**Administrators' insights on uncovering littering hidden motivations and challenges in behavior change.**

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**Keywords (5):**

Littering behavior change, U theory, immunity to change, effective solutions for littering, iceberg model.

**Abstract (150 word)**

There are many attempts to deal with littering which is a worldwide problem. Based on theory U and Immunity to Change frameworks derived from the field of organizational management and behavior change, this study presents a comprehensive examination of littering from administrators’ perspectives. It aims to gain insights into the underlying causes of littering, investigate its deep-rooted attributes, and identify the challenges faced by administrators in implementing effective solutions. By Utilizing phenomenological qualitative methods, the study analyzed semi-structured interviews with 52 educational and operative administrators responsible for maintaining cleanliness in public spaces. The findings reveal difficulties in changing littering behavior faced by administrators. The study highlights the need for a deep reflection and reform in addressing the issue of littering, emphasizing the importance of regenerating individual behavior and administrators' actions. It suggests a shift in focus towards understanding the underlying layers of the problem and calls for brave and open-minded action to facilitate profound change.

**Introduction**

Litter in public spaces is harmful to the environment, society and the economy (Chaudhary et al., 2021; Weiss et al., 2016). In littered and untended public urban spaces, residents have expressed negative feelings, lack of security and even fear of crime (Medway et al., 2016; Vos et al., 2018). Dirty public spaces are caused mainly from littering, a topic that has been extensively researched in developed and in developing countries (Chaudhary et al., 2021). Despite this ongoing research along with wide-ranging programs and activities to reduce littering, in many places in the world it is still a common occurrence and in some places, is even increasing (Al-mosa et al., 2017; Cingolani et al., 2016; Schultz et al., 2013). In a comprehensive assessment of previous studies on littering, focus has been placed mainly on quantitative research methods, hence it was recommended to promote qualitative research methods (Chaudhary et al., 2021), which explore the phenomenon from an in-depth perspective and might enable a deeper understanding (Creswell et al., 2003; Mittal et al., 2017).

Therefore, there is merit to an in-depth qualitative study, adapted to examine a complex social phenomenon, such as littering and might provide a theoretical basis to its characteristics (Bryman, 2006; Malina et al., 2011). This study examines littering from a unique perspective of the experiences of the administrators of sanitation operations and education. Contrary to previous qualitative studies that examined the public’s perception (Al-Mosa et al., 2020; Beeharry et al., 2017), this study focuses on the perceptions of administrators and decision makers. Additionally, administrators’ perspective can aid in comprehending the issue and contribute to the field in seeking the means with which to address littering.

Littering behavior is influenced by personal perspectives (e.g., attitude, values, internal motivation, social norms) and environmental factors (e.g., sanitation level, trash receptacles, distance to receptacles) and the association between them (Al-mosa et al., 2017; Schultz et al., 2013a). When littering, individuals consider costs in terms of time, convenience, and monetary price considering all these perspectives (Esfandiar et al., 2019). Additionally Internal motivation exerts a stronger influence on littering than external motivation (Moqbel et al., 2020; Thomas, 2018). Therefore, it is valuable to examine personal perspectives. For example Attitude negatively correlated with littering and the willingness to promote environmental cleanliness are inversely related to the likelihood of littering (Aziz et al., 2019; Hansmann & Steimer, 2017; Zambezi et al., 2020). However, attitude alone lacks substantial motivating power (De Groot & Steg, 2009). The perception of someone cleaning up after them reduces personal responsibility and increases the propensity to litter (Spehr & Curnow, 2015). External locus of control and the belief in the ineffectiveness of personal actions also contribute to inconsistent behavior and a higher inclination to litter (Esfandiar et al., 2019; Kollmuss & Agyeman, 2002; Ojedokun & Balogun, 2013).

Sense of belonging to a place is one of main factors contributing to littering behavior (Spehr & Curnow, 2015). as individuals who spend leisure time away from home are more prone to littering (Esfandiar et al., 2019). Therefore, social norms, religion and local culture are also influential on littering (Carmi, 2019). even though littering occurs all over the world, its characteristics are connected to the local culture and politics (Carmi, 2019). When examining a complex behavioral issue from a cultural perspective, not all is apparent; much is hidden like an iceberg. Part of it is easy to explore and found above the surface, but the lion’s share is below the surface and concealed. This part contains basic principles and assumptions that shape behavior (Dimitrov, 2012). Hence for this study, we will use the Iceberg Model to describe the littering phenomenon, to gain a deeper understanding of the hidden characteristics of the issue, deep-rooted reasons for this behavior and the challenges we faced when seeking effective solutions.

Two central theoretical lenses are at the basis of this study: i) Theory U – a theory having a systemic approach from the field of leadership that enables the exploration of leading a paradigmatic change (Scharmer, 2009), ii) Immunity to Change is a model dealing with a hidden dynamic that prevents us from making the changes we passionately seek to make (Kegan & Lahey, 2009). Combining the theoretical lenses (the Iceberg Model, Theory U, and Immunity to Change), as presented in this study, enables a renewed exploration of littering on both the theoretical and applicative level.

As littering is a world-wide phenomenon, there are common elements and unique outlooks for each local arena. Researching the issue in various countries having a variety of characteristics might enrich comprehension of the phenomena and provide a range of tools with which to address the issue. In Israel, studies have been conducted in this field, focusing on a specific population (Al-Khatib, 2009; Arafat et al., 2007; Brennan & Portman, 2016; Carmi, 2019). These relatively limited studies do not represent Israel's, complex, multicultural society characterized by clashing and opposing tendencies, lifestyles, and habits. Israel comprises two major ethno-national groups, Israeli Jews (79%) and Israeli Arabs (21%). They differ in terms of religious, social, and cultural values and ideologies and constructs (Bragazzi et al., 2020). Within these groups there are further subdivisions of orthodox, traditional and secular Jews and Muslim, Christians and Druze Arabs. The present study endeavors to address this void by incorporating a comprehensive range of representations that reflect the multicultural nature of Israeli society.

In Israel, the public domain is filled with litter despite research that indicates that for most of the population a litter-free environment is important; 50% of the population has reported that they have littered at least once in the past year (Lev et al., forthcoming). The multicultural complexity in Israel, that characterizes many countries, correlates with littering and the perception of public space, therefore, it is possible to project findings from this study in finding solutions in countries with a similar social structure. In light of this, this study’s objective is to characterize the issue of littering in Israel and seek methods of tackling it, as it is perceived by operational and educational administrators working in public spaces and dealing with littering.

* 1. **Current ways dealing with littering**

Many studies have been conducted to assess various interventions in the attempt to change the situation and generate an improvement in the degree of sanitation. Interventions can be classified into five categories: 1. Marketing and public relations – various messages and publicity stunts such as campaigns, signs or face-to-face explanations have a considerable impact on behavior (Bateson et al., 2015; Bonarrigo et al., 2020; Brown et al., 2010; Egar et al., 2020; Hansmann & Steimer, 2015). 2. Improving infrastructure – the level of sanitation, changing trash disposal facilities, such as location of trash cans, type of trash can, distance between trash cans and the color of the trash liners has an effect on littering (Cialdini et al., 1990; Doesum et al., 2021; Liu & Sibley, 2004; Rangoni & Jager, 2017; Sater et al., 2020; Willis et al., 2019). 3. Financial incentives and fines – useful means that rely on external motivation and not on changes in core positions; the change in behavior will be short-term and will remain as long as the incentive or punishment exists. It is possible that financial motivation is not as strong as it was once thought to be and moral motivation might be more effective (Benartzi et al., 2017; Bolderdijk et al., 2013). 4. Laws and regulations – determine the practical and judicial aspect of the change. Laws, restrictions and prohibitions are very powerful tools, as they mark social norms of undesirable behavior. By the same token, these tools will lose their impetus if they are not accompanied by implementation and real-time explanation (Pahl et al., 2020). 5. Community educational activity – long-term activities within the community or school frameworks that attempt to generate changes in attitude, values and adopting habits of conserving clean public areas, in most cases were found to be effective in influencing habits relating to refuse disposal. Recruiting individuals for clean-up activities and monitoring areas adjacent to residences were successful in some cases to modify behavior (Hartley et al., 2015; Herdiansyah et al., 2021; Syakura et al., 2020; Zambezi et al., 2020). In each category it is necessary to direct intervention programs relating to the needs and desires of the target audience, instead of implementing a “one-size” approach for all (Al-Mosa et al., 2017).

* 1. **Generating a change in littering behavior – theoretical basis**

There are many theories related to change in human behavior. In this section we present the theoretical lenses which support the understanding of the phenomenon of littering and can promote change from a leadership perspective: the Iceberg Model as a basis for developing the Theory U and the Immunity to Change model. The Iceberg Model, from the world of nature, which can aid in understanding the complexity of behaviors (Dimitrov, 2012), is used to describe phenomena of cultural impact (Hall, 1976). The observed cultures that are found “above the surface” and are easily assessed and the core culture that is concealed “below the surface” comprise central values, assumptions, beliefs, attitudes and course of behavior (Dimitrov, 2012). The deeper we delve into the iceberg, the more the impetus increases to impact the entire system (Betzler, 2019; Dimitrov, 2012). This is one of the reasons that this model is suitable for assessing issues relating to cultural gaps or intercultural communication (Huan Hu & Chang Wang, Peng Yu, 2019). Littering behavior highlights the gap between the visible, which is the behavior of littering and the cultural motivations.

The Iceberg Model serves as a familiar approach on a systemic level (Leimann, 2020; Meadows, 2008). Therefore, it is suitable for this specific study, which examines littering from the point of view of administrative sanitation and educational administrators who oversee systems that relate to the phenomenon. In order to change a system, we must be aware that intervention on an incidental level (results) or of behavioral patterns and addressing the symptoms only, is not sufficient to generate a significant systemic change (Feola, 2015). The more we dig into the iceberg on a habitual behavioral level, to structural patterns and conceptual models, the more we will arrive at a level that is difficult to intercede, but can be highly effective (Meadows, 2008; Kennedy, Gladek & Roemers, 2018).

**Theory U as an organizational change from administrators’ point of view**

 Theory U was developed by Scharmer (2009) while observing the Iceberg Model. It is an approach to systemic, cohesive and combined thought, enabling a change in a paradigm on individual and collective levels through leadership. Its aim is to provide a solution for challenging phenomena such as the climate crisis, poverty and violence, when solutions for these issues cannot be based on outmoded paradigms of thought (Nullens 2019); therefore, it is suitable for this study, which addresses a complex, multi-faceted issue – littering in public domains. It is based on the notion that all human actions, intentions and attention evolve from a source. The place from which people operate is a blind spot; it is invisible to them. One of the critical factors in undertaking transformational change requires an understanding of these sources - how the field of our attention or our blind spot works (Jogiat, 2009).

 There are two key dimensions in Theory U. One is the distinction between perceptions and actions as we work from deeply connecting and sensing toward enacting and realizing. The other shows us the different levels of change: (1) **Reacting** – acting on an impulse to the symptoms selecting and applying known solutions; responding by relying on existing habits and routines; (2) **Restructuring** - incrementally adapting solutions in use (3) **Redesigning** - innovation based on new perspectives, changing the underlying structure and process while still operating within the constraints created by the organization (4) **Reframing** - radical innovation based on new conceptual frameworks and paradigms; changing the underlying pattern of thinking (5) **Regenerating** - essential change based on presenting, connecting with “the presence,” and trying to see possible organizational futures without the mental model that has created the problem; to navigate into the deeper layers of the field structure of attention one must use an open mind, open heart and open will (Scharmer, 2009; Schmitt, 2021). Most human beings and systems tend to operate only from the first two levels (i.e., reacting and restructuring), becoming stuck in reenacting past patterns, engaging in debate over conflicting views. To create a change, it is essential to work from the fourth to fifth levels (i.e., reframing and regenerating), which enable profound change, shifting from repeating previous patterns and mistakes to transforming the emerging future (Abdulhasan et al., 2020).

**Immunity to Change**

This model combines with the process of a change and explains why people, organizations and systems do not change (in our case, why the public space remains dirty). It is described using the metaphor of the immune system designed to protect the body from negative influences, imbalance and anxiety (Kegan & Lahey, 2009). While this system maintains the body’s proper function, it can also be dangerous when it rejects foreign material the body needs to heal itself and thrive. While making an effort to maintain dynamic balance, the protection the immune system provides limits the ability to receive information and new ideas. The immune system of organizational details and systems is often supported by our mental models or “assumptions” that are taken for granted as being “correct” without criticism. As long as we assume the assumption is correct, the system makes us blind to the problem itself (O’Brien, 2013), similar to the phenomenon described in Theory U.

Given the recognition that certain individuals exhibit immunity to change and making a behavioral change, especially in the context of littering, is a complex undertaking, the research aims to address the following Research questions: first How do the administrators perceive the characteristics of cleanliness and littering behavior in public spaces in Israel? Second According to their perceptions, what are the causes of littering behavior? And What operational and educational challenges are involved in addressing this phenomenon?

Lastly, driven by the intention to provide practical strategies for addressing the challenging issue of public space cleanliness What defines the approaches and methods used to bring changes in public littering behavior?

1. **Methods**

 This study uses a phenomenological qualitative method to examine the phenomenon of dirty public spaces caused by littering behavior. Qualitative methods are crucial in conducting research on social behavior when the underlying concept is difficult and phenomena need to be understood (Mittal et al., 2018). The contribution of phenomenology method is its rigorous and systematic exploration of subjectivity (Stolz, 2020). Therefore, the phenomenological qualitative approach is suitable for this study. This approach examines the essence of the practice through semi-structured interviews.

* 1. **Semi-structured interviews**

 Fifty-two (52) semi-structured 45–90-minute interviews were held during 2021with local operational and educational administrators. Interviews were conducted in Hebrew according to a protocol using the Zoom application. The questions were designed to be sufficiently approachable in a way that the researcher could be open to new ideas but at the same time be aware of the theories and the research purpose (Wengraf, 2001). The purpose of the interviews in this qualitative research is to get a better understanding of the participants’ experience (Almeida et al., 2017; Sovacoola et al., 2018; Wengraf, 2001). Interview is one of the most important data sources in qualitative research (Yin, 2015). The protocol was designed in four parts: The first includes personal questions, followed by details related to participants’ work (e.g., *What do you aspire to lead in your position?)*. The second includes questions collecting data related to the regulated area (e.g., *What is your vision regarding public space?)*, its level of cleanliness and characterizing its littering behavior (e.g., *What is your perception of littering in public spaces? What do you think are the causes for littering behavior in public spaces?)*. The third deals with the successes and challenges of littering. The last part comprises participants’ recommendations and thoughts about possible implications in the future.

**2.2 Participants**

 The study involved 46 interviews with 52 administrators (complete list in Appendix 2) dealing with littering behavior in public spaces: 27 from operational aspects (52%), and 21 from educational and explanatory aspects (39%). Public spaces include urban domains, nature sites, open spaces, and parks. Participants were selected according to pre-determined categories presenting broad and comprehensive perspectives of the phenomenon as possible. As mentioned, Israel is a multi-cultural country, and it was important to represent the varying sectors according to different populations, regions, and authorities’ characteristics. Although sample size is relatively small and targeted, the research is conducted in more depth than would be possible in any other type of quantitative research (Connelly, 2010; Stolz, 2020).

 Participants were distributed according to the type of public domain they manage. Previous studies examined littering behavior in nature sites or national parks (Aziz et al., 2019; Esfandiar et al., 2019; Shimazu, 2018), or in urban areas (Nyawira, 2016; Schultz et al., 2013; Zambezi et al., 2020). Natural areas are generally more susceptible to waste damage; therefore, 20 of the interviews (40%) focused on administrators of these areas. 27 interviews (53%) were conducted with administrators of urban areas, and the remaining 5 interviews (7%) were conducted for academics and activists in civil organizations who do not work according to this division. Participants were categorized by size and type of municipality - four regional councils (23.5%), one local council (5.9%), and 14 municipalities of different sizes. The municipalities were divided according to the number of residents: representatives of three large municipalities (17.6%) with over 200,000 residents participated in the study; representatives of five medium-sized municipalities (29.4%) with 50,000–200,000 residents as well as representatives of four small municipalities (23.5%) with fewer than 50,000 residents. Three of the authorities were Arab, one ultra-Orthodox and three were mixed localities. Five had a high socio-economic rating and nine, a low socio-economic rating.

 To comply with the ethical rules and guarantee the rights of the participants, the participants expressed their consent in writing (consent form) after receiving an explanation of the rationale and goals of the research. It was clarified to the participants that their choice to participate or not in the study and any details provided as part of the interview would be kept confidential and would not affect their workplace in any way, that the use of the information they submit would be made while ensuring their confidentiality and anonymity. The interview and questionnaire items were thoughtfully constructed, taking into consideration the cultural attributes of the participants, and deliberately excluding any content that could potentially cause embarrassment, or harm them. Ethical approval was obtained from the authors’ University ethics panel (23.1.2020).

**2.3 Data analysis**

 Data analysis included reading and rereading transcripts of the interviews to identify meaningful pieces of information that could help answer the research questions. The pieces of data were combined into themes and sub themes that were cross-referenced among interviews to validate the findings. This thematic analysis was supported by direct quotations in the findings section (Connelly, 2010). Information collected in interviews was analyzed using a qualitative interpretive method (Corbin & Strauss, 2014). Analysis of the findings was conducted using first- and second-cycle coding and the creation of categories (Saldaña, 2014). First-cycle coding was performed as an inductive analysis to derive meaning, patterns, and themes from collected data that included reference to some preliminary codes appropriate to literature review. it was conducted in two phases: First, 96 codes emerged from the data (e.g. education works; the solution is not technological or infrastructural; consumption effect litter; what can I do?; crowding causes litter).after then using the Axial Coding, six main categories were revealed: 1. Participant characteristics and background. 2. Characteristics and factors of dirty public domain. 3. Reasons for littering behavior. 4. Who litters? Socio-demographic background. 5. Means of tackling littering. 6. Values, education, and leadership for reducing littering and keeping the public domain clean. Second-cycle coding was performed as a deductive analysis to established theories and seeks to confirm them by scanning the texts according to the categories examined. ATLASti version 9 software was used for the coding and analysis process. Using first- and second-cycle coding based on the software enabled the creation of organized, systematic, and valid analysis that could compare all sources.

1. **Results**

This section examines litter occurrence and administrators' perception of littering behavior. It explores the recurring cycle of littering that entraps administrators and analyzes the rationales and justifications behind littering activities. It also investigates the challenges faced by administrators in modifying littering behavior and suggests potential strategies for managing and mitigating the littering problem.

* 1. **The problem – the cycle of littering and cleanliness**

 The general sense of the administrators we interviewed for the study was that the public space in Israel is full of litter and the problem is increasing. The Israeli public is concerned by the lack of cleanliness in the public domain, and despite this, it seems there is a large discrepancy between the population’s desire to live in a clean environment and the present littering behavior. An administrator of the Operations Department in a middle-sized city attempted to explain the accepted mentality of littering: “People are lacking awareness regarding cleanliness and littering. They just leave their garbage and go, even though there are trash cans.” From this testimony, we can conceive how the public domain is regarded, and it is apparent from all the testimonies, that the cause is not lack of waste bins. The attitude towards public spaces and disposal of refuse are influenced by the home, primary education, and an individual’s system of values. This system of values also contributes to littering and increase in inappropriate refuse disposal.

 The increase in the amount of litter directly escalates cleaning up activity. As the problem of littering increases, so does the concern for the situation from a segment of the population; they act and go out to clean up public spaces. This is a cyclic situation. The administrator of the Operations Department in a regional council emphasized this cycle: “It is a never-ending battle. You clean up, and then there are those who continue to litter.” Many administrators believe that littering behavior will not disappear on its own. The administrator of the Operations Department in a regional council emphasized the endless cycle of littering and cleaning up: “It doesn’t matter how much we invest in resources: Bring more workers, clean up, place more garbage receptacles…people will litter. It’s very frustrating and disturbing because we have no solution; we have no control… nothing helps.” This official expresses a sense of frustration, a feeling expressed among all the participants. One of the reasons for the lack of ability to deal with the situation is focusing on the litter, and not the littering behavior as an administrator of the Operations Department in a middle-sized municipality noted: “I hope that municipalities’ strategy will change - that they will address the root of the problem and not the symptoms.” Despite the understanding that an on-going and deep-rooted process is necessary, most organizations and authorities choose to invest in clean-up solutions, infrastructure workforce, time, and budget instead of promoting a process of behavior modification.

* 1. **Reasons for littering behavior**

Administrators have raised a variety of reasons and justifications for littering. It is difficult to isolate each reason, as littering can stem from several reasons at the same time. In this chapter we present the reasons for the difficulty in modifying littering behavior. The itemization will be according to the level of difficulty to modify the behavior (Figure 1).

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Figure 1: Reasons for littering behavior according to administrators’ perceptions

Figure 1 describes reasons for littering mentioned by the administrators: from easy to difficult to modify – from lack of awareness or attentiveness to the effect the behavior has on the population. Meaning, people litter unintentionally. Lack of awareness or attentiveness is rated “easier to modify” by the interviewee, as will be described more comprehensively in the next section. The next level of difficulty to modify is personal feelings such as fear, laziness or feeling disgust or discomfort around garbage. Last, are the factors that are the most difficult to modify – negativity towards the community in which they litter or towards the establishment, such as alienation, lack of sense of belonging, entitlement, and extreme nationalism.

* + 1. **Lack of awareness**

According to a researcher of waste policies and management, litter is found in certain familiar areas: “When we drive along the highway, we accept that the fence is “embellished” with litter and debris that runs all along the road. It’s part of the scenery.” Litter in public domains has become acceptable and it characterizes Israel to the point where Israelis often do not even see it. Moreover, people who litter are completely unaware that they are doing something inappropriate. According to them, it is “really okay,” as was indicated by the interviewees. An education administrator in an environmental unit of a major city explains: “Sometimes they set the bag of garbage down and leave. That’s it. It doesn’t seem wrong. It’s a cultural, educational issue.” There is no malicious intent, or defiance or outright lack of consideration; most people who litter are completely unaware that they are doing so; they believe there is nothing wrong with the behavior.

Another characteristic is the sense I’m okay, but everyone else isn’t. Many people believe they do not litter. “It’s the other guy”. An administrator of the Operations Department in a regional council described how “everyone has an explanation of why the other is to blame. It’s not me, it’s the neighbor. It’s not the residents, it’s the guests. It’s not from this street, but the next one over. Everyone sees the other, but not themselves.” The common approach seen here is pointing fingers. In conclusion, one of the main reasons for littering is lack of awareness of the consequences of the individual’s behavior, in addition to lack of understanding of the effects of this behavior.

* + 1. **Negative Feelings and values**

Littering can stem from feelings, such as phobias – mysophobia (fear of germs), a sense of disgust, discomfort, or lethargy that prevent us from behaving appropriately. An administrator of the Operations Department in a middle-sized municipality described her mind frame and thoughts regarding those who leave their bag of refuse behind: “If the trash can is clean and washed, it will be more inviting to touch, if it looks dirty, clearly a person might say, ‘it’s gross – I don’t want to go near it,’ and leave the bag on the ground.” This indicates that in order to avoid litter, people need to overcome their feelings of disgust, fear, and discomfort. An administrator explained why people litter: “Lethargy. Laziness. That’s the reason.” The issue of laziness relates to convenience which relates to the use of disposable plates. The use of disposable products impacts garbage disposal.

The feelings are not only negative, but also related to cost-effectiveness - what effect my activity has on the individual, whereas the effect of these actions is a drop in the bucket. This sense of external locus of control prevents people from modifying their behavior, despite their knowledge that it is harmful to the environment. An administrator of environmental education explained this feeling and its connection to littering: “People say: What can I change - the little person? What difference will it make? I hear that a lot. People care – they don’t want to see their environment full of litter, but they don’t believe that their small contribution will make a change.” The sense of weak locus of control, helplessness, allows for apathy/laziness and inconvenience to overtake consideration, so even if they do want a clean public space, they will not take on the initiative for it to happen.

Littering behavior directly relates to an individual’s system of values, as indicated by the administrator of the education department in a middle-sized city: “There are people whose values stipulate that they will not litter under any circumstances, and there are those who are the opposite – they are not terribly impressed by the moral or ethical issue of littering.” Littering might be an expression of disregard for the public domain, as described by an administrator of a civil organization that addresses cleanliness in nature: “Littering is a symptom of a person’s attitude towards the public domain - nature. A person who litters does not care.” Though the public domain might be dirty, private spaces (yards and inside the home) are clean and well-tended. Administrators emphasize that this discrepancy as described by the administrator of the education department in a middle-sized city: “People allow themselves to behave disrespectfully in public spaces, something they wouldn’t think of in their private space; and a meter away; ‘it’s someone else’s business, not mine.’ It’s very disconcerting. It is apparent that all the participants in this study who oversee education and maintenance of the public domain are extremely distressed by the discrepancy between the public’s attitude toward public and private spaces.

* + 1. **Alienation towards the community and establishment**

Additional reasons that concerned administrators related to the relationship between people and their community, attitudes toward municipal establishment, organizations, and the country, feelings of lack of trust in the community and establishment that cause hostility and a desire to exhibit vengeful behavior. In this section, we will examine how alienation relates to the issue of littering. An administrator of a civil organization explained: “One of the biggest problems we are facing in Israeli society today is lack of mutual consideration for the country on a national level, of place, home, society, community, integrity…it’s all gone from Israeli society.” Lack of consideration in this case indicates lack of a social connection and lack of a sense of community on a national level. In fact, the issue indicates a lack of solidarity manifested in the incident described by an administrator of a nature site:

One day I meet a man who… is very close to nature; he is sitting with his children among garbage and filth. I say, “What is this?” He replies, “Do you see those Arab workers? They’ll clean it up.” The Arab says that the Jew will clean up and the Jew says that the Arab will clean up. The ultra-Orthodox says that the Secular will clean up and the Secular says the ultra-Orthodox is the one making the mess. Long story short, all the battles we are fighting among us about our existence in Israel in general, and all the fighting against the elite and non-elite, is manifested in garbage.

This statement reflects opposition among the various multicultural groups, resulting in negative reactions that are expressed in vengeful behavior such as littering in public spaces. In other words, lack of a sense of community is manifested in littering. Lack of a sense of community raises a sense of alienation and at times is coupled with the desire to avenge, as the administrator of a nature site illustrated: “There are those who do it as an indirect way of avenging the authorities…the establishment, organizations, the State. There are those who take revenge on the country by littering, because this is how they express their disdain.” The administrator of the Operations Department in an ethnically diverse city provided several examples of defiance and vengeance towards the authorities by littering: “There are those who do it to us (the municipality) on purpose… ‘I pay taxes…I don’t have to do any work. Let the guy with the truck come and clean up. Why should I do it?’ There aren’t too many like that, but they exist.” Residents, even if they are few, take revenge on the municipality as an expression of their expectation of getting their money’s worth.

An additional issue that characterizes the Israeli public is a sense of entitlement, as is described by an administrator in the Operations Department: “There is a small sector of the population that thinks they are entitled to everything: ‘It’s ours – we can do whatever we want.’ We encounter vandalism, and refuse that people leave behind.” People believe they are the authority – the public domain belongs to them, and thus, they can do with it as they please. Sometimes, lack of trust in the establishment stems from feelings of extreme nationalism and hostility, a feeling that boils over in certain sectors, as an administrator of education in one of the Arab villages stressed:

Sometimes our youth take revenge through vandalism because of hostility, miscomprehension that we are part of the county. There is a very fragile context – the Arab-Jewish conflict puts me in second place. Therefore, I do not have a sense of belonging to the country… we have a long way to go before we can respect the environment.

This statement indicates that frustration towards the country gives rise to a lack of belonging to place and country; one of the manifestations is littering and vandalism. In order to solve the issue of littering, first a sense of belonging to the country must be instilled in these groups.

* 1. **Difficulty in generating change in behavior – the Iceberg Model**

As stated, the findings indicate the frustration among administrators in coping with litter. One of the causes of this frustration is that the symptoms of littering are being addressed and not the difficulty and complexity in generating a change in behavior. Table 2 describes representational concepts of administrators regarding challenges of this change that originate from lack of awareness and concern, lack of values of respect for the public domain, difficulty in changing behavior and the complexity of cultural modification.

**Table 2: Difficulties according to administrators’ perceptions**

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| **Characteristic of the source of the difficulty** | **Quotes** |
| Lack of awareness and concern | Anyone who thinks that collecting trash and hanging the bag of garbage on a bush is okay, needs to have someone tell them: ‘Don’t do that’ in real time. (An administrator of several nature sites). | When the socio-economic level is low, you deal less with educating people and maintaining their area, and more with day-to-day survival stuff. It’s harder to see the area; you see yourself. And when these populations come to the nature sites you can see that they don’t care about cleanliness (An administrator of Education Dept. of Environment). |
| Lack of values of respect to public and public space | I feel bad that people don’t always consider their environment highly. And what mainly bothers me…these values are not generated from them, from their personality. (An administrator of Dept. of Environment). | The major challenge is how to get the residents to believe, even though it is not an ingrained value of theirs; I understand that not everyone is like that. Not everyone has this perspective. How can I change people and get them to behave differently? (An administrator of the Operations Dept.). |
| Changing habits | It’s hard to turn it (information for people on how to properly dispose of their trash) into a permanent future modus operandi. (An administrator of several nature sites). | How to get people to change their ways? It doesn’t take a character change, it takes a change in how you live, and that’s something that can be done. (An administrator of the Operations Department in a large municipality). |
| Changing culture | It’s Israeli culture. We saw it during Covid-19. It’s hard to change DNA. You see it [public disrespectful behavior] in soccer fields, on the roads. (An administrator of Operations Dept.). | To tell you that in ten years the world will be perfect and green, and people will recycle, and not bury trash? From what I see today I find it hard to believe. Our culture does not change so fast. (An administrator of Operations Dept.). |

Table 2 indicates that the administrators face many difficulties when attempting to address littering in the public domain. Among most, these difficulties create a lack of belief in their ability to change the public’s behavior due to lack of awareness, values, habits, and culture. In fact, these feelings might be a testament to low locus of control towards the administrators’ ability to change this behavior. Low locus of control might explain the fact that they are focusing on littering and garbage disposal (the symptoms), where their input is recognized and not in behavior change (the problem). Moreover, there is indication that there is a degree in the level of difficulty to deal with littering, so that a change in behavior is perceived by some administrators as easier than a change in culture or values.

* 1. **Means in addressing littering behavioral change**

Addressing littering behavior in public spaces includes a variety of methods: specific solutions using the existing tools (e.g. maintenance infrastructure and clean-up endeavors); finding creative solutions through reframing and redesigning (e.g. prevention and personal presence in public areas, negative incentives through enforcement and monetary fines, positive incentives through various rewards, adaptive public relations and personal example), and via systemic solutions with in-depth consideration towards change (e.g. education and collaborations) (Table 3).

**Table 3: Analyses of administrators' actions and insights regarding the ways for dealing with litter in public spaces.**

| **Administrators’ actions – Quotes**  | **Administrators’ insights – Quotes** | **Interpretation and analysis** |
| --- | --- | --- |
| **Maintenance and infrastructure**We are always thinking of ways to improve, both removal time, removal frequency, street cleaning…it requires us to think all the time (administrator of Operations Dept).**Clean-up activities**Clean-up day is full of events, and I think kids and teens connect to the experience of going out, taking pictures and posting. It leaves a positive imprint. It’s great, but short-term; at the end of the day, its effect wears off. There must be some sort of explanation to support the endeavor (administrator of environmental education in a city). | **Maintenance and infrastructure**Underground receptacles or above-ground containers will not make a difference in the level of cleanliness of a picnic ground. They won’t solve the problem. The problem of dirty national forests and picnic areas in Israel will not be solved technically (administrator of nature sites).**Clean-up days**Success depends on the residents living in the area and their connection to that area. The fact that (soldiers) will come and clean up the street is nice, but it’s only first aid; it doesn’t treat the root of the problem (administrator of a small-town Operations Department).  | Administrators are busy seeking solutions on the one hand, by reacting, which is expressed by repetitive cleaning up, like “putting out fires” and restructuring; therefore, they are trying to accommodate the infrastructure and maintenance. Despite this, they understand that it is necessary, but not enough to prevent littering.According to the administrators, clean-up days are part of an educational activity and the administrators’ feeling who promote this endeavor is that they are making a deep change. However, in fact, the effect of these days is limited and short-term, thus remaining at the restructuring stage, i.e., reverting to familiar tactics. |
| **Prevention (from getting into conditions you can litter)**There was a lot of vandalism before we put up the gates. Today there is less. We put up two electric gates that open in the morning and close at sundown. It prevents littering and vandalism (administrator of a natural reserve).**On-site presence**We did an experiment… we handed out bags and no one littered! It was amazing. They didn’t pick up other people’s trash, but they didn’t leave their own garbage either (administrator of nature site)**.** | **Prevention**We will prevent…the more we reduce consumerism, there will be less trash and less dirt (administrator of civil organization); The more we prevent access to cars, people carry less, and there is less trash (administrator of a nature site).**On-site presence**On-site presence can make a difference… to prevent vandalism and littering (administrator of nature site). | Prevention and on-site presence generate new practices and serve as an additional means for administrators to restructure and address the issue. In places where prevention is applied, or administrators are present, there is a notable improvement; the question remains: is it pushing the problem to another place, or a deep-rooted solution? It is impossible to be everywhere all the time, we need a deeper solution. |
| **Enforcement as a negative incentive**Lately littering has begun to decrease. People are more aware, and enforcement is stricter - policing, inspectors of local authorities (administrator of Operations Department). | Within a permanent population (urban areas) means of enforcement is more effective. When one person gets a fine, family and friends will think a thousand times before littering again. Tourist areas are much harder to enforce. The population changes; there is no long-term effect (administrator of Operations Dept.).  | Administrators state that there is little enforcement due to lack of desire to deal with the political repercussions. When people get fined, they are liable to be “vengeful” towards the administration and not vote to reinstate them. Norms in Israel are lack of enforcement in many areas and thus it is difficult to apply this means. Therefore, increasing enforcement to inhibit littering requires redesigning and creating new perceptions regarding positions and the public. |
| **Positive incentives**We cleaned up the area. I learned that from Brazil. We gave out toys to the kids. We said, “Whoever brings us a full bag of trash gets a toy.” But these are ad hoc solutions. It’s not culture over time (administrator of Operations Dept.).**Adaptive publicity**I have a project in the city [based on a T.V. show] ... we go around… as soon as we see a child disposing of trash properly, we call to the parents, take their picture give them a medal and a certificate from the mayor and post it in the paper. The child is a hero of that day - a model citizen at such a young age. It draws others to follow suit. We’re using the embrace model, not punishment (administrator of Operations Dept.).**Administrators as role models**I received a video of a person littering and disposing of junk not on the designate day. I understood it was a video of the deputy mayor! He is the role model for the city! (Administrator of operations dep.). | **Positive incentives**After spending time in nature, they will be thanked for cleaning up and receive a small token: a cup, bag or other souvenir (administrator of nature site).**Adaptive publicity**Publicity is a good tool. We need a variety of tools because of the complexity of the issue and we are working with different types of people. For one person, reading a flyer is enough, another needs a video, and a third needs someone to show them where the trash can is and why they need to throw their waste in the receptacle. It’s an issue that requires perseverance, logic, continuity… we are in maintenance mode the whole time (administrator of an Operations Dept.).**Administrators as role models**Being a role model is intense. We must harness the leaders or strong people who will serve as role models; it’s very significant (administrator of environmental unit). | Understanding that there is a need to change the concept, administrators are becoming creative to reframe the issue through positive incentives. Administrators are positively creating new thinking through dialogue with the residents that relates to their culture.According to the administrators the objective of publicity is to generate a conceptual change through dialogue between administrators and residents and raise awareness regarding littering. Here too, administrators who choose to stick with diverse types of publicity are reframing the way they address the issue. Administrators’ personal example in Israel’s existing norm as presented here is often littering. Therefore, a change needs reframing innovation based on new paradigms. When an official serves as a positive role model, it is rewarded with positive feedback from cleanliness administrators. |
| **Education**The education system failed in explaining why it is important to maintain a clean public domain…it dealt with it…too little and not the necessary amount (administrator of Operations Dept.); the education system did not operate systemically. If there is a nutty teacher who takes on public cleanliness, then it exists. The Department of Education says it’s the Department of the Environment’s problem. The Department of Education shirks its duty and says, “It’s not our problem” (administrator of a civil NGO).**Collaboration**The topic of systemic collaboration across the board does not exist. Lately we have been trying to pass on the message of the importance of collaboration among all the departments and branches of the municipality. I took action and initiated training for all the administrators regarding sustainability... join forces with the departments because I find it imperative for our work and it does not exist enough (administrator of an environment dept.) | **Education**I can say that if we do our job in education and publicity, the situation will improve. If we let fate take its course and behave as we have been until now, then it seems the situation will remain the same (administrator of Education Dept.).**Collaboration**Previous endeavors failed because they focused on one sector, either education or publicity and it’s not right to take only a fourth of the whole pie. If we only use publicity without education and enforcement, it won’t work. It must be multi-faceted: collaboration with central and local governments, authorities, the third sector and civil society (administrator of NGO) | To generate an essential change, systemic education processes must be put into motion that provide values of taking on responsibility for the public domain and maintaining its cleanliness. Findings indicate that the national and local education system is dodging its responsibility and does is not part of what is necessary to create public awareness.Administrators understand the importance of creating collaborations on a local, regional and national level. There is an understanding that these kinds of processes can lead to renewed systemic and in-depth thought that is imperative for addressing the issue. However, forming collaborations is complicated and in most cases, it doesn’t come into fruition. |

 Table 3 indicates that administrators are focused on existing solutions, as was presented in the previous chapter (3.1.1. Figure), however, these measures alone are inadequate in addressing the problem comprehensively. They claim there is not enough enforcement, education publicity, willingness of the public in the field and no collaboration between the national and local levels, though they recognize the need for and importance of action at this level. In fact, the administrators’ locus of control, as stated above, is external, and they do not believe in their ability to generate a change and address the issue. It is expressed by administrators of the education system who believe the solution is in enforcement, and administrators of infrastructure and enforcement who think the solution is in education and publicity. In sum, each official domain believes the solution is in another domain, that is not his.

1. **Discussion**

This study characterizes the issue of littering in the public domain and the perceptions of administrators who are entrusted with education, advocacy, and cleanliness. Israel, like many other countries in the world that contend with immigration and multi-culturalism, is challenged when addressing the issue of littering. Despite endeavors undertaken by administrators, the situation has not improved; on the contrary. This global phenomenon has increased in both urban and natural public spaces in the world in developing countries (Al-Mosa et al., 2017; Chaudhary et al., 2021; Hu et al., 2018; Ojedokun et al., 2022) and in developed countries (Esfandiar et al., 2021; Hansmann & Steimer, 2017; Schultz et al., 2013b). Therefore, renewed exploration of the characteristics of the issue, the reasons behind it and effective means with which to deal with the problem are necessary. In the discussion, we will observe the issue through a global lens, which can be relevant to many countries and communities. The starting point of the study is that beneath the visible basic assumption of littering, there is a deeper layer that impedes the possibility of generating this anticipated change. In fact, the public, administrators, and the entire system are unconsciously resistant to the change.

Considering this, the discussion is based on two theoretical frameworks: Theory U, based on the Iceberg Model and Immunity to Change model. Two main sections will be presented; the first discusses the visible layer and the second discusses the hidden layer. In each section, several potential endeavors are combined to tackle littering. The model (Figure 3), developed according to the findings of this study, is based on these two theoretical frameworks and is structured according to the Iceberg Model. The visible layer includes two phases – reacting and restructuring – and addresses the symptoms of the issue, while the action that is applied is just “first aid,” e.g., cleaning up an area (as is described in Figure 2). The hidden layer that addresses perspectives and deep-rooted reasons behind the issue includes three phases – redesigning, reframing and regenerating – means that oblige creative, deep consideration of feasible processes of change.

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Figure 3: Methods to deal with littering

**4.1 Visible layer – symptoms - description of the issue, and difficulty resolving it**

the findingsindicate that administrators perceive the public domain as dirty. Though Israel is considered a progressive country from so many perspectives, such as technology and healthcare (Baram & Ben-Israel, 2019; Clarfield et al., 2017), it has difficulties dealing with notable litter everywhere – city streets, public parks, beaches, and nature sites (Negev, 2016). This will address the description of the littering issue, the difficulty in resolving it, and ways to deal with the issue, which exist in the visible layer. As mentioned, in the visible layer, the participants of the study state symptoms; the public domain is littered because of existing public routine behavior. Findings present that in reality, there are solutions to deal with the issue and attempts to rectify it through “first aid.” They are reacting mainly by investing in an existing routine of continual cleaning up, and not in behavior – which is the source of the problem. Examples in the study indicate that introducing technologies and infrastructure to improve the cleanliness situation without relating to human behavior as well, will not impart an improvement because they do not address the problem itself (Winterstetter et al., 2021).

In various places, such as in this study, where there are no habits and routines to maintain clean public spaces, it is extremely difficult to address the problem. All the participants of the study indicate the difficulty in making their public space clean, as is presented in other studies around the world as well. These studies highlight the difficulty considering the new cultural change that encourages personal consumption and is based on the individual and not the collective (Brown, 2015). Great effort that has been documented in studies indicates that marketing and publicity methods might be effective, but are limited in their ability to be influential; methods related to maintenance require many resources and do not always prevent littering. Investing ways to cope with regulations and enforcement generate a change, however, are focused mainly on the specific time of the incident (Al-Mosa et al., 2017; Sagebiel et al., 2020; Spotswood & Whitaker, 2017).

Effort to manage the litter requires a multi-sectored approach, that involves the government, the private sector and community, and therefore is highly complicated to implement and execute (Puluhulawa & Puluhuwala, 2021). This difficulty arises not only in the field of cleanliness, but also in various pro-environmental behaviors (Kollmuss & Agyeman, 2002; Larson et al., 2015; Laurens, 2017). Though much research has been done regarding environmental behavior from several perspectives, such as environmental psychology (Schultz et al., 2013), sociology (Singh & Kaur, 2021), environmental education (Camargo & Shavelson, 2009; Mapotse & Mashiloane, 2017), environmental policy (Hansmann & Steimer, 2017; Thomas Hoppe et al., 2013), and behavioral economics (Castaldi et al., 2020; Ioan et al., 2016), the desired change has not been generated. In Israel the situation is similar; the public domain is dirty (Carmi, 2019; Negev, 2016).

As stated, the study’s participants indicate difficulty addressing the problem, i.e., modifying littering behavior. This difficulty raises several considerations. The first, theoretically, is the simpler and easier it is to act on an environmental level, the easier it will be to generate a behavioral change (Esfandiar et al., 2019; D. Li et al., 2019). On the surface, binning is easier and does not require any great sacrifices as opposed to reducing greenhouse gases, or environmental activism. These pro-environmental activities are difficult, among other reasons, because of their lack of relevance to daily life and lack of immediate evidence of the damage caused as a result of the behavior (Gifford & Nilsson, 2014; Thomas & Sharp, 2013). On the other hand, the ramifications of littering behavior are relevant to daily life and its visual aesthetic damage is immediate. Thus, the more the problem becomes personal, the damage is perceived to be greater, and in most cases, there is a greater desire to change (Truelove & Parks, 2012), i.e., keeping public spaces clean might be associated with immediate visible results.

The second consideration is that from the findings it seems that according to the participants, the public is in favor of clean public spaces, as indicated in the literature, that clean public spaces are important for the Israeli public and they are opposed to littering (Lev et al., forthcoming). This fact is reflected in the concept of Immunity to Change that explains why individuals and groups behave in opposition to their own goals in order to prevent the change from taking place. In many cases there are opposing incentives and interests that require deep understanding of behavior (Conway et al., 2018). For example, as appears in the findings, the public uses disposable products that generate a great deal of waste; however, its use is convenient and inexpensive and therefore overrides the willingness to keep public spaces clean. This issue illustrates the difference between environmental behavior within the context of time, convenience, and money. Behavior of non-littering is considered low cost as it requires no monetary investment, very little time and inconvenience compared to cleaning others’ litter that is considered high-cost and requires a great deal of time and inconvenience (Esfandiar et al., 2019).

Another way to deal with the symptom of littering, according to this study, is through indirect methods such as preventing vehicles from entering nature parks, which reduces the number of visitors and the amount of equipment they bring with them, hence, the amount of litter. Though literature presents those preventative activities such as entering beaches without disposable products reduces litter (Göktuğ, 2021; Winterstetter et al., 2021), these indirect methods do not tackle the source of the problem to generate behavior modification.

Parallel to ongoing maintenance, cleanliness and prevention, the participants of this study indicate activities that might be perceived as “first aid,” e.g., initiating ad hoc clean-up projects. Although there are studies that indicate the contribution of such projects (Löhr et al., 2017; Musora, 2018), other studies (Lucrezi & Digun-Aweto, 2020; Zambezi et al., 2020), as well as the present study, indicate that they are ineffective as a long-term solution to littering. When launching a one-time clean-up project and requesting from volunteers’ behavior that calls for a price tag (cleaning up other people’s trash) without any long-term, profound educational process that generates internal motivation and change – the impact is ineffective and short-lived. Contrary to one-off clean ups, a small number of the participants claimed that clean-up days that are part of a long-term meaningful educational process, are successful in modifying internal motivation of those who take an active role. Clean-up days that are part of an educational process belong, in essence, to the hidden layer, where the source of the difficulty in behavior modification is found.

**4.2. The hidden layer - the source of the littering behavior problem**

This section presents the hidden layer, at the bottom part of the iceberg, the deep-seated reasons for littering and means with which to tackle the issue and change the behavior at the root level. The hidden layer is a human blind spot, which expresses the source of the reasons behind littering behavior that relates to deep feelings of frustration and defiant reactions and habits that relate to a sense of comfort. In fact, everything underneath the surface is difficult to change as by the very nature of human beings, they are unable to see the source of their intentions and actions (Scharmer, 2009). In other words, the hidden dynamic prevents people from making changes which is also known as immunity to change (Kegan & Lahey, 2009).

**4.2.1. The majority needs to modify their habits: redesigning, reframing and regenerating**

The current study, as other researches in Israel, presents that littering behavior is normative in several sectors of the population (e.g., secular-religious, youth-adults, Jews-Muslims, populations from various socio-economic echelons) (Lev, et. al., forthcoming), as is similar to other studies worldwide (Araújo & Costa, 2019; Brown et al., 2010). In Israel many litterers do not realize that they are doing something wrong. Strong, deep-seated habits that override knowledge and intentions can serve to impede a change in behavior (Linder et al., 2022; Wood & Rünger, 2016). Addressing behavioral modification, according to Theory U, requires redesigning, reframing and regenerating ways to change littering behavior, through innovative thought that modifies perceptions. In this study, we found attempts to redesign (e.g., presence in the public domain, negative incentives, and enforcement), and to reframe (e.g., culture-oriented advocacy, positive incentive, and role models) the issue.

 In order to generate a profound change, we must conduct a deep analysis of all the layers of the iceberg, the visible that is obvious, and the hidden, enabling recognition of assumptions that affect behavior. The Immunity to Change theory offers the following phases with which to examine these assumptions that prevent amending the problem: (1) identify the goal; (2) identify what is happening instead; (3) identify hidden competing commitments, and (4) identify the big assumptions that underlie these competing commitments (O’Brien, 2013). In the first phase, in this study, the “desire for change” - the stated objective of all the participants - is that the public domain will remain clean via changing littering behavior. In the second stage, in this study, “what is occurring instead” - it seems that people not only litter in a previously littered space, but litter even if found clean as is indicated in other studies worldwide (Schultz et al., 2013).

The third phase, in this study, is to recognize conflicting incentives and identify hidden competing commitments - the conflicting incentives for littering, as also presented in the literature, are: the desire to be in a clean place versus lack of awareness of maintaining a clean public domain (e.g., litter that is considered “legitimate” to throw on the ground such as organic waste in nature or cigarette butts in the city), which is perceived as relatively easier to change than disgust or convenience (Bakker, 2019; Carmi, 2019; Kotz & Kastaun, 2020); the understanding that littering is undesirable in public space versus the sense of disgust when touching trash (Moqbel et al., 2019); maintaining a clean environment versus laziness and inconvenience (e.g., in cases which there are no trash cans in the vicinity) (Arafat et al., 2007; Hansmann & Steimer, 2017; Torgler et al., 2012); consumer culture and the use of disposable products as part of the perception of convenience versus the amount of waste they produce. According to our study, we also identify hidden competing commitments, as the conflicting incentives which appear in Cialdini’s classic study (Cialdini et al., 1990) - the gap between norms: the injective norm, in which the individual is aware that it is unacceptable to litter and the descriptive norm – in which the environment was dirty anyway, rendering it acceptable.

The final phase is identifying the big assumptions (Figure 4). We recognized in this study two assumption types: the first relates to the reasons that behavioral change is not happening: **human nature** – it might be that a short-term activity such as appropriate disposal of waste, does not motivate people to see the effect of the behavior over the long term. This is because the fact that humans are a short-sighted species that tend to be reactive, rather than anticipatory (Graham et al., 2019; O’Brien, 2013); **the limited point of view of administrators** - the perspective of solving a problem via administrators is that they address littering as a resolvable, isolated issue. In fact, one cannot relate to this issue as isolated and systemically unrelated to other issues, i.e., in order to address people who litter due to nationalist or oppositional motives, superficial resolutions such as cleaning up a public space, which address only the symptoms, are ineffective. This issue requires addressing the problem in depth including a change in how the individuals feel towards the government and community. On the other hand, while many assume that real change will not ensue until values and worldviews change, studies show that social tipping points do not require much of the population to change. In fact, as little as 10% of the population holding a strong belief may be enough to trigger social change (O’Brien, 2013). However, this study indicates that a change in 10% of the population’s behavior is not enough to generate a change in littering behavior in society. Literature in this context indicates that there is a far greater percentage than 10% of the population that does not litter, but the public domain is still dirty (Chaudhary et al., 2021; Negev, 2016). We can presume that in the case of littering, even if 10% of the population changes their behavior, this will not necessarily generate a change. This is based on findings that indicate that littering behavior originates in the home. The reason for this apparently stems from the fact that as long as there is a handful of litterers, their influence on the public is considerable. A dirty public space warrants other people to litter, whereas perhaps in a different situation they might not (Cialdini, 1990; Keizer et al., 2008).

The second type relates to the reasons which inhibited the ways to deal with the issue, which include: **the educational worldview of educators** - Findings indicate that education is a seminal means for resolving the problem, though it is practically non-existent regarding the public domain in Israel. We can assume that a holistic application of the topic within a broad educational context as claimed by Orr (2004) “All education is environmental education” might aid in resolving the issue, i.e., the path to applying environmental knowledge, perspectives and behavior, must be expressed in every educational perception of the authorities and organizations and not just isolated environmental education (Bonnett, 2019; Wals, 2014). Therefore, a paradigmatic change in a world where environmental, social, political, and economic problems are intertwined (O’Brien, 2013) within the context of a clean public domain, is needed. To succeed in changing littering behavior, we need a holistic and systemic education that imply skill acquisition regarding environmental behavior and adopting specific behaviors maintaining clean public spaces; **networking among the central government and the local government** - Findings indicate a lack of cooperation between government offices and local authorities, lack of collaboration between branches of municipalities and lack of connection between budget allotment and implemental needs. Each problem is discrete, rather than systemically related (O’Brien, 2013). This study did not examine this issue in depth and seems to be a good starting point from which to continue.

In conclusion, immunity to change can occur within each level of participant (i.e., individual, administrators, educators, and systematical relationships); examining each assumption that touches upon each of these sources of power is imperative to generate a change in littering behavior (Conway et al., 2018). All assumptions complexly affect the behavior of the individual and society, which intensifies the difficulty in generating a change. The strongest Immunity to Change in this study is found in the minority populations and projects directly and comprehensively in the following chapter.

* + 1. **The minority that litters intentionally out of defiance – reframing and regenerating paradigms**

Findings indicate a minority that litters out of a sense of alienation. Moreover, the minority has a great impact on the sullied state of the public domain; when a space is dirty, it legitimizes littering, and the issue intensifies (Cialdini, 1990). In other words, when littering is done out of spite, a minority member might arrive at a clean public space, and purposely litter; s/he is not motivated by accepted social norms (Cialdini, 1990). Therefore, it is much more difficult to address this minority in relation to other litterers due to their moral perceptions, beliefs and perspectives. All the above contribute to polarization and social gaps that exist in Israel, which is characterized as a multi-cultural country (Da’as & Zidenberg, 2021). In this case, as indicated in the findings of this study, intentional littering behavior stems from the desire to harm national institutions. This behavior is recognized in literature related to vandalism and destructive behavior that characterizes social situations in which people feel frustrated, hopeless and have a sense of lack of control on their life (Carmi, 2019; Ojedokun, 2011). The actions offered by Theory U (reframing and regenerating) are almost impossible to implement within this minority, in the framework of resolving only the issue of littering. The solution requires a cultural and political reform that will alter the balance of power in a multicultural society as Israel. From this study we can infer that until the relationship between the local people and the establishment change, there is little hope in achieving cooperation among citizens vis-à-vis littering. In the long term, we must comprehend the basic narratives and the developing politics on a local level in order to recognize what interventions might be effective and which might not (Brennan & Portman, 2016).

1. **Summary and conclusions**

This study presents the seminal perspective of administrators of their daily concern with littering. The study examined how administrators perceive the characteristics of littering in Israel, what the causes of this issue are and how is it possible to address the issue of littering. As the study indicates, littering is a complex issue and causes for this behavior are diverse. Littering is expressed by symptoms that are visible from the surface, but there are also deep-rooted causes relating to norms and assumptions. Therefore, addressing the issue cannot rely on solutions relating to infrastructure and cleaning up public spaces. Concurrently, the solutions must touch upon the blind spot of administrators that impedes them from dealing successfully with the problem. Participants in the study claim that they continue to operate the way that they have been previously, and we can assume that this is one of the reasons that the method has not generated a change. Administrators of the Operations Departments keep cleaning up, educators choose not to deal with the subject, law enforcers do not want to enforce the law, and the overall feeling is that it is so difficult to the point of impossible to change the reality, but in fact, no deep-rooted endeavor that would be necessary to inculcate the change has been attempted.

 There is a need for new approaches for tackling the relationship between knowledge and action. The assumption that more solutions-oriented knowledge about littering will lead to a clean public domain is not necessarily the right option for dealing with the problem. “It is time to shift attention to the issue of change itself and to question some of the assumptions that reproduce certain types of knowledge and certain types of action over alternatives” (O’Brien, 2013). In our case, decision makers should pay attention to the change process they need to create and not only anticipate the public or other sectors to create a change.

In order to generate the necessary cultural reform and a wide-ranged change in habits and behaviors relating to littering, it is necessary to regenerate. In order to achieve this, there is a need for educators, public figures involved in infrastructure, maintenance and enforcement to examine themselves and their conduct deeply, and not presume it is the other person’s job. In addition, they must collaborate by analyzing and understanding what Immunity to Change is and what the conflicting incentives are among all the factors and administrators, thus, to collaboratively address the conflicting incentives of the different fields. For example, administrators know that there must be some kind of enforcement, but it conflicts with the need for public support and interests of politicians. Administrators know that there is a dire need for deep-rooted education from a young age, but they still outsource short-term programs (probably because it is easier and cheaper), whose impact is limited and insufficient.

Collaboration among all factions on municipal and national levels must examine the local culture of the root sources for the Immunity to Change, thus, create a collective action based on new thinking how to adapt new principles, how to implement new processes and core activities, and only at the last stage develop new structure and practices. This process or change must be creative, integrative, systemic and holistic, and be specifically adapted to diverse communities and multicultural groups.

One of the goals of this deep change is to create a sense of belonging to the public space and sense of community both with litterers that need to overcome the inconvenience and create a change in habits and those who litter out of a sense of alienation and defiance. Studies have linked quality of life and health with the environment in which we live and our community (Bagnall et al., 2017; Vos et al., 2018). When a group of people has a strong sense of connection to a place and a sense of community, a sense of shared ownership of the space develops, which leads to a sense of joined accountability, and therefore there is less of a tendency towards littering and vandalism (Spehr & Curnow, 2015).

The public domain serves as a place where a variety of people can meet and interact and even create a social bond and social capital, and tighten the community. When people share daily experiences with people outside of their milieu, they develop a collective understanding of what public interest is (Mean & Tims, 2005). To this end, the public domain must be accessible, aesthetic, well-tended and safe (Hassen & Kaufman, 2016). One of the most contributing factors for strengthening the connection to the public domain is a process of public involvement in planning these spaces, which creates a sense of activism, cooperation and a response to one’s needs (Joynt, 2021). In addition, different activities that promote social processes and create intense interactivity can be initiated. Creating diverse public activity through personal experience including cultural and traditional activities, and activities for developing the community were found to enhance the bond. Furthermore, networking of hiking trails in open spaces contributed to strengthening the connection as well (Piyapong et al., 2019).

This study indicates a hierarchy of the difficulty in changing littering behavior in conjunction with the source of the behavior, i.e., it is easier to address lack of awareness than a sense of negativity or discomfort, disgust; the most extreme difficulty is changing one’s sense of alienation. This classification is raised qualitatively according to the perceptions of administrators participating in this study and it is recommended to explore its existence using a qualitative research model in different areas and cultures in the world. Similar to many other studies, this study suggests a combination of research tools with which to address littering behavior. It is possible that development and examination of a clear classification will enable adapting the means of solution with the reasons for littering. For example, in some cases the behaviors that are described by people can be due to a result of lack of knowledge as some research offers (Liobikiene & Poškus, 2019; Zambezi et al., 2020). When littering becomes the norm, even if it is a theoretical norm, and not an injective norm (Cialdini et al., 1990), it is difficult to change, and explaining the implications of the situation apparently is not enough.

The current study was conducted using the qualitative research method with a relatively large number of participants. Therefore, it enables a generalized observation of the issue on a national level and can serve other countries due to its size. The study’s contribution is the exploration of the perceptions of leaders in the field that provide an alternative and in-depth angle due to their daily involvement with the issue. An additional contribution can be the level of implementation in which administrators and policy makers can draw conclusions and the study’s recommendations and apply them when contending with littering. The study also provides a theoretical contribution by connecting the Iceberg Model with Theory U and the Immunity to Change model; as such, littering can be understood on an in-depth level. This understanding can project on future research as well as aiding in applying the theories in the field.

we recommend conducting further research for understanding the issue more holistically, that compares administrators’ perspectives on littering versus those of the public both in quantitative and qualitative approaches. We also suggest comparing the characteristics of the issue in urban public spaces and in nature, with the hope that spearheading research on this topic will aid in reforming the issue and not only comprehending it. After years of research and intervention programs, Litter is still a crucial Problem worldwide. Facilitating profound change, it is vital to reframe and regenerate individual behavior and administrators’ action by exploring the deeper layers of this problem. A brave action and research of open mind, open heart, and open will in a deep reflection way are crucial.

**Acknowledgements**The authors are grateful to the interviewees for their time and contributions.We thank the Society for the Protection of Nature in Israel (SPNI) for partial funding of this research.

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**Appendix A**

| **Job definition** | **Type of locality / open space** |  **sector** | **resident / non-resident in the locality**  | **Seniority**  | **Relevant training experience/professional**  |
| --- | --- | --- | --- | --- | --- |
| Director of environmental and sustainability dep.  | Big city | Jewish | No | 5 years | An environmental engineer with a master's degree, she worked as a coordinator and director of an association of cities |
| Director of sanitation dep.  | Big city | Jewish | Yes | 16 years | Municipal employee for 30 years in the water and sanitation department |
| Chif of staff of environmental dep. | Big city | Jewish | No | 1 year | A logistics officer in field units was released with the rank of lieutenant colonel |
| Sustainability field manager | Big city | Mixed sectors |   | 5 years | She was an activist and entrepreneur in the field of the environment. A great desire to make a change in the field |
| Deputy Director of the Sanitation Division | Big city | Mixed sectors | Yes | 2 years | For over 15 years working in various positions in sanitation, this is a never-ending Sisyphean job |
| NGO coordinator | Big city | Mixed sectors | Yes | 8 years | Social activist in the field and works in a community manager in the city. Teaches people to put on the junk glasses and see things that others don't see |
| Deputy director of the sanitation department | Medium city | Jewish | Yes | 6 years | She worked in the municipality for years until accepting the position. |
| Director of the city cleaning department, garbage disposal and recycling | Medium city | Jewish | Yes | 10 years | I am retired from the army, in the past he did a degree in sociology and anthropology. Succeeding in 8200 is easy compared to the municipal police department |
| Sustainability Education Coordinator | Medium city | Jewish | No | 4 years |   |
| Director of elementary school dev.  | Medium city | Jewish | Yes | 5 years | My grandparents are pioneers who built the city |
| Mayor | Medium city | Mixed sectors | Yes | 2 years | PhD, teacher and school administrator for years. ran a chain of schools |
| Director of Operations Department | Medium city | Mixed sectors | No | 1 year | Long service in the Israel Defense Forces |
| Director of the Sanitation Department | Medium city | Mixed sectors | No | 3 years | IDF retiree in training as a real estate appraiser. He realized that the generation of garbage will never end and therefore there will always be work in the field. He chose to work in a city with a low socioeconomic rating. |
| Director of elementary school dev.  | Medium city | Mixed sectors |   |   |   |
| Deputy director of the City Improvement Department | Medium city | Arabic | Yes | 1 year | A bachelor's degree in environmental education and a master's degree in agricultural and environmental management. Work experience at the Ptolemy Aviv agricultural farm as well as teaching at a new farm |
| Director of the Education Department | Medium city | Arabic |   | 30 years | He was one of the founders of the Education Directorate. Has been in the position for years |
| Director of the Education Department | Medium city | Jewish orthodox |   | 5 years |   |
| Director of the Education Department | Small city | Mixed sectors | Yes | 20 years | Started as a teacher, continued to teach in college and from there to manage a community center |
| Director of the City Improvement Department | Small city | Mixed sectors | No | 9 years  | IDF retiree with the rank of lieutenant colonel. Worked in another authority as a project manager and market manager. Bachelor's degree in the history of the Middle East and a master's degree in administration and public policy. |
| Director of the City Improvement Department | Small city | Arabic | Yes | 1 year | A chemist by training. Worked in the headquarters office of the Ministry of Environmental Protection and in the Union of Cities |
| Director of the Education Department | Small city | Arabic | Yes |   | 28 years in the local authority, graduated in mechanical engineering, master's degree in robotics. Education was by chance. Teacher of physics and mathematics, and technological subjects, 14 years high school principal. Volunteer at the Friends of the Earth organization |
| Coordinator of environmental education and outreach | Small city | Mixed sectors | Yes | 16 years | A master's degree in economics, not related to the field of education, came for a year and fell in love with the field |
| Director of the Education Department | Small city | Mixed sectors | Yes | 2 years | Grew up in a resilient settlement in the south of the country, managing a school that was "green" for many years. Defines herself as a recycling woman |
| director of the sanitation department | Small city | Mixed sectors | Yes | 15 years | Instructor at a youth boarding school, working under the supervision of the municipality, manager of the supervision section, chief sanitation officer and from there to the position |
| Director of the Education Department | Small city | Arabic | Yes | 30 years | Grown in the Galilee and connected to the natural environment. He made it his goal to develop the issue of decency and the cultivation of public space in schools |
| Waste coordinator in an environmental unit | Small city | Arabic | No | 3 years |   |
| Director of the City Improvement Department | Local council | Jewish | Yes | 2 years | Project management in the engineering department, graduate of the "Cadets for Local Government" program of the Ministry of the Interior |
| The director of the environmental unit | Local council | Jewish | Yes | 3 years | The issue of litter and waste has been in his blood for many, many years. I'm sensitive and only see dirt everywhere. In the past he guided trips, engaged in environmental education and was active in the field |
| Environmental education coordinator | Regional municipal cuncil | Jewish | No | 2 years | Worked in environmental education at the Society for the Protection of Nature |
| Director of the Education Department | Regional municipal cuncil |  Jewish | Yes | 10 years | The area in which we live in which the connection to nature is requested is always harnessed to say yes to an environmental education project |
| Director of Inspection Department | Regional municipal cuncil |  Jewish | No | 4 years | Started as a volunteer, became part-time, several years under supervision until the management and establishment of the department, a total of 17 years working in the council |
| Education and community coordinator | Regional municipal cuncil | Jewish | Yes | 2 years | As a child she dreamed of a superpower that would allow her to clean nature. Previously worked at the Hirayeh Environmental Education Center |
| Director of the Sanitation Department | Regional municipal cuncil | Jewish | No | 9 years  | Farmer, managerial positions in a kibbutz tender for managing a department |
| Director of the City Improvement Department | Regional municipal cuncil | Jewish | No | 1 year | I was the deputy director of the abundance department in another city for 3 years. I have a bachelor's degree in economics, industrial engineer and management, and I am currently doing a master's degree in political science and my field of research is waste recycling |
| Environmental Education Coordinator | Regional municipal cuncil | Mixed sectors | No | 26 years | In the past, she was one of the first science teachers to deal with the environmental field |
|  Director of the Sanitation and environment Division | Regional municipal cuncil | Jewish | Yes | 10 years | Work in the Ministry of Agriculture in the economic, planning, statutory field. |
| Director of the Education Department | Regional municipal cuncil | Jewish | No | 3 years | Born in Tiberias, studied at Reali in Haifa and went through a profound cultural and social change. For 28 years he served in the army in intelligence in various positions and later in hitech. Decided in the last ten years chose to deal with education |
| Director of the City Improvement Department | Regional municipal cuncil | Jewish |   |   |   |
| Director of elementary school dev.  | Union of authorities- Regional municipa | Jewish | Yes | 1 year | have been working in the Jordan Valley Regional Council for over 14 years in various positions in the council, in the education department. Current position, director of schools |
| Nature site manager | Israel nature and parks authority |  |   | 4 years | Director of KKL-Junk patrols, desire to engage in education and nature conservation |
| Project manager | Israel nature and parks authority |  |   | 1 year | Not a person of sustainability and nature experience in managing national projects in the military and civilian world |
| Nature site manager | Israel nature and parks authority |   |   | 6 years | An industrial designer by training, a field man who loves the outdoors, applied for an RTG tender for supervision and did an agent course |
| Community and Forest Coordinator | KKL-JNF (Jewish national Fund) |  |   | 6 years | Worked for 30 years at KKL-Junk in various positions, proud of her work |
| Nature site manager | KKL-JNF (Jewish national Fund) |  |   | 5 years | Worked for 33 years at KKL-Junk in a variety of positions such as warehouse manager, fire truck driver and safety surveyors |
| District Forester | KKL-JNF (Jewish national Fund) |  |   |   | Lives in an agricultural settlement, training and several positions in the organization. I wanted a field of plotting and action |
| Community and Forest Coordinator | KKL-JNF (Jewish national Fund) |  |   |   |   |
| District manager | KKL-JNF (Jewish national Fund) |  |   | 10 years | For years he worked at KKL-Junk in various positions. He lives in a rural settlement. He is a geographer by profession |
| District manager | KKL-JNF (Jewish national Fund) |  |   | 22 years | Lived at the Teva site. Conceived the idea of the position of KKL-JV Forestry Coordinator. Graduated from the Shel Shalom Associates |
| NGO General manager  | Environmental NGO |  |   | 4 years | Many years of being busy in the field of planning and preserving nature. Until recently dealing with dirt seemed marginal and less important and in the last three years she was devoted more to the subject |
| NGO General manager  | Environmental NGO |  |   | 13 years | Ben Kibbutz, started by working in the field of cleaning education in schools across the country of all sectors and ages. Over the years he has developed educational tools to deal with dirt in the public space |
| Academy researcher | Country-wide |  |   | 25 years | Senior researcher in the fields of environment, sustainability and economics |
| Academy researcher | Country-wide |  |   |   | Researches in two fields, each of them separately and both of them together also connect to the topic, which is environmental education and environmental psychology. |