991, p.4) states as a rule, "...the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration".

Moreover, LaMorte (2019) points out that the stronger the intention to perform the desired behavior, the more likely the individual will perform the behavior. This is also supported by Arbuthnott, 2008. She affirms that as more personal and specific the intention is, the more likely the behavior to be implemented. However, humans are more oriented to act consistently with attitudes aligned with their own interests rather than the needs of others or the environment.

However, there is a gap between the behavioral intention and the performance of the behavior that is not covered inside the TPB. A person that is influenced

16 Cited in Wu & Chen, 2014 . p.121

by the above factors can state they intend to or will do something, for example, reduce the use of plastic bags in the upcoming weeks. How they make this happen is missing. That is the gap.

The gap is filled with the concept of implementation intentions introduced by the psychologist Peter Gollwitzer (Orbell et al, 1997). After the intention, a plan should be made to accomplish the desired behavior that specifies the necessary action to implement the intention and when and where to take it (Ibid). This concept is also used in the S.H.I.F.T framework (see section Habit Formation, p. 33). If the intention is to reduce the use of plastic, a plan to implement it could involve bringing a reusable bag (RB) everytime that the person is going to the supermarket. Then the performance of the desired behavior will be executed.

For the aim of this research, the TPB framework is used to analyze the behavior of Cairenes and its relationship to the consumption of SUPB with the purpose to verify how the actual behavior can be influenced towards a PEB.

2.2.4 S.H.I.F.T. Framework

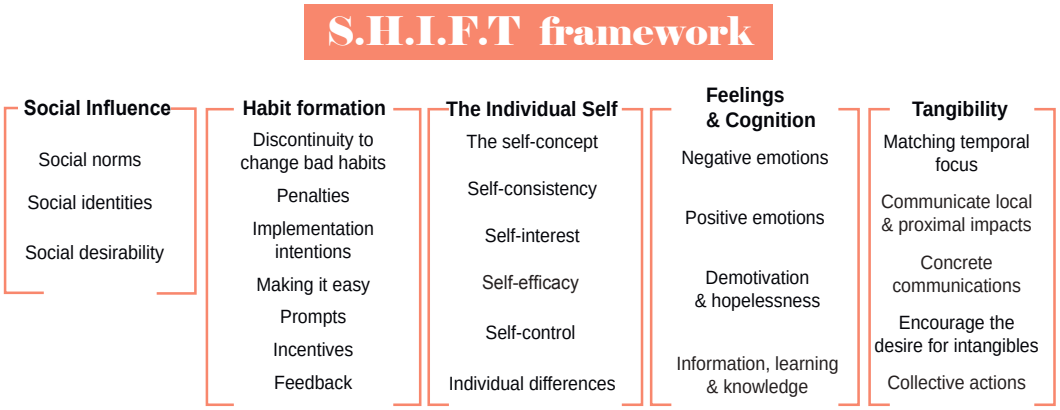

Figure 11. S.H.I.F.T framework
Source: White, K. et al, 2019. Adapted by Author.

The S.H.I.F.T. framework was created by White, K., Habib, R., & Hardisty, D. J. in 2019 and is based on the review of existing literature on sustainable consumption. It proposes that consumers are more inclined to engage in PEB when strategies include the following psychological factors: social influence, habit formation, individual self, feelings and cognition, and tangibility. This framework focuses on the marketing perspective related to behavior and message framing and has been adapted within the scope of this research.

Social Influence

People's behavior is highly affected by social factors such as the presence, behaviors, and expectations of others. According to Abrahamse & Steg (2013) social aspects are the most influential ones to encourage change towards PEB. This is measured by different social groups such as the family, colleagues, and friends. Social influence has the following three aspects.

- **Social Norms**

"Beliefs about what is socially appropriate and approved of in a given context, can have a powerful influence on sustainable consumer behaviors" (White, K. et al, 2019, p. 24). Social norms predict behaviors such as buying eco- friendly products, using less plastic, and saving energy. Additionally, social norms encourage policy intervention "...that try to change behavior rather than just creating awareness: It implies that others will follow if some people can be persuaded." (Nigbur et al, 2010).

Cialdini et al, (1990) identifies two types of social norms. The first one is the descriptive norm. It is the visible behavior of others. A norm that individuals follow or imitate because it is what people commonly do and it is related to a specific context. The second one is the injunctive norm. It is a socially shared rule of conduct. It refers to behavior that is acceptable and unacceptable by others (White, K. et al, 2019). Nigbur et al (2010), illustrated that household recycling is encouraged when social normative influence is divided between the perceptions of whether neighbors recycle (descriptive norm) and perceptions of whether significant social groups such as the neighbors would want the individual to recycle (the injunctive norm).

The use of descriptive norms to frame a message to encourage behavioral change can be highly effective. In a study made by Goldstein et al (2008), descriptive norms were used to communicate that other individuals were part of an environmental conservation program in a hotel. Messages, such as "... the majority of guests reuse their towels." were more effective than a traditional environmental message.

- **Social Identities**

Social Identities refer to the sense of belief related to the belonging to a group. Individuals are more likely to engage in a PEB or sustainable actions if the members of the person's group are already involved in it (Goldstein et al, 2008). This is amplified in public settings where the collective self is more important (White, K. et al, 2019). Identity can also be related to aspirational role models that foster sustainable behavior through the sense of desirability and inspiration (Ibid). Therefore, it is important to make people feel they are members of a movement supported by their community and relevant to their circumstances (Kolff, 2018)

- **Social Desirability**

Individuals are likely to act in a socially acceptable manner in public where other people can evaluate their performance (White, K. et al, 2019). People have the tendency to select sustainable or eco-friendly options to make a positive impression on others (Green & Peloza, 2014) or to show social status (Griskevicius et al, 2010). However, sometimes people perceive sustainable behavior negatively. In some instances, men avoid being related to eco-friendly attitudes due to the fact that is more associated with a green-feminine stereotype (Brough et al, 2016).

The implications from the S.H.I.F.T. framework for policymakers, marketers, and organizations is to create socially desirable PEB and reduce the negative perceptions towards sustainable behaviors (White, K. et al, 2019). To create effective campaigns, social awareness (see next section, p.45), social influence, and public pressure are important factors to take into account when a message is framed in order to have a considerable influence on PEB behavioral change. Van der Linden, (2015) suggests that to have more effective influence in the behavior, the delivered message should display persuasive information and remind individuals that there are social norms sustaining the desired behavior. This will result in people grasping the message better "...because social support from relevant ingroup members increases motivation to mentally evaluate the arguments presented—making it easier for individuals to fit new information into existing belief structures." (van der Linden, 2015,).

Habit Formation

Habits are persistent behaviors that have become an automatic response to a specific situation as a result of the regular execution of these behaviors (Kurz et al, 2015). Most of the common daily habits that people have are unsustainable. For this reason, changes that lead to the formation of new sustainable habits is needed to encourage PEB. This can be achieved, according to White et al,(2009) by "...replacing relatively automatic behavioral responses with more effortful new responses" (p.35). To acquire new habits and consequently new behavior it requires the learning of new skills (Grenny, 2013). For example, a person should carry a RB every time they go grocery shopping to reduce SUPB consumption. This requires repetitive actions that need the formation of new habits. Becker et al (2014) claims that habits are more powerful than intentions. Therefore, incentives, institutional regulations, and penalties, e.g., bans or taxation on plastic bags, encourage behavioral change by "...altering the value and intention of the behavior." Kollmuss & Agyeman (2002) empathize that old habits are a strong barrier to habit changes.

To create new habits it is necessary to first break the bad habits through interventions, e.g., discontinuity and penalties. Then enforce new habits with actions that foster repetition, making sustainable action easy, incentivized, using prompts and providing feedback. This is explained below.

- **Discontinuity to Change Bad Habits.**

Discontinuity to change bad habits refers to the disruption or change of the context where the habit usually occurs. This leads to conditions for habit change and makes it difficult to carry out the usual bad habit. Contextual changes combined with habit formation techniques can motivate PEB (White, K. et al, 2019).

- **Penalties**

Penalties are sanctions that work to decrease the motivation to be involved in undesirable behavior. This can be a tax, a fine, or a fee on an unsustainable habit. These penalties can exist in the form of policies and voluntary agreements (see next section, p.42). Fines can influence behavioral change in areas where this can be monitored, i.e, the disposal of waste (Fullerton & Kinnaman, 1995). Bans, taxes, and economical instruments can be effective in sectors that involve

strong habitats such as the consumption of SUPB (Krause, 2009). According to the study made by Muralidharan and Sheehan (2016) “paying a tax” can be framed as a loss for the consumers and can encourage them to bring their own bag. “Avoiding” a fee can be perceived as a gain and also a decision made by the consumer. To an extent, fees are linked to a natural “loss aversion” according to Daniel Kahneman, a behavioral economist and Nobel prize in economics winner (Schwartz, 2020). The desire of people to “avoid a loss,” even if it is a small charge, can influence their behavior. Often, these fees amount to small charges that are enough to make people feel a loss that they can choose to avoid (Ibid). The penalty should be visible to produce a behavioral change. “Signage at checkout and verbal reminders from cashiers may further increase salience of the tax.”(Homonoff et al, 2018).

However, these actions can also bring some counterproductive effects. If the penalty seems unreasonable (Fullerton & Kinnaman, 1995) or not strong enough it can lead to a negative impact and a defensive response (Bolderdijk et al, 2012). Later, if the penalty is removed, individuals could resume old habits. Penalties, therefore, should be combined with another measure such as awareness campaigns in order to have an effective and long-term impact.

- **Implementation Intentions.**

During transition from an old habit to a new one, individuals consider the implementation of their intention to engage in a new habit or behavior and are required to identify which steps they should follow (Kurz et al, 2015). Implementation intentions fill the gap between the behavioral intention and the execution of the behavior in the TPB. The intention to acquire a new habit is motivated by repetition making sustainable action easy, creating positive feedback, prompts, and incentives.

- **Making It Easy.**

Two of the barriers that prevent people from getting involved in pro-environmental actions is related to the difficulty and time consumption of those actions (McKenzie-Mohr, 2000). Making things simple, easy, and convenient is a useful strategy for sustainable behavioral change. Contextual modifications, such as having water fountains to refill or placing composting and recycling bins nearby, encourage the ease of involvement in a PEB. Another strategy is making sustainable action the default, for example, set energy savers in devices

as a default makes people stick to it (Pichert & Katsikopoulos, 2008). As White, K. et al (2019, p.26) explain "...consumers are often low on cognitive resources, simplifying the decision making process can allow them to more automatically form sustainable habits."

- **Incentives**.

Incentives are stimulations that increase positive habit formation and motivate people to adopt and maintain PEB. Incentives can be gifts, social praise, economical instruments (see next section) such as rewards, discounts and monetary incentives, among other things (Homonoff, 2015a; White, K. et al, 2019). However, incentives can also have some disadvantages.
For example, there may be less motivation when there is a smaller monetary reward in contrast with other kinds of incentives such as free gifts or social praise that can be more engaging (Handgraaf et al, 2013). Another drawback to incentives is when it is removed the sustainable behavior tends to vanish with it. Moreover, short-lived actions are easy to encourage with incentives than long-term behavioral changes (Cairns et al, 2010). In order to have a long-term behavioral change, effective incentives should be combined with awareness campaigns that result in people understanding why it is important to create sustainable habits. This will increase adoption because of the new understanding of their impact on the environment.

- **Prompts.**

Prompts are messages or indications that are given before the sustainable action occurs to remind the people the desired behavior (Lehman & Geller, 2004). The prompt should be placed close to where the behavior will be performed and is more effective when it is clear and easy to follow (Austin et al, 1993).

- **Feedback**

Feedback is a tool that provides people with specific information about their performance in a certain behavior, i.e., water and energy consumption, and it can be compared with past performances or in comparison with other people (Abrahamse, et al, 2007). Feedback presented in an understandable form, in real-time, over a long period has been shown to have an even greater impact (Chiang et al, 2014).

The Individual Self

Components related to the individual self can have a strong influence on behavioral change.
Factors such as self-concept, self-interest, self-consistency, self-efficacy, self-control, and individual differences are the most relevant. It is worth highlighting that the factor of self-control was added by this researcher.

- **The Self-Concept.**

"Individuals desire to maintain positive self views and can reaffirm the positivity of the self-concept through consumption" (White, K. et al, 2019, p. 27). Thus, self-concept is an extension of self-identity that includes people's possessions (Belk, 1988). This can be translated into the consumption of eco-friendly products or taking sustainable actions to reassert a positive view and good feeling for oneself.

- **Self-Consistency**.

Individuals view themselves being consistent. Reaffirming the self concept, for example being environmentally aware, leads to consistent involvement in sustainable behaviors (Van der Werff et al, 2014). Consistency can occur more frequently when it is linked to transcendent values related to the others and the biosphere rather than self-interested values (Evans et al, 2013). Self-assessment is a factor that can affect consistency. "Those who felt that the end sustainability goal was unimportant were less motivated to pursue the end goal when they were unable to achieve subgoals" (White, K. et al 2019). Inconsistency and consistency can also occur at the same time in the same context. People can use a RB to do groceries, but they buy food wrapped in plastic (Karmarkar & Bollinger, 2015).

- **Self-Interest**

Individuals have their own interests and seek out things that benefit them. Emphasizing the self-benefits that a product or behavior has can be leveraged to influence a PEB (Green & Peloza, 2014). Another strategy is to target self-interest by pointing out the self-benefits that can compensate for negative beliefs or implications that some sustainable actions have (Gleim et al, 2013).

- **Self-Efficacy**

It is considered to be the conviction that a certain behavior is achievable (Ajzen, 1991). Self-efficacy can predict pro-environmental attitudes and tendencies that will continue with sustainable behavior over time (Armitage & Conner 2001). Individuals tend to choose a sustainable option when the commitment is low and they have high confidence that their behavior is having a positive impact (White, K. et al, 2019). It can provide people a sense of agency, "allowing individuals to perceive themselves as the causal agents of behavioral outcomes, offers them a perception of empowerment and the ability to actually effect change" (White, K. et al, 2019, p.32).

- **Self-Control**

It refers to the capacity of the individuals to regulate their feelings, thoughts, and behaviors in order to achieve a certain goal (DeLisi, M., 2014). PEB may require more self-control than other kinds of behavior due to the extra efforts required to complete sustainable actions that have an uncertain future payoff (White, K. et al, 2019, p. 33). The action of lessening plastic consumption requires self-control in situations where there are free plastic options, i.e., a coffee cup. The individual must resist drinking a coffee until they have a reusable solution in order to not use a disposable cup. Even if this action does not have an immediate impact, a strategy that encourages self-control can bring the environmental benefits more close and contextual.

- **Individual Differences**

Personal beliefs can vary significantly between individuals. It is related to a sense of personal obligations and is linked to self-standards (Bamberg et al, 2007). People who have a strong personal norm and values related to sustainability and connections with nature are more likely to be involved in PEB (White, K. et al, 2019). Characteristics such as extroversion, agreeableness, conscientiousness, and environmental concern can predict sustainable behavior (Fraj & Martinez, 2006). Interventions and strategies should be adapted to the motivations, needs, benefits, and barriers to the specific target(s) to be influenced (Abrahamse et al, 2007)

Feelings and Cognition

Decision making is driving and dominated by the following factors: intuition and affection or cognition and knowledge (Epstein 2003). This is significantly relevant regarding information about the environment. The factors that influence decision making are related to positive and negative emotions and feelings of demotivation and hopelessness. Cognition is determined by information, learning, and knowledge.

- **Negative Emotions**.

Most of the time people consider the negative emotional implication of their involvement or not in PEB (Rees et al, 2015). Creating strong negative emotions is not recommended. Instead, it is more effective to activate these kinds of emotions in a more subtle way (Meng et al, 2017). There are three specific emotions that are used to influence behavioral change:

- "Fear appeal" is often used in message framing focusing on the negative impacts of the execution or not of an action (Banerjee et al,1995). The fear appeals should be used to moderate and combined with alternatives and actions to take (Li, 2014). Messages that make individuals feel that the consequences are uncertain and long distance, make it seem that environmental issues are less serious. Therefore, people can also feel overwhelmed when strong fear appeals are used in communications (White, K. et al, 2019). Strong fear appeal can lead to behaviors of passiveness, denial, or indifference.

- Guilt drives people to assume responsibility for the unsustainable outcomes of their behavior, influencing them to feel moral responsibility (White, K. et al, 2019). "Anticipated guilt" is an effective strategy to motivate PEB than can be used subtly, making people consider their own self-standards of the behavior (Peloza et al, 2013). Ferguson et al (2011) state that "collective guilt" can be used to support sustainable causes. For example, a city that has a high level of air pollution generates collective guilt and provokes willingness to support environmental causes.

- Sadness is also a feeling that acts as a driver of PEB and can lead people to donate a higher amount of money to environmental causes. It has

> been shown that it is more influential when people are currently feeling it. However, when the emotion is gone the message containing a sad factor does not have much impact (White, K. et al 2019).

Negative feelings can contribute to sustainable behavior yet not at a high level. These feelings make people reflect on their negative impact. However, strategies based on fear, shame and guilt are often not effective and can be counterproductive (Kolff, 2018). This also leads to having the individuals feeling saturated and overwhelmed. As the above theory states, they should be used moderately, carefully, and combined with other strategies to have better results. Although, the negative effect of unsustainable behavior should be pointed out but not as the main focus on a strategy.

- **Positive Emotions**.

People tend to react better when a message or action gives them a positive feeling or pleasure, such as joy, pride, and the warm glow that comes from doing good. If the sustainable option is fun, people will want to do it. People involved in a PEB can decrease negativity and increase positive feelings (Onwezen et al, 2013). Emotions, such as happiness and optimism, influence the intentions of involvement in sustainable behaviors and the maintenance of them, (White, K. et. al 2019) such as cleaning up activities.

Enhancing feelings of pride and morale allows them to commit to pro-environmental actions due to increased feelings of efficiency and responsibility (Antonetti & Maklan, 2014). Hope is another feeling that can be generated by sustainable action and can lead to climate activism (Feldman & Hart, 2018) “Feelings of hope can be augmented by framing climate change as a health issue as opposed to an environmental issue” (White, K. et al, 2019, p.29). This can attract more people to be interested in participating in PEB due to it showing that it is affecting other aspects of life besides the environment. Furthermore, PEB can have positive outcomes linked to innovation and being healthy (White, K. et al, 2019). As an example, to make people relate with sustainable actions and good feelings, people that share on social media their use of a bike instead of a car and while expressing the good emotions that they got from it can elicit empathy and closeness.

- **Demotivation and Hopelessness.**

Serious and huge environmental topics, such as climate change with its immense consequences, can trigger feelings of powerlessness when people feel that their contribution is too small for the size of the problem. A strategy for this can be to "...celebrate small and concrete wins that can positively reinforce further sustainable actions and keep consumers engaged" (White, K. et al, 2019, p.36).

- **Information, Learning, and Knowledge.**

Presenting clear information about the desired behavior and its consequences is key for the individuals to understand why they should change the behavior. People are not likely to engage in a PEB if they do not have the proper information about the problems, the impact of their behaviors and actions, the alternatives that can be taken, and the consequences (Gifford & Nilsson, 2014). However, there are some factors that contribute to the low acceptance of sustainable behaviors. These include the lack of exposure to the information, overloading of information, and confusion (White, K. et al, 2019). However, as Johnson and Saylor et al (2011)[17] supported by Kollmuss & Agyeman (2002), state that strategies and campaigns providing information, knowledge, and understanding of the environmental issues are not enough to stimulate significant and long-term sustainable behavioral changes. In consequence, information can be effective if it is combined with other tactics like social awareness and presenting alternatives to induce the desired behavior (see next section, p.46).

Tangibility

A particularity of the PEB outcomes is that they can seem abstract, vague, and distant from the self (Reczek et al, 2018) and are difficult to grasp for some people. The results of the PEB are not easy to evaluate or track because they take time, develop slowly, and some of the solutions to the issues are still uncertain. Griskevicius et al (2012), highlights that individuals do not often tend to take action on situations that are impalpable in nature. The following are strategies that can help to cope with issues of tangibility.

17 Cited in Van der Linden, S. 2015

- **Matching Temporal Focus.**

Sustainable actions are future-focused, in contrast, most of the people are present-focused. Most of the PEB impacts are not immediately felt by people with some impacts occurring in different lifetimes. A consequence of this is that when people perceive an environmental benefit is in the distant future they will be less interested in it (Hardisty & Weber, 2009). To cope with this, it is necessary to encourage the individuals to think more abstract and to focus on the benefits that the pro-environmental action will eventually bring. Stimulating thinking towards future generations and the consideration of the individual's legacy can increase future-oriented focus and engagement in sustainable behavior (White, K. et al, 2019). Additionally, external impacts other than the self should be highlighted such as the benefits of behaving in a sustainable manner that impact external entities e.g., other people, the environment, and future generations (Ibid).

- **Communicate Local and Proximal Impacts.**

This strategy consists of making visible the direct outcomes of sustainable behavior for a city or neighborhood so it feels more real and concrete (Leiserowitz, 2006). The tactics can be focusing on environmental issues, such as extreme weather phenomena and air pollution, and show how local biodiversity and the people are affected by those. When sustainable behavior occurs the impact will be more tangible related to the highlighted problem.

- **Concrete Communications.**

Make the sustainability topics clear, relevant, and specific. For instance, conveying the immediate impacts of environmental issues and giving clear alternatives to tackle them. For delivering an effective message it is recommended to use communications techniques that include metaphors, analogies, vivid images, and narratives (White, K. et al, 2019). As an example, it can be stated that the Great Pacific Garbage Patch is three times the size of France instead of just showing the number of km^2 (Liu, 2018) or show a picture comparing the ice loss in a glacier in different years rather than a graph.

- **Encourage the Desire for Intangibles.**

Consumption of material goods and the craving from people to own material possession is a huge threat to sustainability. To motivate PEB it is necessary to discourage the consumption of tangible goods. Alternatives to the consumption

of goods can be experiences, digital products, and services. Moreover, taking part in newer trends like the “sharing economy,” where there is a shift from owning and buying products to accessing existing ones through collaboration between individuals and “voluntary simplicity,” that refers to people focusing less in the possession and more on simplifying their lifestyles (Cherrier, 2009). In consequence, sustainable behavior takes place and at the same time fulfills the desires of people without owning unnecessary things.

- **Collective Actions**

In order to have a big impact, PEB needs collective effort. Spreading knowledge about what can be achieved when there is collective action can encourage sustainable behavior. A common use in communication is to highlight the possible impact of a collective action with messages like this, “If everyone in the United States switched to reusable shopping bags and rejected plastic bags we would avoid throwing away to the environment 100 billion plastic bags annually” (Earth day, 2018). This kind of message can have 2 outcomes, on one side it is the incredulity by the people that everyone in the United States would do that. On the other side “it scales up the perceived size of the impact, which could increase sustainable behavior” (White, K. et al 2019, p.35).

2.2.5 Measures to Reduce SUPB

Different strategies and alternatives to restrict or eliminate the production and consumption of SUPB were reviewed from legislation to alternatives to awareness campaigns. The measures come from the efforts of different stakeholders e.g., governments, scholars, NGOs, and ordinary citizens. These measures directly influence behavioral change. In this section the measures are briefly explained due to the fact that the implications on the change of behavior are described in the above section.

In order to implement any kind of measure, the thickness of the plastic bag is an important factor that has to be defined to regulate which type of plastic bags would be taken into consideration within the measures. To illustrate, the European Union has defined the low density bags or lightweight bags as the ones that are not over 50 microns (0.05 millimetres) of thickness (UN Environment, 2018a).

Figure 12. People using plastic bags for grocery shopping
Source: https://gerlach-customs.com/news/sweden-introduces-tax-on-plastic-bags/

Policies

There are tools to change people‘s behavior discouraging the use of SUPBs (Homonoff et al, 2018). Their objective is to disincentivize and reduce, partly or completely, the use and production of SUPB (Clapp & Swanston, 2009) before it enters the environment (Willis, K., et al, 2018). The global south, specifically African countries, were the first ones to implement anti-plastic bag policies.[18] The most common ways are bans, taxes, and fees. According to the UN Environment (2018a) by 2018, 127 countries have implemented some form of legislation to reduce the SUPB consumption and to change people’s behavior.

-Ban On Plastic Bags

Bans work as a regulatory instrument that prohibits retailers from giving out SUPB (Lopez, J., 2015). The ban can be total or partial e.g., banning bags under 30µ thickness (0.03 millimetres). This affects the behavior of the people where their usual habit of having SUPB for groceries is disrupted[19] (see section Habit Formation, p.33).

18 The implementation in Africa countries has not completely succeeded. To illustrate, in 2008 a severe ban was implemented in Rwanda, banning production, use, sale and importation of all plastic and those were replaced by paper and cloth bags . Penalties can range from high fines to jail (UN Environment 2018b). However, not all the key stakeholders were consulted and the low income population was not taken into account (Ibis). Due to the lack of good and affordable alternatives, the population started to smuggle plastic bags and the black market of plastic bags has become a lucrative business (Werft, 2015

19 In 2009 South Australia was the first state in Australia to ban “lightweight checkout style plastic bags”, effectively eliminating around 400 million of SUPBs and changing consumer behavior to have alternatives such as reusable bags (Green Industries SA, 2019).

-Taxation

A tax can be levied on the supplier (producers and importers) and retailers such as supermarkets. The cost of the tax is often passed on to the consumers (Lopez, J., 2015; UN Environment, 2018b). The tax for the plastic bags is framed within the Pigovian tax on pollution, which is a tax that is imposed on industries that harms the wellbeing of the society, such as polluting the environment (Kagan, 2020). It makes companies, in this case the plastic industry, pay for what they pollute. By shifting responsibility to the company or industry, it encourages them to find more profitable and less polluting activities and to incentivize finding sustainable alternatives (Sostenibilidad para todos, 2016)[20].

-Economical Instruments

Monetary tools that "encourage desirable behaviors or discouraging harmful behaviors will be effective only if the magnitude of the incentive exceeds the costs an individual associates with changing his behavior."(Homonoff, 2015a p.1). It can be a fee or penalty when discouraging bad behavior. It can be a reward or incentive for good behavior.

Fees are also known as a levy on consumers, because shop owners charge directly to the consumer for the plastic bags (Lopez, J., 2015) instead of giving them out for free. This allows the customer to make their own decision about whether to pay for a bag or not. Fees can be more effective than other policies because they are linked to "loss aversion" that was explained in the section on habit formation. For instance, plastic bags often get a small charge, from about 0.5 to 0.10 dollar, that is enough to make people want to avoid paying for it (Schwartz, 2020). In contrast, rewards are gains for the consumers and they can be taken as bonuses or discounts for bringing a RB (Homonoff, 2015a). A study conducted by Homonoff (2015a) in Washington D.C, demonstrate that a levy of 0.5 dollar in SUPBs drives a significant decrease in plastic bag consumption, while in contrast,

20 In 1993, Denmark was the first country to introduce a tax based on the bag's weight on the manufacturing or import of SUPB. The retailers were allowed to pass the cost on to consumers. As an initial result, the use of plastic bags drop by 60% (Larsen, J., & Venkova, S.,2014). Nowadays, the average use of plastic bags in the country is 4 per person per year; the lowest in Europe (Gunn, K. 2018).

a bonus offer of 0.5 dollar for RBs usage has almost none effect in the reduction of SUPBs. This show that consumers are more affected by loss aversion than gain (Homonoff, 2015a)[21] [22]

> **The Case of Chicago:** The city has used different legislation to regulate the use of SUPB. In 2015, a ban on SUPB free distribution was imposed. As a result, some supermarkets started to offer for free or for purchase thicker and reusable plastic bags, biodegradable bags, cloth bags, or they switched to paper bags (Elejalde-Ruiz, 2015). However, this did not significantly influence the behavior of people as they kept using these alternatives as they would SUPB, with the exception of cloth bags (Ibis). In 2016, the ban was revoked and replaced with a 0.7 dollar tax on all SUPB and paper bags (Homonoff et al, 2018). According to the study led by Homonoff et al, after the tax implementation, the use of disposable bags decreased significantly and the use of RBs increased. As well the probability that consumers are using RBs or not using any bags at all increased considerably.

Voluntary Agreements

They are arrangements and negotiations between the government, the producers, and retailers and social partner organisations to facilitate voluntary action to have a specific outcome such as the reduction of SUPB, to demonstrate public-private collaboration (UN Environment, 2018b, Tough, 2007;) and to encourage a behavioral change. The agreements should be monitored by external and internal parties (European Environment Agency, 2019). Retailers can be encouraged to lead a voluntary agreement by factors such as corporate

21 In 2002, Ireland was the first country to impose a levy on SUPB (Irish Environment, 2015) called plastax. The levy on the consumers was 0.15 Euros and in 2007 was increased to 0.22 Euros. This led to a reduction of the 90% of SUPB in the first year of the policy implementation (UN Environment, 2018b). The money raised is used for environmental projects. The success of the policy was thanks to the consultation with key stakeholders including the industry and strong awareness campaigns (Ibis).

22 In the global south, similar measures were implemented. In Colombia in 2017 the tax on plastic bags was established. The tax rate starts at 20 Colombian Pesos (0,005 USD) and it would be increased gradually reaching 50 Colombia pesos in 2020. (Tiempo, C. E. E. 2017). This is charged per each plastic bag delivered by department stores and supermarkets. The aim of this tax is to disencourage the consumption of plastic bags due to a Colombian, on average, using 288 plastic bags a year (Ibid). By December 2018, Colombia managed to reduce the use of plastic bags in the main commercial establishments by 53% compared to the annual average (Portafolio, 2019). This measure supported a law in 2016 that established that bags smaller than 30 x 30 centimeters must be removed from circulation and those that continue to be produced will have to include messages of caring for the planet. (Castillo, J., 2018)

social responsibility or marketing purposes (UN Environment & Mediterranean Action Plan, 2019).

The most common voluntary agreements work as an economic discouraging tool for the consumer, which leads to a reduction of SUPB consumption. These are: the non-distribution of plastic bags and make available alternatives where most of the time the consumers assume the cost of them or paying for the plastic bag itself, as well having the option to buy a RB (UN Environment & Mediterranean Action Plan, 2019)[23]. The outcomes related to behavioral consumption are the same as the policies ones. (Refers to Habit formation section, p.33)

Social Awareness and Public Pressure

These strategies can result in gradual behavioral changes and furthermore in implementation of laws. According to the UN environment (2018b) awareness campaigns are designed to persuade and educate in topics such as proper disposal, reuse, recycling, and most important the responsible use and impacts of SUPB. These strategies should serve as a support for measures such as taxation and banning to reinforce and make them more effective. Additionally, social and information campaigns aim to behavioral change "without altering incentives or authority systems, working through ideas, information, learning" (Weiss 1990)[24]

Willis et al (2018) refers to education as an effective way to raise public awareness to reduce plastic waste, and it also creates a sense of "environmental responsibility in participants". Additionally, to achieve a long term change, environmental awareness in educational institutions should be integrated as well messages framed in "regular didactic practices" (UN environment, 2018b). For instance, clean up campaigns in beaches or rivers motivate participants to question their own consumption and littering behavior and can create as well as a sense of "custodianship" (Willis et al, 2018). In addition, the expert in social behavior Les Robinson, states that public awareness should be focused

23 In 2017 in Switzerland the biggest retailer associations signed a voluntary agreement to not provide single-use plastic bags for free with some exceptions (bags used for vegetables and fruits). The retailers charge CHF 0.05 per lightweight plastic bag. This resulted in a decrease by the 84% of SUPB consumption in the first year of the implementation.

24 Cited in Tough, 2007

on positive emotions, rather than negative feelings, therefore making new behaviors easy to follow and make people feel that they are supported by the community (Kolff, 2018).

Public or social pressure is defined as the influence exercised on a person or group by another person or group. (M.S, 2013)[25]. It can work as collaborative empowerment (Kolff, 2018) [26]. Raising social pressure can serve as a trigger for policy decision making (UN environment, 2018b). Both at the government level and at retail level.

Alternatives

There are a significant number of alternatives to SUPB. From basket to cardboard boxes and backpacks. However this section will focus on three widespread and popular types of bags. Every material and manufacturing of these bags has different carbon footprint and environmental impact. The key for a bag to be a better option is to be reused several times. This is supported by the study made by the environment agency of the UK (2011) that found that durable carrier bags are being reused, the impact reduces "Whether this reuse is achieved depends both on the physical properties of the bag and consumer behavior." (Great Britain, & Environment Agency, 2011, p.57).

25 The "Bye Bye Plastic Bags" a young drive initiative in Bali, Indonesia, with the purpose to encourage people to say no to plastic bags and at the same time ban them (Rosane, 2018). The teenagers have campaigned for over six year starting with a beach clean up and a signature-gathering campaign that collected over 100,000 signatures (UN environment, 2018b). This influenced the governor to sign a memorandum of understanding to phase out plastic bags by 2018 and they have achieved that businesses such as hotels and restaurants engaged in the campaign and committed to reducing plastic waste. (Ibis).

26 An example of collective empowerment and pressure onto retailers is the campaign by Greenpeace, which encourages people to make pressure on the overpacking of vegetables and fruits through stickers that state " I'd like this product to be plastic-free" and "We love plastic-free fruit and veg". Moreover, sharing pictures in social networks with the hashtag #Ridiculous-Packaging. This is an easy and effective way to motivate consumers to push for environmental alternatives in supermarkets.(Kolff, 2018)

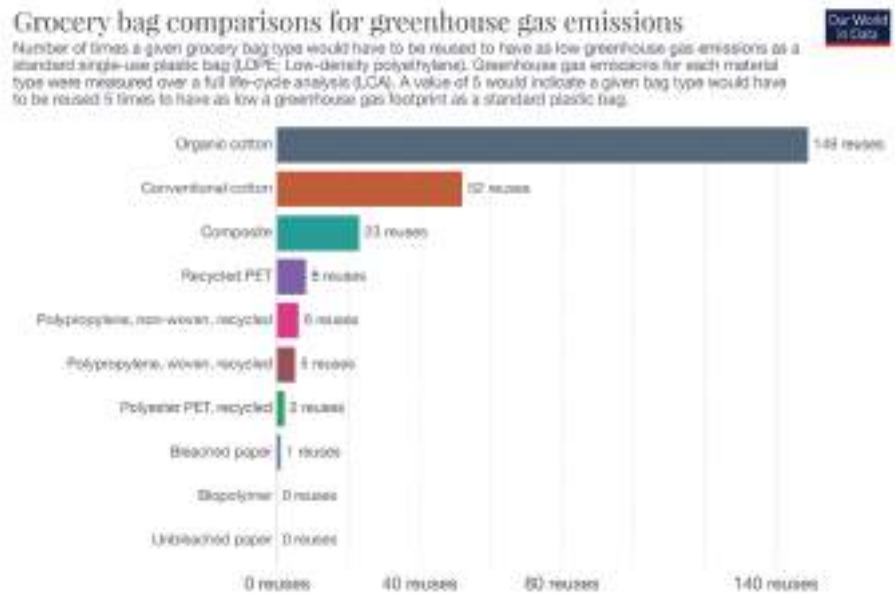

Figure 13. Grocery bag comparisons 2018.
Source: Our World in Data based on The Danish Environmental Protection Agency (2018).
Retrieve from https://ourworldindata.org/grapher/grocery-bag-comparisons-ghg

-Reusable or Durable Carrier Bags

They are designed for multiple reuse and produced in different materials from natural fibers to synthetic ones, such as polyethylene plastic (PE) polypropylene plastics (PP), multiple types of cloth (cotton canvas, nylon, jute, etc.), and recycled plastic beverage containers (polyethylene terephthalate, or PET) (ICF International, 2011). In comparison to SUPB, they require more water and energy consumption to be produced, and their carbon footprint and recyclability depends on each material. Even though, if they are used several times the carbon footprint will reduce (Ibid). Regarding the disposal of the RBs, recycling them is not easy and depending on the material they would require different processes. Therefore, most of them are not recycled and end up in the landfill (UN Environment, 2018b).

-Paper Bags

Often they are perceived as a sustainable and popular alternative. However, they are likely to be used once, becoming a single use item as well (Evans, D., 2019). Only if they are reused more than three times, their environmental impact would be less than plastic bags (Great Britain, & Environment Agency, 2011). Yet, they are not easy to reuse, because they tear easily (All about bags, 2012). Additionally, their production is more highly water and energy intense

than plastic bags and generates more carbon emission (Access Science, 2019). Paper bags are heavier, which increases transportation costs, gas emissions, and waste disposal weight (Tanguay, M., 2019,). In contrast, thanks that they are heavier they do not easily blow with the wind as plastic bags do.

The material to make paper bags is coming from trees, on one hand, the overconsumption of paper bags can put high pressure on the forest (Lopez, J., 2015), and lead to deforestation (Access Science., 2019). On the other hand, thanks to the nature of this material, it allows paper bags to have a high recyclable rate, to be biodegradable, and compostable (Evans, D., 2019). Even though, according to Evans, D. (2019) 80 percent of paper bags go to landfills.

-Bioplastics: Biodegradable and Oxo-Biodegradable Bags

Bioplastics are designed to degrade thanks to the action of microorganisms such as fungi, algae, and bacteria (ICF International, 2010). They are regular plastics that are added around 20 percent or more of renewable materials such as starch. However, not all types of bioplastic are biodegradable. (UN Environment, 2018b). Some types of biodegradable SUPB can actually break down completely only if they meet certain conditions such as being exposed to prolonged high temperature above 50°C or placed in a composting facility (ICF International, 2010). These conditions are not often commonly found in the environment (UN Environment, 2018b).

Oxo-Biodegradable plastic bags are conventional plastics that have “have small concentrations of additives to accelerate the fragmentation of the material, when exposed to ultraviolet light or dry heat and mechanical stress, break the plastic into small particles which may then be further degraded by microorganisms”(Defra, 2010). However, the European Commission, (2018, p.2) state that the plastic particles, fragment into microplastics, “with similar properties to microplastics originating from the fragmentation of conventional plastics.”

There is a lot of controversy about these alternatives, due to the fact these bags do not automatically degrade in the environment, they have to meet conditions that are not easy to find in the environment. Additionally, they can not be reused for long-term, due to they are designed to start fragmenting within a few months or years, they can not be recycled or composted (New Plastic Economy, 2019)

Conclusion

The researcher uses these concepts and frameworks as a way to understand different determinants that influence the current behavior of people and to analyze which factors can be applied in the context of Cairo. However reviewing the SHIFT framework, even though there are some interesting strategies to predict, and to influence the behavior, it is found that some of the factors proposed focused on individuals that already have some level of environmental awareness. This is an element to take into account before to implemetate them. In contrast, measures can affect the behavior of people that do not have environmental awareness. This is why some factors are likely to work better with the support of other ones in order to have more effective results in the intention and execution of a PEB. For example, banning should be hand on hand with alternatives such as RBs, awareness campaigns and social influence. This should be adaptable to the contextual conditions.

Figure 14. Alternatives to replace SUPB
Source: Author

3. Case of study: Cairo a city that drowns in SUP

Figure 15. Informal nodes of plastic pollution on Cairo‘s streets
Source: Autor

This chapter explores the situation of Egypt and Cairo regarding plastic pollution, focusing on SUPB. Firstly, an overview from the historical background is given in order to understand the previous pattern in the consumer behavior, how they evolved, and the influence of the political and economic shifts. Secondly, the circumstances, impacts, measures and efforts that are currently happening in Egypt and Cairo are discussed. The following text was built with information collected through personal communication with stakeholders and secondary data.

3.1 Consumption background in Egypt

Egypt has been through different transitions that have shaped the consumption behavior of society. Under the socialist regime of the Nasser government (1956–1970) the consumption of goods was restricted, nevertheless, the middle class developed a consumerist attitude towards local production. „People were rather satisfied with what they have and less resentful of the continuous unfulfilled expectations of consumerism“ (Abaza, 2006). The people used to reuse glass bottles for storing water and biscuits tins as a multipurpose item (Ibid). In this time Cairo was not too overpopulated, solid waste management (SWM) was not a problem and the city was clean[27]. The Sadat‘s open door policy in the 70‘s brought plenty of changes in consumer behavior. This drove to the westernization of Egypt (Serag, 2008; Mourad, 2014) and according to Abaza (2006) the consumption of non-essential products increased. People shifted from buying local products to purchasing imported and more expensive goods (Ibid). The integration of Egypt into the capitalist world encouraged consumerism as a new lifestyle (Abaza 2006).

In the 80’s the population growth accelerated. In addition to this, more Egyptians were having higher salaries, leading to an increase of consumption and waste production [28]. People used to had RBs from cloth, thick plastic and other strong materials, as well they used baskets and paper bags, and have their own container to buy liquid food[29] such as *ful* [30]. In the middle of this decade plastic bags use was slowly spread as well the use of plastic bottles (Abaza 2006). Also, people used to buy stuff to keep, to use and to fix, in contrast to the current throw-away culture[31] In the 90’s globalization started to permeate the egyptian society and the consumers started to follow the western trends, as an evidence a large number of malls were built in Cairo (Abaza 2006). Therefore, the production and use of SUP became common and socially accepted practice[32]. The plastic pollution started to be a visible issue in the country.

27 Kamal, personal communication, March 15, 2020 (see appendix)

28 Ibid

29 Shaat, personal communication , April 20, 2020

30 Mashed fava beans

31 Khalil personal communication, April 30, 2020

32 Khalil personal communication, April 30, 2020

In the last two decades, the number of hypermarkets and supermarkets have increased. This changed the way Egyptians make grocery shopping and have encouraged the consumption of plastic thought packaging and SUPB. (Gressel et al, 2010). Thus, the plastic pollution in the country exploited, becoming a visual and a real problem. “Egypt only got these plastic craziness only in the past 18-19 years. It starts from 2000’s” Kamal, personal communication (March 15, 2020). The problem of plastic in the last decades has been intensified by the lack of a proper SWM and the throw-away society which make very convenient and accessible the use of SUP[33] [34].

Figure 16. A batch of plastic bags in a vegetable market.
Source: Author

33 Abaza, personal communication, April 09, 2020

34 Khalil personal communication, April 30, 2020

3.2 Egypt & the plastic: the current situation

The plastic consumption level in Egypt is unsustainable. According to statistics from Our World In Data Organization (OWID)(Ritchie & Roser, 2020), Egypt generates approximately 5.4 million tons of plastic annually and it increases every year, 67% of this waste is mismanaged, resulting in incineration and in the disposal of in open and illegal landfills where it is most likely to make its way into water bodies through winds and streams (WWF, 2019). Even though this estimation is from 2010, the projection for 2025 shows a similar rate of growth for plastic production in the country (Ritchie & Roser, 2020).

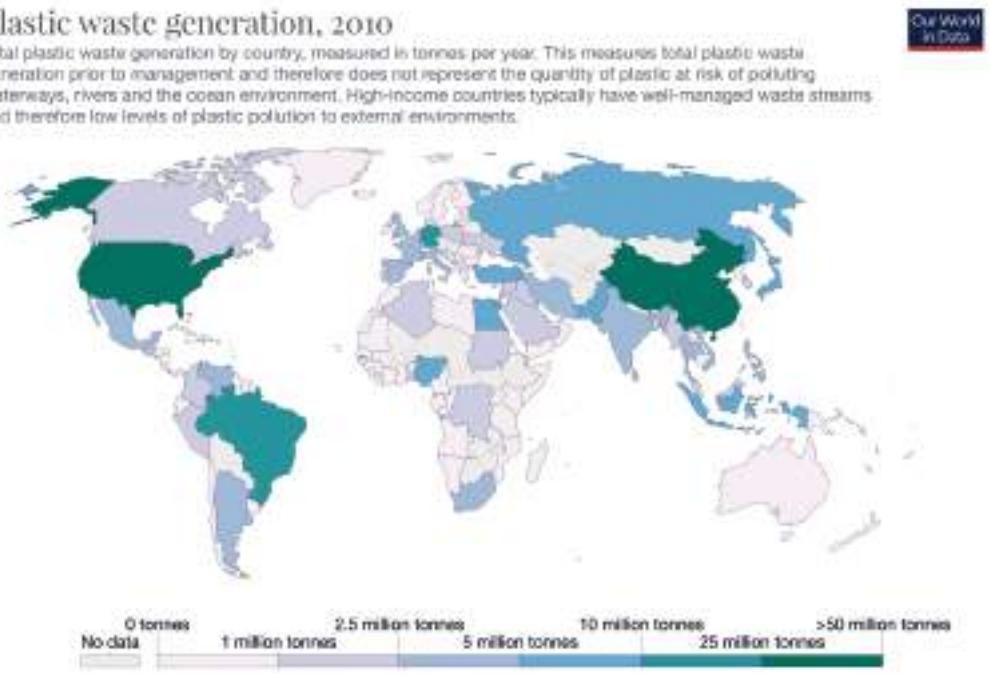

Figure 17. Plastic waste generation by countries.
Source: Our World in Data based on Jambeck et al, 2015 & World Bank
Retrieved from https://ourworldindata.org/plastic-pollution

Due to geographical location with the Mediterranean Sea on the north and the Red Sea to the east, the country is having serious impacts on the environment. This is illustrated by the statistic from OWID that ranked Egypt as the biggest polluter in the Arab World and the second biggest in the Middle East after Turkey (Nader, 2019). In 2019, WWF cataloged Egypt as the main source of plastic pollution in the Meditteranean Sea, contributing 250,000 tons per year. It is not just affecting the country, but at a worldwide level its contribution is significant.

Egypt has another issue, the plastic sector is an import dependence of raw material to produce plastic, for instance 70% of PE[35] is imported (CEDARE, 2019). That is also a burden for the country's economy.

> *"What is happening is we can not stop the import of the raw material of the plastic that is costing us 60% of the price. We are bleeding money because some people want to do some ridiculous business in Egypt selling plastic bags and supermarkets are consuming and giving them for free to the people. It is a very damaging industry from all levels" Yassin from Banlastic, personal communication (April 4, 2020).*

Regarding SUPB, the country has a strong dependency on them (El-Sayed, 2018). The Egyptian Plastic Technology Center (EPTC)36 estimated that Egyptians consumed around 14 billion plastic bags per year in 2019 (CEDARE, 2019). The sectors where the plastics bags are more consumed are in the groceries shops, fruits and vegetables kiosks, stores and shops and large supermarkets (Ibid). According to CEDARE (2019), the major environmental concern is littering, that consequently have impacts on the Nile, the Mediterranean and the Red Sea, and in the environment in general.

Figure 18.SUPB market segments
Source: CEDARE, 2019.

35 Polyethylene

36 The Egyptian Plastic Technology Center Belongs to the Ministry of Trade and Industry

Impacts of Plastic in Egypt & Cairo

Figure 19. Plastic bottles in the Fayoun desert. Egypt
Source: Author

Figure 20. Plastic pollution in The Nile river. Cairo
Source: Author

Figure 21.Plastic bag blowing away by the wind thanks to its parachute shape and its light-weight. Cairo
Source: Author

The repercussions of plastic debris in Egypt are the same as those worldwide. There are some specific implications related with the natural and urban geography, economy and dynamics of the country. The following information was provided mostly by interviews with expertises.

The vast amount of plastic consumption in the country has resulted in detrimental effects on the environment. These effects include plastic pollution on the streets, around heritage landmarks, the clogging of sewers, and the contamination of water bodies. To illustrate, the Nile has a significant contribution to the pollution of the mediterranean sea but is not on the 10 top most polluted rivers, thanks to the flow of water coming into the river is very little[37]. In contrast, there is more irrigation canals that takes water from the river, and those are more polluted than the river itself[38]. In agricultural land plastic can clog waterways, irrigation systems and pipes. It is clogging the drainage water in the delta region, some of the water waste is used for people

37 Kamal, personal communication, March 15, 2020

38 (Ibid)

that do not have access to tap water[39]. Furthermore, plastic incineration is a common practice in the country, which releases harmful gases into the air (El-Sayed, 2018), contributing to climate change and air pollution in Egypt.

For instance in coastal cities, beaches are greatly polluted that people are not enjoying them because they are not clean properly. The fish stock is being affected as well by the plastic debris[40]. Also, the country is very famous for places for diving but the oceans are highly contaminated that tourism can easily decrease .“When tourists save money the entire year to come and dive and want to see the coral reef and instead they see garbage, they say to the locals that they are not coming again” Dorghamy from CEDARE, personal communication (April 29, 2020). Egypt‘s economy depends heavily on tourism and this sector is the most affected one. Moreover, the Egyptian Ministry of Environment states that seabirds and many marine species are highly vulnerable to being poisoned by plastic (Espanol, 2019), as well the coral reefs are under threat.

Plastic and SUPB affected all levels of the Egyptian economy. Besides tourism, maritime trade and fisheries sector (Espanol, 2019), it costs a lot of money to the government to collect and dispose of all the plastic pollutants. In addition, the SWM system[41] is not properly prepared and equipped.

3.3 Efforts to solve the problem

There is a considerable number of environmental NGOs, civil society initiatives and research centers working actively in Egypt. Some of them with some support from the government. They work with strategies from raise awareness, create alternatives to SUP and research, to propose policies, and push the government for laws to ban these items.
In the last decade, environmental awareness has been slowly increased. In 2011 the Red Sea province proposed a SUP ban. Unfortunately, this plan was put on hold owing to the political turmoil in which Mubarak was overthrown (France 24, 2019). In June 2019 the initiative took place as a decree and the use of SUP was banned in commercial facilities such as restaurants, supermarkets, and coffee shops as well as on boat trips and safaris (El-Gundy,

39 Dorghamy, personal communication, April 29, 2020

40 Yasin, personal communication, April 4, 2020

41 Yasin, personal communication, April 4, 2020

2019). Particularly, because the environment is significantly important for tourism, the main economic sector of this region. Additionally awareness campaigns were supporting the implementation of the ban and eco-friendly alternatives sprout in the region (Ibid). The ban was pushed maily for the Hurghada Environmental Protection Association (HEPCA), and civil society. It was implemented for the government in charge of that moment as an executive order (Ibid). Nevertheless, the new governor withdrew the ban[42], but it is still implemented by the community. Despites of that, the ban on SUP in the Red Sea governorate indicates that strategies that focus on reducing consumption of SUP can succeed in Egypt.

After making an analysis for the status of SUPB in Egypt, a policy measures to address SUPB in Egypt was presented by CEDARE[43] with the support of different stakeholders. For them, awareness activities are important but slow. They are pushing hard for a law implementation on banning free distribution of SUPB that will reduce the amount of the SUPB in the environment faster. However the drawback they found it is the difficulty to monitor and evaluate the enforcement of the law, and the willingness of the government to implement such a law (CEDARE, 2019) .The stakeholders involved in this policy are expecting to have it implemented in a couple of years, with the help of effective regulations and awareness campaigns. This will result in the reduced consumption of SUPB, in parallel with the improvement of the SWM.

Environmental organizations such as Banlastic (Alexandria) and Greenish (Cairo) have a similar focus. Some of the most successful campaigns have been clean ups in the Mediterranen Sea and in the Nile, respectively (Espanol, 2019). They generally do workshops, awareness campaigns, research and they address different levels in society with customized strategies, for example in middle and upper classes they focus on awareness and in low class they focus on showing them how to manage waste and have a profit of it, and also in health security[44]. They inform not just about the impact in the environment of plastic but on the health of the people, this aspect has been more significant for the population.

42 Khalil, personal communication, March 30, 2020

43 Center for Environment and Development for the Arab Region and Europe

44 Khalil, personal communication, March 30, 2020

They have eco- friendly alternatives to replace SUP[45]. Additionally, they are part of the Coalition Ban Plastic Egypt, where different organizations are pushing for a law to ban SUP, where industry and government are also involved (Espanol, 2019). The Egyptian Initiative for Personal Rights is part of the coalition with the department of Health and Environment. They research about waste, how to handle plastic, and have published relevant studies about bioplastic and oxo-degradable plastic[46].

Figure 22. Cleaning up in The Nile river by Very Nile organzation
Source: Author

45 Yasin, personal communication, April 4, 2020

46 Elgerzawy,personal communication, April 8, 2020

3.4 Cairo a city that drowns in SUPB

The capital city of Egypt is one of the biggest cities in the world with a population of over 20 million people (CAPMAS)[47]. It produces more than 15,000 tons of waste per day of which only 60% is properly disposed of and recycled. The remaining 40% of waste goes to the streets and illegal landfills (Zafar, 2019). This leads to a huge environmental strain. Cairo's SWM system is managed by formal and informal waste collectors *Zabbaleen*. The latter being the most important actor in waste collection in the city. Around 60% of the solid waste produced in Cairo is collected by Zabbaleen, of which 80% of it, it is recycled and recovered (Ibid). They are in charge of processing and recycling a large quantity of plastic. Even though the lack of a proper SWM leads to people to throw away the garbage on the streets and water bodies or to incinerate it.

Plastic pollution, of which SUP and SUPBs are the most common items, makes a considerable contribution to the waste problem that Cairo faces. Plastic waste can be seen everywhere in the city. Litter covers streets in the neighborhoods, it accumulates in the Nile river and is even present at the Giza Pyramids. Around Cairo, it is common to find huge piles of plastic and other types of waste on sidewalks, streets, and corners.

This is not just related to the waste management system, but the lack of education and infrastructure for the prevention and proper disposal of the waste. Around the city it is not easy to find a trash bin or places to properly dispose of the waste, this leads to the waste being littered everywhere. Additionally, the massive consumption of SUP items that are used briefly has significantly increased the amount of litter that covers the urban and natural fabric.

Cairenes have a strong reliance on SUP items (El-Sayed, 2018). The way they consume, use, and dispose of them is having a significant negative impact, not just on the environment but also affecting the dynamics of the city itself.

47 CAPMAS The Central Agency for Public Mobilization and Statistics in Egypt

Figure 23. Informal node waste. The lack of SWM bring animals that scattered all the garbage and break the plastic bags in Cairo
Source: Author

Conclusion

Egypt is struggling with two main problems related to plastics, the overconsumption of it and the mismanagement of waste such as SUP that is massively consumed and not properly disposed of. This becomes more evident when plastic can be found everywhere, including in the desert and remote places. If waste management improves, not all plastic material is suitable for recycling. For instance, SUPB are not easy nor cheap to recycle. It can be inferred that improving SWM probably will not reduce consumption. Actions should be taken and include both prevention and reduction in order to prevent plastics from being leaked into the environment. This should involve changing people's consumer behavior and awareness towards SUPB.

4. Findings: Unveiling Behaviors and Habits

Figure 24. Coconut drink poured in a plastic bag , the straw is included.
Source: Autor

The behavior and habits of the Cairenes are exposed through different perspectives. Experiences from the researcher, point of views from the stakeholders and the perceptions of the respondents. The following is a description of the findings gathering through the data collection methods. These findings are categorized by subtopics.

4.1 Discovering The Dynamics of Cairenes Towards SUPB

Methodology used: Participation Observation

The dynamics in supermarkets, work in a way when the client is paying for the products at the cashier, the groceries are immediately packed in individual bags. Then, if there are small items previously packed in bags, they are placed in another big bag. People receive all the bags without any complaints. Sometimes they ask for an extra one. People tend to carry all the groceries in plastic even though they are products that can be easily carried by hand or in a backpack. In the street vegetable markets, the vendor places each type of vegetables in a different bag in order to weigh each bag. After that, the consumer gets their vegetables packed in individual bags.

After the social experiments were done, the results showed that vendors and clerks are not used to people rejecting SUBP and bringing their own RB. In bulk stores, the vendors attempted to replace the SUPB that was brought for reuse for the purchase for instance rice, by a new SUPB.

It can be inferred that these behaviors are tied with the customer service culture, where the shop workers show appreciation through having all the purchases for their client well packed in new plastic bags.

Observations were also taken in food chains. Consumers would often buy food and take it elsewhere to eat, for instance, a falafel sandwich. Most of the time these kinds of fast foods come wrapped in paper or plastic and then they are placed in a plastic bag before handing them to the customer. It was observed that after the people got the bag with the food inside they would remove the food and immediately dispose of the plastic bag. These plastic bags have a service life of just a few minutes.

At the same time that the observations were made, small and casual conversations were taking place about the relation that plastic has in the everyday life of people. The general answer provided was that they take SUPB because it is for free, even if they do not intend to use it. They do not conceive

there is a problem to pack their groceries in multiple plastic bags. Also, some did state that they keep some plastic bags at home to reuse. However, most of the people that spoke during the phase, about the topic did not have enough information about the impact that SUPB is causing or the resources that are used to produce it.

A certain number of people do not give a second thought about the plastic they are consuming every day. To them, it is just part of their daily routine and the idea of rejecting the SUPB is unheard of. They think they are paying for the SUPB when they buy a product.

"what should I not take the plastic bag if I pay for that when I buy my food? Why do I have to give it back to the store? I took it because it was given from the store and I trashed it because I do not need it " well-educated man, 32 years, personal communication.

This small talk happened after this person bought a sandwich that came with a plastic bag. He took the sandwich from the bag and then he threw the bag away after he left the store.

Figure 25. Street markets in a typical street in a traditional neighborhood in Cairo
Source: Alamy stock photos
Retrieve from https://c8.alamy.com/compde/r20hn6/kairo-agypten-dezember-21-2017-die-strassenszene-in-al-khayama-basar-mit-lebensmittel-und-haushaltswarenindustrie-geschafte-wandern-fussganger-und-reiter-tuk-tuks-auf-dec-r20hn6.jpg

4.2 SUPB and The City: a Complete Overview From Expertises

Methodology used: In-Depth Semi-Structured Interviews

Plastic Pollution in Cairo and Egypt

Cairo is a megacity. Big cities tend to consume more plastic and this is linked with the economical income, the lifestyle and the capitalism system. Plastic debris is a serious issue in the country and in the capital city. This can be evidence in the amount of plastic litter found in the streets and in The Nile. According to the interviewees there are two major problems: the lack of proper waste management and the way that people consume and dispose of SUP. Therefore, the government is not having this issue within their priorities.

The stakeholders agree that the most consumed and littered SUP items in Cairo are plastic bags, food packaging and beverage bottles. However, the latter, unlike the others, is collected and recycled because plastic bottles have an economical value.

Characteristics of SUPB in Cairo

Plastic bags are given for free. “Any free product causes more demand, that is natural in human behavior” Dorghamy[48] from CEDARE, personal communication (April 29, 2020). This illustrates the overconsumption and overproduction of plastic bags in Cairo. Therefore, they are really cheap to produce and it is a lucrative business. The majority of SUPB used in Cairo are thin and low quality. The problem is the thin and low density plastic bags and not the thick one, due to the thin plastic can be cut really easily and move effortlessly with the wind and water streams, that result in the leakage of SUPB in the environment, which is the biggest problem of SUPB. Therefore, SUPB does not have any economical value for the collectors.

Consumerism

SUPB were gradually introduced, but not all shops were using them, after the demand on them increased, the cost decreased and that brought more consumption. Thus, a huge increase in the population in the country in the last

48 Dorghamy has been involved in the “analysis for the status of Single-Use Plastic Bags measures in Egypt.

decades and the improvement of life standard have driven an increase of the consumption. Some of the stakeholders, reflect that the consumers behavior and urban lifestyle around the world are also affecting Egyptians thanks to globalization, they are also following those patterns.
Especially in big cities such as Cairo, the massive consumption happens in hypermarkets and supermarkets, where every product is packaged in plastic. Additionally, they will be delivered to the consumer inside a SUPB. Some stakeholders stated that most of the consumption of SUP is from middle-upper and upper class.

"People need to be more aware about their consumption. They have the choice or the luxury to adjust their consumption, but the majority in Cairo and in Egypt are not upper middle or upper upper. The majority of people are struggling so they will buy the cheapest option, they do not have time. They want the convenience option " Khalil from Greenish, personal communication (March 30, 2020).

Cultural Behaviors & Habit

There are some beliefs regarding plastic bags in the egyptian society. People related plastic bags with the concept of cleanness and hygiene, especially the transparent ones. The black ones are made of recycled material and are not good for package food, instead they prefer to use the transparent ones to carry food. This is a well-known factor spread in society. In general, people are not aware of the health problem that plastic bags have.

An extended belief among supermarkets is the way they show appreciation to the customers through the plastic bags. "they will be generous in distributing the bags. It will be an attractive sign for the customers or a compliment from their side." Elgerzawy, from The Egyptian Initiative for Personal Rights, personal communication (April 8, 2020). This is a strategy to make the customer think they are generous. Therefore is related to the clerk or person that packs the groceries, "they are usually generous because on one hand they are getting tips from the customer and on the other hand even if they do not get tips they want to be generous because this is for free and they no receive any instructions to be reasonable in their use" Dorghamy from CEDARE, personal communication (April 29, 2020).

The problem with free things as Dorghamy stated before and it is also supported for other interviewees is that people go shopping and they take more bags than they really need just because they are for free. Egyptian tend to store the plastic bags they got from the groceries shopping. It can be inferred that SUPB are used more than once in households. There is a psychological effect, even if people know they will get more plastic, at the same time they want to keep them. The most common uses are as a bin liner, carry bags and storage food in the fridge. However, they are thrown away after few uses. This can carry problems of public health, because when use them as a garbage bag, and are disposable on the streets, they attract street animals that cut the bags because they have food creating nodes of waste on the streets.

Particularly in informal and low income areas the use of plastic bags as a food container is a common practice in Egypt, it means the food is in direct contact with the plastic. One clear example made by the stakeholders, It is that juices and other beverages are generally put in thin plastic bags, to explain better the liquids fill the bag and the seller knots the bag and give it to the client with a straw.Therefore hot and cook meals as *ful*[49] are also poured in thin plastic bags regardless of the chemical reaction that plastic has over food.

Another phenomenon that stakeholders emphasized was that even if people store the SUPB, and they use them as much as they can, they have to throw away a portion of these plastic bags after the first use due to the increased amount of those items. When they are trashed they can have different paths, if they are thrown away in a garbage bin they mix it with all the waste for one side and when collectors are looking for material to recycle, they throw the SUPB on the streets because they are not valuable for them. For the other side, if people do not find a bin, they are thrown then in open spaces where they fly, and can go to gardens, trees, streets and the Nile.

Normalization of SUP and throw-away society

Some of the stakeholder interviewed agreed that people do not see SUP as a problem, they see it more as a convenient item and they normalize the use of them. Therefore, the culture of Cairo is not sensitive to the problem of littering, the people do not have the awareness to dispose in a good way, they just throw the waste on the streets, that is also reflected by the lack of proper waste

49 Mashed fava beans

collection. However, they know that plastic can be recycled.
People now are immersed in a throw-away culture where the norm is to buy something to use briefly, and then trashed, this is also linked with the idea of convenience. Especially, with the fast rhythm of life in Cairo. This has become socially accepted without thinking too much about the consequences of these behaviors.

" If you have a birthday party or a lunch in your house you bring a SUP item because you don't want to clean you don't want to have any effort and that is the idea of convenience and how SUP becomes attached to convenience. Low cost and there is no need to clean, I can buy and can throw away. Our generation and also the older generation became embedded from the 80s" Khalil from Greenish, personal communication (March 30, 2020).

Another reason for the normalization of SUP is that people and special kids have growth in environments surrounded by plastic, they see this as a normal landscape and it is not so easy to them to connect with a a green landscape

Environmental awareness

Generally, people do not know about the impact of plastic in the environment and there is a lack of basic environmental education in Egypt. The latter has been covered most of the time by NGOs. For some of the interviewees environmental awareness depends on socio-economical and cultural levels. In contrast, others did not find any difference.

Some stakeholders agreed that the major level of awareness can be found in the middle-upper and upper class. "The higher the income the more understanding of the use and the reuse of SUPB. The people from lower income are struggling too much to get bread and butter" Shaat, advisor for the governor and at GIZ personal communication (April 20, 2020). Therefore, the environment is not a priority for them. Other interviewees argue that the lack of awareness between classes is the same and there is no variation in the use of plastic either.

Another important factor is the language barrier. A significant amount of the information related to the environment and plastic is in english, and the people that are not well educated can not understand english. Additionally, the information is not is not related to the context.

However, the level of awareness is slowly changing, “no because people are educated. It is because they have seen how bad plastic is around them” Kamal, academic researcher, personal communication (March 15, 2020). The situation can improve if there is an enforcement of a law to ban plastics.

Initiatives

Groceries stores are starting to promote RBs and oxo-degradable bags, even though, for the later there is a lot of controversy about the impact on the environment. Supermarkets such as carrefour and Metro already introduce RBs inside their stores.

The level of awareness is increasing in middle-upper and upper neighborhoods such as Zamalek and Maadi, thanks to initiatives led by foreigners and NGOS. They managed to convince many stores to change plastic bags for paper bags. They are taking credit for being environmentally friendly.

Approach from the organizations

There is a considerable number of environmental NGOs and research centers working actively in Egypt. The main objective is to educate and inform about the environment issues, the impact of the people‘s behavior, alternatives for coping with these issues, and deliver accurate and contextual information mainly in the local language. Moreover, to push for policies at a governmental level.

There is not enough information and data available about the issue of plastic in Egypt, even though some research and studies have been done, people are not sharing all the information and this can have obstacles to address the problem in the country. More public data and information is needed.

Organizations are carrying out some studies and implementing strategies involving different stakeholders. Additionally, all the organizations interviewed works in cooperation between each other, local and international organizations, international donors, civil society, researchers and the government.

> *“ The important thing is the small effort that each org makes for each event or workshop, collectively they can make a change with the policy making and individually they do changes in people’s mentality each person counts” Khalil from Greenish, personal communication (March 30, 2020).*

Approach from the government

Environment is not a priority for the government. They will support the initiatives such as ban SUP, but the enforcement of a law for that is not realistic. The government is too busy with other issues such as health care and national security. Additionally, there is not so much budget for environmental projects and the one they have is used for projects related to water because it is the focus of the country according to the SDGs. It should be noted that the government counts with very well educated people about climate change and plastic pollution. There are some initiatives but for one side, but those are not enough and for the other side, they are not easy to implement.

For instance the parliamentarian lady, requests and draft law to ban SUP but nothing has happened yet. The SWM is one of the biggest environmental problems in Egypt but does not receive enough attention from politicians. However, the ministry of environment wants to enact a law for the SWM but not just for plastic pollution.

Interviewees say that the government does some things and campaigns, also they are open to initiatives. However the approach is weak and that is why is so important that NGOs, local and international organizations and civil society like a critical mass push the government to make policies and laws that bring a real change

Role of the Industry

Plastic industry is a lucrative business in Egypt and it is a huge polluter. A large part of the industry is informal. Regarding the implementation of a law that banning SUP and SUPB has to be gradually and take in consideration the economic and social impacts due to the fact this industry employs a significant number of people.

Plastic industry should take responsibility for the pollution they are producing, but this is not an easy thing to do in this context. Instead, they can be encouraged to shift the production for a more sustainable way. What is needed is a law, incentives and a frame time to encourage to shift and adapt.

Laws implementation

Nowadays there are some policy proposals to ban SUP, such as the ban of free retail distribution of SUPB. The banning of SUP should be gradual, so that it does not affect the economy and give the industry a time framework to adapt. There are factors to take into account for the implementation of the policy as a law.

First, the policy proposal should come from the parliament and be signed for the president in order to pass as a law and not be easily overridden. Unlike previous policies, like the ban of SUP in the red sea, they came as executive orders, they worked well. However, they can be easily overridden if the government changes or if they are influenced by the industry/business sector.

The government is not a single body, inside there are different ministries who are pushing back and others who are supporting the decision.The entities and organizations that make the policy proposal have to lobby between ministries. To illustrate, the ministry of trade will not support the policy because continuing with the plastic industry is beneficial for it, in contrast, there is the ministry of environment and the ministry of tourism who will support this kind of policy because of all the positive implications that will have for them. Moreover, there is the pressure made by the plastic industry, they are pushing for having this kind of policy down.

Policy-makers should see further than economical impacts of this policy and have in mind the environmental cost. The financial impacts of SUP in nature and economy should be analysed. This should be measured in different ways such as the health impact and the loss of the ecosystems. However there is a lack of research in this area and it is really hard to quantify and measure.

COVID-19 & The Lockdown Situation

The stakeholders are not so sure how this situation (March & April 2020) is affecting the consumption of SUP, they just have some assumptions and they suggest that needs to be observed and measured.

The state that the situation is helping the environment, the fuel consumption and the general consumption of goods has declined. As a society we can learn a lot about the situation, and to live with less things. Regarding SUPB, it is expected to reduce, because people are buying more in bulk, which means less trips to the supermarkets, and less SUPB. However, the use of SUP for deliveries has increased since the outbreak of the virus

4.3 Cairenes and Their Relationship with SUPB

Methodology used: Online Survey

Figure 26. In the vegetable markets, the vendor packs each type of vegetables in a different bag
Source: Autor

Figure 27. Species and condiments packed in SUPB in a supermarket
Source: Author

Figure 28. Storage of SUPB in a household
Source: Katy Jones
Retrieve from https://www.stuff.co.nz/environment/97533570/breaking-the-plastic-stalemate-how-a-future-with-less-plastic-bags-could-look

Demographic Determinants

The data collected show a certain homogeneity regarding age, gender, place of residence and education whereas there are more variations concerning monthly income.

The majority of the respondents around 80% are young and young adults between 18-35 years old and can be classified as millennials. Just three people were older than 56 years old. Regarding gender, females represent more than a half with 84

Figure 29. Results online survey. Gender and age
Source: Author

participants.

Almost all the participants have at least a bachelor university degree, and just one person having a high school degree alone. The big majority live rather in middle and middle -upper class neighborhoods (Nars city, zamalek, New Cairo, Maadi,

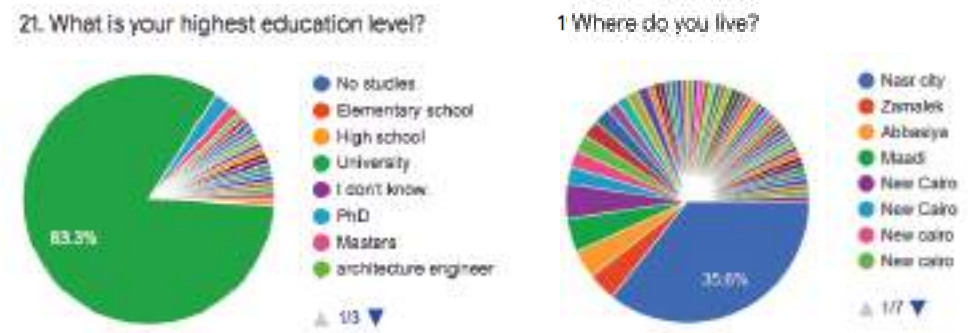

Figure 30. Results online survey. Education and Neighborhood
Source: Author

among others),only a small portion live in low middle income neighborhoods (Abbasya and Zawya el hamra).

For income average, the answers were almost equally distributed in three quarters. The biggest percentage, a quarter of the participants earn between 5001-10000

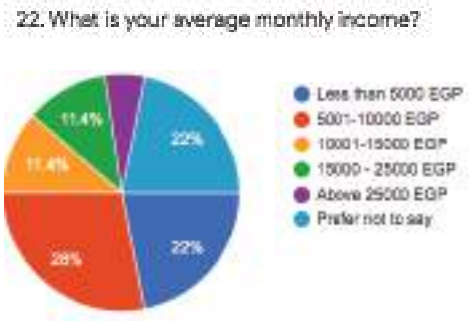

Figure 31. Results online survey. Income
Source: Author

EGP[50] . The following quarters have the same percentage, divided in people that earn under 5000 EGP and the people that prefer not to say . Just seven people earn more than 25000 EGP.

Behavior and Habits

Almost a half of the respondents, 52 people, consume between 5-10 bags per week and a quarter, 39 people consume more than 10. That is a total

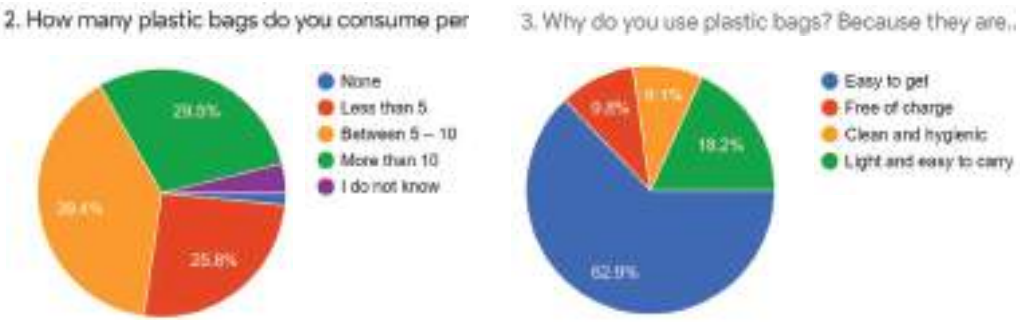

Figure 32. Results online survey. SUPB consumption & quantity
Source: Author

of 91 individuals. Taking 10 SUPB as a weekly average, this results in the consumption of 910 SUPB weekly. Which is already a significant amount just for an extremely small portion of the whole population of Cairo. Just 2

individuals claim to not consume SUPBs. Additionally, more than a half of the participants find “easy to get” as the most important factor to use plastic bags,

50 Egyptian Pound

followed by " light and easy to carry", the other 2 options "free of charge" and "clean and hygienic" were the less chosen factors.

In supermarkets the behavior of the majority of the people is divided almost equally by the ones that receive all the bags without questioning and the ones

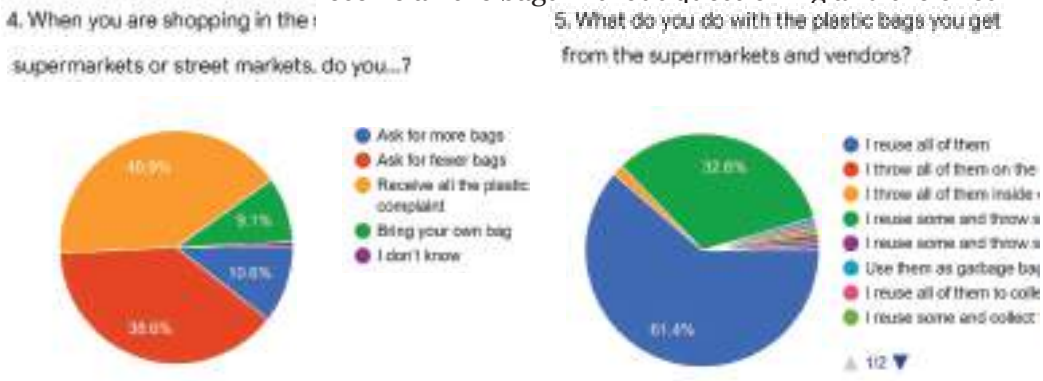

Figure 33. Results online survey. Relation with SUPB
Source: Author

that ask for less bags. An important finding is that some people are carrying their own bag, even if it is a small number of 12 people. Ironically almost the same number of people ask for more bags. Regarding the use of the bags after they are taken from the supermarkets, an interesting finding is that two thirds of the sample reuse all the bags, a third reuse some and throw some in a trash bin. Most of the people that choose the open option "other" claim to reuse the bags as a bin liner and one person state that normally the SUPB are reused but due to the current situation of COVID-19 they are thrown away.

The use of RBs is linked to the reduction of SUPB consumption. A large part of the participants, 55 people, use them "sometimes" . In contrast, "never" was

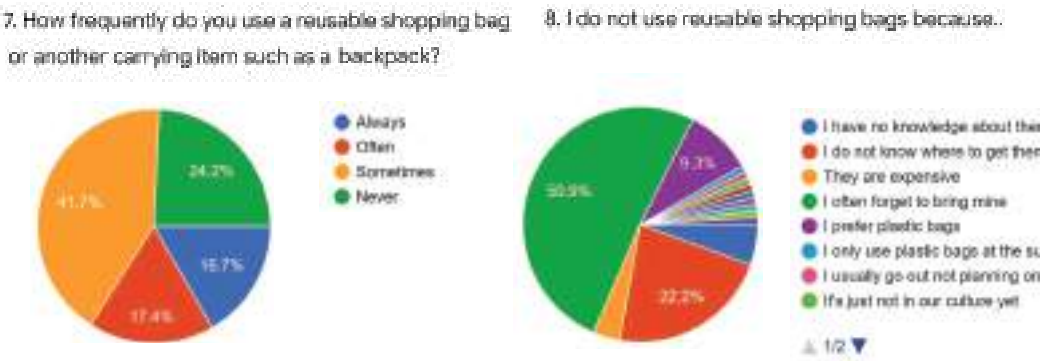

Figure 34. Results online survey. Use of RBs
Source: Author

the second most chosen option by 32 people, and “often” and “Always ” were the less claimed options. The most common reason for not using RBs is that people regularly forget them (55), followed by the factor that 24 participants do not know where to get them, some (10) prefer plastic and a small number of 6 people do not know about them. Some interesting answers came from the open option, such as going for shopping without planning, buying more things that can be carried in a RB, insistence of the clerk to use SUPB and one person opinion was that the RBs are not useful.

Less than a half of the respondents claim that their consumption of SUPB

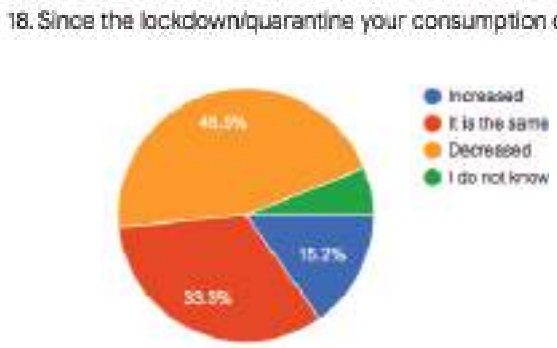

Figure 35. Results online survey. Comsuption od SUPB in lockdown
Source: Author

decreases and a third state that it remains the same.

Normalization of Plastic

The question was designed to analyze the knowledge of the people about the

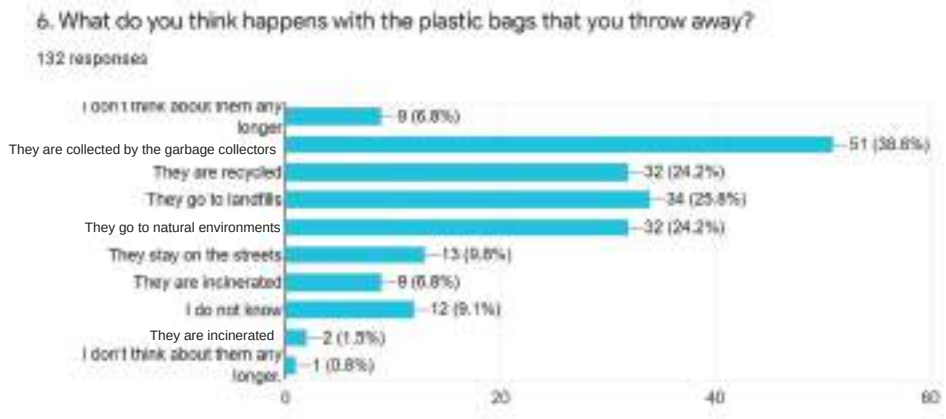

Figure 36. Results online survey. Perceptions about the final disposal of SUPB
Source: Author

final disposal of SUPBs, moreover, participants could choose more than one option. The best-ranked answer was “They [SUPB] are collected by the garbage collectors”. Moreover, a significant number of participants think that plastic bags are either recycled, go to a landfill, or end up in the natural environment, those options were similarly ranked. The less ranked choices were “ don’t think about them any longer” or they think they are incinerated.
The vast majority of respondents, 104 people, either agree or strongly agree that plastic waste is affecting them. A small portion of 8 people disagree or strongly

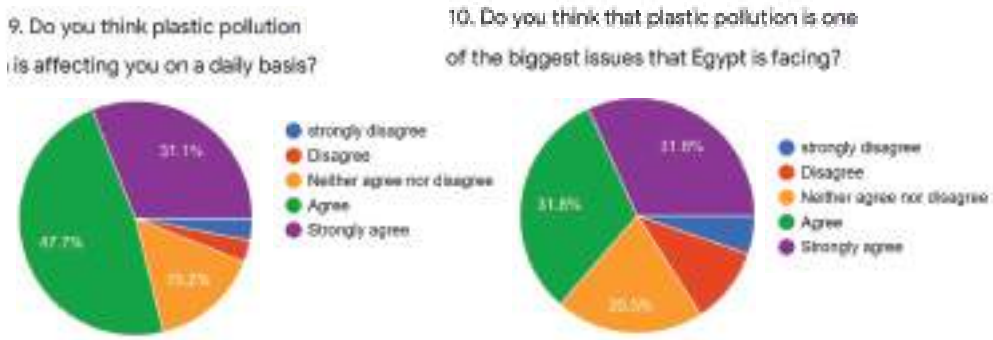

Figure 37. Results online survey. Perception of the plastic pollution issue
Source: Author

disagree with the statement. Regarding if plastic pollution is a big issue in the country, the number of participants that strongly agree or agree are equal. The people that disagree (14) and strongly disagree (7) are almost the same amount of the people that are neutral. (27)

Environmental awareness

The numbers of the left represent the frequency that an option is chosen.

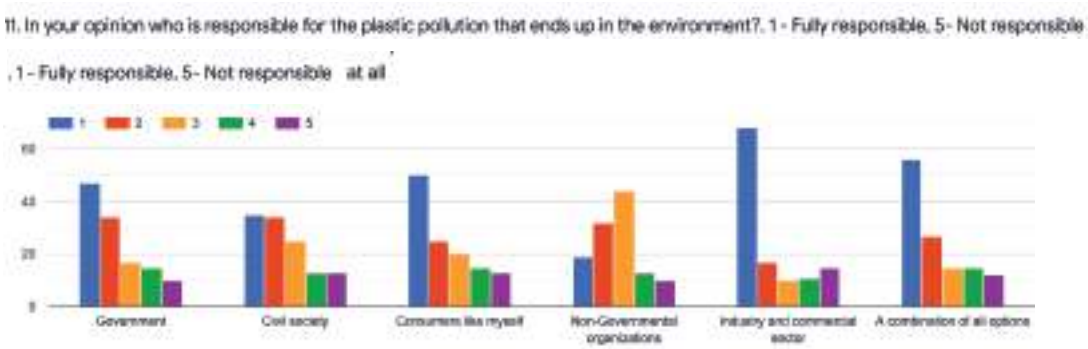

Figure 38. Results online survey. Environmental resposability
Source: Author

Overall, the most frequent answer was “fully responsible” between all the stakeholders, with the exception of Non- Governmental Organizations, where more than 40 people think they are in the middle of the responsibility. “Industry and the commercial sector”, followed by “a combination of all options” were chosen as the most fully responsible stakeholders by 68 and 56 people respectively. It is interesting to highlight that “consumers like myself” (50) and “Government ” (47) obtained almost the same amount of answers in the option of “fully responsible”

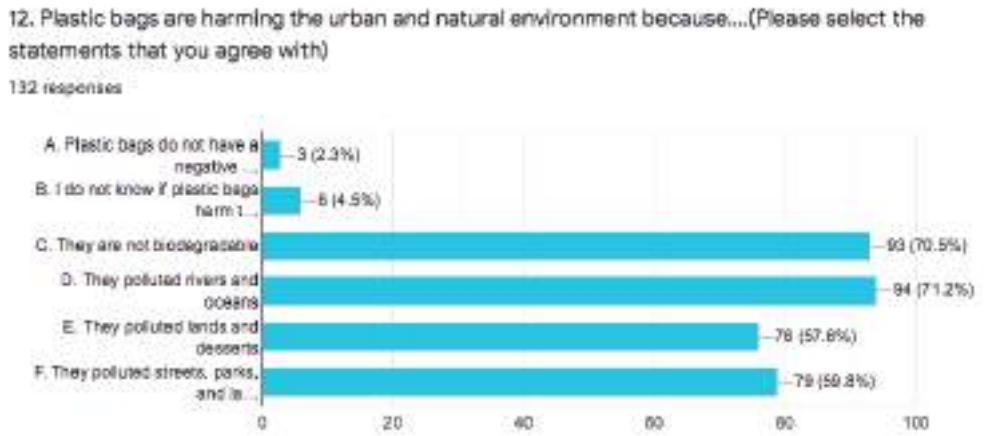

Figure 39. Results online survey. Environmental knowledge about SUPB
Source: Author

A large portion of the people chose the options that are related to the negative impact to the environment. The statements related to the pollution of water bodies and to the fact that plastic bags are not biodegradable are the factors that people think are harming the environment the most. In contrast, just a few people show either no knowledge about the issue or they think plastic bags do not have a negative impact.

This question was formulated to know by what means people obtain

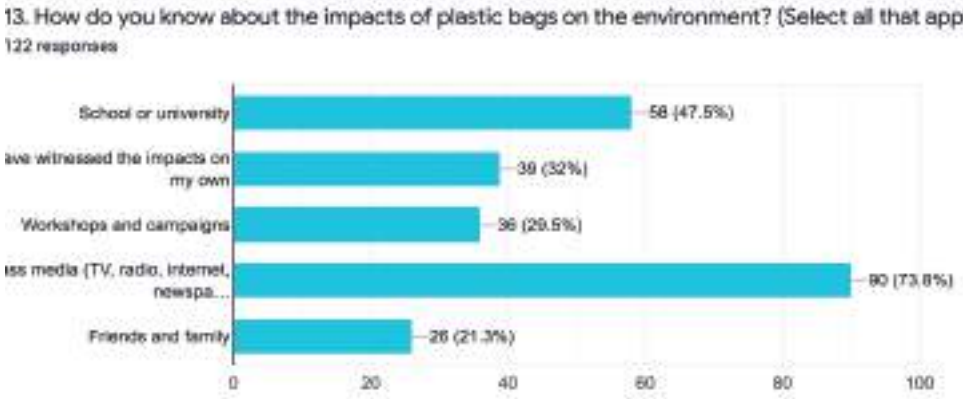

Figure 40. Results online survey. Environmental information means
Source: Author

information about the impact on the environment and at the same time to see which ones are the most effective. In general, all the media are being used in a constant way to obtain information. Mass media is the most used means by a large number of participants (90). Followed by formal education (58). The options „I have witnessed the impacts on my own“ and „Workshops and campaigns“ are used by a similar number of people. „Friends and family“ was the least selected option, it was chosen by 26 people that still represent a significant percentage of the sample.

For measuring the degree of importance of environmental issues, the scale

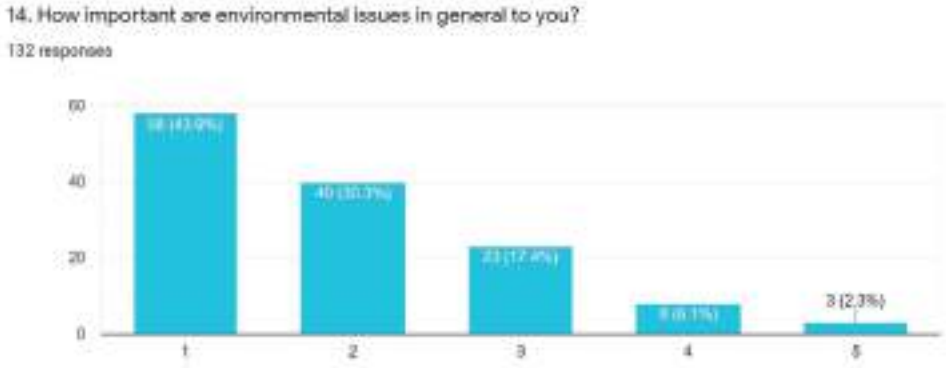

Figure 41. Results online survey. Environmental issues significance
Source: Author

used was from 1 to 5 where extremely important is represented by number 1, while number 5 corresponds to not important at all. In general, for respondents environmental issues are important, this is shown by the chart which almost half of the sample consider that environmental problems are extremely important for them, and the importance for these issues reduce gradually. Just 3 people feel that these issues are not important at all.

Most of the participants are aware of campaigns or initiatives, the majority

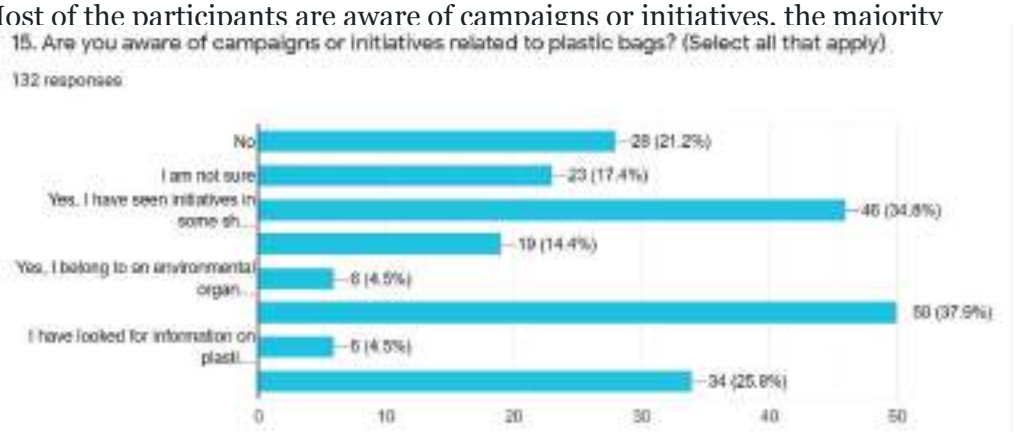

Figure 42. Results online survey. Awareness about campaigns and initiatives
Source: Author

claims to see them in social networks (50) and in shops (46). However, 28 people do not have any knowledge about the campaigns and 23 people are not sure. Just 6 participants argue to be involved in environmental organizations, and the same amount state that the information that is on the internet is not relevant for them. In contrast to 34 people that state that they have looked for

information they can relate to most of the content they find regarding plastic bags. It is interesting to see that at least 19 people have been involved in workshops and clean up activities.

Willingness to Change

Different reasons to reduce SUPB were given. The most popular option chosen

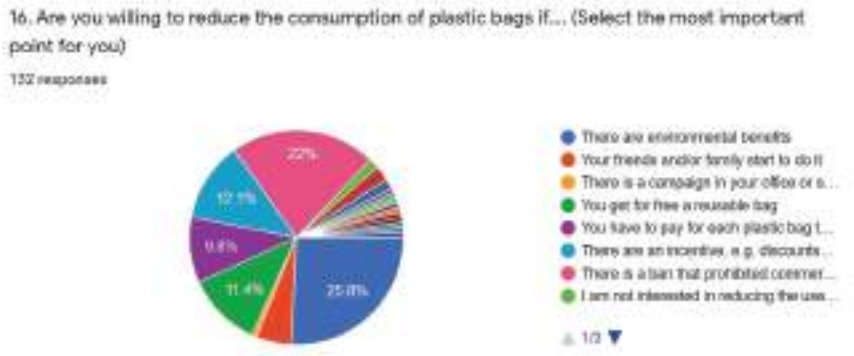

Figure 43. Results online survey. Willingness to reduce SUPB
Source: Author

by a quarter of the sample (34) was the environmental benefits. Followed by a ban of distribution of SUPBs in supermarkets chosen by 29. In contrast, three people state that it is not convenient for them to reduce SUPBs and just two people show no interest in doing it. Just one person chose as an option a campaign in the office or school. Moreover, an open option “Other” was provided and some of the opinions were about having alternatives and one interesting answer was “the only way we get the plastic bags from the markets so if they replace it. We will not get it from anywhere”

Overall, the reasons related to positive impacts were preferred for the

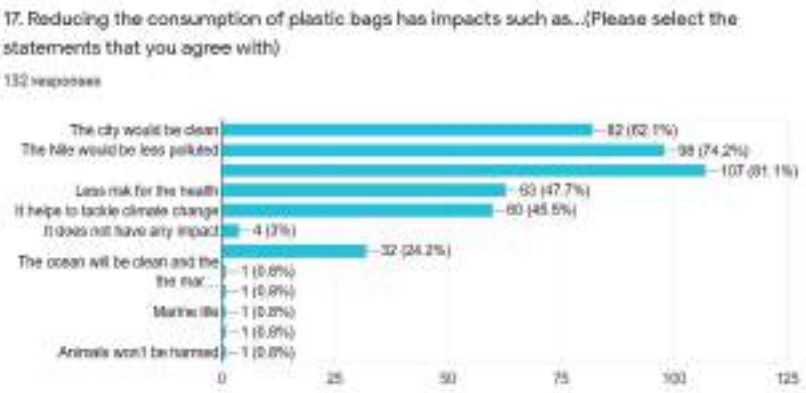

Figure 44. Results online survey. Impact of the to reduction of SUPB
Source: Author

participants.The most selected reason by 107 respondents was “The natural environment would be less polluted” followed by “ The Nile would be less polluted” and “The city would be clean” were selected with a slightly different of number of participants, 98 and 82 respectly. Therefore, a significant number of people are also aware that the reduction of SUPB would bring less health risks (63)and will help to cope with climate change (60). In contrast, four people think that it will not have any impact. The option “Other”,had answers related to the wellbeing of animals, and marine ecosystems. It is worth highlighting that 32 people think that the reduction of plastic bags will have an impact if a significant amount of people do it.

Conclusion

From the three different methods in which the data were collected there are interesting findings that would be analyzed in the next section. Also it was found that there are different results about the same topics and they can be contradictory. For instance, Observation visualizes the experience that the researcher had on the ground, from first hand, even though could be biased by the language and cultural factors. The interviews indicate the opinions from the stakeholders at macro level, it means they talk about general factors in Cairo’s society. In contrast, the survey shows the perceptions of a particular sample, at micro level.This, makes it difficult to generalize the result of the data collection.

5. Discussion: Current Behavior and predictors of change

Figure 45. SUPB in the corniche of The Nile. Plastic bags can easily ended up in the river
Source: Author

This chapter relates the research's findings with factors given from the stakeholder perspective combined with the theoretical framework (TF). The discussion is divided into two parts. The first part analyzes the factors which influence the current behavior of Cairenes towards SUPB. The second part discusses which factor might influence the reduction of single-use plastic bags (SUPB) in Cairo.

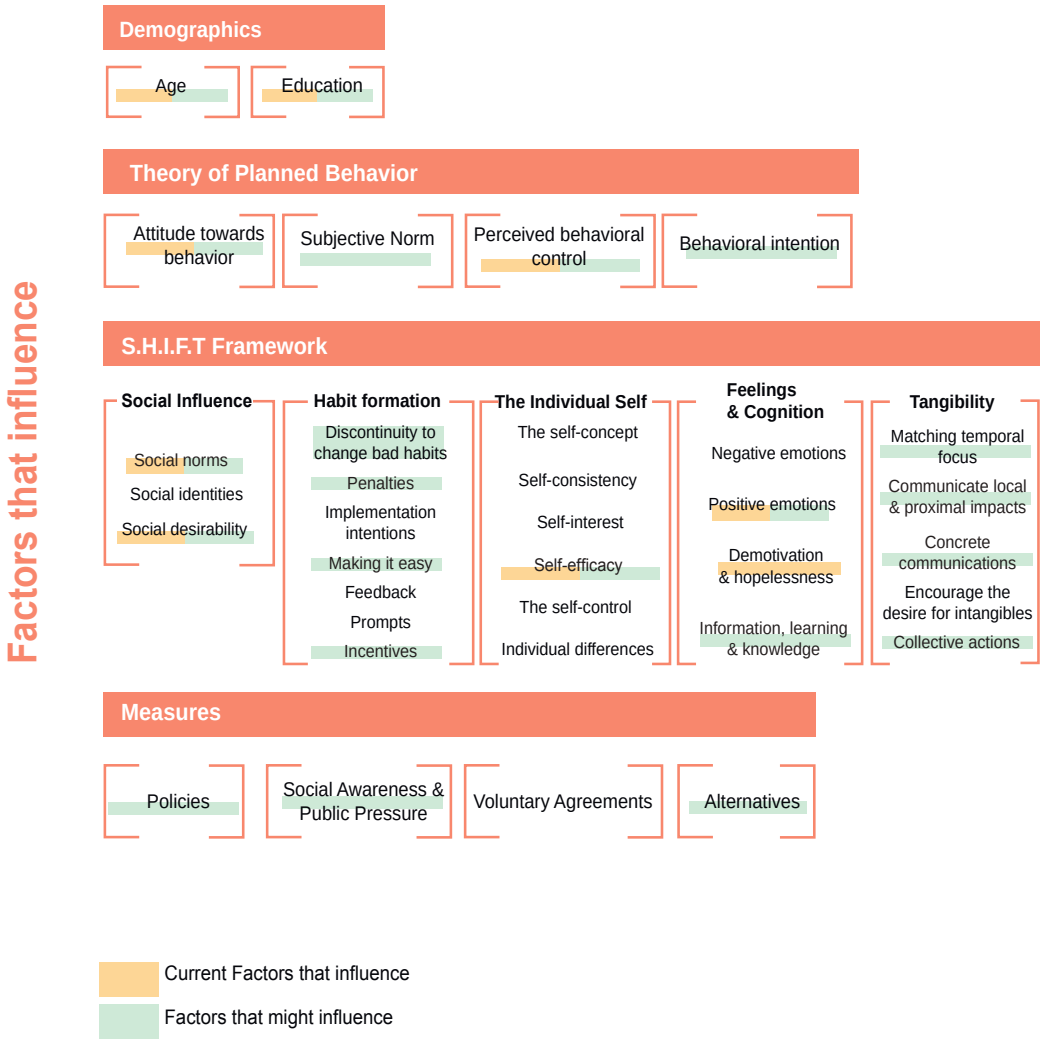

Figure 46. Factors that influence the current behavior and factor that might influence behavioral change in Cairo
Source: Author

5.1 Factors that Influence the current Behavior of Cairenes Towards SUPB

5.1.1 Demographic Factors

The majority of participants are between 18-35 years old, they have at least an university degree, and show a proper level of awareness and knowledge about the environment. According to the demographic factors from the TF this is linked to age and education. This is supported by authors such as Cottrell (2003) and Kieżel et al (2019) that state that youth and young-adult people are more sensible and have more interest in environmental issues. Education level can be a key factor that leads to a high level of environmental concern. It is worth highlighting that this age frame and educational backgrounds are often targeted by NGOs who are a key stakeholder to spread environmental awareness. It can be inferred that the level of awareness is also influenced by NGOs. Regarding the theory of planned behavior (TPB), this can be interpreted as a predictor factor that leads to the intention to manifest a sustainable behavior.

However, it is stated by the stakeholders that proper environmental education is often lacking. This includes a lack of contextual information created in the local language, Egyptian Arabic. That means that people do not relate to the worldwide and local environmental problems and those who do not know English cannot easily access the information. This creates a lack of tangibility, the factor where the information related to the environment is not communicated concretely, in a clear, relevant, and contextual way.

5.1.2 Environmental awareness

The perspective from the stakeholder shows that Cairenes in general do not have a proper level of awareness and do not see plastic pollution as a problem. This is arguable. The socio-economic level can be an influential factor. Meanwhile some stakeholder believe that the environmental awareness is not related to socio-economic level. In contrast, some others argue that environmental awareness and the understanding of the reduction of SUPB is related to socio-economic class, where people from middle-upper and upper neighborhoods show the highest level of awareness.
The level of awareness in the middle-upper and upper class is evidenced in the section of the society where the sample is placed. The respondents have knowledge

about the negative impacts of SUPB. Environmental issues are important to them and the plastic waste is affecting their daily lives. They agree that plastic debris is a big problem in the country and recognize their own responsibility and contribution to the problem. Additionally, they are aware of initiatives and campaigns. This can be interpreted as a positive attitude that can predict the engagement of this population in the reduction of plastic bags. Although, they are not reducing their SUPB consumption. It can be assumed that they do not behave in a sustainable way due to different reason, such as demotivation and hopelessness factor, where they feel their actions are too small to generate a big change, or they do not have enough motivation to do it, and additionally the social norms do not encourage to adopt a pro-environmental behavior (PEB).

The people from the sample, also have a positive perception about the consequences that their behavioral changes can have. However, these consequences of the PEB are distant and not tangible and this can be a reason why they are not committed to change their behavior.

Change-makers, such as NGOs and civil movements, have made efforts to influence behavioral change and raise environmental concern. They play a key role in society. In some of Cairo's neighborhoods, such as Zamalek and Maadi, there exists a significant population of expats who contribute, with the help of NGOs, to raise the level of environmental concern among the people and stores through campaigns and behaviors. The expats and NGOs are setting a trend influencing the social norms through the descriptive norms where people start to follow these actions. Thus, the factors of information, learning, and knowledge are also active throughout the clear information given to the consumer and the shop owners. This also suggests that people can easily follow behaviors that are coming from external influencers.

Strategies such as campaigns, workshops, and clean ups, where some of the respondents claim to participate, are strategies linked to social awareness measures where individuals are also having a pleasant and fun atmosphere. In accordance with those factors and the stakeholders from NGOs, these strategies make people witness the impacts of plastics, creating environmental responsibility, and engaging people in a PEB. Communicating local impact and positive emotions factors are visible in these strategies.

However, these efforts are limited and are not fully supported by the government. There is still a huge need for a broader change in societal habits. There are active Egyptians but not enough to pressure the government and influence the society on a larger scale.

5.1.3 Socio-cultural and Consumption Behavior

People can show a positive attitude towards a PEB, but they often do not act as they say. This was found in the survey sample where most of the people show a high level of environmental awareness but they are still consuming a large amount of SUPB. Paradoxically, the middle-upper and upper class are the ones that consume the most and at the same time they are the ones that have the choice to adjust their consumption. Their consumption patterns are contradictory to their level of awareness and attitude. It can be inferred that they have a strong perceived behavioral control (PBC). However, the behavioral intention is not strong enough to trigger the PEB. This reflects Kollmuss & Agyeman (2002) findings that more education does not necessarily lead to a PEB and favorable attitude does not mean behavioral change.

People recieve SUPB without complaint and supermarkets show appreciation and generosity by giving their clients extra SUPB. In contrast, some people are also asking for less bags executing the action to reduce the consumption of SUPB but it is not clear what their motivation is. The use of SUPB is related to the convenience of these items owing to they are easy to get, easy to carry and they are for free.

The tendency to store SUPB leads to people asking for more even if they already have some at home. Even if they reuse them it would be just one time and often as a bin liner. Due to the oversupply of SUPB by the supermarkets and the industry, not all SUPB are reused and they are trashed. SUPB that are received in fast food are not likely to be stored and reused. Instead they are trashed within a few minutes of use because often the destination is not home as it is with the bags from the supermarket. This is a contextual behavioral where these actions are repetitive, socially acceptable, and encouraged. There is a lack of understanding of alternative ways that consumers and business owners can reduce their plastic consumption. Social norms, habits, and beliefs influence the way people relate to these items. In Cairo there is the belief that black plastic bags should not be used for food while transparent ones are because they are

linked to the concept of cleanliness and hygienic. This would indicate that Cairenes are not aware of the health problems of plastics and lack information on this topic.

The overconsumption of SUP and SUPB is also caused due to the convenience of disposable items that led to the patterns of buy, use briefly, and dispose. This is a global tendency that is followed also by Cairenes and it is also influenced by the fast life rhythm of Cairo where a throw- away society has become a socially accepted norm. This led to the normalization of the use of SUP and plastic pollution. According to the theory from the TF, this phenomenon is created because people follow the comportament of others (descriptive norm) and the throw-away society is a socially shared rule of conduct (injunctive norm) where these behaviors happen. It is also inside the social desirability factor, due to people following the pattern of consumption in order to be socially accepted.

In general, these unsustainable actions permeate the culture becoming socially accepted and they are highly habitual. These habits are difficult to break and the behaviors are governed by beliefs and social norms that exist in the context.

5.1.4 Normalization of the plastic & External factors

According to the stakeholders, Cairenes are not sensible to the littering problem, they do not dispose of the waste in a proper way. They believe this is directly related to the contextual factor of the lack of proper solid waste management (SWM) that results in the visualization of plastic pollution on the streets. People get used to this landscape. They normalize the pollution and the disposal of plastic on the streets allowing it to become socially accepted. There is an extended belief that all the plastic, including SUPB, can be recycled and is collected by the informal waste collectors. This is a wrong assumption due to the SUPB are not recycled and not likely to be collected because SUPB do not have any monetary value for the pickers.

Another aspect to have in consideration is the way SUPB is produced. They are mass produced and often are thin and low quality. This is done with the aim to lower the cost of the product. SUPB has to be a cheap asset for supermarkets to provide them for free. This brings a supply of low quality bags that need to be replaced often by more low quality bags. Additionally, the data related to plastic in the context is limited and not easy to find. Furthermore, the findings

indicate that the environment is not a priority for the government and the implementation of laws and policies is a complex process.

5.1.5 Application of the TPB

TPB is applied to two tendencies. One has a strong PBC and the other one has a weak one. Both have a positive attitude towards PEB. The first one has a strong PBC, such as knowledge, access to the alternatives, and economical capacity which has driven some people to manifest the intention to have a PEB (Figure 47) and it can lead to the implementation of the behavior. In the second tendency, a significant number of people are aware of RBs as an alternative to SUPB but the use of RBs can be influenced by different reasons, such as they forget the bag at home, they do not know where to get it, or they do not have enough knowledge about them. In this case, the intention and adoption of the PEB is weak. This is also related to the context (subjective norm), where the use of RBs is not so common or socially desirable (Figure 48). Although there are some shops and supermarkets that promote and sell RBs, expanding store participation in this can serve as a way to reduce the impediments listed above and serve as a reminder for people to reduce their consumption of SUPB while encouraging a sustainable behavior. Subjective norms are taken as the social norms that influence the context. The influence of the social networks as a friends or family are not taking in consideration to be applied in these explanations of the TPB due to the lack of information.

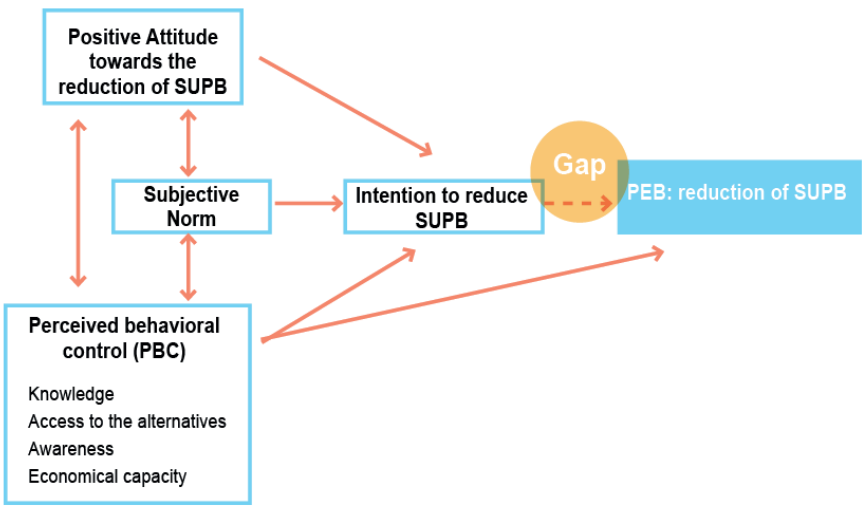

Figure 47. Strong PBC and favorable attitude are enough to manifest intention of PEB.
Source: Author

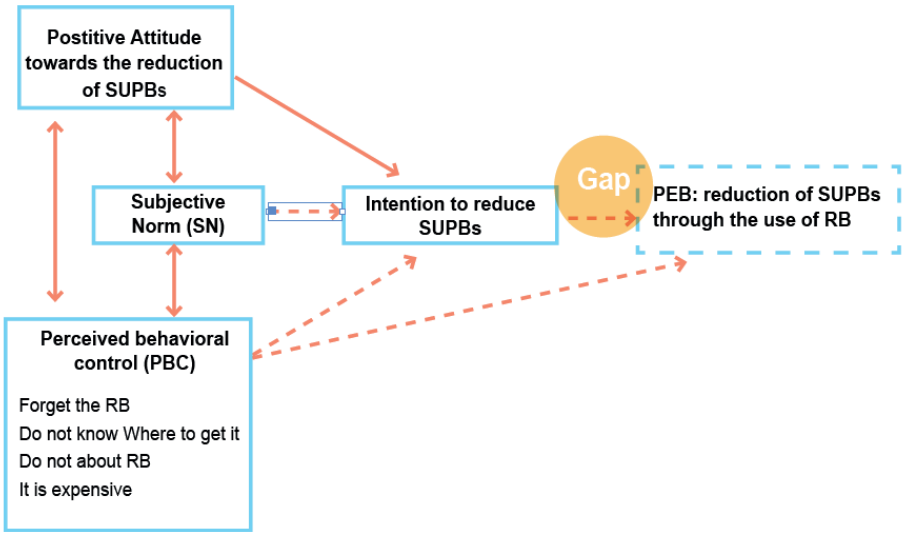

Figure 48. Weak PBC and subjective norm impediment the intention and the behavior manifestation of PEB through the use of RBs
Source: Author

As Macovei (2020) states, people with a high PBC are more inclined to adopt that behavior, although if the effort related to performing the behavior is high it can become a barrier for adoption, as it can be seen in the *figure 48* . The strongest behavioral intention is the result of a strong PBC positive attitude and adequate subjective norm. As is stated in the TF, behavioral intention not necessary leads to the execution of the behavior. There is a gap, where the intention needs to be implemented to achieve the PEB.

Figure 49 & 50. Free distribution of SUPB in a supermarket
Source: Author

5.2 Factor that can influence behavioral change towards a PEB through the reduction of SUPB

According to the findings discussed in the above section, it can be inferred that there is a gap between the attitude and intention of the people and the execution of a PEB. In this section different factors are discussed that might trigger the performance of a sustainable behavior. Some factors can work well alone but most of them can have a bigger influence when they are combined.

5.2.1 Willingness and breaking habits

According to the TPB, the best way to predict behavior is by asking the people if they are willing to have a PEB. Actually, Cairenes are willing to reduce their consumption of SUPB and their perspective towards plastic is starting to slowly change. According to stakeholders there are different stages: no aware, aware but no interested, aware and trying to change, individuals that have a sustainable lifestyle and activists. The findings from the survey show that most of the people can be found in the being aware but not interested stage, and aware and trying to change stage.

When the participants were asked about the willingness to reduce their consumption of SUPB, the factors that would influence that decision were environmental benefits and a ban of free distribution of SUPB. It can be inferred that they are aware of the positive environmental benefits that the reduction of SUPB can bring and that they have a favorable perception about the implications that their behavioral changes can contribute to less environmental pollution and a cleaner city. However, environmental benefits are not easy to see and take time to be realized. Tangibility plays a key role in visualizing in a concrete and contextual way the positive impacts that PEB can bring and how to implement the behavior. This can trigger the participants to move from saying to the action.

On the other hand it shows that people are aware that a regulatory framework is needed in Cairo to break unsustainable habits. This can come in the shape of a ban, taxes or economical instruments to discourage the consumption of SUPB or incentives that motivate the PEB. This goes in concordance with the policy proposal of banning free retail distribution of SUPB by CEDARE.

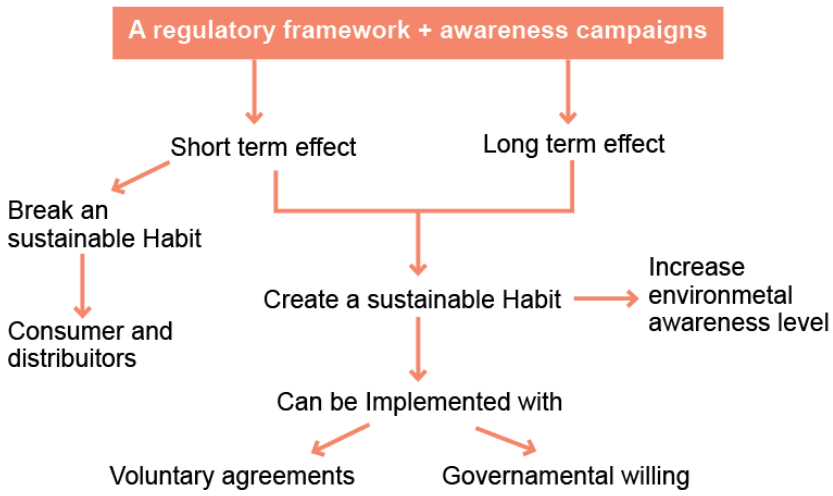

Figure 51. Posible outcomes of a policy and awareness campaigns implementation
Source: Author

Having a study and a proposal from a local organization shows that this strategy likely works in the context. This can drastically and fast change the consumer behavior of people because it is breaking an habitual behavior through the loss aversion concept. Policies should work hand in hand with social awareness

campaigns that involve information, learning, and knowledge factors for people to understand why they should change their behavior and the positive impacts of that change. Communicating the local and proximal impacts will relate the outcomes for the city to the population. Alternatives should be provided and, in the case of RB, they should be affordable and easy to find. These factors can strengthen the policy measures, and in the case that the policy is removed, the behavior could remain.

These initiatives should have the support from different NGOs and the government. The government is necessary for the achievement of a regulatory framework as well the will of the commercial sector. Those can represent a challenge for the policy implementation. These policies are expected to reduce the consumption of SUPBs in parallel to the improvement of the SWM in Cairo.

5.2.2 Tangibility, Feelings and Cognition

Awareness and education should provide proper and clear information about the contextual problem of SUP by explaining the economical, health, and environmental impacts. Economy and health are working better as a primary approach, applying the information, learning, and knowledge could make people relate to the issues of SUPB in Cairo and stop the normalization of SUPB use and plastic pollution in the city. Bringing the benefits of the PEB more palpable and understandable for the population can influence the behavior and improve the lack of environmental education and enhance the level of awareness through factors such as matching temporal focus, communication local and proximal, and concrete communications. Also, displaying what can be achieved through collective actions can trigger the adoption of a sustainable behavior oriented to a common and collective goal.

Additionally, convenient alternatives should be provided to people to be able to cope with this problem. New habits should be easy to adopt, undemanding, and should be convenient in the short term and aligned to the lifestyle of the person for a long term engagement. Then when individuals understand the problem, have alternatives, and easy ways to do it they might easily start to change their behavior.

Related to workshops, activities, and strategies they should bring a great and enjoyable atmosphere, positive emotions and self-efficacy factor can be applied

in order for the people to easily engage and have the perception that they are contributing to the change even if the action is small, this can offer them a sense of empowerment. Activities, such as clean-ups, are didactic practices that make people face the problem first hand, generate a warm glow, and give a sense of agency.

5.2.3 Social Influence

Attitude and PBC are important predictors that can lead to the intention to reduce SUPB. However, according to the TPB this is not enough to influence the behavioral intention. A social influence is necessary and making the behavior desirable can trigger a change.

This is one of the most relevant factors that can affect behavior. This can be changed through policies and awareness campaigns that can trigger behaviors that can lead to influence more people. New social norms can be also created and implemented between consumers and shop keepers. Both can influence each other. If a consumer starts to reject SUPB several times in his/her habitual supermarket and explain the reason this might have an influence in the shopkeeper and other customers, and vice versa.

Therefore, the supermarkets are getting more aware of the situation, they are willing to reduce the use of SUPB and to offer alternatives. For them this can be a beneficial economical change that can save money while reducing the use of plastic bags and even create new profits selling RBs. At the same time they can be seen as environmentally friendly. This would break the habits from the supermarket to give out an excessive quantity of bags and from the people to receive SUPB without complaint. This also can raise awareness with the clients that are not so aware.

This will gradually change the social norm of the excessive distribution of SUPB under the descriptive norms and injunctive norms where these behaviors would be followed and accepted. People will be more willing to change if they see that others are making the change. Additionally, social norms can encourage policy intervention. For that it is necessary to have a critical mass to pressure, not just the government, but the commercial sector and persuade society in general.

Conclusion

People in Cairo are willing to change. Willingness and awareness can suggest the willingness to implement behavioral intention, but as was stated in the discussion that is not enough to trigger a change. The gap between intention and execution can be triggered through social influence, tangibility, positive emotion, and policies to help to increase awareness, to break unsustainable habits, and lead to the execution of a PEB through the reduced consumption of SUPB and plastic pollution in Cairo.

6. Recommendations & Conclusions

Figure 51. Use of a transparent SUPB to carry bread
Source: Author

This research attempts to unveil the behaviors of Cairenes towards SUPB and how to influence them towards a PEB. The final considerations and suggestions are displayed in this chapter. It is divided into three sections. The first one gives recommendations that can be applied in Cairo. The second one proposes future research to enrich this study, that can be valuable for the field and the context. The third one gives overall conclusions from the whole research.

6.1 Practical Recommendations

There is a gap between people showing a positive attitude towards PEB and having an intention but not acting in concordance with that intention. This highlights a challenge for stakeholders. That is why factors that can trigger behavioral performance should be taken into account. Even though there are a lot of variables to be considered such as age, social-economic background, and level of awareness and knowledge about the SUPB and the environment. The following are recommendations that might be applied by the government, NGOs, retailers and civil society in Cairo.

-PEB through the reduction of SUPB consumption should be promoted and made socially desirable by not just by NGOs but the authorities in order to encourage a positive perception towards sustainable behaviors and the executions of them. The use of social networks and mass media can have a huge influence and reach a large part of society.

-Make information clear and engaging. Some people should act as “the precursors” in performing the PEB to help stimulate the crowd to follow the behavior.

-Social awareness campaigns, strategies, and alternatives to reduce plastic consumption should be tailored to each segment of the society and their level of environmental awareness. Factors such as information, learning, and knowledge, combined with positive emotions and enjoyment environments are important to influence people from different backgrounds.

- For campaigns it is highly recommended to frame messages using the descriptive norm, to communicate that others are already behaving in a sustainable way. This could result in people following these behaviors.

-Some people have the knowledge and awareness but not the motivation. It is recommended to combine different factors that can easily engage the people to adopt a PEB in the short term first, to later on generate the adoption of the PEB on the long term.

-Environmental education should play a more important role and should be included in both privates and public schools. Regular didactic practices should be applied.

- Policies such as banning the free distribution of SUPB should be implemented by the government by a law or decree. However, policies are not so easy to implement in Egypt and it can take a long time. An alternative for this can be a voluntary agreement between NGOs and retailers, also the government can be involved. If an economical instrument is proposed, stakeholders should be aware of how much can be charged per SUPB. Verbal reminders from cashiers can also help to increase the awareness and the adoption of the reduction of SUPB. Therefore, those measures should be accompanied by awareness campaigns and in the beginning of the implementation give out free RBs to drive awareness of the alternatives and to get more people used to them.
-For the implementation of policies, strategies, and awareness campaigns it is important to take into account the low income population because they rely on free assets and use plastic to sell vegetables and food.

-In order to have supermarkets on board, a strategy could be used that shows them how they can save money and have a better image if they reduce the distribution of SUPB and how the selling of alternatives could lead to new profits. This can be more attractive for the shop owners.

- Data about plastic should be more accessible. It is recommendable that data can be shared and open for research, policymaking, and awareness campaigns.

Environmental organizations are already working with some of the factors that were mentioned before. However, they can take some of the recommendations and factors from the TF to improve and boost some strategies to have a better and faster outcome while reaching a bigger spectrum of the population.

6.2 Future Research

In order to influence society it is necessary to have a different approach for each segment of it. That is why an interseccional study with a larger representative sample is necessary. Comparison about the level of awareness, knowledge, and willingness to change between different socio-economical backgrounds and ages can help to understand the needs of each level of society in order for stakeholders to tailor the strategies and factors that can influence a PEB.

Social influence was not a factor that was deeply studied or verified. Research into social influence in the close network of people e.g., colleagues, family, and friends, can shed lights on how important the social influence is for the people of Cairo.

Gender was a demographic element that was out of the scope of this researcher but some interesting discussions with the stakeholders brought this topic over the table. Gender plays an important role in the social structure of Egypt. Research into the intention and the execution of the PEB behavior by gender can have valuable findings in order to see how gender influences the perception of the SUPB and the engagement in PEB.

The commercial sector plays a key role in the massive consumption of plastic in Cairo. A future study can unveil the reasons, behavior and habits behind the massive distribution of SUPBs and perspective that they have about the environmental impacts of these items.

This research touches superficially the consumption behavior and COVID-19. A study that can look into how the lockdown changed the consumption and behavior towards SUPB can bring valuable findings about behavioral consumption under a particular situation where social normas have been changed due to external factors.

6.3 Conclusion

This thesis aimed to understand the factors that influence the current behavior of Cairenes towards SUPB and the factors that might influence behavioral change towards a PEB through the reduction of SUPB by applying some theories from the TF. The aim was to evaluate the environmental awareness and the willingness to change the behavior. The proposed theories, SHIFT and TPB, are more

oriented towards predicting and changing behavior rather than to explain the current trends. However, there are some factors that are used to both explain the current behavior and to propose ways to influence such social norms that are an important determinant of the culture in Cairo.

Based on the qualitative and quantitative analysis of Cairenes behavior, the expected outcome that assumed that the biggest factors leading to the disengagement by the population about the impact of SUPB was tied to the lack of environmental, consumption habits and normalization of the use of SUPB, matches partially with the findings. People from the middle and middle-upper class actually do have environmental awareness. Yet they consume a considerable quantity of SUPB. These behaviors are still normalized inside the context through the overconsumption of these items. Mainly, because the consumption habits combined with the excessive distribution of SUPB and the throw -away society that govern Cairo's society.

Not all the relevant findings were suitable to be connected with the factors of the TF. There are different factors that are affecting the current behavior of people in Cairo not just related to the environmental awareness and the social-cultural settings but external forces like the quality and cost of plastic bags production, the lack of SWM, and government willingness. An interesting and unexpected finding was that the proper level of awareness that people from the survey have and the constant finding that environmental concern is gradually increasing in Cairo's society. This can result as a strong predictor towards the reduction of SUPB accompanied with the willingness to change that were also present in the respondents. However, this is just showing the intention to implement the desired behavior. There is a gap between intention and action. To have the intention to change the behavior is not enough to execute it. The findings suggest that something is missing to trigger and motivate the PEB.

That gap can be triggered by different factors from both theories such as PBC, social influence, tangibility, positive emotions, and policies to motivate and encourage Cairenes to create sustainable habits, execute a PEB through the reduction of consumption of SUPB, and the reduction of the leaking of plastic to the environment. That can bring a beneficial impact in the local and global

environment including in the city where the improvement of SWM will be more clean and aesthetic. Ideally, to achieve a visible reduction of the consumption of plastic bags in Cairo and reduction of pollution, a significant percentage of the population should adopt a PEB towards SUPB.

The result of the research can contribute to understanding a piece of the behavior and the perception from a sector of society in Cairo towards SUPB and the environment, and shed light on how to influence behavioral change to cope with the environmental degradation of Cairo, Egypt, and the region. Moreover, these issues have not been well documented in Middle East academia and can have a considerable contribution to the region for the improvement of sustainable practices in the societies, enhancing the environmental education and adoption of PEB through the reduction of not just SUPB but plastic in general that leads to improvement of the urban and natural environment, as well to the health and the economy of the cities.

Figure 52. A flying plastic bag
Source: The Author

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Appendix

Appendix 1. List of Interviewees

NGOs and start-ups

- Shady Abdalla Khalil: Co-Founder of Greenish
- Karim Eldomyati: Project manager in Greenish and Founder of zero waste arab
- Ahmed Yassin (AY): Co-founder Banlastic
- Alaa Afifi: Founder of Bekia

These organizations are working on raising awareness about plastic pollution. They conduct research and provide and promote alternative solutions to SUP products. They provided an overview of the issue, insight into the behavior of the people, and the strategies that they used to cope with this situation, such as clean-ups and workshops.

Government

- Hussein Abaza : Counselor for the State Minister of the Environment. Director of the Association for Environmental and Community Development (ACED), the Centre for Sustainable Development Solutions (CSDS) and he works with UN environment programme for 27 years in the sustainability area.
- Khalil Shaat: Advisor of the governor, Contract Administrator and Senior Policy Advisor at GIZ

Researchers:

- Dr Ragia ElHarzawy: Health and Environment Officer at The Egyptian Initiative for Personal Rights. Researcher about oxo degradable plastics situation analysis
- Mohamed Kamal (MK): Environmental engineer with a MCs. researching plastic leakage in informal settlements in Cairo.
- Ahmed Dorghamy (AD): works at Centre for Environment and Development for the Arab Region & Europe (CEDARE) and he has conducted a study about the status quo of Single Use Plastic Bags measures in Egypt.

Appendix 2.

In-depth Interview questionnaire

1. When plastic bags were introduced in Egypt? And since when plastic pollution became an issue in Egypt?
2. Why does Egypt currently produce so much plastic waste, specifically in Cairo?
3. What are the most consumed /littered Single-use plastics in Cairo?
4. Why do people consume too many plastic bags? Is it something related to culture or economic status or education?
5. Which are the impacts of plastic bags? the health impact? Social impact? environmental impact? and economic Impacts of Single-use plastics and specifically of Single-use plastics bags?
6. What are the most common habits and behavior of people related to Single-use plastics bags? How do they use them and dispose of them? E.g do they keep the plastic bags at home?
7. What are the beliefs and myths about plastic bags? E.g. the black plastic bags are made from recycled material and they are bad for food
8. What do you think about why commercial facilities such as restaurants/ fast food, supermarkets or street vendors (vegetables) give so many plastic bags and how the shoppers/ clients react to it? How is the industry helping to worsen this problem?
9. Do you think that consumerism can be a pull factor for people to use plastic bags?
10. How can you perceive the level of awareness of the people in Cairo regarding the impact of Single-use plastics bags?
11. Do you know any initiative, laws or campaign to reduce plastic pollution done by the government? And from other institutions?
12. Which international cases, campaigns, and regulations can be taken as an example to be transferred to Egypt?
13. Do you think that strategies like ban and taxations in places like the Red Sea are working and why these measures have not been implemented in Cairo?
14. What was it that triggered you to start this change and be part/found your initiative?
15. Can you tell me what you do and which strategies you use to raise awareness and to tackle the problem of Single-use plastics and of Single-use plastics bags
16. Cairo has a lot of social and economical layers. How is the approach to the different socio-economical levels or do you have a specific target or location (district)?
17. Do you also work with the government or other organizations?
18. Which impediments do you face in the process of implementation of a campaign or strategy? and what are the most difficult things you have been facing to raise awareness in this context?
19. Regarding the impact of the strategies can you tell me if the behavior of the people starts to change related to Single-use plastics and of Single-use plastics bags? Which factors can influence this change?
20. How do you measure the impact of a strategy? I know it is not easy to measure these things but do you have any estimation or any result?
21. Which channels are you using to communicate your messages? What is the role of (social) media in your campaigns and how can this impact the mindset of the Cairenes/Egyptians?
22. Most of the information and movements related to Single-use plastics are coming from the global north. e.g zero waste movement. Do you think this has been a problem for the people to get the message better or to relate with it? Because it is not contextualized to the Arab culture e.g. most of the sources are in English and the feature products are no available here
23. According to your experience do you think that Cairenes are willing to change their behavior and reduce the consumption of Single-use plastics bags?
24. How the current situation of the lockdown due to COVID-19 can affect the use of plastic bags and the current initiatives
25. How do you see the situation of Single-use plastics bags in 5 years in Cairo?

Appendix 3.
Online survey

Use and perceptions of single-use plastic bags in Cairo

Dear Participant
This survey is conducted to find out how different people from Cairo use single-use plastic bags, and what they think about single-use plastic bags.

All of the answers are confidential and the data will be treated anonymously. The information collected will be used for academic purposes in a Master Thesis for Ain Shams University, within the program of Integrated Urbanism Sustainable Design.

We would like you to answer the questions with absolute honesty according to your experience and perception. There is no wrong answer to any of the questions.

The survey will take about ten minutes.

Thank you for your participation!

Laura M. Diaz
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Ain Shams University
Integrated Urbanism Sustainable design
* Required

1. Where do you live? *

   Mark only one oval.

   - ◯ Nasr city
   - ◯ Zamalek
   - ◯ Abbasiya
   - ◯ Other: _____

2. 2. How many plastic bags do you consume per week? *

   Mark only one oval.

   - ◯ None
   - ◯ Less than 5
   - ◯ Between 5 – 10
   - ◯ More than 10
   - ◯ I do not know

3. 3. Why do you use plastic bags? Because they are...(Select the most important point for you) *

   Mark only one oval.

   - ◯ Easy to get
   - ◯ Free of charge
   - ◯ Clean and hygienic
   - ◯ Light and easy to carry

4. 4. When you are shopping in the supermarkets or street markets, do you...? *

Mark only one oval.

- ◯ Ask for more bags
- ◯ Ask for fewer bags
- ◯ Receive all the plastic bags without any complaint
- ◯ Bring your own bag
- ◯ I don't know

5. 5. What do you do with the plastic bags you get from the supermarkets and vendors? *

Mark only one oval.

- ◯ I reuse all of them
- ◯ I throw all of them on the streets
- ◯ I throw all of them inside of a garbage bin
- ◯ I reuse some and throw some away inside of a garbage bin
- ◯ I reuse some and throw some away on the streets
- ◯ Other: _____

6. 6. What do you think happens with the plastic bags that you throw away?

Check all that apply.

- ☐ I don't think about them any longer
- ☐ They are collected by the garbage collectors
- ☐ They are recycled
- ☐ They go to landfills
- ☐ They go to natural environments like deserts, rivers, and seas
- ☐ They stay on the streets
- ☐ They are incinerated
- ☐ I do not know

7. 7. How frequently do you use a reusable shopping bag or another carrying item such as a backpack? *

Mark only one oval.

- ◯ Always
- ◯ Often
- ◯ Sometimes
- ◯ Never

Skip the next question if you answered "Always" in the previous question.

8. 8. I do not use reusable shopping bags because...

Mark only one oval.

- ◯ I have no knowledge about them
- ◯ I do not know where to get them
- ◯ They are expensive
- ◯ I often forget to bring mine
- ◯ I prefer plastic bags
- ◯ Other: _____

9. 9. Do you think plastic pollution is affecting you on a daily basis? *

Mark only one oval.

- strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

10. 10. Do you think that plastic pollution is one of the biggest issues that Egypt is facing? *

Mark only one oval.

- strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

11. 11. In your opinion who is responsible for the plastic pollution that ends up in the environment?. 1 - Fully responsible, 5- Not responsible at all

Mark only one oval per row.

	1	2	3	4	5
Government					
Civil society					
Consumers like myself					
Non-Governmental organizations					
Industry and commercial sector					
A combination of all options					

12. 12. Plastic bags are harming the urban and natural environment because....(Please select the statements that you agree with) *

Check all that apply.

- [ ] A. Plastic bags do not have a negative impact on the environment
- [ ] B. I do not know if plastic bags harm the environment
- [ ] C. They are not biodegradable
- [ ] D. They polluted rivers and oceans
- [ ] E. They polluted lands and desserts
- [ ] F. They polluted streets, parks, and landmarks

Skip the next question if you answered "A and B" in the previous question.

13. 13. How do you know about the impacts of plastic bags on the environment? (Select all that apply)

Check all that apply.

- [ ] School or university
- [ ] I have witnessed the impacts on my own
- [ ] Workshops and campaigns
- [ ] Mass media (TV, radio, internet, newspaper)
- [ ] Friends and family

14. 14. How important are environmental issues in general to you? *

Mark only one oval.

	1	2	3	4	5	
Extremely important	◯	◯	◯	◯	◯	Not important at all

15. 15. Are you aware of campaigns or initiatives related to plastic bags? (Select all that apply) *

Check all that apply.

- [ ] No
- [ ] I am not sure
- [ ] Yes, I have seen initiatives in some shops and supermarkets e.g encouraging to bring your own bag
- [ ] Yes, I have participated in workshops and/or cleanups e.g. Very Nile
- [ ] Yes, I belong to an environmental organization e.g. Greenish
- [ ] Yes, I have seen initiatives in social networks e.g zero waste Egypt
- [ ] I have looked for information on plastic bags on the Internet but it is no relevant for me e.g it is not in Arabic or it is nor relate to my context
- [ ] I have looked for information on plastic bags on the Internet and I can relate to most of the content I find

16. 16. Are you willing to reduce the consumption of plastic bags if.... (Select the most important point for you) *

Mark only one oval.

- ◯ There are environmental benefits
- ◯ Your friends and/or family start to do it
- ◯ There is a campaign in your office or school
- ◯ You get for free a reusable bag
- ◯ You have to pay for each plastic bag that you consume
- ◯ There are an incentive, e.g. discounts if you bring your own bag
- ◯ There is a ban that prohibited commercial facilities such as supermarkets to give plastic bags
- ◯ I am not interested in reducing the use of plastic bags
- ◯ It is not convenient for me
- ◯ Other: _____

17. 17. Reducing the consumption of plastic bags has impacts such as...(Please select the statements that you agree with) *

Check all that apply.

- [ ] The city would be clean
- [ ] The Nile would be less polluted
- [ ] The natural environment would be less polluted
- [ ] Less risk for the health
- [ ] It helps to tackle climate change
- [ ] It does not have any impact
- [ ] It has an impact just if a significant amount of people do it

Other: ☐ _____

18. 18. Since the lockdown/quarantine your consumption of plastic bags have: *

Mark only one oval.

- ◯ Increased
- ◯ It is the same
- ◯ Decreased
- ◯ I do not know

19. 19 . Your Age *

Mark only one oval.

- ◯ Under 18
- ◯ 18-25
- ◯ 26-35
- ◯ 36-45
- ◯ 46-55
- ◯ older than 56

20. 20. Your gender *

Mark only one oval.

- ◯ Female
- ◯ Male

21. 21. What is your highest education level? *

Mark only one oval.

- ◯ No studies
- ◯ Elementary school
- ◯ High school
- ◯ University
- ◯ I don't know.
- ◯ Other: _____

22. 22. What is your average monthly income?

Mark only one oval.

- ◯ Less than 5000 EGP
- ◯ 5001-10000 EGP
- ◯ 10001-15000 EGP
- ◯ 15000 - 25000 EGP
- ◯ Above 25000 EGP
- ◯ Prefer not to say

Laura Maria Diaz Ospina

التحليل السلوكي لاستهلاك البلاستيك ذات الاستخدام الواحد في القاهرة.
العوامل التي تؤثر على السلوك الحالي لاستخدام الأكياس البلاستيكية ذات الاستخدام الواحد والعوامل التي قد تشجع على تغيير السلوك المؤيد للبيئة.

نبذة مختصرة

التلوث البلاستيكي مشكلة بيئية كبيرة تواجه القاهرة. يعد الاستهلاك المفرط للمواد البلاستيكية ذات الاستخدام الواحد والتخلص غير الكافي منها من العوامل المساهمة الكبيرة في المشكلة. الهدف من هذا البحث هو الكشف عن السلوكيات التي لدى سكان القاهرة تجاه الأكياس البلاستيكية ذات الاستخدام الواحد(SUPB) والعوامل التي تشجع وتثبط استخدام هذه العناصر. حلل البحث الوعي البيئي للقاهريين واستعدادهم لتبني سلوكيات مؤيدة للبيئة. تعتمد المنهجية المستخدمة في هذا البحث على نظرية السلوك المخطط وإطار العملS.H.F.I.T الذي يحدد العوامل التي تؤثر على السلوك المستدام. في وقت لاحق ، يتم تطبيق هذه العوامل على جمع البيانات من خلال استطلاع عبر الإنترنت ومقابلة مع أصحاب المصلحة. أظهرت النتائج أن الناس واعون بيئيًا ومستعدون لتغيير سلوكهم ، ومع ذلك فهم يستهلكون قدرًا كبيرًا من(SUPB) . لقد وجد أن هناك فجوة بين ما يقوله الناس وكيف يتصرفون. يمكن أن يحدث هذا من خلال عوامل مختلفة مثل التأثير الاجتماعي، والملموسية، والعاطفة الإيجابية، والسياسات. يمكن أن تؤثر هذه العوامل على الحد من (SUPB) في القاهرة وتشجع على تبني سلوك مؤيد للبيئة.

الكلمات المفتاحية: الأكياس البلاستيكية ذات الاستخدام الواحد، السلوك، تغيير السلوك، عوامل التأثير، السلوك المؤيد للبيئة، الوعي البيئي، القاهرة، مصر.

إقرار

هذه الرسالة مقدمة في جامعة عين شمس وجامعة شوتجارت للحصول على درجة العمران المتكامل والتصميم المستدام. إن العمل الذي تحويه هذه الرسالة قد تم إنجازه بمعرفة الباحث سنة ...

هذا ويقر الباحث أن العمل المقدم هو خلاصة بحثه الشخصي وأنه قد اتبع الإسلوب العلمي السليم في الإشارة إلى المواد المؤخوذه من المراجع العلمية كلٌ في مكانه في مختلف أجزاء الرسالة..

وهذا إقرار مني بذلك،،،

التوقيع:

الباحث:

التاريخ: /

عنوان الرسالة
عنوان فرعى

مقدمة للحصول على درجة الماجستير في العمران المتكامل والتصميم المستدام

أعداد: أسم الطالب

لجنة أشراف

أ.د
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جامعة

أ.د
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لجنة الحكم

أ.د .....الممتحن الخارجي
أستاذ.....
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أستاذ.....
جامعة .....

التوقيع

تاريخ المناقشة:.....

الدراسات العليا

ختم الإجازة

موافقة مجلس الكلية .../.../...

أجيزت الرسالة بتاريخ:.....

موافقة مجلس الجامعة .../.../...

جامعة عين شـــــمس

جامعة شتوتجارت

09/06/2020