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## Behavioral Analysis of Single-use Plastic Consumption in Cairo

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### Abstract

Plastic pollution is a huge environmental and urban problem in Cairo. The overconsumption of single-use plastic bags (SUPB) and their inadequate disposal are significant contributors to it. The aim of this research is to unveil the behaviors and factors that encourage and discourage the use of SUPB among Cairenes. The research analyzed environmental awareness and the willingness to adopt pro-environmental behaviors. The methodology used is based on the Theory of Planned Behavior and S.H.I.F.T Framework. The results demonstrate that people are environmentally conscious and willing to change their behavior, yet they consume a considerable amount of SUPB. Furthermore, there is a gap between what people say and how they act. This could be changed through different factors such as Social Influence, Tangibility, Positive Emotion, and Policies. These factors can potentially influence the reduction of SUPB and encourage the adoption of pro-environmental behaviors and policies.

**Keywords:** Single-Use Plastic Bags; Behavior; Behavioral Change, Factors of Influence; Pro-Environmental Behavior; Environmental Awareness; Cairo; Egypt.

### 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 one of the biggest environmental issues that humanity is facing (Parker, 2019). Most of it is a result of the unrestricted consumption of single-use plastics (SUP) and the inadequate disposal of it. SUP are considered convenient items for the fast rhythm of the 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 on 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, 2018a).

Egypt is the leading contributor of plastic waste in the Arab world (Nader, 2019) and it is the biggest plastic polluter in the Mediterranean (WWF, 2019). 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 waterways. 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 are not easy to recycle.

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. However, 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.

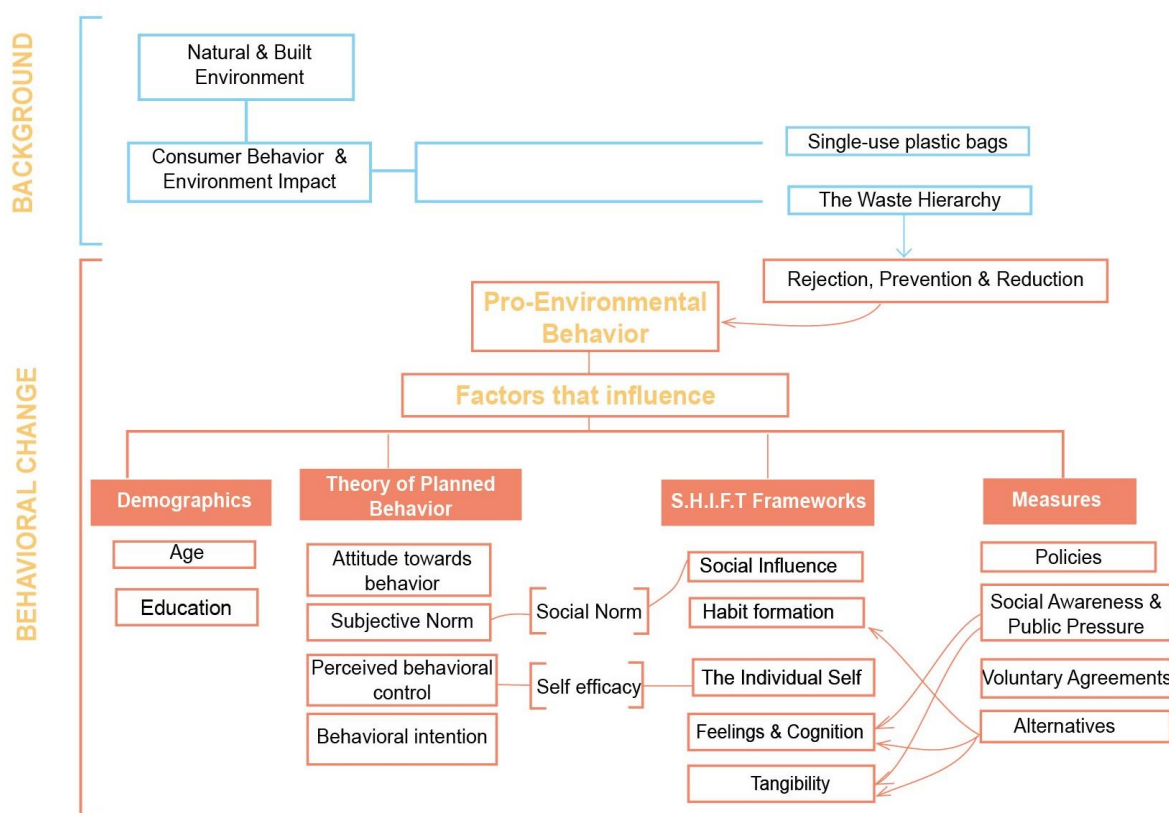
This research focused on the reasons behind the Cairenes' behavior towards SUPB and the factors that both encourage and discourage their use by analyzing their environmental awareness and their willingness to change their behaviors. There is a lack of studies about behavior towards SUP in the Middle 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, which promotes sustainable consumption and production to achieve sustainable cities (UN, 2020).

### 2. Theoretical Framework (TF)

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

The TF was divided into background concepts related to the problem of consumption and the environmental impacts of SUPB, and into the factors that influence people to adopt PEB through behavioral changes. The latter is the main focus

of this study. Those factors are under four different aspects and theories that were adapted by the author: demographic determinants, existing measures to reduce SUPB, the theory of planned behavior (TPB), and the S.H.I.F.T framework. They will be briefly explained.



**Figure 1:** Theoretical Framework. **Source:** The Author

## 2.1 Demographic Factors

**Age:** “As people grow, their needs, knowledge, and environmental sensitivity change” (Kiezel et al, 2019 p. 5). Different authors have diverse perceptions related to the age gap and the development of the PEB. Some such as Shen & Saijo (2008)<sup>1</sup>, argued that older people care more about the environment, others such as Kiezel et al (2019) state that young adults are the group that shows the biggest interest in environmental causes, for instance millennials<sup>2</sup> and Generation Z<sup>3</sup> are willing to pay extra for sustainable products (Nielsen, 2015 ). 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. “More educated people tend to be more concerned for the environment and more willing to adhere to pro-environmental behaviors.” (Kiezel et al, 2019). 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 (Kiezel et al, 2019; Gilg et al, 2005; Cottrell, 2003).

## 2.2 Theory of Planned Behavior (TPB)

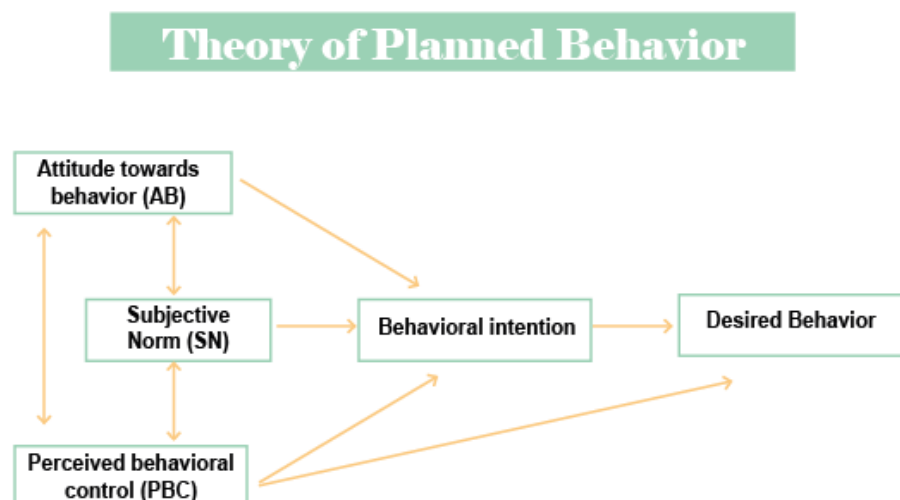
It was created by the social psychologist Icek Ajzen in 1991. TPB is designed to explain and predict an individual's behavior in a specific context (Ajzen, 1991). It proposes that the individual's behavioral intentions and actions are influenced by their attitude towards a behavior, subject norms, and perceived behavioral control (PBC) (Ibid). It states that the best way to predict behavior is by asking people if they are willing to behave in the desired way. As Macovei (2015a) explains

<sup>1</sup> Cited in Kiezel et al, 2019, p.5

<sup>2</sup> People between 21 and 38 years old

<sup>3</sup> People under 20 years old

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”.



**Figure 2:** 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.

#### 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 engaging in a certain behavior based on the approval, disapproval, and opinion of the people in their immediate social network (Macovei, 2015b). The functions of the subjective norm are social pressure and compliance motivation (Ajzen, 1991). Subjective norms can also be understood as the social norms that govern within a specific cultural context. Those are also shared with the S.H.I.F.T framework

#### 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 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 (2015b, p.18) this determines “...the real degree of control over behavior.” Macovei (2015b) states that 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 to adoption.

#### Behavioral Intention

It 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. 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”.

Arbuthnott, 2009, affirms that as more personal and specific the intention is, the more likely the behavior is 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.

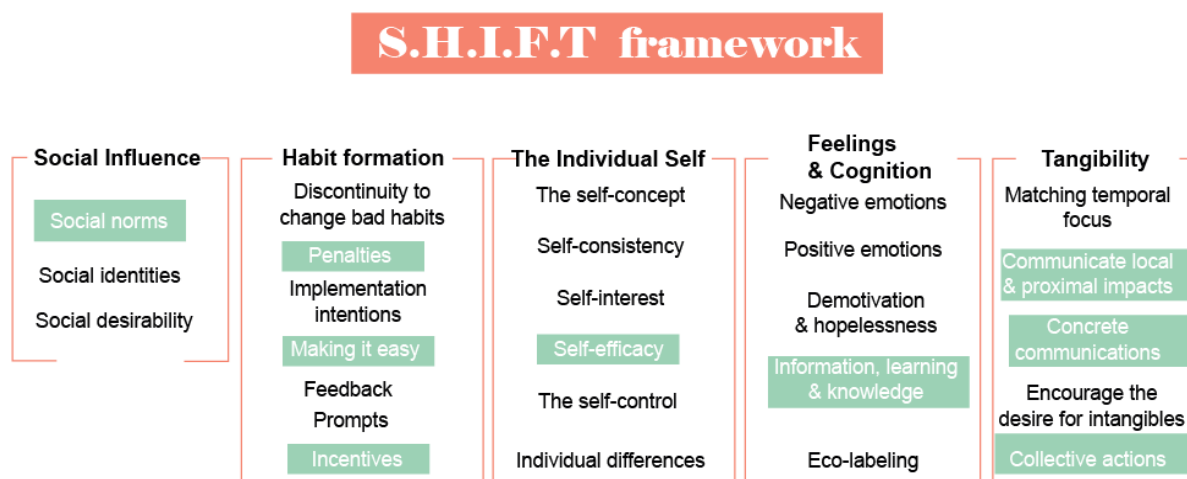
However, there is a gap between the behavioral intention and the performance of the behavior that is not covered inside the TPB. A person that is influenced by the above factors can state they intend to or will do something, for example, reduce the use of plastic bags in the upcoming weeks. How they make this happen is missing.

The gap is filled with the concept of implementation intentions 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. If the intention is to reduce the use of plastic, a plan to implement it could involve bringing a reusable bag (RB) to the supermarket every time. Then the performance of the desired behavior will be executed.

### 2.3 S.H.I.F.T. Framework

It 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. The study focused on the highlighted concepts that will be explained.



**Table 1:** S.H.I.F.T Framework. **Source:** White, K. et al, 2019. Adapted by Author

#### 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 three aspects: social norms, social identities and social desirability.

- **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). 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).

#### 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). Changes that lead to the formation of new sustainable habits are 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). Becker et al (2014) claims that habits are more powerful than intentions. Therefore, incentives, institutional regulations, and penalties, encourage behavioral change by "...altering the value and intention of the behavior." Kollmuss & Agyeman (2002) empathise 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, then enforce new habits with actions that foster repetition, making sustainable action easy, incentivized, using prompts and providing feedback. Those should be combined with another measure such as awareness campaigns in order to have an effective and long-term impact. That results in people understanding why it is important to create sustainable habits.

- **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. 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. The desire of people to "avoid a loss," even if it is a small charge, can influence their behavior (Schwartz, 2020).

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.

- **Making It Easy:** Two of the barriers that prevent people from getting involved in pro-environmental actions are 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.
- **Incentives:** are stimulations that increase positive habit formation and motivate people to adopt and maintain PEB. Incentives can be gifts, social praise, economical instruments such as rewards, discounts and monetary incentives, among other things (Homonoff, 2015; 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 (Handgraaf et al, 2013). Another drawback to incentives is when it is removed the sustainable behavior tends to vanish with it.

### 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.

- **Self-Efficacy:** It is considered to be the conviction that a certain behavior is achievable (Ajzen, 1991). It 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).

### 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.

- **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) supported by Kollmuss & Agyeman (2002), state that strategies and campaigns providing information, 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.

### 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. 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: Matching Temporal Focus, Communicate Local and Proximal Impacts, Concrete Communications, Encourage the Desire for Intangibles and Collective Actions.

- **Communicate Local and Proximal Impacts:** 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).
- **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 two outcomes, on one side it is the incredulity by the people that everyone 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).

## 2.4 Measures to Reduce SUPBs

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.

- **Policies:** 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 most common ways are bans, taxes, and fees. According to the UN Environment (2018b) by 2018, 127 countries have implemented some form of legislation to reduce the SUPB consumption.
- **Ban On Plastic Bags:** It works as a regulatory instrument that prohibits retailers from giving out SUPB (Lopez, J., 2015). This affects the behavior of the people where their usual habit of having SUPB for groceries is disrupted<sup>4</sup>.
- **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, 2018a)<sup>5</sup>. The tax on plastic bags is framed within the Pigovian tax on pollution, which is a tax that is imposed on industries that harm the wellbeing of the society, such as polluting the environment (Kagan, 2020). By shifting responsibility to the industry, it encourages them to find more profitable and sustainable alternatives.
- **Economical Instruments:** Monetary tools that “encourage desirable behaviors or discourage harmful behaviors will be effective only if the magnitude of the incentive exceeds the costs an individual associates with changing his/her behavior.” (Homonoff, 2015 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”.
- **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 (UN Environment, 2018a; Tough, 2007). Retailers can be encouraged to lead a voluntary agreement by factors such as corporate 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)<sup>6</sup>.
- **Social Awareness and Public Pressure** These strategies can result in gradual behavioral changes and furthermore in implementation of laws. According to the UN environment (2018a) awareness campaigns are designed to persuade and educate in topics such as proper disposal, reuse, recycling, and 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. 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 as messages framed in “regular didactic practices” (UN environment, 2018a). 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 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

<sup>4</sup> 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).

<sup>5</sup> 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).

<sup>6</sup> In 2017 in Switzerland the biggest retailer associations signed a voluntary agreement to not provide SUPB 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.

person or group. (M.S, 2013)<sup>7</sup>. It can work as collaborative empowerment (Kolff, 2018) <sup>8</sup>. Raising social pressure can serve as a trigger for policy decision making (UN environment, 2018a).

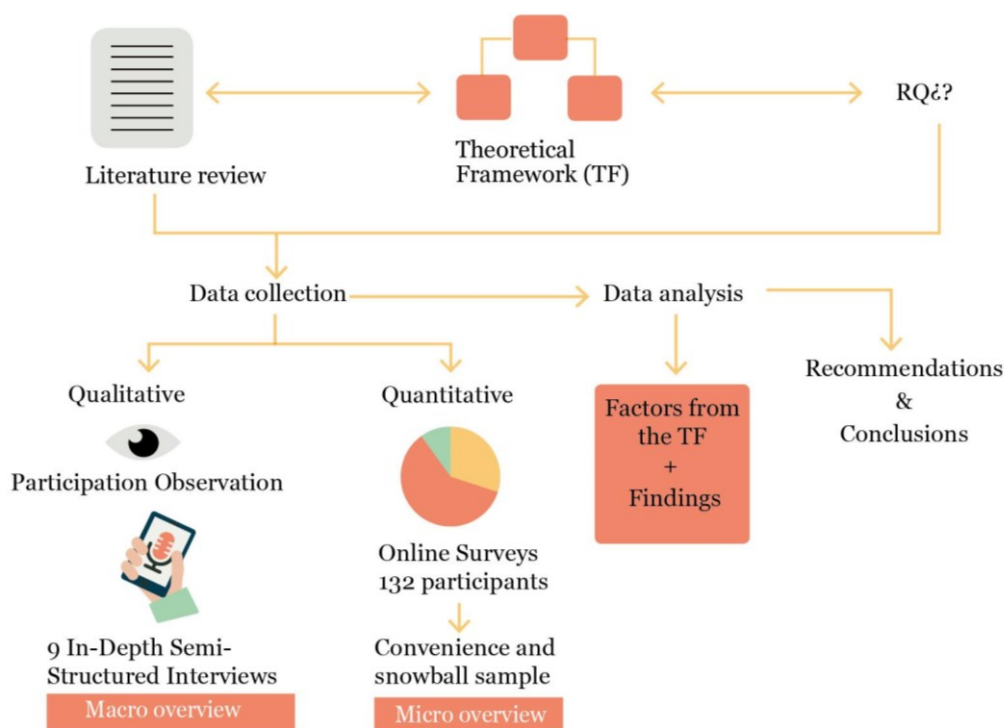
## 2.5 Alternatives

There are a significant number of alternatives to SUPB. From basket to cardboard boxes and backpacks. However, this study is focused on three widespread and popular types of bags. Every material and manufacturing of these bags has a 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). The main alternatives to SUPB are: Reusable or Durable Carrier Bags made mainly of different materials from natural fibers to synthetic ones, Paper Bags, and Bioplastics: Biodegradable and Oxo-Biodegradable Bags. The latter being controversial due to tend to have similar effect that the conventional SUP (European Commission, 2018)

## 3. Material and Methods

The research was carried out in different stages using a non-linear process. The TF was created based on the literature review and parallelly the research questions were formulated.

The Qualitative and quantitative data were collected to form a broad view of the SUPB situation in Cairo, through online surveys, interviews with stakeholders, and participation observation. Concepts from the TF such as Theory of Planned Behavior and S.H.I.F.T Framework were applied to the data collection methods. The discussion took form analyzing the findings through the lens of the TF and the concepts related to behavioral change. Lastly, recommendations and conclusions were developed.



**Figure 3.** Research Methodology framework. Source: The Author

<sup>7</sup> “Bye Bye Plastic Bags” a young 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 years starting with a beach clean-up and a signature-gathering campaign that collected over 100,000 signatures (UN environment, 2018a). This influenced the governor to sign a memorandum of understanding to phase out plastic bags by 2018 and they have achieved those businesses such as hotels and restaurants engaged in the campaign and committed to reducing plastic waste. (Ibis).

<sup>8</sup> 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 #RidiculousPackaging. This is an easy and effective way to motivate consumers to push for environmental alternatives in supermarkets. (Kolff, 2018)

#### 4. An overview of the SUP in Egypt and Cairo



**Figure 4.** Informal nodes of plastic pollution on Cairo's streets

##### 4.1 Plastic Consumption Background in Egypt

In the middle of the 80's 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<sup>9</sup>. In the 90's globalization started to permeate Egyptian society and consumers started to follow the western trends, as 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<sup>10</sup>. The plastic pollution started to be a visible issue in the country.

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 this plastic craziness only in the past 18-19 years. It starts from 2000's" Kamal<sup>11</sup>. The problem of plastic has been intensified by the lack of a proper solid waste management (SWM) and the throw-away society which make very convenient and accessible the use of SUP<sup>12 13</sup>. This led to Cairenes to 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.

##### 4.2 The Current Situation

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. The plastic consumption level in Egypt is a local problem with regional and global implications. The country is ranked as the biggest plastic polluter in the Mediterranean (WWF, 2019) and it is the main source of plastic waste in the Arab region (Nader, 2019). Egypt consumes around 5.4 million tons of plastic per year (Ritchie & Roser, 2020), and approximately 14 billion plastic bags (CEDARE, 2019). 67% of the plastic 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). It is not just affecting the country, but at a worldwide level its contribution is significant.

The overconsumption of plastic has impacts that range from pollution on the streets and heritage landmarks to clogging sewers, and pollution of beaches, water and land ecosystems, affecting the natural and urban environment, the socio-economic sector, for instance tourism and fisheries sector, and the health of the population. Furthermore, the plastic sector is an import dependent on raw material (CEDARE, 2019), that is also a burden for the country's economy. SUPB are consumed the most in the groceries shops, fruits and vegetables kiosks, stores and shops and large supermarkets (CEDARE, 2019).

Egypt is slowly becoming more environmentally aware (Shaban & El-Bassiouny, 2015) influenced mostly by NGOs, civil society and research centers that work actively. They work to raise awareness, to create alternatives to SUP, to research, to propose policies, and to push the government for laws to ban these items.

<sup>9</sup> Khalil personal communication, April 30, 2020

<sup>10</sup> Khalil personal communication, April 30, 2020

<sup>11</sup> Researcher on plastic leakage, personal communication, March 15, 2020

<sup>12</sup> Abaza, Counselor for the State Minister of the Environment. Director of the Association for Environmental and Community Development, the Centre for Sustainable Development Solutions and works with UN environment programme, personal communication, April 09, 2020

<sup>13</sup> Khalil, Co-Founder of Greenish (Environmental organization), personal communication, April 30, 2020

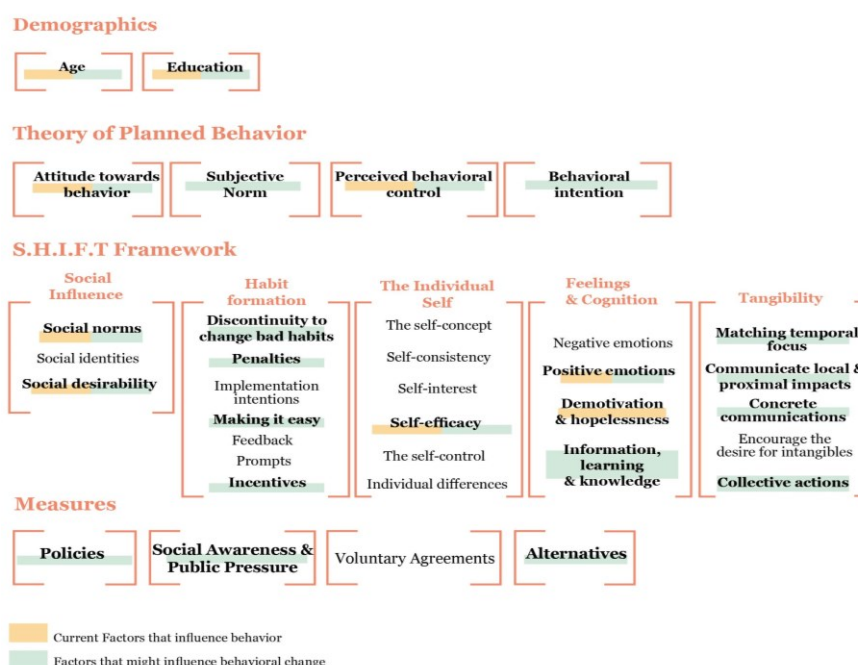
In 2019 a policy measures to address SUPB in Egypt was presented by CEDARE<sup>14</sup> with the support of different stakeholders. They are pushing hard for a law implementation on banning free distribution of SUPB. However, the drawback they found is the difficulty to monitor and evaluate the enforcement of the law, and the willingness of the government to implement such a law (CEDARE, 2019). However, in the Red Sea province a similar initiative took place as a decree and the use of SUP was banned in commercial facilities (El-Gundy, 2019). Particularly, because the environment is important for tourism. Additionally, awareness campaigns were supporting the implementation of the ban and eco-friendly alternatives sprout in the region (Ibid). Nevertheless, the new governor withdrew the ban<sup>15</sup>, but it is still implemented by the community. Despite 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.

#### 4.3 Cairo A City That Drowns in SUPB

The capital of Egypt is one of the biggest cities in the world with a population of over 20 million people (CAPMAS)<sup>16</sup>. 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 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 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 also related to 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. Additionally, the massive consumption of SUP items that are used briefly has significantly increased the amount of litter. Even 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.

#### 5. Discussion: Current Behavior and predictors of change



**Figure 5:** Factors that influence the current behavior and factor that might influence behavioral change in Cairo  
Source: The Author

<sup>14</sup> Center for Environment and Development for the Arab Region and Europe

<sup>15</sup> Khalil, personal communication, March 30, 2020

<sup>16</sup> CAPMAS The Central Agency for Public Mobilization and Statistics in Egypt

## **5.1 Factors that Influence the current Behavior of Cairenes Towards SUPB**

### **5.1.1 Demographic Factors & Environmental Awareness**

Most of the participants of the online survey were young and young adults, well educated and from middle-upper and upper class. They show a proper level of awareness and knowledge about the environment. This can be influenced by the educational level and also by the NGOs that often target this segment of the population. According to Cottrell (2003) and Kiezel et al (2019) this age frame is more sensible and has more interest in environmental issues. Regarding the theory of planned behavior (TPB) a proper level of awareness can be a predictor factor that leads to the intention to manifest a sustainable behavior.

In contrast, the general population is lacking environmental education. This includes an absence of contextual information and communication in the local language. That means that people do not relate to the local environmental problems and those who do not know English cannot easily access the information. This creates a lack of tangibility, where the information related to the environment is not communicated concretely, in a clear, relevant, and contextual way. At the same time the environmental awareness can be also related with the socio-economic background taking in account that the middle-upper and upper class population can have the choice to adjust their consumption. "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" state Shaat<sup>17</sup>. However, it is stated for other stakeholders that the level of awareness is not related to it.

Even if the participants show a positive perception regarding the consequences that their behavioral changes can have and they are environmentally aware, they are not reducing their SUPB consumption. The reason can be related to the consequences of the PEB are distant and not tangible, 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 PEB.

Change-makers, (NGOs, civil movements, and expats) have made efforts to influence behavioral change and raise environmental concern through campaigns and behaviors. They 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 people and the shop owners to understand why they should be reduced SUPB. This also suggests that people can easily follow behaviors that are coming from external influencers. Strategies such as campaigns, workshops, and clean ups, make people witness the impacts of plastics first hand, creating environmental responsibility, and engaging people in a PEB. Factors such as communicating local impact and positive emotions are linked to these strategies.

However, these efforts are limited and are not fully supported by the government, due to the environment not being a priority. There are active Egyptians, but not enough to pressure the government and influence the society on a larger scale.

### **5.1.2 Socio-cultural and Consumption Behavior**

The consumption patterns of the sample from the survey are contradictory to their level of awareness and attitude. It can be inferred that they have a strong perceived behavioral control (PBC). This means they have the tools to change their behavior (knowledge, economical capacity, etc). However, the behavioral intention is not strong enough to trigger the PEB. More education does not necessarily lead to a PEB and a favorable attitude does not mean behavioral change. (Kollmuss & Agyeman 2002).

People receive SUPB without complaint and supermarkets show appreciation by giving extra SUPB. In contrast, some people are also asking for less bags, 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 and 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. The SUPB will be reused at least once 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. There is also a 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 hygiene. This would indicate that Cairenes are not aware of the health problems of plastics.

The global tendency of buy, use briefly, and dispose is followed also by Cairenes especially with SUP items due to their convenience. 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. This phenomenon is created because people follow the comportament of others. It is also inside the social desirability factor, due to people following the pattern of consumption in order to be socially accepted.

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<sup>17</sup> Shaat, advisor for the governor and at GIZ, personal communication, April 20, 2020

In general, these unsustainable actions permeate the culture becoming socially accepted, repetitive, encouraged 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.

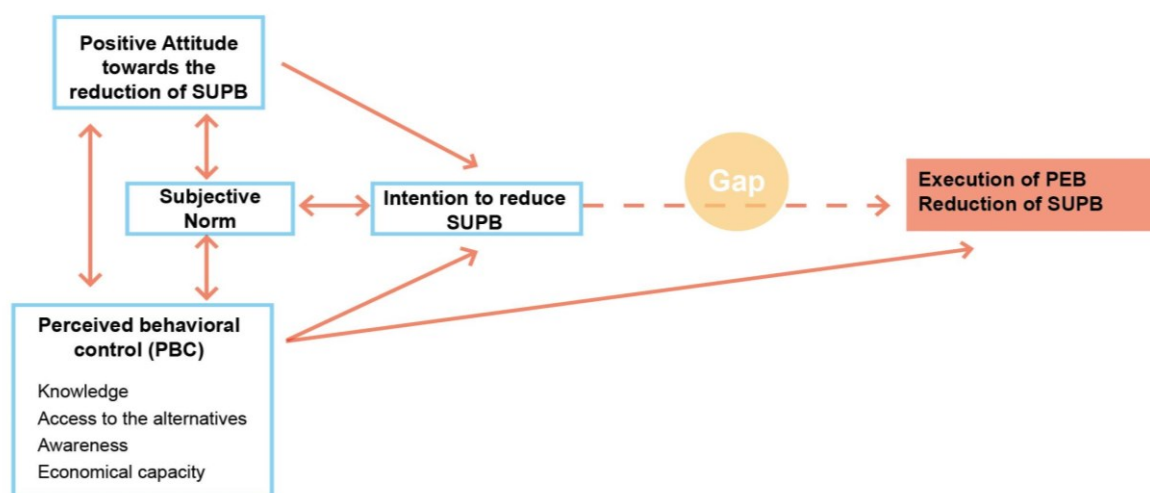
### 5.1.3 Normalization of the Plastic and External Factors

Most cairenes are not sensitive to the littering problem, they do not dispose of the waste in a proper way. This is directly related to the contextual factor of the lack of proper SWM that results in the normalization of plastic pollution. This led to the disposal of plastic on the streets becoming socially accepted. Another factor is the belief that all the plastic, including SUPB, can be recycled and is collected by *Zabbaleen*. This is a wrong assumption due to the fact that the SUPB are not recycled and not likely to be collected because SUPB do not have any monetary value for the pickers.

Therefore, SUPB are mass produced and often are thin and low quality. 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. Additionally, the data related to plastic in the context is limited and not easy to find, and the implementation of laws and policies is a complex process.

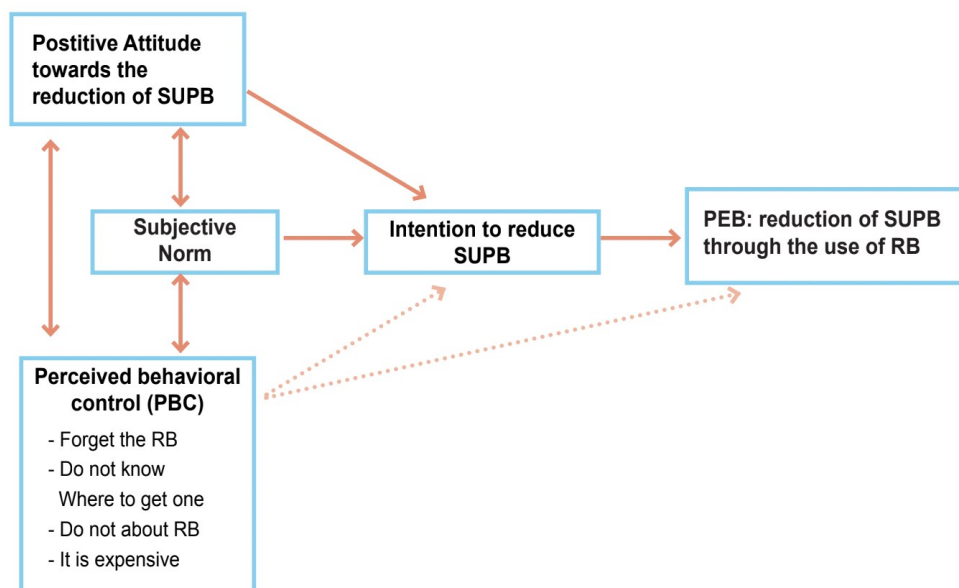
### 5.1.4 Application of the Theory of Planned Behavior (TPB)

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 and it can lead to the implementation of the behavior. However, behavioral intention does not necessarily lead to the execution of the behavior. There is a gap between what people say and how they act. The intention needs to be implemented to achieve the PEB.



**Figure 6.** Strong PBC, favorable attitude and the gap

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 them, 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 7). 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 sustainable behavior. Subjective norms are taken as the social norms that influence the context. The influence of the social networks as friends or family are not taken into consideration.



**Figure 7.** Weak PBC and subjective norm impediment.

As Macovei (2015b) 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 can be seen in the figure 7.

## 5.2 Factor that Can Influence Behavioral Change Towards A PEB Through the Reduction of SUPB

People in Cairo are willing to change. Willingness and awareness can suggest the inclination to implement behavioral intention, but 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.

### 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 if there are environmental benefits and a ban of free distribution of SUPB. 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.

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<sup>18</sup>. This can drastically and fast change the consumer behavior of people because it breaks an habitual behavior through the loss aversion concept. Policies should work 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 to people, 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.

### 5.2.2 Tangibility, Feelings and Cognition

Providing proper and clear information about the contextual problem of SUP by explaining the economical, health, and environmental impacts. Information, learning, and knowledge factors should be applied to make people relate to the issues of SUPB in Cairo and stop the normalization of those and plastic pollution. Bringing the benefits of the PEB more palpable and understandable for the population can influence the behavior and improve the lack of environmental

<sup>18</sup> Centre for Environment and Development for the Arab Region & Europe

education and enhance the level of awareness through factors such as matching temporal focus, communication local and proximal, and concrete communications in the local language, Egyptian Arabic. Additionally, displaying what can be achieved through collective actions can trigger the adoption of a sustainable behavior oriented to a common and collective goal.

Workshops, activities, and strategies should bring a great and enjoyable atmosphere, positive emotions and self-efficacy factors 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.

New habits should be easy to adopt, undemanding, and should be convenient. Then when individuals understand the problem, have alternatives, and easy ways to do it they might easily start to change their behavior.

## 6. Recommendations

The following factors can trigger behavioral performance. Therefore some variables should be taken into consideration such as age, social-economic background, and level of awareness and knowledge about the SUPB and the environment.

- PEB should be promoted and made socially desirable by NGOs and 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.
- Strategies to reduce plastic consumption should be tailored to each segment of the society. Factors such as information, learning, and knowledge, combined with positive emotions and enjoyment environments are important to influence people from different backgrounds.
- Message framing: messages should communicate that others are already behaving in a sustainable way. This could result in people following these behaviors.
- Environmental education should be included in both private 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, 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.
- 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, it is recommended to show 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.
- Data about plastic should be more accessible. It is recommendable that data can be shared and open for research, policymaking, and awareness campaigns.

## 7. Conclusion

Based on the qualitative and quantitative analysis of Cairenes behavior, most of them have a proper level of awareness and the willingness to change, especially in the middle and middle-upper class. Yet they consume a considerable quantity of SUPB. These behaviors are still normalized inside the context through the overconsumption of these items. Mainly, because of the consumption habits combined with the excessive distribution of SUPB and the throw-away society that govern Cairo's society. Despite that, environmental concern is gradually increasing in Cairo's society. This can result as a strong predictor towards the reduction of SUPB together with willingness and behavioral intention.

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. 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. This can bring a beneficial impact in the local and global environment including the improvement of SWM. 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.

There are also 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.

The result of the research can contribute to understanding a piece of the behavior and the perception from a sector of the 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.

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### Conflict of Interests

The authors declare no conflict of interest.

### List of Acronyms

**NGOs:** Non-Governmental Organizations

**RB:** Reusable Bag

**PBC:** Perceived behavioral control

**PEB** pro-environmental behavior

**SUP:** Single-Use Plastics

**SUPB:** Single-Use Plastic Bags

**SWM:** Solid Waste Management

**TF:** Theoretical framework

**TPB:** Theory of Planned Behavior

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