

*THE DREAM OF A ZERO WASTE SOCIETY:
EXPLORING THE PRACTICES AND
BEHAVIOURS OF WASTE GENERATION IN
GREATER MEXICO CITY*

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How to cite:

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**THE DREAM OF A ZERO WASTE SOCIETY:
EXPLORING THE PRACTICES AND
BEHAVIOURS OF WASTE GENERATION IN
GREATER MEXICO CITY**

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Thesis Submitted for the Degree of Doctor of Philosophy
Department of Geography and Anthropology
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2021

Abstract

This research aims to re-conceptualise consumption and waste generation through a broader set of theoretical questions and analytical methodologies to establish a more holistic theoretical framework for comprehending the global South's "*waste crisis*." This thesis is primarily based on the following question: "*why do we dispose of things?*". By focusing on practices and behaviours of consumption and disposal on citizens of GMC, this thesis seeks to unpack the networks, symbols, skills, and meanings of these practices.

This moves the conceptualisation of waste generation away from being conceived as an irremediable consequence of population growth or as primary responsibility on the consumers' shoulders. Therefore, this thesis proposes that consumers are embedded in a "*throwaway environment*" that pushes them toward unsustainable practices. However, this does not mean that the consumers have a "*throwaway culture*"; consumers might be "*carriers*" of practices, but they are still active participants.

By unravelling the multiple layers of framing that aggregate into consumption and disposal of citizens in GMC, we shall see how GMC society's historical, social, and political framework serves as dispositions that guide an individual to act. This study focuses on modifying the narrative of considering consumers as careless, lazy, or consumption-driven. It also sheds light on how ignoring these behaviours and practices will only bring temporary and reactionary solutions when dealing with waste.

This dissertation also offers an analytical framework that explores how consumers' elements interrelate and are synergetic. By re-conceptualising consumption and waste generation, I propose not focusing on the insidious moral narrative of whether consumption and disposal are acceptable and to what degree. Instead, we should concentrate on a policy strategy that will help reduce the flow of materials. As a result, we might be able to curve a waste crisis by accepting shared responsibility (mostly borne by governments and businesses).

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List of Abbreviations

ANATEL	<i>National Association for Telecommunications</i>
BANXICO	<i>Banco de México</i>
CH ₄	<i>Methane</i>
CO ₂	<i>Carbon Dioxide</i>
COVID-19	<i>Coronavirus Disease</i>
DERA	<i>Department for Environment, Food & Rural Affairs</i>
EC	<i>European Community</i>
EU	<i>European Union</i>
GBP	<i>British Pound</i>
GDP	<i>Gross Domestic Product</i>
GHG	<i>Greenhouse Gas</i>
GMC	<i>Greater Mexico City</i>
INEEC	<i>National Institute for Climate Change Studies</i>
INEGI	<i>Instituto Nacional de Estadística y Geografía</i>
IPN	<i>Instituto Politécnico Nacional</i>
IRS	<i>Informal Recycling System</i>
MC	<i>Mexico City</i>
MJ	<i>Megajoules</i>
MSW	<i>Municipal Solid Waste</i>
MSWM	<i>Municipal Solid Waste Management</i>
MXN	<i>Mexican Peso</i>
NAFTA	<i>North American Free Trade Agreement</i>
NGO	<i>Non-governmental Organisation</i>
NIMBY	<i>Not in My Backyard</i>

OECD	<i>Organisation for Economic Co-operation and Development</i>
PET	<i>Polyethene terephthalate</i>
RGS-IBG	<i>Royal Geographical Society</i>
SACMEX	<i>Sistema de Aguas de la Ciudad de México</i>
SEDEMA	<i>Secretaría del Medio Ambiente</i>
SEMARNAT	<i>Secretaría de Medio Ambiente y Recursos Naturales</i>
SoM	<i>State of Mexico</i>
UK	<i>United Kingdom</i>
UN	<i>United Nations</i>
UNAM	<i>Universidad Nacional Autónoma de México</i>
USA	<i>United States of America</i>
USD	<i>American Dollar</i>
USMCA	<i>United States-Mexico-Canada Agreement</i>
VHS	<i>Video Home System</i>
WEEE	<i>Waste Electrical and Electronic Equipment</i>
WMP	<i>Waste Mobile Phones</i>
WWII	<i>World War II</i>

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Acknowledgements

It is said that making advances in science comes from "*standing on the shoulders of giants*". I do not have the privilege of knowing who my ancestors are, at least not more than two generations back. However, I know that the only reason why I am a PhD candidate is because of the immense efforts of the generations before me. I am the result of my family's hard work and dreams, and I see myself only as representing those who came before me.

Through my mom, I learned to love science, and it was through my grandma that I learned how to read. My dad showed me never to give up and persevere, and it is my sister who pushes me to give my best at every step of the way. Every one of them has helped me be where I am. For me, they are my giants; and it is through this dissertation that I will (hopefully) become the first Doctor of the family.

I write this thesis with a profound love for my roots and country. I am deeply in love with my chaotic Mexico City, and I would not ask for more than being helpful towards the city that raised me. Thank you to the CONACYT that believed in investing in science development and sustainability and gave me this life-changing chance. I truly hope this thesis reflects how proud I am of being Mexican and how honoured I am to be representing my country.

I am truly grateful to my supervisors - Mike Crang and Catherine Alexander – for their mentorship, support, and encouragement. Thank you, Mike, for being so patient and supportive; you saw the potential I did not even know I had; I will deeply miss our meetings that were always full of laughter. Thank you, Catherine, for being there at the lowest points of the thesis. This thesis would have never been possible without their encouragement and guidance.

To my friends of Mexico City that believed in my project and never let go of our friendship even if we were miles apart. Dany is and will always be my safety net and my unpaid therapist. Thank you for helping me proofread and sending me anime memes to Maddy. To all the housemates I had throughout these years, Zoe, Gregg, Emmanuel, Maria, Muyeol, and Tamanna, thank you and sorry for the mess.

I miss our interesting conversations with those amazing people in the Manley Room. To the Mexican Society in Durham, thank you for helping me have a piece of my country in the UK. I will cherish you always to the fantastic friends I met in Beijing, Birmingham, Durham, and Newcastle. To the Brooks family that accepted me as one of their own, thank you for welcoming me so warmly.

I was also incredibly lucky to have found long-lasting friendships along the way; Abraham, Carlos, Costanza, Tim, and Connie; I thank you for your advice and support. Thank you so much for your trust and time to all of those who accepted me in their homes to conduct my interviews. To the ones that helped me fight for justice in the scientific sector in Mexico, thank you, we did our best.

Lastly, thank you to the love of my life and future husband. Without you, this thesis would not exist. Thank you for believing in me even when I stopped believing in myself, for holding my hand throughout these years and for being my biggest fan. Thank you for showing me that love does not know of nationalities. I love you more than words can describe.

Mi Roberto, thank you for everything.

Prologue

My dad would often tell me the story of how he started to work with waste. Unlike the rest of my family, who had lived in Mexico City for generations, my father was born in Sinaloa and relocated to the capital with his family in search of a new beginning. My dad told me that money was tight back then, so he had to find ways to provide for himself and his sisters. One day he saw a man collecting waste from households in a small cart; he was a "*pepenador*" (waste picker). This man had trained eyes and hands that would quickly sort waste looking for cardboard, glass, and plastic.

When my dad inquired as to why this man was sorting those items, he replied that he was paid to collect waste as well as any recyclables he might find. Thus, my dad decided to learn how the recycling market worked, and eventually, through hard work, he was able to buy a used waste truck. In the beginning, he specialised in recycling cardboard, but he would then branch out to copper and plastic. By 1995, his small enterprise had turned into a 150 people company.

I fondly remember visiting "*La Bodega*" and playing around the huge cardboard mountains and seeing the immense machines that would shred the plastic and turn it into small pellets. My dad got into the recycling market at the right time; not many people were doing what he was doing; hence, his company kept growing. Unfortunately, this caught the attention of the wrong people. In 2008, my dad got kidnapped. In 2010, my dad decided to close the company; he said he preferred to be alive than the company.

In 2015, I graduated as an Engineer in Sustainable Development, and my first job as a recent graduate was as a private consultant for the government. My first project was "*Zero Waste*", a government initiative to "*manage*" the *waste crisis* in the city. Whenever we went to landfills or recycling plants, people would recognise me: "*aren't you Paco's daughter? The last time I saw you, you were so small!*". In one way or another, my professional and personal life has always gravitated around waste.

When working in *Zero Waste*, I desperately wanted to make a change; I wanted to continue what my dad had started. I was idealistic and truly believed that somehow our ideas could change the city, but we were far away from fully understanding the behemoth that is Greater Mexico City. Our solutions were mainly technological, but the biggest problem was the deep corruption we encountered at every step of the waste's journey. Our recommendations were quickly brushed over, and eventually, an incineration plant became the almighty solution proposed by the government.

This plant never became a reality due to a change in government; however, the new approach seemed to be as misguided as the previous one. We were still not trying to understand the "*waste crisis*" from its origins. We were not even questioning if there was a "*waste crisis*". This project is the result of a long inter-generational journey of looking for answers on how to address waste in the capital. This is a project that has a personal meaning. It reflects my story and the story of my family. It was through waste that my dad managed to provide for his family, and it was also through waste that my dad managed to pay for my education. This is for you dad.

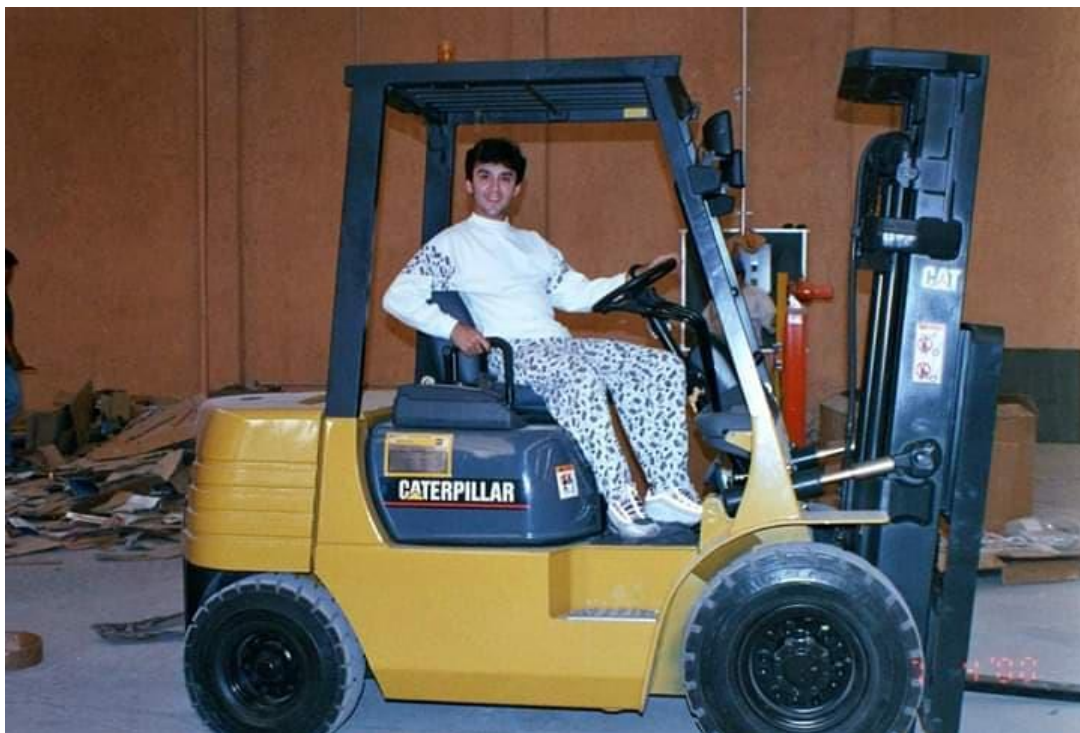


Figure 0.1 Dad trying out one of the new forklifts in the company (1999)

-Esto es para ti papá.

Chapter 1

Introduction

“A growing body of research positioning waste in consumption practices poses a challenge to the environmental psychology paradigm, with its emphasis on individual behaviours and choices, and too much research on consumption, which has focused on acts of purchase and acquisition. It argues that as much is to be learnt about consumption through the devaluation, divestment, and disposal of goods, and it is here that the connection to waste is made. Critically, though, in these readings, waste is an effect, or consequence, of how something is disposed of, not an innate property of particular materials nor harmful stuff that has to be tamed. In short, waste is not; rather, it becomes.” (Gregson & Crang, 2015, p. 10)

Gregson and Crang’s (2010) reflection towards waste scholarship and waste social science concepts lies in the heart of this project. Waste is something we want to disappear, is something embarrassing that has lost all value or significance and therefore should be handled and taken away. Waste also conceals the materials, actors and practices that play a role in their production. Nonetheless, waste cannot be concealed forever.

Waste never really goes away, waste flows (Gille, 2010).

Approximately 2.01 billion tonnes of waste are generated worldwide every year (Kaza, Yao, Bhada-Tata, & Van Woerden, 2018); however, this number conceals many intricate social and ethical implications. It reduces waste to a unit -tonnes- and reducing waste to such a general and manageable unit dooms waste to be defined by and discussed only in terms of disposal and waste treatments while the social and ethical aspects of it will be ignored or forgotten (Gregson, N. and Crang, 2010; Hird, 2013). Hence, this research’s principal motivation is to contribute to the waste scholarship with an approach that considers waste not only as something to be managed but rather to utilise it to understand the social and ethical aspects that it conceals.

This research proposes that rather than focusing on individuals and their decisions, we should emphasise the importance of addressing the social and material factors that lead to waste generation to implement effective waste reduction, minimisation, and prevention

policies. Instead of condemning the consumer and engaging in a politics of morality and moralising, this study contends that as policy advances up the waste hierarchy, it must “*cross the threshold and engage with consumer cultures and the socio-temporal practices that constitute consumption*”. (Crang & Gregson, 2010). Moreover, to describe a material, we must “*follow it*”. Ingold (2012) explains that a material is an ongoing historicity; therefore, an analysis of waste using the theories of materiality could further contribute to the geographical and anthropological waste scholarship.

This research project focuses on the practices, attitudes, and behaviours towards waste experienced in Greater Mexico City (GMC) in its modern history and understanding its complex economic, social, and cultural networks. In 2018, GMC generated 30,000 tonnes of Municipal Solid Waste (MSW) a day, representing an increase of 25 per cent in just eight years, and most of it is destined to landfill (70 per cent) (SEDEMA, 2019). GMC authorities have declared to be experiencing a “*waste crisis*” and have responded with a *Zero Waste* approach. Karani and Jewasikiewitz (2007) suggest that the most commonly understood definition of a *Zero Waste* approach is the minimisation of waste generation, the reuse and recycling of waste, and the diversion of waste away from landfills or incineration.

However, the *Zero Waste* approach mainly focuses on diverting waste from landfills through incineration and recycling in GMC. Furthermore, GMC’s waste policy has customarily been reactionary and focused solely on end-of-pipe solutions. There is a strong indication of attempts to copy technology from developed countries without adapting it to Mexico’s background. Moreover, a fair amount of evidence suggests that the responsibility of reaching a *Zero Waste* society is relegated to the citizens of GMC, whilst the authorities and industries of GMC are primarily concentrated on dealing with the aftermath of the catastrophe they have created. Therefore, it is necessary to understand the economic, social, and environmental network that created the so-called “*waste crisis*” to attend to the causes of the increased waste generation.

Three materials have been chosen to illustrate these networks: water bottles, clothing, and mobiles. Through these materials, I shall delve into the presence and metamorphosis of creating social relations, social institutions, and the “materials culture” in GMC. Firstly, through the stories of acquisition and disposal of **clothing**, we shall explore how consumers are surrounded by a “*throwaway environment*” in which they are pushed

towards unsustainable consumption and disposal practices. Even though Millennials frequently wish to purchase items that reflect their ideas, many cannot do so due to their low income.

Additionally, the “*democratisation*” of fashion, fuelled by fast fashion, has made trendy clothes affordable and accessible to the GMC population. Nevertheless, these stores and production infrastructure bring severe social and environmental consequences. We shall see that everything is in motion to promote a culture of instant gratification and discarding. Only those who cannot afford to buy at fast fashion stores will consistently avoid them. Consequentially, the activities that constitute the practice of unsustainable clothing consumption have materials, meanings and skills that prevent consumers from escaping this lock-in situation easily.

Meanwhile, mobile consumption and replacement trends showcase how consumers are not solely driven by status and up-to-datedness when replacing their mobiles. An emotional attachment to these products prevents consumers from disposing of them as quickly as commonly disposable products. Furthermore, it is shown that only a minority of the population can keep up-to-date. The current infrastructure and unsafe environment of the area do not allow a circular economy to thrive. Moreover, companies push consumers towards new models and are not implementing models or technologies that propitiate sustainable practices. Subsequently, we reveal that one of the main reasons for pre-emptive mobile replacement in GMC is the black market of stolen phones. Nevertheless, GMC authorities have not solved the problem of stolen mobile phones in the capital, nor do they encourage or push companies to create recycling or repairing/maintenance schemes. Therefore, we critique this chapter's stereotype of a selfish and novelty seeker consumer.

Lastly, GMC is one of the main producers and consumers of **bottled water** globally (Pacheco-Vega, 2015). After the NAFTA agreement in 1994, the water bottle market experienced a boom. Hence, water bottle companies capitalised on the city's deficient water systems and propagated the idea that it was not healthy to drink tap water. Furthermore, despite the marketing of “*eco-friendly*” products, only 20 per cent of the water bottles are recycled (ibid). As a result, water bottles not only represent the city's “*waste crisis*,” but they also define a market for “*purified bottled water*” and a recycling sector that cannot keep up with the massive amount of waste. Namely, this research aims to provide answers to the following questions:

- What stories do these materials tell us about the social, economic, ethical, and environmental networks concealed?
- How can the understanding of the practices and behaviours of consumption and disposal in the city help alleviate the current crisis?
- Where should responsibility be placed in GMC's waste crisis?

This chapter is divided into two sections, and the first section provides a brief context for this research project. It discusses the importance of addressing waste in the modern era and presents the rationale for adopting these methodological and multilevel perspectives. Then the second section shall define the objectives and aims that delineate this research, and lastly, it presents the overarching argument that runs through this thesis.

Section I

“Garbage is the formlessness from which form takes flight, the ghost that haunts presence. Garbage is the entrails, the bits or scraps, the mountain of indistinguishable stuff that is in its own way affirmed by a resolute dismissal: it is refuse-d (not accepted, denied, banished).”

(Scanlan, 2005, p.14)

1.1. Waste Scholarship

In 2016, I worked for the Mexican Government to create the first draft of the Zero Waste Initiative. This initiative was created to manage the "waste crisis" that Mexico City was experiencing and proposed an array of measures to promote recycling and waste to energy schemes. However, addressing waste as a manageable issue condemns it only to be treated by the technological realm, while the social and ethical aspects will be ignored or forgotten. Moreover, this kind of thinking could perpetuate a linear techno-economic model, separating policymaking from policy intervention (Hird, 2013, Gregson and Crang, 2010).

In the Zero Waste Initiative, we spent months analysing different alternatives to deal with the mountains of waste generated every day; nevertheless, we never stopped and wondered: *How should we address waste?* It is not a simple question, as it may seem at first because even attempting to define trash creates a linguistic conundrum; its definition is ambiguous since everything can become a waste. For Douglas (2004), waste is not given to any specific meaning based on the physical characteristic but by its inability to be categorised neatly. In addition, waste has famously been depicted as “*matter out of place*” or *disorder*” (Moore, 2012).

However, several authors depict waste as at least more than matter out of place - Gille (2009) considers it “*a concept out of order*”, Reno (2015) points out that it “*produces spatial relationships*”, and Furniss (2017) argue that waste is not a matter out of place because it excludes material transformation and makes it a one-dimensional concept. As Scanlan (2005) mentions, “*Garbage indicates the removal of qualities (characteristics, or distinguishing features) and signals the return of everything to some universal*

condition, perhaps impersonal” (p.14). Hird (2012) concludes that “*knowing waste is rendering the indeterminate determinate*” (p.454).

Thus, knowing that there is no universal definition or categorisation of what is or what is not waste, we might advance the debate by asking: *Where does waste come from?* Essentially waste exists when we deem something important, and therefore, there must exist a thing that is unimportant (Thompson & Beck, 2017). Consequently, the more things we own, the more we deem unimportant. As Thompson and Beck (2017) suggest, waste comes from culture, and waste can be comprehended by its relationship with social order and the pursuit to maintain it. Therefore, as Hird (2012) mentions, waste is “*an ironic testimonial to a desire to forget*”.

As a result, for consumers, waste is something they want to disappear. It is something embarrassing that has lost all value or significance. Therefore, it should be handled and taken away. Nonetheless, our waste reveals our cultural habits, reflecting our culture. As Scanlan (2005) argues: “*garbage is also the broken knowledge that lies in the wake of (and in the way of) progress, the bits that no longer fit or that get in the way of a truth that always lies just ahead (somewhere down the line in some undiscovered future)(p.16)*”.

Furthermore, waste has been instrumental for archaeological research; for example, garbage archaeology (garbology) has shed light on variations between social and ethnic groups throughout time (Eriksen & Schober, 2017). In the Powers of Horror, Julia Kristeva (1982) refers to the abject concept as “*the human reaction to a threatened breakdown meaning caused by the loss of the distinction between subject and object or between self and other*”. Thus, it is a primal repression, an effort to separate the self with its materiality, separating “*me*” and the “*other*”. The classic example of what causes such a reaction is a human corpse; however, waste could easily fit this definition. Hence, the abject represents the threat that meaning breaks down and constitutes our reaction to such a breakdown (Kristeva, 1982).

As mentioned previously, defining waste poses a significant challenge since its ambiguous and various definitions range from “*materials that have ceased to have value to evidence of a culture or even “like the right thing in the wrong time*” (ibid, p.278). In general we could say that waste helps us to “*reverse the real–symbolic dialogue because we can reveal more about it by seeing the way in which other things, judgements, and*

ways of living, symbolize it” (Scanlan, 2005, p.17) . A more standard definition, of Municipal Solid Waste is: “*all solid or semi-solid material disposed of by residents and businesses, excluding hazardous wastes and wastewater*” (ibid, p.279).

In general, waste comes from a force of disgust that opposes a desire for purity; and within this desire of purity, we encounter a desire for action. This desire for action leads to its elimination and relation of secrecy and truth (abjection) (Hawkins, 2003). Consequentially, in this desire for action, social status and intellectual respect are accorded to the person who treats waste correctly (Thompson & Beck, 2017). Furthermore, the production of waste is an inevitable consequence of human activity. Waste generation and disposal worldwide are ever-growing, and its composition is more complicated than ever (Vergara & Tchobanoglous, 2012).

In addition, due to demographic changes, waste is concentrated mainly in urban areas. The same areas experiencing the greatest urbanisation trends are also home to new and wealthier consumers. This newly affluent population is increasing their consumption of various products and changing their lifestyles; for example, the consumption of meat, cars, electricity and other consumers goods has skyrocketed in the last years in developing and developed countries (Vergara & Tchobanoglous, 2012). “*As households stopped managing their waste, companies began selling packaged products and “middle-class people learned to toss things in the trash attracted by convenience*” (Vergara & Tchobanoglous, 2012, p. 287).

In *Throwaway Nation: The Ugly Truth About American Garbage*, Jeff Dundero (2019) states that new generations have “*broken the ancient legacy where nothing was wasted*” with a new mantra: “*buy new, trash the old*” (p.1.). He points out how the practices of repairing and repurposing are entirely lost in the new generations. He remarks the irony that “*the generation that fashioned ecology, re-energised recycling, husbanded alternative energy, made “living less and green” fashionable, now has more of everything than any other generation and is also the age group that is burying the planet and outer space around it with their spoils.*” (ibid, p.2).

This narrative is pervasive; comparing generations, consumption and values seem to be present every time waste is discussed. From academic literature to policy instruments, there is a yearning to go back to an idyllic past, where consumers were “*more conscious*” of the materials that made up their trash and tried earnestly to reuse them in some way.

How we treat goods after they have served their purpose may now be linked to our social and financial status. As Strasser (1999) mentions, “*All consumers play a part in the disposal ritual, which is a normative ritual “, an act of judgment between the valuable and the worthless, the ordered and the disordered”*” (p.45).

Consequently, sorting became an issue of class, where trash-making underscores and creates social differences based on economic status. Thus, “*disposable*” has become synonymous with “*throwaway*”, and since these types of goods fuel our societies, it is no wonder that modern societies are considered “*throwaway societies*”. However, these “*throwaway societies*” habits were not always the rule in modern societies. We must understand that waste is circumscribed by social, infrastructural, and economic factors (Pollans, 2017).

For some countries and societies, recycling and reuse used to be embedded in the social and economic practices of the country before the rise of capitalism, and some even came back to those practices due to extreme scenarios (Cooper, 2008, 2010; Gutberlet, Carenzo, Kain, & Mantovani Martiniano de Azevedo, 2017; Krzywoszynska, 2012). However, as previously mentioned, this did not come from prior generations being “*moral*” or “*good*”, but rather a necessity and the environment and context they were embedded in.

Nowadays, the term is thrown around without a precise meaning, as if the term alone provided sufficient explanation. “*Throwaway society*” was a blanket statement used in how waste policy was discussed in Mexico City. It was understood that we were within a “*throwaway society*”, and we had to go back to a nostalgic past that few of us had ever experienced. We shall see how waste has been framed and imagined in a Zero Waste Society in the following sections.

1.2. The dream of a Zero Waste Society

Levin et al. (2012) use the term “*super wicked problem*” to describe the sternest degree problems – where climate change is the typically used example. They describe super wicked problems as having the following elements:

- The central authority needed to address them is weak or non-existent.
- Time is running out.
- Irrational discounting occurs that pushes responses into the future
- Those who cause the problem also seek to provide a solution.

Thus, Levin et al. (2012) argue that this combination of features creates “*a tragedy because our governance institutions, and the policies they generate (or fail to generate), largely respond to short-term time horizons even when the catastrophic implications of doing so are far greater than any real or perceived benefits of inaction*” (p.124).

Therefore, waste could be easily categorised as a “*super wicked problem*”, especially GMC. Local institutions are only planning temporary and reactionary strategies for a problem that national policies on production and distribution have created. Additionally, the state of the “*waste crisis*” would make us believe that time is running out, and it is essential to solve this problem as soon as possible. In the case of GMC, a Zero Waste approach was proposed to deal with this crisis. However, as Havel et al. (2006) assert, *zero waste*, meaning reducing all waste production to zero, is impossible in a society oriented towards consumption.

As aforementioned, some environmentalists yearn to go back to a heavenly state of non-perturbation of nature, where Zero Waste is possible. The possibility of this state is not only denied by many (Hird, 2017; Reno, 2014; Thompson & Beck, 2017) but is also pointed out as a dangerous aspiration. Environmentalists tend to demonise waste and showcase it as representing the destruction and domination of nature and human separation (Reno, 2014). Nevertheless, “*to purge the earth of garbage*”, as Zero Waste initiatives propose “*, would be to destroy our reflection*” (Knechtel, 2007).

Thompson and Beck (2017) have identified four approaches and understandings of waste management and policies. Firstly, there is the Egalitarian approach; for egalitarian actors, pollution is a social transgression of the natural order. They propose to change social order until it conforms with the natural order. These actors propose a terrifying and unforgivable world, where even the most minor disturbance over nature may have a catastrophic collapse. The issue with this radical approach is that it may be misguided by the actual possibilities of us returning to a pristine state. As mentioned earlier, this could be impossible to implement. In addition, not everyone desires to go back to this pristine version of our world.

Secondly, there is the Hierarchical approach, where the focus is centred on order, both social and natural. Hierarchical actors propose “*to put things back to what they were*”; nature for them is fixable. Governments and policymakers take this type of approach that instrument accounting systems and detailed hazardous waste lists (ibid). According to

Reno (2014), this regulatory and technical approach could be considered a “*zombie model*”. This model makes mass waste material deposits appear “*undead*”, and it considers that it cannot generate new ecological possibilities, usually involving landfilling and incineration. We contain it to avoid contact with “*our world*” in our desire to control and hide our waste. Although this approach might appear pragmatic or practical, it misses out on the possibility to maximise resource utilisation.

This model also breaks the connection we have with waste; this is reminiscent of Josh Lepawsky’s (2018) job. He demonstrates that the common emphasis on segregation when considering recycling obscures the importance of reconnection, reassembly, and what he refers to as the rewording of garbage. As Alexander and O’ Hare (2020) mention, “*Separation can mean that the object under scrutiny changes form between one process and the next. Connections are lost as is a scalar perspective*” (p.17). Further, As Reno (2014) reminds us, waste cannot “*die*”, and it cannot be destroyed; therefore, this undead system that does not foster life is referred to as “*zombie*”.

Hird (2013) reinforces the negative implications of landfilling by saying that it might be viewed as a tragedy of the commons. The tragedy is that each person's ruin is ensured by pursuing his interests. To prevent this tragedy of the commons from happening, the standard ways of dealing with waste (landfill and incinerators) require ethical and technological innovations. Thinking about waste as a technological and ethical concern is the only way to address our vulnerability to earth processes more than a techno-scientific problem (Hird, 2013).

Further, in direct opposition to the “*zombie model*”, there is the Individualistic approach, where waste simply is a matter in the wrong place at the wrong time. This approach focuses on doing whatever possible to get waste in the right place at the right time and understand that working with nature rather than working against it is profitable (Thompson & Beck, 2017). This approach represents a step in the right direction because we must rethink waste management to foster life (Reno, 2014). This approach is a good first start, as we need to rethink waste management to promote life.

Finally, the last approach is the Fatalistic one; fatalistic actors believe there is nothing to learn but plenty to cope with; they believe that the world does things to us and there is nothing we can do about it (Thompson & Beck, 2017). One decisive point that Thompson and Beck (2017) argue is that all these actors (Egalitarian, Hierarchical, Individualistic

and Fatalistic) are inevitably present in all societies. One single actor or approach does not have the absolute or complete way to look at things; all these approaches contribute to a complete solution. These approaches are constructive by criticising each other's points of view and giving feedback towards a holistic solution.

By questioning these perspectives and their connections, I believe we might provide a comprehensive solution. We need to advance the discussion on how we understand waste and how should we address it; by choosing a single approach, we shall never be able to promote sustainable alternatives. Consequentially, the current way of treating waste as a manageable unit can only bring undead or temporary solutions (Hird, 2017; Reno, 2014). Therefore, as Reno (2014) suggests, we should see waste not as a matter of order and disorder, purity, and disgust but as a temporary set of things in-between forms of life. This new reconceptualisation of waste might foster better environmental politics (ibid).

1.3. Key Concepts

The main concepts underpinning this research include materiality, waste regimes, practice theory, waste generation, waste collection, waste disposal, waste management — understanding the factor that influences waste generation and how it varies across time and population groups shall be the backbone of this thesis.

1.3.1. Materiality

Anderson and Wylie (2009) argue that “*matter is assumed to be that which is common across other distinctions: between life and nonlife, between the natural and the artificial, and between the organic and the inorganic*” (p.319). These authors mention that, essentially, matter is defined in terms of the range of our embedded concerns as an issue of engaged perception (ibid, p.324). In socio-ecological systems, “*matter matters*” since the materiality of things and materials may impact social interactions and activities (Bakker & Bridge, 2006). Thus, objects possess some degree of agency and the power to influence the people and things around them (Liboiron, 2016; Sayes, 2014; Van Bommel & Parizeau, 2020).

Objects and the meanings attached to them, as well as the identities and subjectivities that result from these attachments, “*are multivalent and fluid*” (Bakker & Bridge, 2006, p. 12). Further, Miller (2005) reminds us that “*material relations exist in and through our material worlds that often act in entirely unexpected ways that cannot be traced back to*

some clear sense of will or intention” (p.32). Hegel (1977) argues in his *Phenomenology of Spirit* that there can be no fundamental difference between humanity and materiality—that all we are and do emerges from the mirror image of the process by which we make form and are constituted by this same process.

The material cultural turn emerged at the end of the 70s as a humanistic reaction against the scientific conceit of processual archaeology (Ingold, 2012). Since then, the concept of materiality and “*material*” has changed and evolved through different perspectives. For instance, Tilley (1998) defines material culture as a “*framing and communicative medium involved in social practice. It can be used for transforming, storing, or preserving social information. It also forms a symbolic medium for social practice. It can be regarded as a kind of text, a silent form of writing and discourse; quite literally, a channel of reified and objectified expression.*” (p.70).

Tilley (1998) also emphasizes that material culture is always a social production that has to be contextualised, and that involves: “*the relocation of sign along axes defining the relationship between signs and other signs which reach out beyond themselves and towards others becoming amplified or subdued in specific contexts* (p.72).” Hence, this author refuses to define materialism to “*simply the quantity of objects*”. Furthermore, Tilley (1998) mentions that this definition doesn’t stand for long once we take into account the “*the large compass of materiality, the ephemeral, the imaginary, the biological and the theoretical, all that which would have been external to the simple definition of an artefact* (p.4).

Moreover, Miller (2005) sees material culture as “*a network of homologous orders emerged as the powerful foundation for more or less everything that constitutes a given society* (p.7)”. Meanwhile, Julian Thomas (2007) described material culture as the representation of ideas that have been made material and natural substance that has been rendered cultural. Thus, studying materials culture frequently becomes an efficient means of comprehending power, not as some abstract concept, but as the process by which particular forms or individuals come to be realised, frequently at the price of others (Miller, 2005).

Ingold (2012) mentions that there appears to be always two sides of materiality. Firstly, the brute materiality or “*hard physicality of the world’s “material character*”. In contrast, the other side is the socially and historically situated agency of human beings who project

both design and meaning in converting naturally given raw material into the finished forms of artefacts. This thesis will see materiality as a phenomenon and not matter as a “*concrete substance*” (Anderson & Wylie, 2009, p. 324). Additionally, it shall also follow Lingis’ (1999) phenomenology, “*to see something is to see what it is for; we see not shapes but possibilities*” (p.14).

Lingis (1999) speaks of materialities in terms of “*levels*”, which he describes as: “*neither a content grasped in a perception nor a form imposed on an amorphous matter of sensation; it is that with which or according to which we perceive*” (p.27). Anderson and Wylie (2009) advance the concept of levels in materiality by concluding that “*the levels imply a reciprocation, an incessant exchanging of ‘points of view’, a nonlinear narrative of matters and senses without a single ‘author’. The manifestation of a level is not ‘something’ to be described, but a story to be told*” (p.327).

This definition of levels in materiality reminds us of how Ingold (2012) describes materials. This author sees materials as histories, arguing that “*to understand materials is to be able to tell their histories (of what they do and what happens to them when treated in a particular way) in the very practice of working with them*”. (p.434). He compares materials to riddles, whose answers can only be discovered through observation and engagement with what is there; thus, materials are not in time, but rather, **they are the stuff of time itself** (ibid, p.439). We shall then try to accommodate waste materiality within the framework of *levels*, histories, and a phenomenon rather than a concrete substance.

As Hawkins and Potter (2013) argue, “*To think about waste in terms of materiality is to enter into an alternate ‘onto-story’ of the world around us in which living creatures do not monopolise motility and actancy, but participate in wider configurations of matter and energy—in net- works of animate things*”(p.105). Moore (2012) insists that waste “*is not only the poem of our time but also an exemplary object through which to forge cooperative research*” (p.793). Since “*what else deflects us from the errors of our illusionary ways, not a temptation to trashlessness, that is too far off and, anyway, unimaginable, unrealistic*” (Ammons, 1993).

Meanwhile, Scanlan (2005) argues that ‘waste’ is a conceptually arbitrary point in an object's existence that denotes what is valued and, more importantly, what is no longer valued. After all, an object is a valuable commodity; however, after use, it becomes waste

(Kennedy, 2007). Subsequently, Hird (2012) argues that what makes something waste is its unsuitability or insignificance for human objectives. Alexander and O' Hare (2020) describe waste as "*quintessentially indeterminate, often holding multiple, apparently incommensurate values simultaneously*" (p.1). However, it is important to notice that things that are disposed of do not have an intrinsic property to be harmful, and these materials are also not to be tamed (Crang, 2010).

Thus, waste should be referred to as the set of objects in the world that pre-exist symbolic categorisation; waste is a mirror of human culture and a sign of and for other human beings (Reno, 2014, p. 4). Those things deemed worthless and rejected cannot be wholly social and cultural, but they should also possess a material character (ibid, p.5). Moore (2012) highlights the growing social science concept of '*waste as actant*'. Waste can exert influence on society in unanticipated ways. It interacts with both human and non-human others in networks, influences the social and material features of the assemblages it belongs to and is scale constitutive (Van Bommel & Parizeau, 2020).

Additionally, waste can be seen as "*historically mutable, geographically contingent and both expressive of social values and sustaining to them*" (Crang, 2010, p. 1027). Moving the conversation away from waste as a self-evident category to waste as a social construction allows us to question how various matters matter differently. Thus, waste through these lenses is a long way from stuff that "*just is*" but that it becomes (ibid, p.1028). Crang and Gregson (2010) maintain that waste affects social life and the entwining of materiality and the social. Thus, waste is intrinsically a matter of materiality, even if the current waste research remains immaterial (ibid).

As Hawkins and Potter (2013) mention, "*Both environmentalism and engineering demand that waste's materiality be mastered and eradicated. But what if we let that materiality work on us, what if we acknowledged that waste captures us in a multiplicity of different networks*" (p.114). A growing waste literature has examined waste's materiality concerning the wider political and economic structures that influence how and where it arises (Alexander & O'Hare, 2020). An example of this type of waste materiality is Zsuzsa Gille's (2007) concept of "*waste regimes*". In this concept, the affordances of a particular type of material waste or 'waste stream' are utilised to comprehend, express, and drive all waste material processes, often to detrimental, even wasteful, effect.

So, Gille (2007) argues that we must also evaluate the influence of specific materialities and governmental and citizen reactions rather than understanding trash solely as a social construction. Here, the concept of distinct '*cultural*' responses to waste has been supplanted by emphasising states and political-economic hegemonies without neglecting the micro-practices they foster or oppose (Alexander & O'Hare, 2020). For Gille (2010), a waste theory must be composed of three main conceptual prerogatives. First, the concept of waste should not be deduced from that of value. The second is to recognise the macro as having different qualitative and analytical dynamics from the micro.

Finally, to treat waste as having a concrete and socially consequential materiality. Guille (2010) argues that it is possible to maintain the differences between micro-and macro-levels while rejecting specific abstractions that ignore waste's concrete characteristics. These regimes have three interrelated components: waste production, representation of waste, and waste politics (Moore, 2012). The questions posed in the politics of waste include the existence and nature of public discourses, policy tools, the people who deal with waste, and the political instruments that define the division between waste and non-waste (ibid).

Therefore, this concept successfully accommodates the materiality of waste within its theory. Materiality is critical because it introduces concepts of ethics and waste and addresses our vulnerability towards the earth's processes (Hird, 2013). Also, as Gille (2010) stated, this concept extends attention to waste production. It allows us to understand the economic, social, and cultural origins of specific wastes and the logic of their generation. Moreover, waste regimes propose that waste creates social institutions and a material culture that we accept today as "*purely social*" features. Accordingly, waste regimes constitute a powerful concept to address waste, specifically in a nation-state boundary at a macro level.

Therefore, this tool allows us to theorise rather than simplify the complexity of the waste life cycle. Another example of this type of waste materiality is Thompson's (2017) *Rubbish Theory*. He maintains that items do not have an inherent '*rubbish*' condition and follows objects through stages of devaluation and revaluation. Therefore, his main contribution was to develop a theory of waste applicable to industrialised countries and demonstrate how matter and material things might be classified and valued in various ways. Hence, Thompson (2017) is concerned with intentional, purposeful activities resulting in discarded materials.

This type of assessment can also be appreciated in Knowles's (2017) job. She emphasises how cultures generate trash but how the materiality of waste acts as an agent in forming social interactions, economic activities, and feelings of location. Consequently, Alexander and O'Hare (2020) point out "*how waste's materiality influences, but does not determine, both how and why stuff appears as waste in the first place and then how and why it may be extracted from conditions of waste and revalued*" (p.7).

Therefore, waste is materially confined through human disposal practices; it is "*ideologically, symbolically, and culturally contained through these material practices as well as legislation, surveillance, public education, health discourse nation-building rhetoric and so on*" (Hird, 2012, p. 465). Nevertheless, containment is always materially and symbolically temporal. Therefore, waste scholars have begun to question what waste is and how, why and to whom it matters. Waste represents culturally built fears and social conventions that influence how waste is processed, where it flows, who handles it, when it is concealed, purposefully intended to stay in place (Fredericks, 2018, Millar, 2018).

In addition, we need to see waste as encompassing many more factors; as Pacheco-Vega (2019) reminds us (through the study of bottled water), that waste is not only a result of cultural norms; there is a "*systematic attack*" on local infrastructures fostered by "*multinational corporations with a stake in commodifying local resources*" and also "*local governments who abdicate their responsibility towards citizens*". Thus, waste also has a political sphere (p.658). Currently, household waste has developed into a material representation of the neoliberal period since its collection and control have become more subject to shifts in the interaction between state actors and individual urban inhabitants (Fredericks, 2018). Discard from households has become the raw materials for endless cycles of further commodity production.

We exclude serious engagement with other possible analyses when discussing waste management simply as an environmental and regulatory policy (Gregson & Crang, 2015, p. 7). Waste has been black-boxed to govern, treat, and manage (Crang, 2010). However, this can be overturned if we ask how various forms of matter have different affordances and become governed differently under different regimes. To understand waste, we must understand consumption practices (Crang & Gregson, 2010). Consumption through the devaluation, divestment and disposal of goods shall allow us to understand the connection between waste, individual behaviours and practices.

Inevitably, an effective waste policy concerning waste reduction, minimisation and prevention need to address the social and material conditions that generate it (Gregson & Crang, 2015, p. 11). Consequentially, consumers should not blame the politics of morality, and moralising should be avoided (ibid). The waste policy is not a reaction to capitalist surplus but rather contributes to the surplus by transforming waste from non-accumulating to accumulating capital (ibid). Hence, waste is not something without value; it is the material on which concepts of value and the good life are re-imagined (Thieme, 2020)

In this thesis, I want to address how waste flow dynamics connect domestic and global industrial scales; thus, I shall examine waste flows within a globalised and localised scheme of replicated inequities. As aforementioned, waste evokes conversation about development, justice, sustainability, and progress. This thesis understands that objects can *'have politics and are entangled in struggles of power and meaning'* (Liboiron, 2016, p. 90). Cultural viewpoints are juxtaposed with power, materialism, and economic concerns in this approach.

However, this thesis shall also consider Miller's (2005) warning that *"in a society where objects are reduced to their personlike qualities, people also tend to be reduced to their object-like qualities, as vehicles for the expression of values"* (p.39). He argues that it is the job of an ethnographer to reveal *"these reductive processes"* (ibid). As Alexander and O'Hara (2020) suggest, *"there can never be a single epistemology of waste, thereby acknowledging the irreducible plurality of discards and their studies, whilst also emphasising the importance of understanding the consequences of different epistemological standpoints through close ethnographic attention"* (p.11).

I propose the concept of *"contextualised materialities"* as a tool to understand waste through its localised social, historical and cultural context. This concept accommodates and emphasises how institutions, companies, and other stakeholders have facilitated certain materials' consumption, flow, and disposal. Further, this concept attempts to advance the conversation by lessening the role of the consumers on waste generation (and the morality attached to their behaviours and habits). However, it recognises that consumers have active roles, yet they are embedded in an environment that fosters unsustainable consumption practices.

This concept sees waste not as a “*concrete*” matter or material but rather as a macro level that reflects certain habits and behaviours adopted by consumers in a certain society. As Miller (2005) notes, “*objects are important not because they are evident and physically constrain or enable, but often precisely because we do not "see" them. The less we are aware of them, the more powerfully they can determine our expectations by setting the scene and ensuring normative behaviour without being open to challenges. They determine what takes place to the extent that we are unconscious of their capacity to do so*” (p.5).

In the following sections, we shall utilise this concept to analyse different objects through ethnography and find a unifying thread among them. Thanks to this concept, I shall be able to find the similarities and patterns among the behaviours of consumption and disposal among materials that seem completely different from each other (mobiles, plastic bottles, and clothing). This concept will allow me to tell how these materials are acquired, used, and disposed of and what these stories tell us. This concept will shed light on who is be responsible for unsustainable consumption and disposal practices and who can and should change them.

1.3.2. Practice Theory

Changing a population’s behaviour has been described as the challenge of our time (Spotswood et al., 2015). There is considerable doubt about the effectiveness of measures that assume that people lack information or motivation (or that they need assistance) and that once one or more of these elements are supplied, individuals are more inclined to change (Bonsall, 2009). Individualist approaches that consider individual decision making as the point of change have been questioned regarding their appropriateness and effectiveness (Disney et al., 2012; Spotswood et al., 2015). Hence, the individualistic approach aligns with neoliberal policies, which supports individuals to “*manage their behaviour change rather than forcing changes through the regulation of individual freedoms and/or industry or other societal structures*” (Spotswood et al., 2015).

Furthermore, Shove (2010) argues that those doing behavioural changes need to consider how institutions structure action by “*making some actions very much more likely than others*”. Practice theory suggests that behaviour is not driven by isolated factors but rather interconnected in the broader cultural context. Moreover, this author argues that an appreciation of practice theory is required to understand social change. Reckwitz (2002)

describes the practice as: “*A routinised type of behaviour which consists of several elements interconnected to one another... a way in which bodies are moved, objects are handled subjects are treated, things are described, and the world is understood.*” (p.249)

Practice theory considers the role of bodily actions, like emotions, motivations and attitudes, tangible objects, knowledge, routine, and language. Individuals become “*carriers*” of social practice (Reckwitz, 2002). The individual becomes the carrier of routinised ways of understanding, knowing how and desiring. Moreover, the practice is understandable to the “*carriers*” and potential observers. Therefore, practice theory emphasises that individuals understand the world around them through engagement with practices and develop a sense of self (Warde, 2005). This approach, however, does not entail that individuals are not active individuals performing everyday practices; instead, they are skilled agents that interact, negotiate, and perform practices as parts of their everyday life (Hargreaves, 2011).

As Warde (2005) notes: “*The principal implication of a theory of practice is that the sources of change behaviour lie in the development of practice themselves*” (p.140). Nevertheless, there is no unified practice approach (Schatzki, 2002); some theories focus on the connection between the elements that compose a practice (Warde, 2005), others focus on these elements per se (Reckwitz, 2002) (Shove & Pantzar, 2005), while others study the practices as a bridge between socio-technical systems and individual lifestyles (Spaargaren & Van Vliet, 2000). In this research, I shall utilise Shove and Pantzar's (2005, p.58) approach to Practice Theory, where “*the emergence and demise of practices have to do with forging and failing between materials, images, and skills*”. In this approach, materials have to do with technology or stuff, images with meanings and symbols and skills with competence and procedures. Practices emerge, stabilise, and fade off if the connection between these elements is broken (ibid).

Key concepts of Practice Theory which I apply for the historical waste management system transition are:

- **Materials:** As Latour (1992) exposes, mundane technologies play a part in mediating material and symbolic relations between bodies and natural environments. Subsequently, for Shove and Pantzar (2005), the dynamic relationship between the materials and image and performances of the practices they sustain is the more relevant part of studying the materials involved in a

practice. Things are not just communicators of symbolic meaning (Warde, 2005) status or identity (Shove & Pantzar, 2005) but are often “ *directly implicated in the conduct and reproduction of daily life* (Shove & Pantzar, 2005, p.44). However, “*products alone have no value; they do so only when integrated into practice and allied to requisite forms of competence and meaning*” (ibid, p.57).

- **Competence or Skills:** The interaction between the consumers and the materials is the coordination of an action performed by active practitioners and observed and reproduced by observers. Therefore, competences are multiple forms of understanding and knowledgeability, while skills are required for a carrier to succeed at the practice’s performance. (Shove & Pantzar, 2005, p.23).
- **Meaning:** The relation between the material objects and associated images and forms of competence, the image of “*reproducing*” a practice to potential observers. Understandings about significance are shared amongst a group and bring the group together (Bourdieu, 2016).

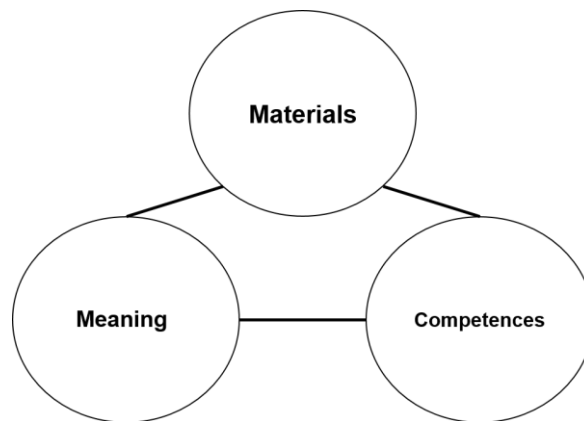


Figure 1.1 Shove et al. (2005). 's three-element Social Practice Framework

Additionally to these critical concepts, I also consider what Suchman et al. (1999) mention about practices, “*systems development is not the creation of discrete, intrinsically meaningful objects, but the cultural production of new forms of practice*” (p.404). In this research, the application of practice theory to waste generation and disposal practices starts with identifying key actors, both human and technical, and the interaction between them and then identifying which role they are playing, materials, skills, or meaning. Waste policies, waste infrastructure like bins, recycling centres, waste collection trucks, and separating and recycling waste are visible manifestations of the practice network.

This research aims to use the broader and holistic perspective of Practice Theory to explore what happens within behaviour change interventions (in this case, specifically on waste management practices) and, therefore, to understand its effects on social practices as Giddens and Zamora (1985) explain that “*It is not the experience of the individual actor, nor the existence of any form of societal totality, which is studied, but a dissection of the practice itself as “carried” by its performers*” (p.45).

Further, Giddens and Zamora (1985) use the example of when someone uses a football, they are not simply playing football, “*they are actively involved in reproducing the game itself*” (ibid, p.45). Therefore, the social practice’s approach would explore the game and consider its ruler rather than target the players individually (Spotswood et al., 2015). The practice itself is the smallest unit of analysis, which allows for an alternative way of considering problem behaviours and potentially a new framework for offering whole-system solutions (ibid).

1.3.3. Consumer’s Responsibility

One of the main arguments this thesis wants to question is whether consumers can foster a circular economy through behavioural change; this thesis will mainly focus on the Millennial generation. Millennials and their habits have been antagonised in the media by portraying them as an example of unsustainable consumption and consumerism. This generation has even been called the “*generation waste*” (Steeden, 2017). However, there is evidence that Millennials tend to buy products that match their values of environmental and social causes (Todeschini et al., 2017). Younger generations also tend to be open to new ideas, passionate about the environment, and involved in political issues compared to previous generations (M. S. W. Lee et al., 2017).

Furthermore, Millennials are becoming more conscious about the products they purchase, including the social and environmental issues behind them (Hwang & Griffiths, 2017). Moreover, they acknowledge that several industries (including fashion and the mobile industry) has sustainability issues (Han et al., 2017) and would be willing to “*vote with their dollar*” (Sorensen & Jorgensen, 2019). Most of the research available points out to two main findings of millennials and their consumption habits:

- They are more aware of social and environmental issues than older generations

- This awareness often does not translate into action (Bick et al., 2018; Bruce & Daly, 2006; Sorensen & Jorgensen, 2019; “*The Price of Fast Fashion*,” 2018)

The “*value-action gap*” has been defined as “*a ubiquitous phenomenon where people express concern about the environment but often display little commitment to change their behaviour accordingly*” (Babutsidze & Chai, 2018, p. 292). Factors contributing to the value-action gap include pre-existing technologies, anti-environmental social norms, individual habits, fundamental ignorance, and status concerns. These findings are reminiscent of Valor’s (2008) work, where she identified three types of obstacles towards “*responsible consumer behaviour*”. The first type is the “*motivational obstacles*”, which depend on the values and individual needs of the consumers.

For example, in this research, we shall see that some Millennials are aware of the environmental issues of clothing or mobile phones but few act on those concerns. Secondly, there are the “*cognitive obstacles*”, which are the opportunity for consumers to process and store information about brands. In this thesis, we will clearly see that in bottled water, where consumers are unaware of the whole “*picture*” of this industry in GMC. Lastly, the “*behavioural obstacles*” are the desire and capacity to find a fair brand to purchase. As we shall see in this thesis, we argue that consumers are embedded in a society that surrounds them with different obstacles that inhibit their participation in a circular economy.

However, even if consumers are surrounded by different elements that push them towards unsustainable practices, they are still perceived as responsible for a “*throwaway society*”. Thus, these consumers end up gaining characteristics of the throwaway society themselves; they are called “*novelty-seekers*”, “*consumerists*”, “*lazy*”, or just plain “*bad*”. In general, they are perceived to not be doing enough for their planet. As Cogan (2000) mentions, there is a distinction between a decent person and a decent citizen. “*A good person lives his or her life virtuously (...); a good citizen... not only lives decently in his or her private life but is also committed to participation in public life.* (p.4).”

Brinkmann (2004) even suggest that citizens use their purchases in the marketplace to elect the society in which they wish to live. However, is this actually true? *Can consumers make a difference through their purchase power and their change of behaviours?* This theory suggests the opposite. In general, it has been found that consumers have very limited power to change the marketplace or industry. At the macro level, market

mechanisms limit customers' ability to influence business behaviour (Held and McGrew 2002). The conclusion is that customers' true power is extremely restricted, as market forces are unbalanced; their decisions may have minimal impact on company actions, preventing systemic change. Lodziak (2002) refers to this impact as the "*insignificant choice*."

As Valor (2008) reminds us, "*Consumers are not heroes; at most, they are good citizens*" (p.323). As we shall see in the rest of the thesis, we cannot expect consumers to fully understand every aspect of every industry they buy from, from bottled water to clothing. Even if they try to use their fragmented and sometimes contradictory information, they often lack the skills, time or money to enforce their views. Further, even if they can go through it and manage to accomplish the almost heroic task of aligning their values with their habits, this will probably not translate into the kind of change they expect to see. However, this thesis is not negating that consumers have an active role in their system.

Yet, we wanted to emphasise, as Valor (2008) mentioned, that "*Consumers can cooperate with existing initiatives, align with them, even provide further incentives. But they cannot be asked to be the cornerstone of the system*" (p.323). We argue that the only way to break the cycle of a "*throwaway society*" or a "*waste crisis*" is if governments and companies are held accountable for the society they have created. We shall explore the different stories the materials chosen for this thesis will tell us. Through these stories, we shall shed light on how much consumers can actually contribute to a circular economy. Using the concept of "*contextualist materialities*" and Practice Theory, we will explore waste through a different lens by leaving behind narratives of waste management just being seen as an end-of-pipe solution or an irremediable result of a growing population.

1.4. Literature Gap

To contribute to waste scholarship, we need to understand many authors' current work and identify the possible gaps. Waste scholarship has been mainly focused on end-of-pipe solutions. Normally, terms such as waste governance', '*waste flow*', '*waste networks*' and '*waste citizenship*' remain solely on the technological realm (Crang & Gregson, 2010; Gille, 2009). Waste scholarship has recently had a renewed interest in waste materiality (Alexander, 2018; Crang & Gregson, 2010; Furniss, 2017; Gille, 2010; Reno, 2014). The concept of waste materiality helps to accommodate the ethical, social, and environmental parts of waste into the equation.

Furthermore, waste scholarship tends to have a big division between the Global North and the Global South because gathering data in developing countries can be challenging (Velis, 2017). The waste scholarship in the Global South tends to be dominated by the transition from informal to formal waste collection systems. (Furniss, 2017; Martin Medina, 2007; Velis, 2017). However, this transition is not always welcome, and as many authors pointed out, sometimes it should not be even something desirable (Velis, 2017; D. C. Wilson et al., 2006).

Many developing countries also tend to imitate developed countries' policies and end-of-pipe technologies, most of them without success (Horen, 2004; Park et al., 2018). Some technologies that developing countries want to imitate, such as waste to energy or incineration, have been proven not to reduce waste generation or are now considered as not such desirable alternatives. For example, in the Goteborg Metropolitan Area, incineration is the default technology to “*treat*” waste in Sweden. Now, using any other alternative such as recycling or reuse becomes challenging to implement. They have found themselves in a lock-in situation that is hard to break (Corvellec et al., 2013).

Consequentially, countries from the Global South that blindly imitate these waste management treatments without understanding that this might also put them into a lock-in situation are doomed to repeat the same path. Furthermore, many countries of the Global South aim to modernise their waste management systems, in which they reduce the reliance on disposal and increase recycling. Hence, studying waste in these countries tends to become a research of the transition from informal to formal, from dumps to landfilling to waste hierarchies.

However, several examples prove that sometimes a hybrid system of formal and informal systems in waste is better than a complete transition from informal to formal. Hybrid systems tend to result in low-cost solutions (Zapata Campos & Zapata, 2014) and improve the quality of materials recovered (Fergutz et al., 2011). “*It seems ironic to move forward by deliberately eliminating what can be a rather efficient, existing recycling system*” (Wilson et al., 2006, p. 798). When governments or local businesses recognise the current system's potential and areas of opportunity, transformational changes can occur.

In this project, I want to advance the conversation focusing on waste materiality rather than the transition from formal to informal waste management; this shall be done by considering the existent waste scholarship and research available. Three principles shall

guide this project. Firstly, understanding that the focus should be on waste materiality and the current consumption and disposal practices of the GMC's citizens, rather than the end-of-pipe solutions. Secondly, avoid imitating waste policies that generate lock-in social and technological issues. As a general idea, imitation of waste policies without a proper adaptation to the chosen context should be avoided as much as possible. Lastly, by analysing and understanding the narratives in GMC and situating the responsibility of these actions where they belong.

This project shall solve the key gap of trash scholarships of continuing in the technological realm while also considering social and ethical considerations. Practice theory shall also explain why some practices have been sustained while others have changed through time; it shall shed light on the elements that have explained those changes. The concept of *contextualised materialities* will be used throughout with the aid of Practice Theory to find a thread that connects different types of materials and sheds light on how they are consumed and disposed of. Behaviours and practices and their origins shall be examined at different scales to locate the responsibility.

Section II

1.5. Research Aims and Objectives

I stopped working for the Mexican government in 2017. However, I was left with a puzzle, and this project set out to address the following research questions to solve it:

Is the GMC experiencing a “*waste crisis*”? If so, who is responsible for it? Based on the current consumption and disposal practices of Mexico City, can we break the cycle of dooming waste to end-of-pipe solutions?

1.5.1. Research Questions

To address the research problem outlined above, I set to answer the following questions:

1. What are the practices and behaviours towards the chosen materials that GMC is experiencing?
2. What factors have allowed these practices to exist (materials, competence, skills or meaning)?

3. How can the perception of these materials change the city and its relation to waste?
4. Can individual behavioural change have a significant effect on reducing the waste crisis?

1.5.2. Fieldwork Aims:

To answer these questions, the following aims were carried out during the fieldwork:

- a. To outline the various practices and behaviours of consumption and disposal of the chosen materials
- b. To define the key actors and the interaction between them
- c. To offer a critique on the current waste policies
- d. To understand the narratives and conceptualisations present regarding the chosen materials

1.5.3. Fieldwork Objectives

To fulfil these aims and answer the research question, the fieldwork objectives were:

- i. To conduct archival research, describe historical and current waste management practices, and include official sources of new national policies, which could be classified as materials, explaining the change of “*behaviours*” since these policies were implemented. *Research questions: 1,2,3,4, Aims: a, b, c, d*
- ii. To interview citizens about their consumption and disposal habits regarding the materials chosen and how they value these objects. *Research questions: 1,2,3, 4, Aims: b, c, d*
- iii. To use the data obtained through the completion of objectives i. and ii. to produce an academic analysis on the practices and behaviours that GMC experienced and relate it to the waste policies implemented. *Research question: 4 Aims: c, d*

1.6. Thesis Structure

This thesis is presented in two parts. Part one presents a review of the academic literature the conceptual perspectives that have helped shape this study. It also discusses the methodological approach utilised in answering the research questions. Part two contains

three empirical chapters, which presents quantitative and qualitative empirical evidence on the waste regimes experienced in GMC by analysing these materials' materiality. Part two concludes with a summary of the leading research findings, some policy implications for addressing the waste crisis on GMC, and comments on future research directions.

Part I

Chapter 2 explains and justifies the quantitative and qualitative methods employed in each part of this study. It focuses on the quantitative research design, secondary and primary data sources, limitations, sampling strategy, and analysis techniques. This chapter also addresses the qualitative research case selection and analysis.

Chapter 3 presents a relevant argument in the academic literature that provides a basis and justification for this thesis. It first presents summary information on the waste scholarship, providing a context on global mass waste generation, collection, and disposal.

Chapter 4 This chapter builds on the literature and framework provided in Chapter Two and then offers historical background on the field study area, Greater Mexico City. Then it compares how waste has been treated in Greater Mexico City to other Global South countries and globally. It then examines why the integrated approach employed in this thesis to study social and technological networks of waste is essential.

Part II

Chapter 5 is the first of three empirical chapters that discuss the research findings. This chapter examines the interviews performed on behaviours and attitudes towards consumption and clothing disposal. This chapter examines how constituent clothing consumption activities are coordinated and sequenced and how those activities are configured across practitioner and societal contexts. It also points out the barriers and limitations of consumers towards a circular economy.

Methodologically, **Chapter 6** builds on the findings in chapter 5 and examines the interviews' results on behaviours and attitudes towards consumption and mobile disposal. The findings indicate that although obsolescence plays a vital role in decreasing the mobile lifespan, other factors, such as contract renewals and device theft, are also pivotal

in this process. Most consumers were led more by convenience and practicality than fashion. Through the story of mobile phones, we can see an unequal society. A large part of the population is struggling with crime daily, while another part of society is coping with obsolescence.

Chapter 7 broadens the research by analysing plastic waste generation. It showcases the evolution of this market, particularly the creation of the water bottle market and the intense propaganda campaigns that pushed GMC residents to assume that the water from their faucets was unsafe and unhygienic (regardless of the area or zone where they live). It outlines how GMC became the number one producer and consumer of water bottles globally. It also explores the recycling schemes and propaganda that perpetuates the common belief that most water bottles are friendly to the environment.

Chapter 8 summarises the main research findings and highlights this thesis's critical contribution to human geography perspectives on waste regimes and materiality. It concludes with comments on where this research might lead to future research projects.

PART I

Chapter 2

On Methods

Fieldwork is fundamental for this research project; we can collect data and engage with the researched community and space through it. This research explores why people buy things and why they dispose of them. This fieldwork aims to gather data and construct a systematic and theoretical understanding of the practices and logistics of consumption practices and waste generation. This chapter moves from the previous discussion on this thesis's conceptual framing to discuss its methodological approach and the data collection method. Firstly, Section I establishes the rationale for case study selection. Then, Section II will provide an overview of how practice theory, based on interviews and archival analysis, was employed to collect and analyse consumption and disposal practices. Finally, the limitations and challenges encountered and the broader implications for research on waste management and practice theory applied to consumption and disposal will be discussed in Section III.

Section I

2.1. Why Greater Mexico City?

Crang and Cook (2007) claim that our choices of research topics are frequently attuned to our personal experiences and interests. I have heard from colleagues that sometimes they have to ponder where will they conduct fieldwork to achieve their research objectives. However, this research was explicitly designed for Greater Mexico City; it is a personal endeavour. "*Zero Waste*" (*Basura Cero*) was the first project I had as a recent graduate. This government initiative was created to manage the "*waste crisis*" that Mexico City was experiencing.

This project looked at what other countries (mostly Nordic countries) had accomplished and attempted to replicate their best practices. As well-intentioned as it was, the project merely looked at waste as something to get "*rid of*" and something that "*happened*".

Furthermore, it proposed mainly temporary and reactionary solutions. The project's focus was to reduce the waste going to the landfill. As a result, the number of tonnes diverted from landfills became our top objective, and this was how we gauged the project's success. However, my work on that project taught me that we were merely moving the waste from one location to another while concealing it in various ways.

As Moore (2008) mentioned, for us, waste was only an object that was *"out of place"*. Basura Cero's team, we never really stopped to wonder (or worry) about what our temporary solutions would bring if we did not fully understand the reasons behind waste generation. We thought the *"crisis"* was so terrible that we did not have time to unpack or comprehend consumption and disposal habits. It was not *"our responsibility"* to do that. My former boss used to say,

"There are 12,000 tons of waste generated in this city every day; our job is to try to deter as many tons as we can from ending in a landfill".

Consequentially, we decided to follow the Waste Hierarchy that many other European countries were using for their waste strategies (as seen in Figure 2.1)

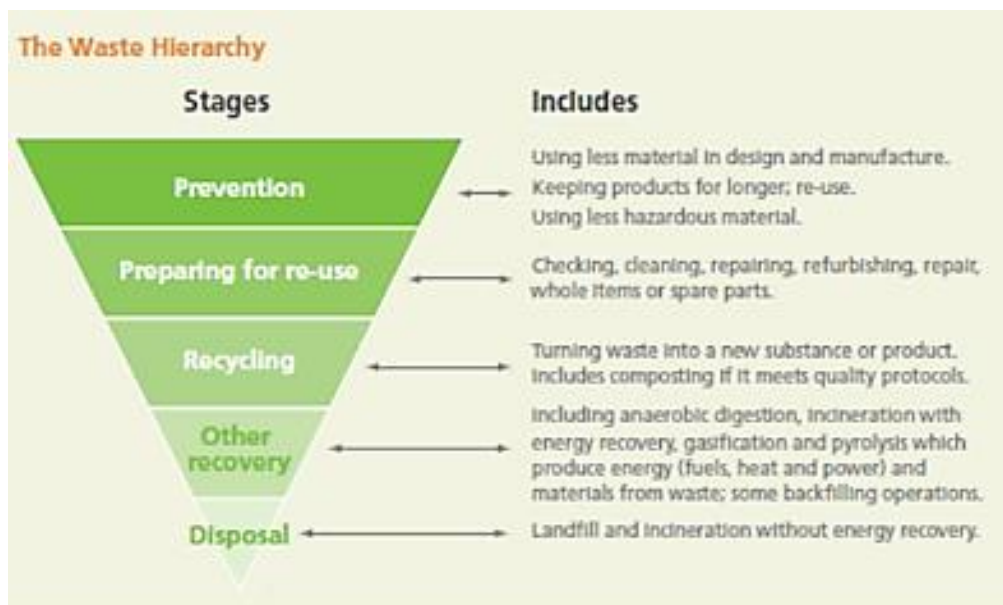


Figure 2.1 Waste Hierarchy in the UK (DEFRA, 2011)

Recycling, Recovery and Disposal were quite clear for us. However, we were unsure about what we could do about Prevention. Thus, we opted for social awareness campaigns to promote reuse, recycling, and waste separation. However, we knew that these campaigns would probably not reduce the waste generated in the city. Furthermore, these

campaigns were merely a way to "comply" with all the steps of the Waste Hierarchy. We agreed that the use of certain products could be disincentivised, things as plastic straws, Styrofoam products and even single-use plastic bags. Nevertheless, anything else would be out of the question. My former boss would warn us:

"We cannot tell the consumers what to do. That is not our role; our role is simply to manage their waste".

Therefore, consumers and their practices were considered as something unmovable. As a colleague mentioned:

"Waste is good; it means the city is moving, people are buying stuff, and the economy is thriving. We need to make people forget about their waste. If they can see it or smell it, we are doing something wrong."

There was another fundamental problem with how "Zero Waste" was developing its strategies. We were only focusing on Mexico City and not on the entire metropolitan area of Greater Mexico City. Since we were a local governmental department, we would only deal with the waste collected in Mexico City. The State of Mexico, Hidalgo, and Toluca had local departments and different logistics, staff, budgets, and strategies. Additionally, the communication and collaboration between these regional offices were minimal. Perhaps legal borders separate these states; however, the metropolitan area functions as one big city.

Thus, it is common for someone to live in the State of Mexico but to work in Mexico City. Therefore, although Mexico City has 8 million people, the "floating population" is near 20 million people (INEGI, 2018). Creating strategies only for the residents of Mexico City would leave out 12 million people that work and commute to it every day. As a result, the strategies we developed in "Zero Waste" were short-sighted and would only bring temporary and limited outcomes. Negotiating with a company to take away 800 tonnes of used tyres per day as fuel for their furnaces was one of our most notable Zero Waste achievements.

Due to the "success" of this agreement, the government decided that incineration would be the primary strategy to tackle the waste crisis. As a result, "El Sarape," a project to build a waste-to-energy facility capable of incinerating 5,000 tonnes of garbage, was conceived (as seen in Figure 2.2). The "Basura Cero" advisors (including myself) tried to explain why this Waste to Energy Plant was not the right approach. There had never been a project of this magnitude in Latin America. Additionally, we did not have a waste

separation system that would allow a Waste to Energy of that magnitude to function properly. Waste in Mexico is mixed and humid; these two aspects would lead to incomplete combustion and an inefficient plant. Moreover, we were concerned if the plant's filters would prevent harmful air pollution. Nonetheless, it would meet the government's goal of "*sending less garbage to landfills*". As a result, consultants who disagreed with these tactics (including myself) were "*disposed of.*"



Figure 2.2 El Sarape (image presented by the ex-major of Mexico City, Miguel Mancera, on the 31st of December of 2017)

However, two years after my departure, the project was cancelled due to a change of government. Even though the government no longer employed me, I welcomed the changes. I hoped that this time there would be a renewed focus on understanding why waste was generated and, as a result, how to eliminate it at its source. The new strategy, however, was now centred on recycling. During my time in the project, it seemed clear that the amount of waste produced grew every day. When I worked there in 2015, 12,000 tonnes of rubbish were generated per day; by 2018, 13,000 tonnes of rubbish were generated.

Recycling or any other way of "*managing*" waste would never be enough, and the dream of "*Zero Waste*" would never be attained. I knew recycling was the new government narrative for keeping waste out of landfills, but it would not solve the current "*problem,*" which is an ever-increasing amount of waste and ever-increasing resource and energy. These events are significant because they inspired me to pursue doctorate study, impacted my perspective on waste, and facilitated my "*entry to the field.*"

2.1.1. Urban Context

Mexico

8th of September of 2016

Mexico City does not know what to do with its waste

The severe crisis of waste management in the Mexican capital has become a human rights issue for the waste workers and its general population

The inhabitants of Mexico City live in an insalubrious environment, not only because of air pollution but also because of the deficient waste management by the authorities. Every day, the population produce 12,000 tons of waste that go through a long journey until they reach their final destination, leaving a toxic trail that pollutes the air and soil behind it. After the closure of the only landfill in the city, the waste in the capital is separated in the street without any precautions, which affects its citizens' health. It is especially toxic for the waste collectors who operate under unacceptable working conditions, many of them without any formal payment. This ticking bomb has drawn the attention of the Human Rights Commission of the City, which after an investigation, has submitted an official recommendation. However, the local government has chosen to remain silent.

Claudia Altamirano, El País

Mexico City is the Mexican capital and is the most populous city in North America. The last national census (2020) declared that MC has 9 million residents (INEGI, 2020). The city is spread between 16 subdivisions, known as "*delegaciones*". The Metropolitan Area, also known as Greater Mexico City, is compounded by 11 surrounding municipalities and MC. The population of GMC reached 21.8 million residents in 2020 (INEGI, 2020), making it the second-largest metropolitan area of the Western Hemisphere and the eleventh largest agglomeration of the world (2017) (United Nations, 2018).

The improvements in social and economic aspects attracted people from rural areas to the city. Therefore, the 11 municipalities that surround MC have absorbed a large number of "*unskilled*" migrants. Consequentially, a complex informal system has developed around Municipal Solid Waste (MSW) collection, recycling, and disposal over the last 70 years. By 2005, 20,000 individuals lived in the informal sector around wastes (Medina, 2005). Furthermore, the generation of MSW has significantly increased in recent years; between 2003-2011, it rose by 25 per cent (SEMARNAT, 2012). In 2018 the Municipal

Solid Waste generation reached 13,073 tons per day, with a daily average per capita of 1.38 kg of waste in Mexico City (SEDEMA, 2019). While in the State of Mexico, it reached, in 2017, 17,000 tons of waste were generated every day (SEMARNAT, 2017). Therefore, it is estimated that the GMC zone generates around 30,000 tons of waste every day.

2.1.2. Into the Field

I started my doctoral fieldwork in May 2019. On my first morning of fieldwork in Mexico City, I was awakened by the sounds of the city. This is not a complaint. Those sounds were missing from my life. I missed the sounds of the waste trucks, of the people buying and selling "*fierro viejo*" (used electronics and electro domestics), the "*camoteros*" (sweet potato sellers) and the local tortilla seller. I also missed saying *Buenos días* and *Buenas tardes* when entering a place and saying *salud* when someone sneezed.

I was finally back **home**.

Growing up in Mexico City meant being woken up by the peddlers' calls and the traffic road. The city is filled with scents and noises. Foreigners may describe Greater Mexico City as chaotic, but it is not chaos for us, the chilangos (Mexico City residents); the city has a rhythm and a beat, and we are accustomed to it. This city has grown immensely socially, demographically, and economically in the last decades. However, whenever I heard the phrase "*throwaway society*", I always thought it did not quite fit with GMC or its population. The city might not be renowned for its cleanliness, but we generally praise thriftiness and creativity; throwing away stuff without a second thought would usually be frowned upon.

The inventiveness and creativity of the Mexicans is something we are proud of; in the case of re-purposing or reusing, we might be world champions. There are endless cases of how Mexicans try to extend everyday products' life cycle. For example, I remember opening the fridge and seeing a tub of ice cream and being disappointed to be greeted with *frijoles* (beans) upon lifting the lid instead of ice cream. I also remembered my mom often filling the soap dispenser with water when it was about to run out instead of buying a new one to save money.

As kids, we would place a *frutsi* (fruit drink for kids) near our bicycle wheels to make it sound like a race car. I also recall that one of the biggest fears a kid could experience was

losing one of your mom's *topers* (it does not matter if a container's brand is an original Tupperware or not, every container was called "*tope*"). Furthermore, recycling was always encouraged, and from a young age, the inhabitants of GMC are urged to participate in recycling schemes. We would have annual "*colectas*" of cardboard and newspaper at school, and the group that collected more of these materials would be praised by the headmaster at the weekly school assembly. Thus, recycling, reusing, and re-purposing was common in Mexico City; we all grew up with it. Nevertheless, our parents would tell us that the new generations were a *throwaway generation*.

After all, long gone were the days when the milkman came, or where it was possible to exchange glass Coca-Cola bottles for some cents or a discount. Clothes were also not seen as almost disposable, and shops were mainly Mexican brands. My parents would tell me they could not buy VHS players, jeans, or CDs before the NAFTA agreement. Having an original Levi's' jeans meant you either had enough money to go to the US and buy it there or that you had gotten it in the black market. Nowadays, Levi's jeans are nothing special since hundreds of brands are available at the malls. My parents would sometimes nostalgically stare at Levi's shops and say:

"As teenagers, we would have never thought it would become so easy to get them".

Times had changed.

Section II

2.2. Field Work: Back Home

During my time working in the Zero Waste initiative, we would always start our presentations briefly introducing how much waste generation had increased in the last decades. We would only add a line or two explaining that this was mainly due to the city's population growth; we would never really look at why it has increased. We have some figures and percentages for the waste categories: organic, inorganic, and their subcategories. We also knew that depending on the city's area, the characteristics of the waste would change. More impoverished neighbourhoods would produce less, and most of their waste was organic, while wealthier neighbourhoods produced more, mainly inorganic waste. At that time, we believed that those numbers perfectly reflected the whole situation and crisis of the city.

Thus, as I mentioned previously, we never analysed why certain types of waste were increasing faster than others. This research aims to shed light on these reasons. Due to my experience working with the government, I still had many friends and colleagues working in the public sector, staff in the waste management sector, and even owners of landfills. I was able to find out how many tonnes of any given waste were collected, recovered, and disposed of in landfills. However, that information would not tell me why they were disposed of. I chose three primary materials to focus on for this research: old mobiles, used clothing, and water bottles. I determined at that point that I needed to hear from GMC residents about their experiences with the materials in question.

2.2.1. What people say they do, and what they really do

Before starting my fieldwork, my supervisor warned me that I had to be aware that there was a big difference between what "*people say they do and what they really do*". Thus, I chose interviews rather than surveys since I believed that would get closer to what people really do. Additionally, I would try to interview people in their homes. Being confronted with their clothing collection and mobile phones might allow them to remember things they would omit in a typical interview.

This research aimed to interview individuals with different life situations, ages, genders, civil status, and family sizes. This way of sampling is often referred to as strategic

sampling, judgemental, or purposeful sampling. The informant's distribution is not representative of the population. Still, the informants were actively hand-picked to maximise the chance that many different and even conflicting sides of the phenomenon in question is encountered (Marshall, 1996). Although many respondents were friends or contacts I already had before starting the research, I knew I had to go out of my comfort zone to get some unbiased and diverse answers. Friends would refer me to other contacts, and I would talk to people I had never spoken to or seen before.

This sampling method is also known as snowball sampling, a technique for finding research subjects (Atkinson & Flint, 2001). It consists of one subject giving the research the name of another subject, who then provided the name of a third, and so on (Vogt, 1999). This process works well when there is an initial "*bond*" or "*link*" between the initial sample and others in the same target population, which then allows a series of referrals to be made within a circle of acquaintance (Berg, 1988). This strategy is commonly used to overcome problems associated with sampling concealed populations like criminals or the isolated (Faugier & Sargeant, 1997).

In this case, the target population was not considered isolated or particularly difficult to reach; however, given that it was necessary to interview them at home, I needed to refer someone the interviewees considered trustworthy. Since I had grown up in Mexico City, I had the initial set of contacts that could, in turn, refer me to people that would fit the profile I was looking for. Additionally, they would be able to "*put a good word on my behalf*", assuring them that I was a "*real*" researcher that would not endanger them. Furthermore, given the current insecurity situation in the GMC (especially towards women), this would also assure me that I was not walking into a dangerous situation.

Finally, this would give me leverage in the interview since there was already a "*bond*" or "*leap of faith*" between the interviewee and me when I arrived at the interviewee's house. We were both in a vulnerable position, in which they were opening their houses to me (a stranger), and I was entering the house of someone I had never talked to or seen before. Moreover, I was conscious of my privileged upbringing, which allowed me, as Kobayashi (1994) has argued, to have access to "*the middle-class luxuries, such as education and professional status that are still relatively inaccessible for most women of all backgrounds*" (p.76).

Due to my upbringing and privilege, I knew that it would be easier for me to access houses of people of the middle and even upper class, even if they did not know me beforehand. Between the referral system and my background, it was relatively simple for the middle and upper class to accept the interview in their homes (although I might need two referrals in some cases). Nevertheless, the interviews I performed with people in the lower-income class were the hardest to get. They were extremely apprehensive even if I was referred by someone close to them (relatives, partners, or bosses).

*"My house is a mess; what are you (**usted**) going to think about me?"*

When they called me "*usted*" (a formal way to address someone in Spanish) rather than my name, I knew this would be a daunting task. I would explain to the respondents that I would not take any photos if they did not feel safe or comfortable and that their names and data would be completely anonymous.

*"Yes, but YOU (**USTED**) would see my house and my clothes. No, I would feel ashamed."*

It was vital for me to make them feel safe and comfortable for this research, so I would agree to interview them elsewhere. I interviewed several house cleaners, and they would usually allow me to interview them at work, but only if their bosses agreed with that. Out of the 50 interviews I performed in GMC, 40 respondents agreed to be interviewed at their homes. There was only one case in the middle-income bracket where the respondent asked me to be interviewed somewhere else:

"I have many valuable things, I do not show anyone my closet, not even to my partners. It is nothing personal, I am just afraid of people finding out how many things I have"

Given this response, I assumed this respondent would not tell me what he had. However, he happily narrated how many clothing items he owned and their brand.

"Gucci, a Gucci belt, it was like \$3,000. You are recording all this, right?"

In the high-income class, there was also one respondent that did not agree to be interviewed at home:

"I know you, and I do not have any problem with you; I know you would not use this information for something bad. However, my girlfriend does not know you. I already asked her, and she suggested we do the interview somewhere else. She is European; you know how private they can be; it is nothing personal."

The interviews were carried out over five months between May and September 2019 and were mostly at the participant's homes. The interviews themselves followed a semi-structured guideline and lasted from 30 minutes to an hour on average (although in some instances, they lasted over 3 hours). Each interview focused on how and when they obtained these materials, why they still retain them, when and how they disposed of them. The list of guiding questions can be found in Annexes 1 and 2.

They were conducted in Spanish and, as mentioned previously, were mainly done in the interviewee's homes. Except for some who preferred to be interviewed at work or a coffee shop. Finally, all interviews were audiotaped and transcribed. These transcripts were coded to record patterns and recurrent themes across interviews. Some interview questions were also designed to obtain quantitative data (for example, how many months respondents used a mobile phone before replacing it).

2.3. The Ethnographic Methods

Ethnography has been recognised within "*everyday*" studies to understand and analyse how people live their everyday lives (Crang & Cook, 2007). Additionally, it enables the researcher to capture the social meanings of practices and ordinary activities of the researched in a particular setting or field, through the direct participation in that setting to collect data systematically but "*without the meaning being imposed on them externally*" (Brewer, 2000).

Given the nature of this research, a multimethod qualitative approach is deemed appropriate. These methods are instrumental in understanding the research issues such as opinions, experiences, and complex and interconnected practices (Denscombe, 2007). The conceptual framework used in this research and the research questions, aims and objectives are rooted in practice theory, waste regimes, and materiality approaches.

"One cannot deduce all aspects of a social regime, including its environmental record, simply from its macroeconomics and political institutions. Therefore the central organising concept is that of waste regimes. There are delineated according to how- that is, through what economic, political and material dynamics- waste is produced, how it is conceptualised and how it is politicised". (Gille, 2009, p., 20).

Consequently, research methods suitable to studies rooted in waste materiality and regimes need to theorise how materials are politicised, produced and conceptualised. This

entails understanding various social, economic, and political practices. Practice theory understands that practices are dynamic and can be replicated, but to understand how they are born and transformed, we need to understand the infrastructure, meaning, skills, objects, and ideologies involved. It is acknowledged that asking the carriers of practice questions will only generate limited insights into its structure.

Nonetheless using interviews (predominantly qualitative ones) has been recommended for practice-based research because "*the discursive interaction between researchers and research participants presents an appropriate way of exploring the structure of linkage between the elements of practice*" (Spotswood et al., 2015). This project is based on qualitative data gathering techniques and will employ archival research and interviews. These methods respond to the theories and principles underpin throughout the document and aim to shed light on the conceptualisation and treatment of the materials chosen.

Gille (2009) understood the waste regimes and demonstrated change processes and their effects on waste discourses through historical and archival research. In the same fashion, this research aims to understand the waste generation habits experienced in the city by this method. Interviews showcase the historical attitudes and behaviours toward waste in the past and the current regimes. This method makes it possible to understand how these materials were conceptualised and how practices changed through time.

Therefore, each chosen research method is suitable for this project as they all obey the principles and conceptual framework discussed. Additionally, they provide a powerful tool to understand attitudes and practices and highlight the transformational changes experienced in the city. Given these epistemological orientations in the theories adopted for this project, a combination of ethnographic methods – semi-guided interview, wardrobe studies and archival research – was adopted for this research.

2.3.1. Data Collection

Being born and raised in Mexico City, I could say I was entirely immersed in the researched community. However, there is no such thing as "*pure*" or "*isolated*" culture in Mexico City and even less in Greater Mexico City. Additionally, I was aware that my privileged position would only let me see "*one face*" of the city. Crang and Cook (2007) mention that "*in reality, research is an embodied activity that draws in our whole physical person, along with all its inescapable identities*", as well as how important it is to acknowledge that research on social relations "*is made out of social relations*" (p.19).

Crang and Cook (2007) also mention that some researchers try to go to "*all-new*" places, where the researcher have never been before. Although this research was situated in the city I was born into, I was trying to understand a part of the community that might look quite similar to me but have utterly different everyday practices. Thus, I was immersed in a combination of a known and unknown culture. This research developed from an already-existing membership of social groups and access to particular spaces. During this fieldwork planning, I decided to interview people of different ages, civil statuses, incomes, and lifestyles.

I would focus mainly on Millennials because they are perceived as completely embedded in the so-called "*throwaway society*". There is no consensus on the precise age range for the so-called "*Millennial*" generation. However, some authors place this generation born between 1980 and 2000 (Donnison, 2007), others 1982 and 2000 (Rich, 2008) and some from 1982 to 2005 (Howe & Strauss, 2007). The sample taken for this study contains people born between 1984 to 1990. Therefore, the respondents can be defined as "*Millennials*" regardless of the author or definition cited. I aimed to interview people from as many *delegaciones* of GMC as possible.

Millennials are more open to new ideas and are more passionate about the environment and political issues than previous generations (M. S. W. Lee et al., 2009). It has been found that Millennials try to purchase products that match their values of environmental and social causes (Todeschini et al., 2017). Additionally, some authors have identified that this generation values individuality and "*have a passion for enjoyment and entertainment*" (Levy, Weitz, & Grewal, 2002). However, "*Millennials with low discretionary incomes have limited choices in today's marketplace*" (Sorensen & Jorgensen, 2019, p. 1).

Furthermore, in this research, I strived to balance income and gender. Thus, I started the fieldwork with an initial network of 10 people I knew before the research. Five of them were middle-income, three were high-income, and two were low-income. Through this initial network, I expanded my network until I got all the desired interviews. In total, 50 people participated in the interviews, of which 26 were male (or 52 per cent), and 24 were females (or 48 per cent). The income perceived was almost evenly spread with 32 per cent lower-income, 36 per cent middle and 32 per cent in the upper-income class.

To determine the income class of the respondents, I employed the thresholds defined by the OECD. According to the OECD (2019), *the "middle-income class are people living in households with incomes ranging between 75 per cent and 200 per cent of the national median. Households with incomes below 75 per cent are lower-income, and those whose incomes exceed 200 per cent are upper income"*. Mexico has the lowest threshold to be considered middle class from the OECD countries (OECD, 2019). According to this threshold, it takes an annual income of between USD 3 800 and USD 10 000 to be part of the middle class for a single person. In Table 2.1, there is a summary of the sample distribution.

Table 2.1 Sample distribution of semi-conducted interviews

Category	N	%
<i>Gender</i>		
Female	24	48
Male	26	52
<i>Age</i>		
20-24	8	16
25-29	31	62
30-35	11	22
<i>Income</i>		
Lower	16	32
Middle	18	36
Upper	16	32

2.3.2. Semi-structured Interviews

Research methods suitable to studies rooted in waste materiality need to theorise how materials are politicised, produced, and conceptualised. This entails understanding various social, economic, and political practices. This project is based on qualitative and quantitative data gathering techniques. This combination was chosen to investigate the underlying motivations regarding the acquisition and disposal of the chosen materials. Interviews are crucial since they are legitimate ways of *"knowing"* or *"conversations with a purpose"* (Burgess, 2002, p. 102). Through these conversations, researchers can understand how people *"experience and make sense of their own lives"* (Valentine, 2005, p. 111).

I aimed to clarify how the behaviours and attitudes were formed and changed through the interviews. Also, it could capture the network of infrastructure, policies, and behaviours

built around the materials. It has been stated that attitudes and opinions are generally the most challenging social survey category to collect (Martin & Flowerdew, 2008). Nevertheless, attitudes and behaviours are crucial for this research because how people "feel" about their materials impacts the current waste and consumption practices and waste regimes. Semi-structured interviews were used to collect data on the interviewees' consumption practices and attitudes toward used clothing and old mobiles.

2.3.3. Wardrobe Studies

Mexicans are known for being friendly; however, *chilangos* are quite wary of whom they allow inside their houses. I was asking not only to enter their house but also to see their wardrobes and drawers. Looking into the respondents' wardrobes would facilitate getting accurate information on what they do with their clothing and old mobiles. This method was developed to understand practice theory where materiality is at its core (Klepp & Bjerck, 2014). To understand how clothes and old mobiles are used and why (and eventually why are they disposed of), we need better knowledge of the material framework of everyday practices. This method considers that materials are not just carriers of different types of symbols but also an active element in the practices (Latour, 1996).

Wardrobe studies consist of an inventory of clothes in a wardrobe. It also involves cataloguing the garments combined with recording what the owner user has to say about each item of clothing (K. Laitala & Klepp, 2015). The goal is "*to look at the relationship between the individual item of clothing and the larger material totalities*" (Klepp & Bjerck, 2014, p. 375). The wardrobe study method's benefit is that the clothes (the material objects) are used in the interviews to get more specific information on behaviour related to the specific clothing items (K. Laitala & Klepp, 2015). Wardrobe studies were also used for mobiles (we could call them "*drawer studies*"). The same methodology and idea were applied to the drawers full of old forgotten mobiles.

Interviews are a great source of information, and they offer excellent access to the respondent's experiences, knowledge, and perception. However, they are limited to producing material or answers on how clothing is discussed in the interview context (K. Laitala & Klepp, 2015). Interviews could allow some respondents to forget some details about their wardrobes or omit important information. In comparison, interviews are used as a supplement in a wardrobe study, and it also forms part of the integrated method. This

method also enables a more direct conversation with the respondents. It can be directed from the general and ideological to something more concrete and based on their daily practices. The fact that the respondents are faced with the physical presence of the garments (or other materials) act as a reminder of their specific experiences, emotions, and considerations. Thus, this permits a dynamic creation of data between the researcher and the interviewee, including references to the material surroundings (K. Laitala & Klepp, 2015).

Laitala and Klepp (2015) mention that wardrobe studies use the interviewee's memories in two ways. Firstly, the presence of clothes influences the respondent's memories and narratives. Secondly, there is an opportunity of providing new knowledge to the researchers by recording, photographing, and even handling the objects themselves; this also increases the researcher's understanding and empathy (ibid). Subsequently, we can reduce the material flow by understanding the habits that lead to shortened usage of clothing (and other materials) and pre-emptive disposal.

2.3.4. Archival Study

The archival study offers researchers a great source of information on "the historical antecedents of current development practice vital to understanding why things are done the way they are today and how they might be done in the future" (Jennings, 2006, p. 243). Practices and attitudes do not happen in isolation; they usually emerge due to a particular development need or trend in development thinking. As Practice Theory stresses, the sources of behavioural change lie in the development of practices, involving three main elements: images (meaning or symbols), materials (technology or infrastructure) and skills (competence and procedures) (Warde, 2005).

Therefore, the archival study was adopted as an additional research method to collect evidence to describe historical and current consumption and disposal practices. The archival study also fills gaps in the informant's memory or triangulates statements in the interviews. The primary archival materials consulted were newspapers, national development plans and policy reports. This method was used as a complement during the research on used clothing and old mobiles, but it was fundamental and critical for plastic bottles research. The archival study allows the evidence to tell how some consumption, disposal and recycling practices were replaced and changed over time.

Furthermore, it sheds light on the evolution and priorities of the stakeholders involved. The analysis of these policy reports and local news helped me identify the dominant discourse concerning water consumption and creating a multi-millionaire water bottle industry. It also allowed me to contextualise developing a general mistrust of the Mexican population on tap water. Finally, this allowed me to map how the government and industries have shifted the responsibility of waste generation towards consumers.

2.4. Data Recording and Analysis

To keep a record of my ethnography, I had a field diary. In my diary, I had the list of the questions I would ask in the interviews and many blank forms for the respondents to sign when they accepted to be part of the interview. I always carried my diary to every meeting or interview. However, I considered it inappropriate to write while the interviewees were talking. Thus, I would write down the main ideas discussed soon after the interview. I would record every interview on my mobile. I would then listen to the interview recording and complement what I have written after the interview with anything I might have missed. My diary also contained personal reflections, ideas, notes for questions and clarifications (seen in Figure 2.3).

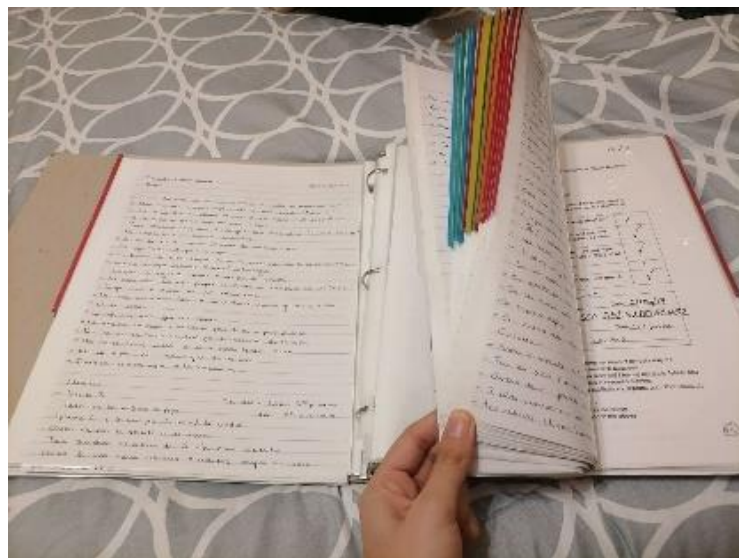


Figure 2.3 Field Diary

Nevertheless, as Wolcott (1995) argues, note-taking is not complete until you return to your notes and make "*notes-on-notes*". Therefore, note-making continued through the writing-up process of the dissertation. Quotes from the field notes were transcribed verbatim, and I would listen carefully to the recording not to misinterpret or miswrite

them. Some were slightly edited for coherence and translated from the original Spanish. All translations are my own, and I decided to keep some Spanish words, like *chilango*, *garrafon*, *patron*, and *usted*.

Those words are explained when used; I preserved them because they represent a unique Spanish (language)/Mexican notion or indicate certain attitudes, not because they are impossible to translate. Coding and decoding were conducted on the English transcripts. The analysis started with my initial ten transcripts (my central network bubble). The semi-guided structure allowed me to identify patterns or repeated phrases such as "*fast fashion*", "*hand me down clothes*", "*just the basics*". Then I would identify dominant themes, like buying clothes to seek approval, fulfil a need, or keep up to date. I then analysed the rest of the transcripts, collating them and classifying them. I would also identify different patterns and codes as I went along. I developed a list of the main patterns and codes; in the section on clothing, I identified 38 codes or patterns, and in the case of old mobiles, I identified 21 patterns.

Identifying patterns allowed me to theorise and connect the content with the fieldnotes. For example, it was clear that people who had recently entered the higher income bracket from a medium one would often seek the approval of others and would imitate the way others dressed. They were also the ones who would seem more eager to show me their collections during the interview. The analysis process was driven by the data rather than imposing an analytical frame on the data from the beginning. In the chapters on used clothing and old mobiles, I allowed the quotes to build a story, and I let the "*qualitative data take the form of narrative, with themes and concepts as the analytical device*" (Dixon-Woods et al., 2001, p. 126). Therefore, this approach helps to unfold experience temporally and allows the personal dynamics to reveal themselves in the practices constructed (Jones, 2004).

2.5. Ethics

This research was subject to the ethical approval procedures of the Geography Department at Durham University. It was also guided by the RGS-IBG Development Geographies Research Group's Ethical Guidelines for researching developing countries, specifically regarding the principles of consent, confidentiality, risks, reciprocity, and responsibility (DARG 2009). To ensure that informed consent was obtained for an

interview, I first explained the interviewees' research objectives. Afterwards, I would show them the Participant Information Sheet (which I translated into Spanish) and the Privacy Notice (in Spanish). I would then ask them to sign the Consent Form before starting the interview.

These documents stated that if they agreed, I would also record the interview contents with my mobile, taking photos of their wardrobes or drawers. Apart from the forms and documents, I would also seek verbal consent to the interview, recording and photographs. Each interviewee was assured that our conversations' contents were confidential and that their identities would be anonymised in this dissertation and other publications that may arise from the research. I also informed the interviewees that they could stop the interview or not answer the questions if they felt uncomfortable. I have changed the names of all the interviewees to anonymise them.

There was only one instance where one interviewee seemed to be uncomfortable. A yoga teacher seemed distressed by not knowing how many shoes she owned accurately. She immediately changed her attitude and rushed the interview by confronting the number of shoes (almost double what she had guessed). In another instance, one house cleaner that allowed me to interview her at work seemed quite nervous and gave me short answers to my questions. I then asked her if she would prefer to talk somewhere else, to which she agreed. Then, I waited for her to finish her job before taking her to a coffee shop where she felt at ease.

For the interviews, several people from my network (mostly high-income) offered to "recommend" me to people from the lower-income bracket. Still, they would often recommend people who worked for them. I only tried to do this once, and it ended with a rushed and brief interview. An initial feeling of anxiousness and mistrust was established if the employer asked the employee to participate. Thus, the interviewee would feel like they did not have a choice. Hence, I refused to accept this help, and I moved slowly with the snowballing technique to reach all the interviewees in a way where they could fully consent to the interview.

Section III

2.6. How is waste treated in the GMC?

Mexico

13th of September of 2016

Waste: the dirtiest moments of Mexico City (and its struggle with the State of Mexico)

The government of the State of Mexico gave an ultimatum to the authorities of Mexico City so they would stop sending their waste or they would have to pay for the environmental impacts it has caused

The waste problem is nothing new to the authorities of the country's capital. In 2010, the federal government and Mexico City announced "that the biggest landfill of the world", the "Bordo Poniente", would be finally shut down and that this would end the grave and latent pollution problem that it represented. This closure (according to the Mexican authorities) offered a significant opportunity for Mexico City to join the effort to fight climate change and contribute to reducing Greenhouse Gas Emissions. Additionally, the government of Mexico City promised to open new dumping sites and create new strategies to manage its waste. However, this did not happen. Thousands of tons of waste are now moved to the State of Mexico and Morelos.

A dirty fight between the State of Mexico and Mexico City

Eruviel Ávila, the mayor of the State of Mexico, reiterated yesterday that the eight thousand tons of waste from Mexico City would no longer be deposited in his city's dumpsites. The mayor asked the Environmental Commission of Mexico City to improve its waste management. He declared that the *"eight thousand tons of waste that Mexico City exports to the State of Mexico, generate more than 10 thousand tons of CO₂, which is extremely harmful for the Mexican population"*. He also stated that *"the authorities of Mexico City have found it easier to send their waste to their neighbours rather than dealing with it."*

Morelos to the rescue

After the State of Mexico, the government announced that it would stop receiving the waste of Mexico City, the state of Morelos offered to accept it momentarily, but it would only receive between 1,500 and 1,800 tons of waste from the capital. Nevertheless, on Monday the 12th of September, the "terrible smell" from the waste made the mayor of Morelos end his offer. He stated that *"if the government of Mexico City does not improve their waste management strategy, by 2020 they will severely pollute its neighbours, and this is mainly due to the indifference of the authorities of Mexico City and the systematic omissions of their responsibility."*

Animal Político

Wilson (2007) mentioned that many countries in the Global South are struggling with "*getting waste out from the underfoot*". Basura Cero believed that Mexico City was ready for the next step; we already had a growing formal waste collection (although an informal one still existed) and an improving institutional capacity. Thus, we eagerly researched and analysed new strategies "*to manage*" the city's waste. Nevertheless, it took only one day to realise how fragile the whole waste management system was. The mayor of the State of Mexico refused to take our waste anymore. He had threatened these actions several times, but he delivered his promise this first time. This time, this did not reach the news, it was 2015, and we were desperate.

Our team had to frantically find ways to "store" 12,000 tons of waste somewhere until the mayors agreed. We had hundred of waste trucks parked waiting for instructions, but the hours kept passing. We decided to "*hide the trucks*" in abandoned lots. After two days of not reaching an agreement, we told the mayor about the critical situation. Waste was not being collected, and eventually, people would realise something wrong was going on. Additionally, several citizens complained about the foul smell the waste was generating. My former boss warned the ex-mayor of Mexico City:

"We have less than 12 hours until we have a full-blown crisis in our hands, waste will be flooding the streets, and the whole city will reek."

We never knew how they reached an agreement or what the mayor of Mexico City offered, but we could again move waste to the State of Mexico. The instructions were clear; we were to find a way to stop depending on other cities' landfills. Waste was deeply political; it was also an economic matter; we were paying millions of pesos to those cities to take our waste. We were focused entirely on end-of-pipe solutions rather than "*closing the loop*" or finding sustainable strategies. The invisible borders between states made it a logistical nightmare to manage waste. Therefore, our team moved from crisis to crisis, developing ideas to "*solve*" the situation. It was not a surprise that this happened again and finally went public. It was inevitable.

We had no idea that the game conditions were rigged; thus, there was no way we could win. The miscommunication between states, the focus on temporary solutions, and the pursuit of solutions on faraway Nordic countries would never bring a solution that would work in this scenario. We attended hundreds of sessions where dozens of specialists

worldwide demonstrated how to manage our waste. We saw all types of waste management technologies and strategies, all of them except prevention and reduction. I would have been fired on the spot if I had advised looking at the problem not just as a problem in Mexico City, but as a problem in Greater Mexico City as a whole, and that we look for solutions not through foreign consultants but rather in the homes, wardrobes, and drawers of its residents. *How can we solve a problem if we do not even understand it?*

As mentioned previously, waste generation was seen as a direct cause of the growing population. However, *do we all generate the same waste? What type of waste do we generate? Furthermore, (and more importantly), why do we dispose of those things?* I consulted various surveys on why individuals buy things while conducting this investigation. Nevertheless, companies who want to keep selling those items are the ones who normally conduct these surveys. Their focus is not to prevent waste generation but to understand the reasons behind the acquisition and potentialise them.

There is a missing link or connection because we have not studied acquisition to reduce it. This is not research that will position the blame on the consumers. By taking a step back and understanding the consumers, we might see how companies and authorities have facilitated and encouraged a *"throwaway culture"*. The methods discussed in this section provides a new way of looking at waste, at least in GMC. It deals with waste at the end of its life and understates its roots and birth.

2.7. Challenges and Limitations

As an engineer, my life has been ruled by numbers and statistics. They have been present in all aspects of my career, and I usually am inclined to explain everything through them. However, I wanted qualitative data to be the project's core in this research. While planning this project, I had to restrain myself from doing hundreds of surveys and analysing everything quantitatively. As aforementioned, this project does not attempt to be a representative sample of GMC. The sample was purposefully chosen to maximise the chance that many diverse and even conflicting stories were told.

Therefore, the quantitative data in this dissertation should be taken as illustrative rather than conclusive. It helps to complement the qualitative data and reinforces why some practices or attitudes are formed. It is also important to point out that waste is entirely geographically and socially dependent. Thus, this project reflects only how citizens of

GMC treat and dispose of certain materials. Similarities can be found in other Mexican cities and other Latin American countries. However, I would heavily advise that whenever it comes to waste and how to "treat", it needs to come with an in-depth analysis of the local scene.

The other limitation of this dissertation is the choice of materials. Anything can become a waste, and therefore, in theory, I could have an endless number of specialised chapters. Every material tells a story. Despite how waste is generally portrayed as a homogenous mix of useless stuff, each type of material has an entirely different journey of how and why it was disposed of. The materials chosen for this dissertation are just a small part of all the stuff that reaches the landfill. Given the limited time for this dissertation, only three materials could be thoroughly studied and analysed.

Additionally, due to the COVID-19 epidemic, plastic bottles had to follow a different set of methods by only interviewing some people from the original sample (5 people) rather than the full sample. Other materials almost made it into this project. Food waste would have fit perfectly here; like the other chosen materials, the practices attached to it have significantly evolved in the last decades, and it showcases several ethical implications. The limited-time (and the sudden pandemic) made it impossible for this research to include it. Future research could include more materials, which would shed light on the other parts of the waste story.

2.8. Concluding Remarks

In this chapter, I explained the methods used to undertake this research. This chapter also has an overview of conducting fieldwork and discussing the most appropriate methods for achieving the research objectives. I described how I could gain access to the field (wardrobes and drawers) and reflected on my privileged roles and how these roles shaped my investigation. By addressing some of the ways waste is typically treated, discussed, and approached, I have reflected on how the methods displayed in this chapter might discover innovative and improved waste "*management*".

I also highlighted that there are some limitations and challenges in my approach. Nevertheless, as Rose (1997) stated:

"...we cannot know everything, nor can we survey power as if we can fully understand, control or redistribute it. What we may be able to do is something rather more modest but, perhaps,

rather more radical: to inscribe into our research practices some absences and fallibilities while recognising that the significance of this does not rest entirely in our own hands." (p.319)

The process of investigation does not end in the "*field*". There is an ongoing dynamic process of reflexivity that the researcher needs. "*Writing up*" then becomes an intuitive tool in the analytical process; it entails a lot of "*mind work*" (Wolcott, 1995). Additionally, the respondents become active participants during the data collection. They are the ones who decide what to tell us, and then the researcher is the one who has the role of unpacking the data in a clear, coherent, and compelling manner (Hay, 2016).

My role as a researcher is to construct a story by detangling the multiple layers of meanings and actions. It is a process of reflection on how to build a story in the best, most rational way, which might aid future analysis and research. It is not merely to produce something "*innovative*" or "*exotic*", but something meaningful. In the following chapters, I shall strive to entangle and construct a "*thick description*" (Falzon, 2009) of why people acquire and dispose of stuff.

Chapter 3

A Global Snapshot of Solid Waste Management

This chapter outlines the debates surrounding themes on waste regarding waste management history and the social and political implications of mass waste. It starts with a discussion on how waste has been managed and dealt with throughout history. Then, it moves on to explore the broad journey of waste from generation to collection, recovery, and disposal. The deployment of a situated lens responds to the theoretical challenges of the subject of my research. Further, this approach will allow developing an analytical lens that compares and explores the current waste management and drivers behind it in GMC; and thus, will allow answering the specific research question:

How can we break the cycle of dooming waste to end-of-pipe solutions in GMC?

We shall see that the literature on waste in the Global South has been focused mainly on the transition from informal to formal waste management systems. Furthermore, we can observe that the drivers behind waste management in the Global South are the same that were experienced in the Global North decades ago. Waste management tends to propose a linear way of thinking and treating waste. As mentioned previously, imitation of strategies has only brought temporary solutions to the Mexican metropolitan area.

By looking at the history of waste management, we might identify and localise GMC's current situation. The chapter aims to develop an analytical framework to address the research gap identified before moving to the next chapter. This chapter is divided as follows, Section I discusses a brief history of Waste Management, Section II analyses the life cycle of waste. Finally, Section III summarises and offers some concluding remarks.

Section I

3.1. Waste Management: A Brief History

Waste has traditionally been "*black-boxed*" into being concealed and managed. Moreover, waste is considered a problem when generated and accumulated elsewhere, where it cannot be reused, or when it cannot entirely "*disappear*." Understanding what has driven development in waste management in the past and its drivers will allow us to understand how to develop sustainable waste management systems in the future (D. C. Wilson, 2007). Our relationship and conceptualisation of waste have been everchanging. Many cultures used to recycle or repurpose materials in the past.

For example, before the Spaniards conquered what is known now as Mexico (1300 A.C), Aztecs had some intense recycling habits. Aztecs would try to recover or reuse every material to its maximum potential; even human excrement was collected and repurposed as a soil fertiliser; urine was used to dye fabrics, and Aztecs would breed dogs that would mainly consume organic waste, like dried tortillas; thus, the resource value of waste drove how Aztecs dealt with waste (Medina, 1999).

In contrast, in Europe in the middle ages, the streets were covered with foul-smelling mud, stagnant water and animal and human excrement; thus, keeping the streets clear of obstruction and the disgusting smell was the priority and drove people in this era to manage waste. Therefore, practicality ruled this era in this part of the world, and waste disposal was not a priority because people were more concerned about where their next meal would come from than any waste collection initiative (D. C. Wilson, 2007).

Eventually, practicality and recycling became the priority in some European countries; for example, there was a revolution in waste management during the Industrial Revolution in the UK. In 1880, a small army of workers would sift through the waste of dust-yards in London to separate coal and soil to be used as fertiliser or brickmaking. Furthermore, public health became the main waste management driver in the Global North until infectious diseases were linked to poor sanitation conditions in the 1900s.

Consequently, there was an effort to keep waste in a "*movable receptacle*" and to make local authorities responsible for emptying this receptacle often (ibid). The UK's sanitation movement experience was described as "*philanthropy, horror, and the recognition that*

better public health was an essential precursor of improved national prosperity" (Girling 2005, p.54). From there until 1907, public health and legislation continued to be the main driver focusing on collection. Technological innovation and resource scarcity drove recycling during the two World Wars; waste was mainly disposed of in dumps and landfills, although some waste was used to generate energy through incinerators.

Clearly, air pollution control was not on the agenda at the beginning of the century. It was not until 1970 waste became political, and environmental protection was the key driver of this era. Hence, the policies regarding waste started with control, then technical fix, followed by integrated policies and targets prevention. A summary of the main drivers and historical changes in waste management can be seen in Figure 3.1.

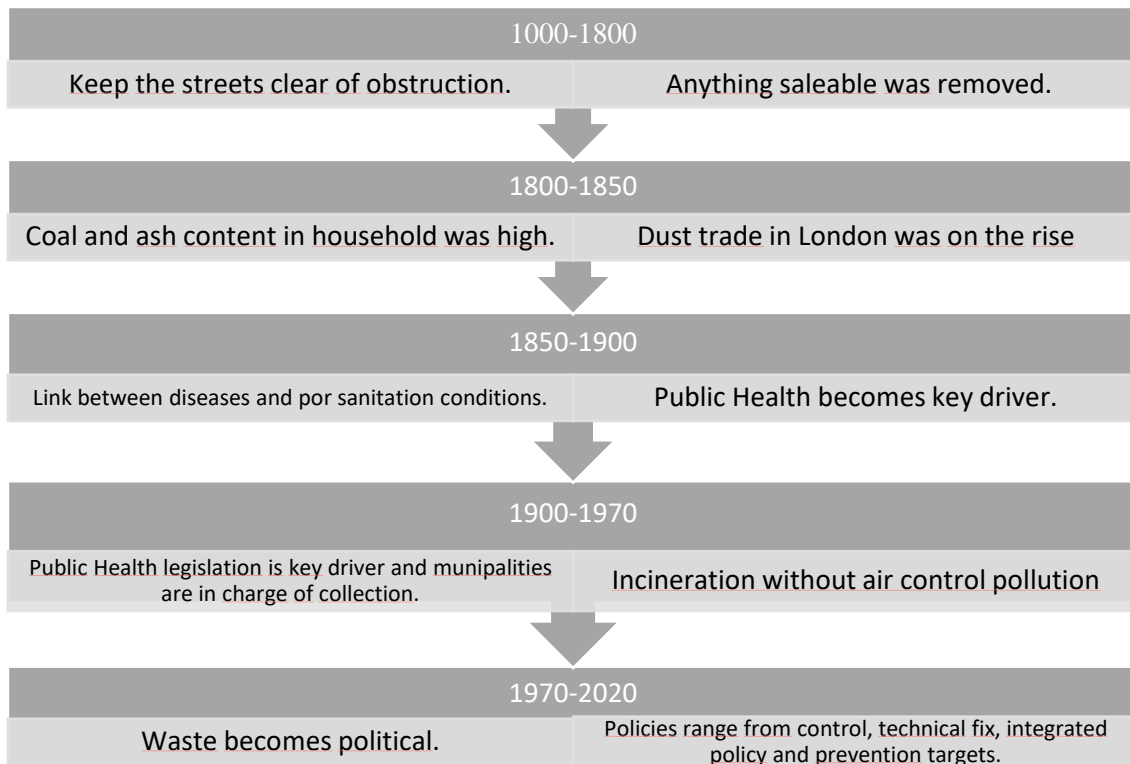


Figure 3.1 Key Drivers of Waste Through History (1000-2020) (Wilson,2007)

Even though these are the significant trends that waste management followed throughout history in Europe and some parts of the Global North, it is necessary to point out that there are currently significant differences between developed and developing countries. For example, nowadays, in Europe, public health is "*taken for granted*" and is no longer a primary driver. Moreover, uncontrolled disposal was phased out when environmental protection became a driver (D. C. Wilson, 2007). While in the Global South, sending

waste to landfills is still the primary way to deal with waste. In the following section, we shall see the evolution of waste generation in the last decades.

Section II

3.2. Waste Generation

Humankind currently produces 2.06 billion tonnes of waste per year, between 7.6 billion people. In 2018, the World Bank announced that our global waste production could rise by 70 per cent by 2050 unless we take urgent action. This study acknowledges that the world is on a trajectory where waste generation could outpace population growth by more than double by 2050 (Kaza, Yao, et al. 2018). The increase in waste generation has severe repercussions on the environment; for example, 1.6 billion tonnes of CO₂ equivalent were generated in 2016 (which accounts for 6 per cent of the total emissions in that year).

Furthermore, in 2016, 242 million tonnes of plastic waste were produced; and particles of plastic waste have been found in the ocean and soil, polluting environments that humans could have never reached decades ago (ibid). When countries increase their life quality ratio, their average waste generation per capita grows. As Vergara and Tchobanoglous (2012) mention, *"As people gain wealth, they tend to throw more away, and the materials discarded are more complex"* (p.74). Waste composition refers to *"the categorisation of types of material in MSW"* (Kaza, Yao, et al. 2018).

At an international level, the largest waste category is food and green waste (44 per cent). At the same time, dry recyclables (i.e. plastic, paper, cardboard, metal, and glass) makes up 38 per cent of global waste. Waste composition varies significantly among developed and developing countries, with the former having more significant quantities, containing more recyclable goods and electronics and the latter having high biodegradable fractions. High-income countries (which only account for 16 per cent of the world's population) generate about 34 per cent or 683 million tonnes of the world's waste.

Further, waste generation was generally increased faster for incremental income changes at lower income levels than at high-income levels. Moreover, waste generation also increases with urbanisation; North America has the highest urbanisation rate at 82 per cent and therefore has 2.21 kilograms per capita per day, making it the highest average waste generation in the world (ibid) (As seen in Table 3.1). If we see waste generation

trends over a longer time frame, we can appreciate technological and cultural trends (Vergara & Tchobanoglous, 2012).

Table 3.1 Ranges of Average National Waste Generation by Region (kg/capita/day)

	2016 Average	Min	25th Percentile	75th Percentile	Max
North America	2.21	1.94	2.09	3.39	4.54
Europe and Central Asia	1.18	0.27	0.94	1.53	4.45
Latin America and Caribbean	0.99	0.41	2.09	3.39	4.54
Sub-Saharan Africa	0.46	0.11	0.35	0.55	1.57
East Asia and Pacific	0.56	0.14	0.45	1.36	3.72
South Asia	0.52	0.17	0.32	0.54	1.44
Middle East	0.81	0.44	0.66	1.40	1.83

(Kaza, Yao, et al., What a Waste 2.0 : A Global Snapshot of Solid Waste Management to 2050 2018)

For example, in New York City, until 1950, ash was the most common material found in MSW because most homes burned coal. By 1960 glass entered the waste stream with non-returnable glass, and finally, in 1970, plastic appeared in the waste stream and, up to this day, is the most common material found in MSW (ibid). In this research, it is essential to identify which materials are more common or problematic now in the waste streams in GMC.

3.3. Waste Collection

Everything consumers cannot give a second use will become waste instead of a resource. Reno (2014) utilises the term "*mass waste*" to refer to the historical product of urbanisation and how this sentiment of concealing, displacing or externalising waste resulted in collection and disposal systems that today comprise sanitary engineering. All consumers play a part in the disposal ritual, which is now normative. After the consumers have completed the disposal ritual, the state intervenes for the first time in the waste cycle: the waste collection.

Therefore, waste makes the state the "*purifying force*" that establishes its power through its capacity to remove the filth, protecting us from knowing where our waste ends (Hawkins, 2003). However, waste never really goes away; waste flows and stays (Gille, 2010). The fate of waste reflects the state's prestige and value, a state that cannot deal

with waste is considered a failure. Thus, the desire to create a clean, "modern" city motivates the establishment of sound waste collection systems (Vergara & Tchobanoglous, 2012). Additionally, we can shed some light on environmental injustice and the social stigma of waste through waste collection.

Waste has been generally associated with growth production and consumption; even within societies, the most affluent are usually the most prominent with waste production. For example, in the United States, a combination of cultural changes that encouraged disposal and municipalities' effort to take responsibility for the city's waste led to a shift from informal, decentralised management to formal, centralised waste. Further, waste collection rates in high-income countries and North America are near 100 per cent (ibid).

Meanwhile, in middle-income and low-income countries, the collection rates are about 51 and 39 per cent, respectively. In the Global South, informal actors have filled in public service provision gaps propelled by economic incentives. (Vergara & Tchobanoglous, 2012). Unplanned development in low-income areas is another reason the government tends not to provide proper waste removal since the narrow streets block access to many areas (Baabereyir, Jewitt, & O'Hara, 2012). On the other hand, waste tends to move in the opposite direction, being hastily removed from the wealthiest areas but left to accumulate in the most impoverished areas (Baabereyir et al., 2012).

Therefore, informal sectors typically provide this critical service in the most impoverished cities. Hybrid waste management systems, combined with formal and informal practices with modern and traditional technologies, are becoming increasingly common in the Global South (Zapata Campos & Zapata, 2014). Further, inefficient waste collection (i.e. inadequate dumping and uncontrolled burning of solid waste) contributes to soil, air, and water pollution; due to the leachates, toxic liquid runoff can drain into rivers, groundwaters, and soil. Moreover, marine pollution due to plastic and uncontrolled dumping has increased and created a global catastrophe. Consequentially, global trends in waste production (including the increasing quantity and complexity of MSW) make waste management one of the biggest challenges of the urban world (Vergara & Tchobanoglous, 2012, p. 280).

3.4. Waste Pickers

"Waste picking is here to stay and thrive in the foreseeable urban future." (Velis, 2017a, p., 329).

Reviewing waste literature without discussing waste pickers would be incomplete, especially if the researched country is Mexico. Although this research shall not centre on the lives and stigma experienced by waste pickers, it is crucial to understand its role in hybrid waste management systems. The Global South has dramatically increased its population in the past decades and experienced an exodus from rural to urban areas. Because of rapid expansion, developing countries often lack the resources to provide affordable, necessary infrastructure and urban services (Martin Medina, 2007). Waste management systems in developing countries are often insufficient, with low standards and inadequate coverage (D. C. Wilson et al., 2006).

Furthermore, despite spending a large percentage of the municipal revenue on MSW, many cities in the Global South only collect between 50 to 80 per cent of the waste generated (Martin Medina, 2005). These conditions facilitate illegal dumping, generally concentrated in poor urban communities (Baabereyir et al., 2012). Inadequate coverage, insufficient collection and improper disposal in open dumps allow the existence of the Informal Recycling Sector (IRS), which refers to the waste recycling activities of scavengers and waste pickers (D. C. Wilson et al., 2006). Waste pickers have historically engaged in resource recovery by retrieving materials from the waste stream (Organizations et al., 2017).

Further, waste pickers have turned waste into their livelihood; it is reported that up to 2 per cent of the population in Latin American and Asian cities earn their living by waste picking (D. C. Wilson et al., 2006). Waste picking is the primary way dry recyclables are recovered in the Global South (Velis, 2017). For example, in the city of Curitiba in Brazil, waste pickers, also known as "*catadores*", are responsible for more than 90 per cent of the recyclables collected (Fergutz et al., 2011). The informal sector is usually an integral component of total national economies, and this also applies in the informal recycling sector (Katusiimeh et al., 2013). If we think about efficiency, the waste pickers fill the gap that formal systems cannot satisfy in the Global South.

The IRS neither imposes any costs on the formal systems nor represents any financial costs on the public sector (Horen, 2004). Thus, the informal waste systems in developing countries reduce the cost of formal waste systems by reducing waste volume for collection, resulting in less financial costs on collection and transport. (D. C. Wilson et al., 2006). They provide a "*free*" service to the community by "*sifting through*" the waste before reaching its final disposal treatment. The informal recycling worker is highly

skilled at identifying wastes with potential value. They add value to the materials that have been discarded by cleaning, sorting, altering and facilitating their transport (Scheinberg, 2001).

Further, waste picking provides employment and livelihood to society's most marginalised groups (Calafate-faria, 2016; Fergutz et al., 2011; Furniss, 2017; Martin Medina, 2005); since most of these vulnerable groups struggle to find a job in the formal sector because of poor education and low skills (D. C. Wilson et al., 2006). Additionally, the average waste picker earns much more than the prevailing minimum wage (Katusiimeh et al., 2013); for example, in Nigeria, waste pickers make almost three times as much (USD 154/monthly) than the minimum wage monthly income (USD 55/month) (Chidi & Chukwuedozie, 2011).

Gutberlet (2011) mentioned that waste pickers could also understand recycling better than ordinary people and change fixed routines and habits that graduated professionals cannot achieve. Waste pickers oversee organic materials, which constitute a significant percentage of municipal solid waste because it does not have a high value per tonne. It is not easy to transport (Calafate-faria, 2016; Velis, 2017). Therefore, by coping with resource scarcity through various resource recovery activities, we could consider waste pickers the best allies of a circular economy when it comes to waste management.

Historically waste picking has been practised by marginalised groups, rural migrants, immigrants, and members of religious minorities. There is the social stigma of working among the waste; commonly, people associated with garbage are often seen as filthy or dangerous (Moore, 2012). Waste pickers are usually associated with "*dirt, disease, squalor and perceived as a nuisance, a symbol of backwardness and even criminals*" (Martin Medina, 2007, p. 113). Waste, like the abject, reminds us of our embarrassing past, is something we want to disappear and be immediately removed from our lives.

The desire for cleanliness, purity, and modernity implies that garbage and those associated with it must be "*erased*" from the landscape (Moore, 2012). Moreover, due to the unequal employment opportunities and infrastructural investments, the socioeconomic inequalities have intensified in the Global South, visible in the differences in quality in the urban services between low- and high-income areas. Waste picker communities experience extremely low-quality (or non-existent) urban services where

they are subjected to widespread pollution and unsanitary conditions (Baabereyir et al., 2012).

Health risks of waste pickers in developing countries are high because of a lack of protective equipment and manual handling. They are also subjected to hostile physical and social environments. They are often subject to harassment by the authorities, whilst female waste pickers are particularly vulnerable because they can be considered sexual targets (D. C. Wilson et al., 2006). In Mexico, scavengers are called "*pepenadores*" this comes from Nahuátl, and it means "*the one that selects or recovers stuff*" (Medina, 2007).

Meanwhile, the term "*cartoneros*" applies to the cardboard collectors, "*buscabotes*" to the aluminium cans collectors, and "*traperos*" to rag collectors (Martín Medina, 1999). As many as 15,000 waste pickers live and work in Mexico City's municipal dumps. Additionally, Mexican *pepenadores* have a life expectancy of 39 years, while the general population is 67 years (Martin Medina, 2005). Some industries in Mexico have historically relied on recycling to exist.

As mentioned previously, waste picking is the predominant or only way dry recyclables are retrieved in the Global South. IRS's existence seems independent of the overall GDP increase; the internal inequalities within cities and nations drive the IRS's growth (Velis, 2017). Even if we recognise that waste pickers are an integral part of the Global South's circular economy, we should not idealise waste picking activities and operating conditions (Organizations et al., 2017). Exploitation, criminal activities, child labour, emerged elites and high occupational health risks inherent in their activities need to be openly challenged (Martin Medina, 2007; Velis, 2017).

Hence, this cannot be the way forward for the Global South's circular economy (Velis, 2017). Many developing countries aim to modernise their waste management systems, in which they reduce the reliance on disposal and increase recycling. Therefore, as Wilson (2006) states, "*it seems ironic to move forward by deliberately eliminating what can be a rather efficient, existing recycling system*" (p.798). When governments or local businesses recognise the potential of waste pickers and waste picker organisations, transformational changes can occur.

Waste pickers can make total sense of recycling for ordinary people and can change fixed routines and habits in a way that professionals could not achieve (Organizations et al., 2017). Additionally, low-cost solutions for collection and sorting can be achieved,

creating jobs and benefitting low-income communities (Martin Medina, 2007). As opposed to being a problem, waste pickers can be a part of the collecting and disposal of waste in developing countries (ibid). Therefore, by the actions of governments and the private sector supporting and merging with the IRS, it could be possible to achieve a perfect example of sustainable development.

As Vergara and Tchobanoglous (2012) declare, "*Waste management systems are not either formal or informal; they are both (p.290)*". Hence, waste management systems fall along a "*formal-informal continuum, with different categories of workers who interact, overlap and may themselves change the category in response to changing circumstances*" (UN Habitat 2010, 72). Nevertheless, it is essential to recognise that there are limits to what the IRS can achieve regarding the circular economy. If there is no external financial support, waste pickers can only process a fraction of dry recyclables.

Additionally, working markets must give some residual monetised value to the materials (Strasser 1999). As established earlier, waste pickers are not the focus of this thesis; however, we need to understand their presence and invaluable help towards the circular economy of GMC. As well as, the ethical and social dilemmas they represent are sometimes perceived as an "*invisible*" part of the waste management system. In the next section, I shall try to expose through a small anecdote how *pepenadores* are treated and seen by the ones around them.

A Hidden Oasis in Bordo Poniente

When I was working for Mexico City's government, I visited several landfills and recycling centres; however, the most memorable experience I had was visiting Bordo Poniente (the former largest landfill in Latin America). It had already been closed for garbage disposal by 2015, and instead of receiving rubbish, the fields were utilised to make compost. One of the engineers in charge of that operation told me that they produced far more compost than Mexico City or the State of Mexico could use. They were now confronted with a massive problem: hundreds of tonnes of stored compost that no one seemed to want.

However, there was another issue that few seemed to discuss: the *pepenadores* who stayed on the premises. When Bordo Poniente was operating, numerous shacks surrounded the landfill, where hundreds of scavengers lived. After its closure, many emigrated to other landfills to continue working. However, some had remained, especially those who could not migrate as easily: women, children, and "older" *pepenadores* (50+ years old). The landfill workers had tried to convince them to leave, but they refused to abandon the few things they owned. Thus, the engineers in charge had a brilliant idea.

Instead of having mountains of compost rotting, they employed the *pepenadores* to use that compost and plant some orchards in the area. What was supposed to be some small orchards quickly became a sizable farm. The former *pepenadores* were delighted; they received a fixed income (albeit just slightly above the minimum wage), health insurance, and some life stability for the first time. While I was at the site, I had the opportunity to talk with some of the people working there. A heavily pregnant woman who was planting some sunflowers told me:



"When Bordo closed, I thought my life was over. Bordo had fed us and given us our livelihood. I still can't believe I am planting sunflowers in the very same place I used to pick trash."

Meanwhile, the engineer in charge said to me:

"It is a pity what we do to them. When the Bordo was open, we openly relied on them. If it were not for them, almost nothing would have been recycled. Then we closed, and we had to tell them to go away, almost like a pest. We often forget about the lives that depend on waste. "

Figure 3.2 Oasis in the middle of Bordo Poniente

3.5. Waste Disposal

"To generate an orderly urban environment, it was necessary to make waste disappear completely."

(Cooper, 2008, p.715)

After exploring the waste collection and historical waste management drivers, we shall unpack how waste disposal is done. Waste has a fetid presence that can be perceived as an image of illness and chaos. Further, waste is physically an eyesore; thus, it becomes a priority to eliminate it and put it in a place where it will be forgotten. Waste management technologies have historically aimed to mobilise the waste (or mass waste) and amass it in new forms elsewhere, eventually forgotten by the outside world. Once we have discarded this waste and become mass waste, it loses its original significance and connection to the being that generated it, and it becomes anonymous.

We could say this process can be viewed as a "*success*" for society; in this state, waste and all the embarrassing aspects can no longer be linked to an individual. The "*guilt*" is shared between all the members of society, and therefore, it is dissipated and finally forgotten. By 2018, at a global scale, 40 per cent of waste was disposed of in landfills, 19 per cent underwent material recovery through recycling and composting, and 11 per cent was treated through incineration. However, 33 per cent of waste is still openly dumped (Kaza, Silpa; Yao, Lisa C.; Bhada-Tata, Perinaz; Van Woerden, 2018).

Economic development aims to move waste disposal from dumping to other methods, firstly landfilling and waste management technologies like anaerobic digestion, waste to energy, and recycling. Furthermore, high-income countries have a small percentage of open dumps and a significant percentage of recycling and advanced methods. While medium and low-income countries resort more to open dumping and have low percentages of advanced disposal methods. It is reported that almost 70 per cent of countries have established institutions with responsibilities for policy development and oversight in the waste sector. That waste data is mostly limited to high-income countries and some middle-income countries (ibid).

3.5.1. Landfills and Dumps

"Is it not a landfill the product of millions of tiny acts of symbolic rejection, whereby a human agent decided

what was relatively disposable?" (Reno, 2014, p. 5)

In the past, big, abandoned lands near cities were common; with the cities' ever-growing expansion, they are almost impossible to get nowadays. Dumping places used to be chosen because of their distance to the cities, far enough not to see it or smell it but not too far away so that the waste transport became a problem. In London in 1919, only "*comparative isolation*" could have possibly justified the prior existence of a dump, which now constituted a "*disfiguring and damaging environment to a rapid-developing district*" (Cooper, 2008).

Controlled tipping became an option because it provided a visual and olfactory barrier that calmed the anxieties of those that feared the waste to "*leak*" in any way. Landfilling, therefore, served two primary purposes. Firstly, it would finally give the disorder and order; a designated land where waste was not out of place. Secondly, it appeared to triumph humans over waste by finding a way to maintain a boundary between the waste and our hygienic selves and giving us the means to forget. Therefore, landfills were a cheap "*orderly*" waste management option by utilising relatively cheap or unused lands.

When the volume of municipal waste was proliferating, landfills became the leading way to dispose of the waste worldwide (Cooper, 2008, 2010). Landfills are an "*accumulation of the past that is very much alive in the present*" (van Wyck, 2012). They are inherently problematic because they do not address the materiality or nature of waste. Consequentially, landfills are just a temporary solution; landfills spill and leak; containment in a landfill is just a mere moment in geological bacterial time (Hird, 2013). Thus, in landfills, failure is there from the start (Virilio, 1993).

If we depend upon the presumption of a world where waste can be controlled or confined entirely by human forces, the solutions will continue to be concerned with management alone (Gille & Hird, 2012; Hird, 2013). Nevertheless, the multiple techniques of removal are never absolute, and they become a fault line in all waste management bureaucracies, threatening to crack at any given time and to expose the fragile efficiency of the state (Alexander, 2018; Corvellec, Campos, & Zapata, 2013; Demaria & Schindler, 2016). Waste is typically generated in the city's wealthier districts and transferred to a remote location; however, these locations are no longer remote.

These locations are usually found in poor communities, where they must cope with municipal trash dumps and hazardous waste disposal. This situation is a clear example of environmental injustice (Baabereyir et al., 2012; Bullard & Wright, 1990; Pellow &

Brulle, 2005; Walker & Bulkeley, 2006). Given the greater vulnerability of socioeconomically disadvantaged communities, this problem becomes even more prominent. As a result, these populations, who are mostly ethnic minorities, are disproportionately exposed to pollution. (Bullard & Wright, 1990).

3.5.2. Waste Management Technologies

In Europe, by 1999, landfilling was the primary disposal method, 57 per cent of the MSW was landfilled in Western Europe and 83.7 per cent in Central and Eastern Europe (Giusti 2009, 2229). We know now that landfilling is the worst environmental option for managing Municipal Solid Waste (MSW), contaminating the water with leachates, air with CO₂ and CH₄ emissions and soil with heavy metals and synthetic organic compounds. By the end of the '80s, European policies focused on more sustainable ways to manage waste.

In 1989 the European Community (EC) published "*A Community Strategy for Waste Management*" this document pushed forward many European policies like the EU's Landfill Directive, which recognised landfills as unsustainable and a waste of resources. This document has been recognised as the turning point of managing waste most cost-effectively (Bulkeley and Gregson 2009). In the UK, in 1996 adopted, the Landfill Tax to reduce the amount of waste sent to landfills, and this was the first action taken by the British government towards a comprehensive waste strategy. By 2015, 45 per cent was recycled, and the total MSW destined to landfill decreased by 71 per cent (compared with the year 2000).

Therefore, political discourses regarding waste are typically treated as a localised environmental concern, focusing on MSW sent to landfill sites (Widmer et al., 2005). These policies have resulted in environmental, economic, social, and regulatory impacts on waste management practices locally, nationally, and internationally. As Pires et al. (2011) explain, an all-inclusive MSW management system must include all basic operational units from the collection, shipping, treatment, recycling, and disposal.

Additionally, Reno (2014) mentions that it does not take that much to turn waste from an undead state to a more life-like state. For example, transforming landfills into biogenerators that can supply "*renewable*" energy and are less harmful to the environment is already a step forward in the right direction. We should re-think waste management in

terms of "fostering life" (ibid). Tables 3.2 and 3.3 show a summary and description of the leading technologies to dispose of waste.

Table 3.2 Biogenic Waste Conversion Technologies (Vergara & Tchobanoglous, 2012)

Technology	Description	Advantages
Anaerobic Digestion	It is how microorganisms break down organic waste in an oxygen-depleted. This process generates CH ₄ y CO ₂ ; these gases can be used as biogas or can be fed to electrical generators	<ul style="list-style-type: none"> - Volume reduction and quick waste stabilisation - Biogas can be used for thermic and electrical energy - The GHG emissions of biological processes are minimal in comparison with landfill emissions
Compost Plants	Compost is obtained by the natural breaking down of organic waste, and it can reach high quality in agriculture and soil improvement.	<ul style="list-style-type: none"> - Volume reduction - Waste Transformation - Potential uses in agriculture and soil improvement
Municipal Solid Waste to Biodiesel	Uses the larvae of black soldier flies (grown on organic waste) to create biodiesel	<ul style="list-style-type: none"> - Do not use feedstocks (which contribute to global-land use change) - It does not require a specialised facility
Biochar Production	Thermal treatment of biogenic waste under oxygen-deficient conditions (pyrolysis) creates it.	<ul style="list-style-type: none"> - Provides agricultural benefits as well as long term carbon sequestration.

Table 3.3 Non-biogenic waste conversion technologies (Vergara & Tchobanoglous, 2012)

Technology	Description	Advantages
Incineration with Energy Recovery	Complete combustion of waste in a controlled environment can be used to generate. For an efficient combustion process, incinerated waste should have a low moisture content (<50 per cent) and a high heating value (>5 MJ/kg).	<ul style="list-style-type: none"> - Volume reduction - GHG emissions reduction - Modern incinerators have pollutions controls that can lower pollutant emissions to acceptable levels.
Pyrolysis and Gasification	<i>Converts Waste to Energy by burning fuel in an oxygen-deficient environment. Pyrolysis creates char, and gasification creates syngas.</i>	<ul style="list-style-type: none"> -<i>The syngas can be burned as fuel</i> - <i>Char can be used as a fuel or soil amendment.</i>
Recycling	<i>Is the reprocessing of discarded materials into new products. Requires a supply (collected, separated materials (and a demand) a market for the recycled product)</i>	<ul style="list-style-type: none"> - <i>Savings in both virgin natural resources and energy</i>

Waste treatment methods vary according to the waste characteristics. In general, more technological methods are employed in high-income cities because these cities tend to have a higher percentage of non-biogenic waste. Besides, these technologies require a high level of logistics and infrastructure (mechanised collection, separation and treatment) (Vergara & Tchobanoglous, 2012). At the same time, lower-income cities depend on higher labour and lower technology options. They are even opting for open dumping as a way of waste management.

However, it is essential to point out that landfilling is still the most prevalent waste technology worldwide (ibid). Most European countries have proposed a waste hierarchy putting landfills as a last resort to dispose of waste and putting waste prevention as the best option possible. The Waste Hierarchy guides sustainable waste management and a legal requirement that focuses on waste minimisation and prevention. The Waste Hierarchy has been an essential driver in Europe; this initiative moves from disposal towards the more sustainable reduction, reuse, recycling, and energy recovery options.

It can also be a historic first step towards a current move away from the end-of-pipe waste management concept. However, Gregson and Crang (2015) point out that as policy moves up the waste hierarchy, it needs to "*cross the threshold*" into the household and engage with consumer cultures and the socio-temporal practices that constitute consumption (Gregson & Crang, 2015). There is growing research on the consumers' behaviours and attitudes towards consumption, reuse, prevention, and recycling, thanks to introducing the Waste Hierarchy in Europe (ibid).

3.5.3. Recycling Reconsidered

Recently, recycling has increased dramatically in the global political agenda (Alexander & Reno, 2012). However, this is just the most recent time that recycling has been rediscovered (Tim Cooper, 2005; Timothy Cooper, 2008). Alexander and Reno (2012) suggest that social and economic crises fuel these moments of rediscovery in history:

"...public and policy concern with recycling regularly coincided with periods of political, economic, and moral crisis, which gave rise to material shortages, before the return to periods of relative plenty" (p.8)

If there are motivations and adequate infrastructure, recycling can become a viable, strong option for diverting waste from landfills and incineration. Such was the UK's case during WWII, and this was because people believed burning was a scandalous waste of raw

materials needed for the war effort. (Timothy Cooper, 2010). Therefore, recycling and salvage acquired national effort importance in the UK. An intense propaganda campaign encouraged the people to participate in salvage and recycling schemes.

Consequentially, using second-hand materials was not merely for the less wealthy but also for a broader domestic handwork culture. These national recycling and salvage efforts were replicated during the Second World War with even greater importance and a better organisation (Timothy Cooper, 2008, 2010). The society was encouraged and motivated to have "*the strictest economy in the use of resources and the careful and humble collection of waste materials*" (The Scotsman, 1940).

After World War II, there were no markets available for the materials recycled during the wars anymore; thus, waste utilisation efforts were considered useless and pointless. It was not until the 70s that there was a renewed interest in recycling when environmentalists challenged the continual growth of capitalism. This environmentalist movement began with a social protest (the "*Not In My Backyard*" movement) in capitalist, socialist and other rapidly urbanising regimes (Alexander & Reno, 2012). Thus, this time around, recycling became popular due to shortages or an economic crisis, but rather a moral crisis.

However, this would be reflected in recycling efficiency in resource recovery. Nowadays, recycling has become the most popular (and most practised) way of doing solid waste other than burying or burning it (MacBride, 2012). Alexander and Reno (2012) define recycling as "*the process by which previously used objects and materials are converted into something else, rather than discarded*" (p.1). The recycling movement has been a keystone of environmental reform since the 1970s (Alexander & Reno, 2012).

Furthermore, due to the ever-growing mountains of waste, the Global North's environmental policy has sought to divert landfill materials by promoting recycling (Gregson & Crang, 2015). Hence, recycling is often hailed and celebrated as a vibrant and growing environmentalism expression (Bell, 2004). This movement's accomplishments are now "*solidified into municipal practice and thriving private industry, and reflected in widespread general public support of recycling in general*" (MacBride, 2012, p. 4).

Nevertheless, we can also understand recycling as an "*economically productive enterprise no less lucrative and no less morally complex than other modes of material transaction*"

(Alexander & Reno, 2012, p. 15). In theory, recycling offers two benefits: economic thrift and environmental care (ibid). Complex international recycling chains currently comprise networks of traders and dealers and small-scale recycling entrepreneurs in the Global South (Iles, 2004). Thanks to the affordability and improvements in global transport and the rising costs of environmental compliance, *"it is often more cost-effective to dump or recycle waste in places with less severe environmental and labour regulations"* (Alexander & Reno, 2012, p. 1). The sinister benefits of moving waste from richer to poorer countries is crystallised in the infamous leaked memo signed by the World Bank Chief Economist in 1991:

"I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable, and we should face up to that." Lawrence Summer, World Bank Chief Economist, 1991

Consequently, harvesting the world's waste to become secondary resources has become a billion-dollar business (Gregson & Crang, 2015). Thus, waste and recycling trades are estimated to be around 90 billion USD in 2016 (OECD, 2018). Alexander and Reno (2012) pointed out a moral problem in which global recycling economies create work and follow existing regulations. Yet, it may localise toxic pollution and hazardous working conditions in poorer countries on richer ones. Further, as MacBride (2012) explains, the global recycling trade might create jobs, but most of these jobs are *"dull, hard, and harsh ones"* (p.4).

As mentioned previously, the two main recycling objectives are economic thrift and environmental care (Alexander & Reno, 2012). Nevertheless, as MacBride (2012) states, *"the goal of saving the earth, saving the trees, conserving resources, and cleaning the economy is far from being realised"* (p.4). Notwithstanding the environmentalists' good intentions, recycling has not yet made a dent in the increasing rates of global materials extraction (Krausmann et al., 2009). Even though there has been a development of a robust and vibrant industry around the recycling of dry recyclables (like paper, metal, plastic, and glass), this industry has had next to zero impact on resource conservation on a global scale, and it has delivered only weak results in terms of pollution and reduction or energy savings (MacBride, 2012).

The recycling movement has stumbled its potential by focusing on specific social realms while de-emphasising technical and practical areas. Moreover, recycling has *"overfocused on the individual consumer, the local scale of economy and governance,*

and a global realm that is only vaguely defined" (MacBride, 2012, p. 4). The movement has also fallen victim to "*derailment*" or "*co-optation*", where it has preferred consensus over conflict (ibid). Under normal circumstances, there are limits to how significant are the improvements in waste reduction that households can generate by recycling (Bulkeley & Gregson, 2009). Physical contexts, such as access to recycling infrastructures and social contexts, such as local waste knowledge, is critical in shaping recycling behaviour (Gilg, Ford, & Barr, 2001). For households that decide to participate in recycling schemes, the time and labour entailed in their waste management practices significantly increase. (Bulkeley & Gregson, 2009).

In other words, participating in recycling schemes tend to be inconvenient. Without strong united motivation, the idea of investing more time and effort in these schemes make the participating households the exception rather than the norm. Furthermore, the recycling movement considers businesses capable of maintaining profits while modifying and decreasing their environmental impacts (Hershkowitz, 2002). It sees businesses as regulating themselves and trusts that the market will respond to the social demands for cleaner and greener products.

Further, it believes that if companies are cultivated and encouraged enough, they shall become environmentally responsible (McDonough, 2002). By assuming these conditions, the movement has been reluctant to acknowledge how companies are restrained by competition to compromise on responsibility when profits are at stake (MacBride, 2012). As MacBride (2012) ponders:

"Do we believe that businesses (without calling it "evil" or any childish names) are not immorally but rather amorally premised on profit and profit alone and thus can never be trusted to limit its activities to those that are ecologically beneficial?" (p.188)

Section III

3.6. Current trends in waste management in the Global South

The drivers in the developing countries resemble the drivers that developed countries had in the 1960s. That means that many countries in the Global South are still experiencing waste collection as "getting waste out from underfoot" (D. C. Wilson, 2007). Additionally, environmental protection is still relatively low on the public agenda in

developing countries. The priority remains in passing out uncontrolled disposal and introducing engineered or full sanitary landfills (ibid). A "*clean city*" is also good to attract foreign and national investment; therefore, investing is a crucial driver in the Global South.

Waste pickers make them live out of recovering saleable materials from waste; as mentioned earlier, a significant part of the population's income depends on this. Moreover, working with waste is still perceived as a dirty or undesirable line of work. Therefore, the waste sector's professionalism has not grown as much as in developed countries. Public awareness in these countries also focuses more on public health than environmental issues. Also, new disposal facilities tend to face universal public opposition, resembling the (NIMBY) movement.

Therefore, we can see that public health led to the emergence of a formalised and centralised waste collection. This driver is still vital in developing countries, while it is mostly taken for granted in developed ones. Environmental protection became a drive in the 70s that increased the systematic technical standards; developing countries are still struggling. Weak institutional capacity, informal waste collection, and lack of public awareness are the main reasons environmental protection has not been prioritised. These weaknesses make waste management in these countries more focused on end-of-pipe solutions rather than "*closing the loop*" or finding holistic and sustainable strategies. Vergara and Tchobanoglous (2012) mentioned that

"In waste governance, there is an increased interest in public participation in decision making, as well as a growing understanding of waste management as more than a technical problem." (p.302)

Waste management requires locally specific solutions. One of the ways scholars recognise we can close the loop with waste is by designing products to last longer, and its waste to be repaired and reused, that is seeing waste as a resource (Cooper, 2005; Hird, 2017; Pollans, 2017; Vergara & Tchobanoglous, 2012; Wilson et al., 2006). As Vergara et al. (2012) state, "*Waste scholars and policymakers are recognising the importance of manufacturers in designing waste products and using responsible materials*" (p.301).

The recognition of human factors in waste management is relatively new but widespread. Integrated waste management requires the inclusion of generators, providers, and information (ibid,302). The main challenges for waste management are integrating informal waste into a long-term waste management plan, collecting more data on waste

production and treatment, and using standardised definitions for waste. Also, the waste composition is getting more complex; thus, novel ways to reuse materials should be introduced. Improving waste management systems and reducing waste generation is vital to reducing GHG emissions and abating climate change.

3.7. Concluding Remarks

This chapter outlined the literature's debates on waste generation, waste collection and waste management. It also explored the journey waste experiences from its generation to its disposal. Hence, this allows us to understand how waste management has concealed social and technological networks and increased waste generation. This chapter discussed how waste becomes mass waste and shipped and accumulated, thus discussing its social implication. Further, it reviewed the state's role to ensure that waste is "*governed*" and managed how narratives, behaviours and attitudes have changed and evolved into the current formal and informal waste management systems.

We also delve into how society works and lives with waste, how their lives are intertwined with it, and how they suffer the same stigma reserved to waste. Finally, we look at recycling history, showcasing the cycles it has experienced how and why has recycling been enabled or abandoned in the last decades. The ability to gain a detailed description of waste literature via a situated lens suggests four key contributions my research can make to more comprehensive studies of sustainable waste strategies. Firstly, hybrid systems of waste management are not inherently wrong since the expertise provided by waste pickers is unparalleled. However, the marginalisation experienced by these groups is intolerable; thus, we cannot depend entirely on systems that exploit a part of the population.

Secondly, landfills are temporary solutions that do not contain waste and pollute the environment. They should be considered the last option possible when dealing with mass waste. Thirdly, drivers motivate the central part of the population; we have seen that Global South cities are mainly focused on getting waste under the foot. I believe GMC is transitioning to be concerned with the environmental repercussions of waste generation and disposal. Finally, a waste hierarchy will help us create a sustainable waste management strategy; however, it is merely illustrative. The development of this strategy should be guided by the geographical, historical, and political context of a location. In the next chapter, we shall explore these elements of the Mexican metropolitan area.

Chapter 4

Greater Mexico City: An Impending Crisis

"You have to know the past to understand the present." Carl Sagan

This chapter will showcase a brief introduction of the growth and evolution of Greater Mexico City to provide a deeper understanding of the current practices of consumption and waste generation. It will illustrate how the metropolitan area became one of the most extensive urban areas in the world and how its inhabitants, along with the city, have changed and transformed. This chapter also illustrates the cultural differences within the cities that constitute GMC and how this has had severe repercussions in the logistics, communication, and organisations within GMC's constituent states.

It will also provide a detailed overview of how waste is currently managed by Mexico City and the State of Mexico authorities. These explanations will set the context for the detailed discussion that follows on how the current understanding of waste in GMC has created a *"crisis"*. This case study approach demonstrates how history matters in practices around waste. This chapter also serves as an initial point to debate how and why are consumption practices born. Additionally, it discusses how some materials are considered necessary while others lose popularity and how we treat those materials at the end of their lives.

As Gille (2010) points out, social institutions determine what types of wastes are considered valuable by society, and these institutions regulate the production and distribution of waste in tangible ways. Developing the ideas discussed in Chapter Three also demonstrates how treating waste with end-of-pipe strategies brings only temporary and dead solutions.

This chapter is divided as follows: Section I presents a brief historical and geographical context of GMC, Section II shows the available data on how MC and SoM manage their waste. In Section III, we expose some of the new developments and challenges and developments of the Waste Management System of the metropolitan area. Finally, we

offer a brief analysis of the expected outcomes of the new policies implemented in the capital.

Section I



Figure 4.1 "The weird and beautiful Mexico City" by Santiago Arau

Mexico
of July of 2014

7th

Mexico City and the State of Mexico: the divided city

Mexico City and the State of Mexico have never really been integrated. We share a name: Greater Mexico City, but someone from Huixquilucan has never talked with someone from Chalco. Instead of an integrated metropolitan area, we have an immense universe of local authorities that provide public services and plan exclusively for their localities' inhabitants. The 60 municipalities and 16 boroughs are part of the same economic and social area, and it is time for that to be reflected in the institutional and administrative arrangement.

Carlos Grandet

4.1. La Chilanga Banda

"Mexican urbanisation is a multidimensional process within the society's overall historical structural transformation."(Kemper & Royce, 1979, p. 267)

"Chilango" is typically used to refer to someone from Mexico City. There are many theories of where or how it originated; some believe it comes from *chile* (chilli) and *chango* (monkey), and somehow it creates a negative connotation. Others believe it has indigenous roots, specifically from the Nahuatl "*chilan-co*", which means "*the red ones*". Nahuas, the indigenous group in the Basin of Mexico, used this nickname for those who lived around Mexico City because of how "*red*" Aztec skin was (Zaid, 1999). However, it may be *chilango/a* is how people from Mexico City refer to themselves nowadays, and there is a great sense of pride among the *chilangos*:

"Mexico City is a mother: my mother! Mexico City is a mystical place: the ones born here carry, for better or worse, the energy of buried civilisations. There is no romanticism here: we are a brutal force!"

-Gonzalez Iñarrítú, 2020

Chilangos tend to identify with the Aztecs, even though we are primarily mixed with indigenous communities and Spaniards. There is a big divide in Mexico City between "*us*" (*chilangos*) and "*them*" (everyone else) that runs deep from many generations. Moreover, it is quite challenging for us Mexicans to know our exact ancestry because of colonisation. Spaniards would call any indigenous community "*Indios*" (Indians), which came from their original misunderstanding of Spaniards thinking they had arrived in India instead of a new continent (Alexander, 1952).

Thus, this homogenisation of communities marginalised the culture and identity of hundreds of indigenous communities. Aztecs were predominantly located in Mexico City; the neighbouring cities like the State of Mexico and Morelos were oppressed and used to pay tribute. Eventually, the communities in those areas allied with the Spaniards and defeated the Aztecs (Carrasco, 1996). These historical feuds seem to be present nowadays, and those differences are visible within the general population and the local authorities.

After Tenochtitlan's (the grand Aztec city) fall in 1521, the Spaniards created hundreds of cities and towns to assure military control in New Spain. These cities had an exploitative character that reflected the economic, political, and religious institutions

responsible for building and maintaining their hierarchy. After Spain's independence, there was no rapid urban growth; rural "*haciendas*" were the economic and demographic backbone of the country. By the 19th century, the urban area of Mexico City was focused inward and was contained well within the Federal District boundaries. The Zocalo (central plaza) was the heart of government, church, commerce, and culture (Kemper & Royce, 1979). The spatial form of the capital was simply the continuation and extension of colonial and pre-Columbian trends.

The economic system, land ownership patterns, and transportation network were not substantially altered until after 1859, when the reform laws triggered the dis-entailment of church and corporate assets. This expropriation process opened new urban growth possibilities in the congested central city area and created urban planning peripheral lands (Moreno, 1978). Subsequently, in the following years, constructing a national rail network based in Mexico City strengthened its national affairs dominance (Kemper & Royce, 1979).

Railroad networks, strict governmental control of public finances and easy access to foreign capital were critical to concentrate national affairs in Mexico City. However, when the Revolution happened, there was a dramatic impact on the nation's population structure and urban system. The national population fell from 15.2 million in 1910 to 14.3 million in 1921. Moreover, people living in rural haciendas fled the countryside's insecurity, increasing the urban dwellers' population from 11.7 to 14.7 per cent. Therefore, the 1910-1940 period was characterised by relatively slow population growth and urbanisation (ibid).

In Figure 4.2, we can see a chart of the population growth in Mexico City from 1550 to 1940. With the bureaucratic and structural reforms of the post-revolutionary era, Mexico City diversified and strengthened its social, economic, and cultural roles within the national structure (Unikel, Ruis, & Garza, 1976, p. 37). The city also expanded to the periphery of the capital. Significant, upper-class subdivisions (like Polanco and Lomas de Chapultepec) were established in the western zones since many elite families moved out of their homes in the central part of the city (Corona Rentería, 1974, p. 282). This change in elite demographics opened the door to the development of central city slums where rent-control and small community apartment houses were the predecessors of the abandoned cities of the 1960s and 1970s.

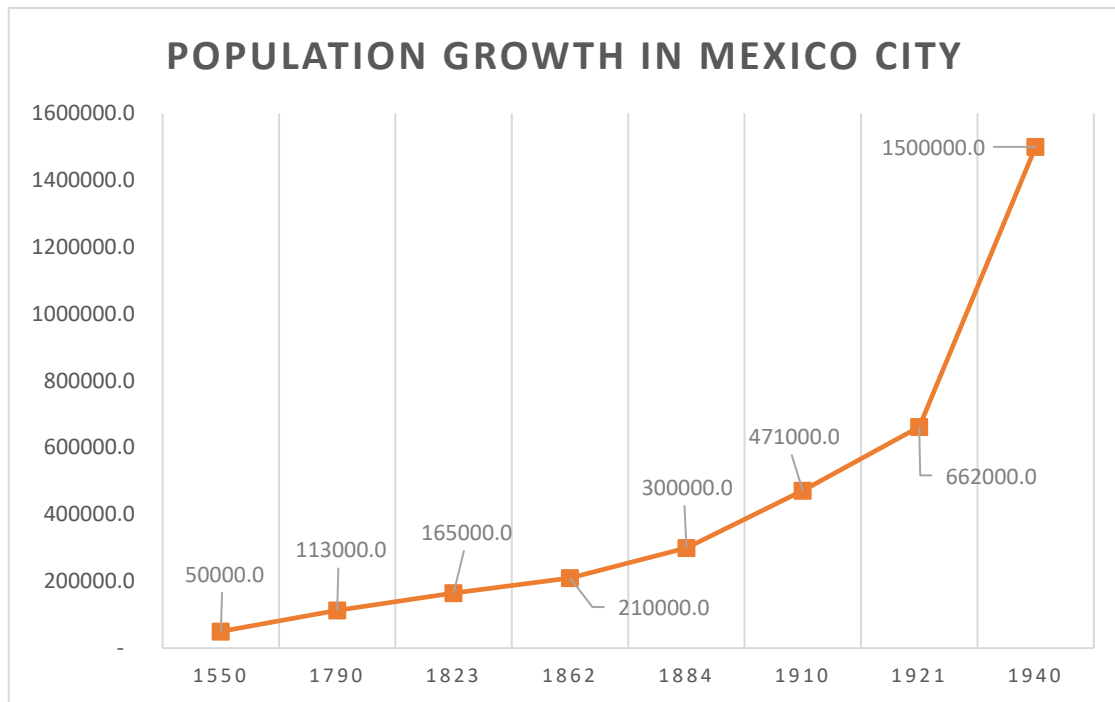


Figure 4.2 Population Growth in Mexico City from 1550-1940 (Kemper & Royce, 1979)

Even after these shifts in the spatial layout of the capital, urban life remained based on the Zocalo and varied very little from the Porfirian period (Bataillon, 1972). The end of the Depression, the spread of government-sponsored health and education programs, and governmental policies to industrial development helped boost urbanisation (Kemper & Royce, 1979). These aspects: "*made inevitable the concentration of urban growth in the metropolitan area at the expense of other cities in the urban hierarchy.*" (Kemper & Royce, 1979, p., 278). By the end of the 1970s, the metropolitan population had risen to about 15 million.

The urban area had extended 800 km² in the Federal District and surrounding municipalities in the State of Mexico. Some areas of the State of Mexico, like Ciudad Netzahualcóyotl (which officially did not exist in 1950), had around 2 million inhabitants, clustered in a mostly non-industrial region in the desiccated Texcoco lakebed (ibid). For the past 60 years, all population growth in Greater Mexico City has taken place beyond the urban centre (Cox, 2011). Therefore, the Valley of Mexico was projected to become the world's largest metropolitan region in the early 1980s.

Nevertheless, various aspects operated to deter this from occurring, such as the declining birth rate and the catastrophic earthquake of 1985. These aspects led to greater decentralisation in the Valley of Mexico and other Mexican states (ibid). In the 1950s

and 1960s, the population increase in the Valley approached 5.5 per cent per year. By the 2000s, the annual population growth rate had declined to 0.8 per cent. Additionally, in the 70s, a successful campaign promoted smaller families and planned parenthood; it advised the population that families would afford more stuff than previous generations and have a better life quality (as seen in Figure 4.3).



Figure 4.3 Mexican Campaign to promote smaller families (1970)

This campaign was truly successful; in 1974, families had seven kids on average, and by 1996 this was reduced to two kids per family on average (SEGOB, 2014). In 1970, the Mexican economy was considered exemplary, with low inflation, price control and economic growth (Peña-Alfaro, 1979). However, the national economy was not "thriving" six years later. In 1976, Mexico was going through a severe financial crisis which was characterised by an inflationary spiral, a plateau of production growth, a voluminous external debt, a financial sector in critical conditions, a devalued currency, and a loss of confidence by the majority of the population in the State and its capacity to conduct the country through safe economic and political ways. A graph of the minimum wages vs inflation in Mexico can be seen in Figure 4.4.

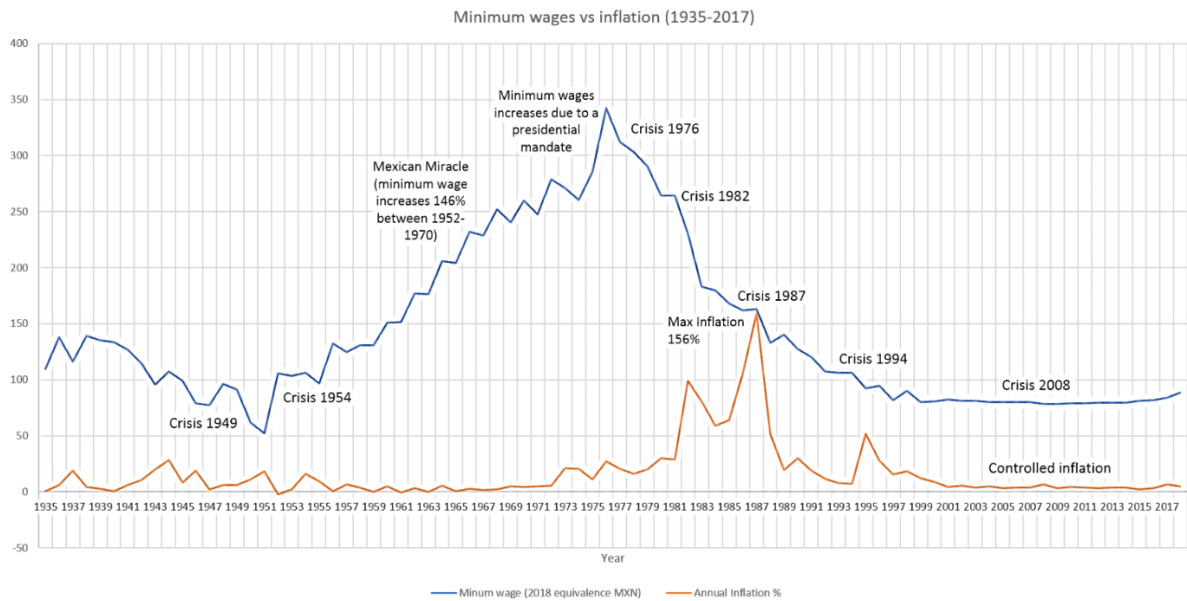


Figure 4.4 Minimum wages vs inflation in Mexico (1935-2017)(BANXICO,2019)

Furthermore, in 1950, the core "delegations" had 2,23 million inhabitants out of the 2,88 million metropolitan population; and the urban centre accounted for 78 per cent of the population in urban cities, by 2010, this number had dropped to less than 10 per cent, (Cox, 2011). Nowadays, more than 90 per cent of the metropolitan area population lives in what has traditionally been the suburbs, according to the 2010 census. Thus, over the last 60 years, the suburbs have accounted for more than 100 per cent of population expansion.

Consequentially, the falling population in the urban core of Mexico City resembles cities like Chicago, Copenhagen, and Paris, and virtually all other urban centres in the high-income world (Cox, 2011). Additionally, we have previously established that although borders might exist, Mexico City's growth impulse the neighbouring cities' growth, and eventually, Greater Mexico City was created. Nevertheless, as exposed earlier, there is a disconnection between states and a lack of acknowledgement that the metropolitan area grows and functions as one immense urban unit. The next section will delve into how waste management logistics work in the metropolitan area.



Figure 4.5 Map of Greater Mexico City (Mexico City in white, the State of Mexico in green and Hidalgo in yellow)

Section II

4.2. Global South Waste Management Systems

Many cities in developing countries face similar challenges in managing their Municipal Solid Waste, which is mainly insufficient collection and inappropriate disposal. Even if cities spend a significant amount of their municipal revenues on MSW (20-50 per cent), they still collect only a fraction of the waste generated (with cases of even less than 50 per cent) (Medina, 2005). It has been estimated that high-income countries collect almost 100 per cent of their waste in rural and urban areas, while in low-income countries, the collection rate is only 48 per cent in urban areas and 26 per cent in rural ones. In some cities, disposal is still done by open dumping, which can constitute a source of pollution and can become a significant risk to human health and the environment.

Therefore, continuous population growth, urbanisation, industrialisation, and higher consumption levels have worsened MSW's management. Municipal Solid Waste Management (MSWM) coverage in Mexico is inferior to the electricity, water, and sanitation services (Martin Medina, 2005). However, it still consumes around 20 to 40 per cent of the municipal budget. Some of the reasons why the MSWM has such a low efficiency are weak organisation and adequate management (Martin Medina, 2007). In 1998, no more than 73 per cent of all waste was collected, and only 15 per cent of them received final disposal in sanitary landfills (Acurio, Rossin, Teixeira, & Zepeda, 1998).

Additionally, low-income areas tend to have sporadic or non-existent MSWM service; and face higher risks to their health from substandard service. Moreover, insufficient collection systems also lead to an increase in illegal dumps (Medina, 2005). As aforementioned, Mexican cities have increased over the past 70 years, and there has been a significant exodus from rural to urban areas. This exodus created a demand and a supply of abundant and inexpensive labour, and often, this means that many people are engaging in informal economic activities, resulting in fewer people paying taxes (ibid).

Furthermore, Mexico had the lowest rate of tax collection of the OECD in 2018, with 16.1 per cent of the gross domestic product (Morales, 2019). This low taxation level translates into a low availability of funds for municipalities (Medina, 2005). As mentioned earlier, waste tends to move from the wealthiest areas to the poorest ones (Baabereyir et al., 2012). Thus, waste collection systems tend to be better in wealthier neighbourhoods and inefficient in low-income ones (Martín Medina, 1999). In the next section, we will see how GMC waste has been managed in the last years.

4.3. Waste's Journey in GMC

Waste regimes explain how certain types of materials are treated by society at a certain point in time (Gille, 2010). For example, Gille (2010) narrates how metal was used in Hungary during the post-soviet era. In GMC, waste seems to be treated homogeneously; waste is treated, discussed, and managed in tons and numbers. It is merely some "*stuff*" that must be hidden and taken away, and this can be easily seen in how the government and local authorities approach the "*waste crisis*". There seem to be only three main categories of waste: organic, inorganic, and recyclables.

Since scavengers retrieve most recyclables from households, the authority's responsibility is to manage the remaining waste. We will narrate the journey waste has from the households to its final disposal. GMC functions as one economic, industrial, and social entity; however, the logistics are separated per city. Thus, the amount of waste generated and how waste is separated and transported differs per state.

4.3.1. Waste Generation in GMC

This section uses archival records (reports, policies, and regulations) provided by the authorities of Mexico City and the State of Mexico to approximate the journey waste goes through in GMC. One of the most common problems encountered when researching waste is the lack of data. Mexico City reports regarding waste have improved greatly in the last years; however, the State of Mexico does not produce the same quality or frequency reports.

Therefore, some information is missing in this section regarding the State of Mexico. Mexico City, the State of Mexico and Jalisco are the states that produced more waste in the country; combined, they represented 33 per cent of the waste generated. In Table 4.1, there is a summary of the population and waste generation data of MC and SoM.

Table 4.1 Population and waste generation data of Mexico City and the State of Mexico

Characteristic	Mexico City	State of Mexico
Total Population	8.8 million people	16 million people
Waste Generated Daily	13,073 tons	17,000 tons
Waste generated per person/daily (average)	1.38 kg	1.18 kg
Greenhouse Emissions attributed to waste management	5.58 million tCO ₂ e	-

In Mexico City, between 2014 and 2018, the MSW generation went from 12,893 tons a day to 13,073 tons, increasing on average 45 tons of waste a day (SEDEMA, 2019) . In 2017, the State of Mexico generated approximately 17,000 tons of waste a day, representing 15.7 per cent of the total waste generated in the country. It is estimated that each inhabitant produces around 1.18 kg/hab/day, which is 0.2 kg less than the average waste produced by Mexico City's inhabitants (SEMARNAT, 2017).

Further, waste generation varies depending on social, economic, and environmental characteristics. For example, Iztapalapa, Gustavo A. Madero and Cuauhtémoc, representing only 15 per cent of the city's entire territory, are the boroughs that generate

the most significant amount of waste. In Figure 4.6, we can see the average waste generation per borough in Mexico City.

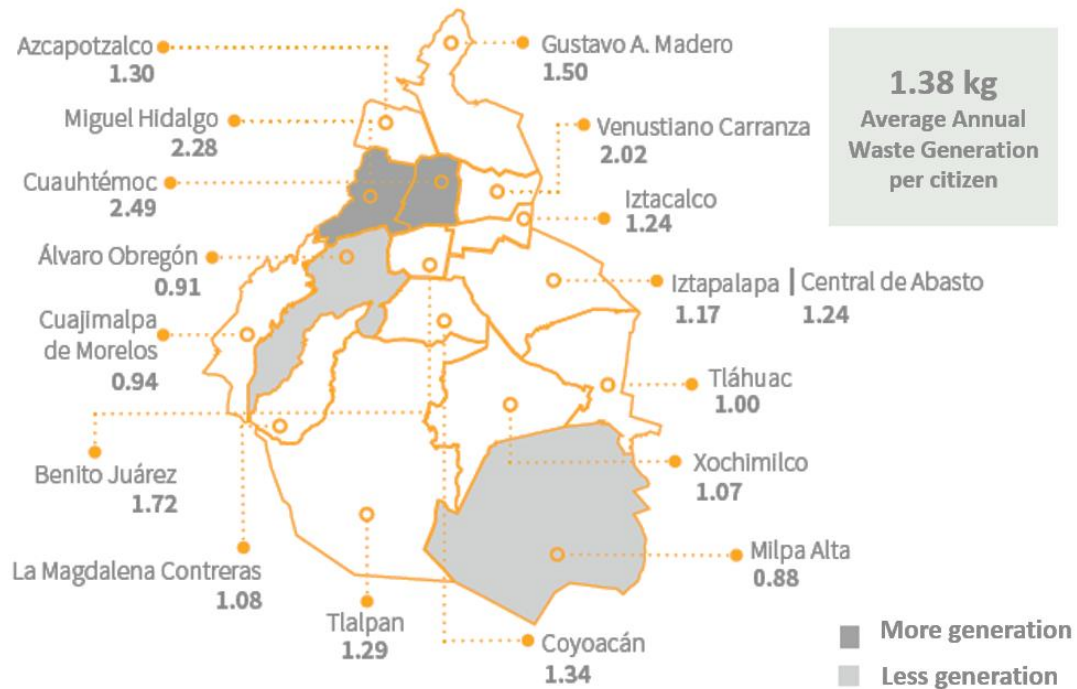


Figure 4.6 Average Annual Waste Generation per borough tons/per day. (2019) (SEDEMA, 2019)

Similarly, in the State of Mexico, the more populated and wealthier areas produce significantly more waste. Thus, the average waste generation per capita in Toluca that has 873,000 inhabitants is 1.2 kg/hab/day, whilst in San Miguel Almaya that has 4,000 inhabitants, the average is 0.38 kg/hab/day (Cuenca, Alvarado Granados, & Pérez Ramírez, 2015). In 2012, Mexico City emitted 31 million tons of CO₂e, contributing 5 per cent of the country (620 million tCO₂e).

The emissions due to the MSWM in Mexico represent 18 per cent (5.58 million tCO₂e) of the total emissions in the city (SEDEMA, 2013); this would represent a third of the waste emissions of the entire UK (18 million tCO₂e in 2015). In the following segment, we shall see how waste is collected, treated and disposed of in the GMC while comparing how MC and SoM differ.

4.3.2. Waste Collection

In 1998, only 85 per cent of MSW was collected in the country; by 2011, 100 per cent of MSW was collected in Mexico City. In contrast, in other states, the waste collection only reached 26 per cent (SEMARNAT, 2012). Waste collection in Mexico differs from other

countries. For example, in the UK, waste is put into wheelie bins, and then the waste truck will come to pick it up. In Mexico, waste collection demands more active participation by its residents. In Mexico City, the State of Mexico and other parts of the country, waste is collected in the streets. The waste trucks announced their arrival by calling: "*Basura!!!* (Waste!)" or ringing a bell (depending on the borough).

With this announcement, citizens get ready, and they must take their bins or waste bags out and wait for the waste truck to arrive. Unlike Mexico City, the State of Mexico has more rural areas, and the waste trucks cannot access all the areas or attend to all the households. Therefore, the inhabitants have found other ways of disposing of their waste. Consequentially, 8 per cent of the waste is burned by the inhabitants in open dumps, 1 per cent is thrown in the streets or empty lots, 0.2 of waste is buried 0.11 is thrown into rivers (Mendoza, 2017).



Figure 4.7 Street Sweeper of Mexico City, March 2020. Photo by Santiago Arau

Waste collection is supposed to be a service fully provided by the state; however, the state only hires the drivers of the waste trucks, street sweepers (as seen in Figure 4.7) and sometimes a helper per truck. Nevertheless, several other helpers or "*chalanés*" go on the truck. They do not receive a salary and are considered "*volunteers*", and their job is to help the citizens empty their bins and bags into the waste truck. There are around 3,834

"volunteers" in Mexico City (SEDEMA, 2019). Sometimes, they even charge an extra fee (like 10 pesos or 20 pesos a week) to whoever wants them to pick up their trash from their doorstep to the truck.

Additionally, *chalanés* separate waste when they receive it, and they are swift to spot dry recyclables, like plastic containers, aluminium cans, and glass. Thus, they had already sorted all these materials before throwing the waste to the compacter. It is common to see bags on the top of the waste truck, and these bags are where *chalanés* store all the recyclables (Figure 4.8). Then, they usually sell those materials and split the revenue between the staff of the waste truck.

It is common for the driver to get a more significant share of the money since he is "allowing" the *chalanés* to work in "his" truck. The government do not penalise this type of activity. However, before entering the waste distribution centres, the *chalanés* take the bags of waste they collected and leave the truck. This activity is also called "*pre-pepena*", which translates to "*pre-scavenging*".



Figure 4.8 A waste truck with some *chalanés* on it, Mexico City

4.3.3. "Pepenadores"

Scavengers are known in Mexico as "*pepenadores*", which is generally considered one of the worst forms of employment. However, informal scavenging has become an essential part of the waste management system in GMC. They are in charge of collecting waste in

unattended parts of the city and are crucial to the recycling industry. Collecting and selling recyclable materials has become a focal part of their income.

Nevertheless, there have been many efforts to reduce the scavenging percentage due to the many ethical and moral issues it represents. There are doubts regarding if it is right to deprive scavengers of their only source of income since they help the juvenile waste management system in Mexico (El Economista, 2012). For example, in 2012, just after Bordo Poniente's closure, they recycled 20 per cent (2,414 tons per day) of the MSW, easing the transition to various landfills (SEMARNAT, 2012).

Without their help, maybe an unauthorised dumpster would have increased. In 2018, it was estimated that 13 per cent of the MSW was recycled via informal scavenging (1,621 tons per day) (SEDEMA, 2019). *Pepepenadores* are also quite prevalent in Mexico's State; however, it is harder to estimate how much waste they collected. Nevertheless, we could assume it has to be somewhere between 12 to 20 per cent of the waste, given how much waste arrives at landfills and how much is recycled, but it is still unclear (GIZ, 2000).

4.3.4. Waste Separation

In Mexico City, for the first time in 2015, waste trucks with a section for organic and organic waste were introduced (as seen in Figure 4.9). The proper separation of waste is highly vital for an efficient Waste Management System. If the waste is not correctly separated, it hinders recycling, reusing, and energy transfer, which will make the whole waste management process inefficient. On the 8th of July 2017, a new waste separation policy was announced in Mexico City (Organics: Tuesdays, Thursdays and Saturdays, Inorganics and Recyclables: Mondays, Wednesdays and Fridays, Bulky Waste: Sundays) (SEDEMA, 2017). However, the government did not provide the population with trash bins to separate waste.

As aforementioned, waste collection in Mexico City works by citizens taking out their trash and waiting for the waste truck to pass; this means that each citizen must sort out where to store their trash. Therefore, separating the waste into organic and inorganic involves having more space in the house designated for waste separation. Furthermore, in 2019, only 24 per cent of the city's waste trucks had a divided section for organic and inorganic waste. Thus, GMC's citizens complain that even if they do separate waste, it gets mixed in the waste trucks. A significant portion of GMC has ignored this newly

introduced waste separation policy, and waste trucks are now receiving all types of waste any day (Pantoja, 2019). So far, only 42 per cent of the population correctly divides their rubbish into organic and inorganic waste (SEDEMA, 2019). However, this varies greatly depending on the borough (i.e., Milpa Alta has a 71 per cent separation efficiency, while Alvaro Obregon has 15 per cent).



Figure 4.9 Waste truck with a division for organic and inorganic waste

In the State of Mexico, it is estimated that only 15 per cent of the waste is separated by the consumers (INEGI, 2011) because there are not enough waste trucks that have a division for organic and inorganic waste. Additionally, only 33 per cent of the boroughs in the State of Mexico try to incentivise the waste separation, and it is not a mandatory regulation but rather voluntary participation (Centro Mario Molina, 2015). Nevertheless, Diaz, Alvarado, and Perez (2015) observed in their survey in SoM that 89 per cent of their interviewees acknowledged that it is essential to separate waste. They said that 64 per cent did so. However, like in MC, they complained that even if they separated the waste, it was thrown into the same truck and would mix again; thus, they would eventually abandon this practice.

4.3.5. Waste Treatment and Disposal

Waste Hierarchy

Currently, no official regulation follows a Waste Hierarchy in Mexico. As aforementioned, there was an initiative by "Basura Cero" (Zero Waste) to establish the same Waste Hierarchy format that has been used in the European Union for decades (Figure 4.10 shows the proposed Waste Hierarchy by Basura Cero). However, many political barriers have hindered its implementation (SEDEMA, 2016). The current waste management system in Mexico City relies almost entirely on landfills, followed by

compost, waste incineration and recycling (as seen in Figure 4.11). As previously mentioned, a significant percentage of the waste is recovered by scavengers. Since this is an unofficial way to recover waste, it is impossible to know how much waste is recycled or repurposed. Thus, the Waste Hierarchy, followed by Mexico City, would resemble the one shown in Figure 4.12.

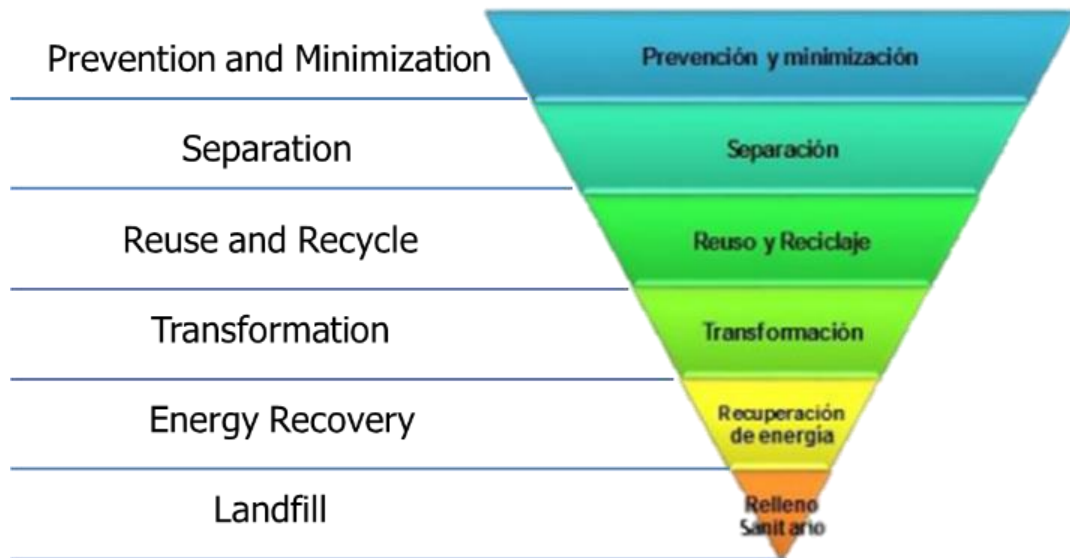


Figure 4.10 Proposed Waste Hierarchy in Mexico City (SEDEMA, 2010)

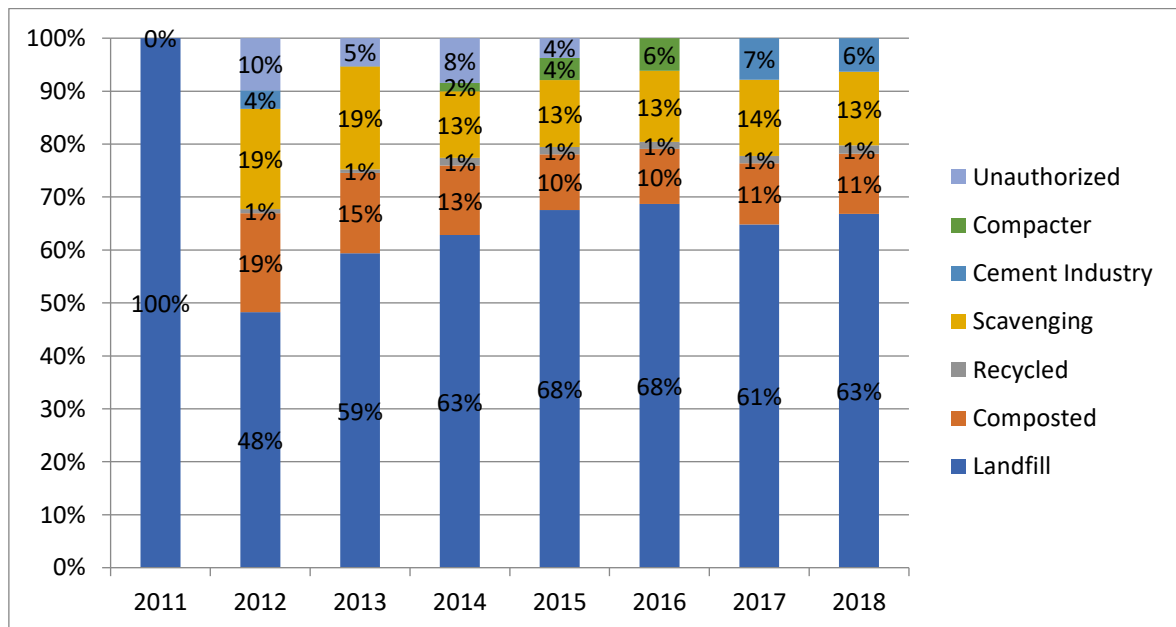


Figure 4.11 Waste Treatment in Mexico City (2011-2018) (SEDEMA, 2010) (SEDEMA, 2016) (SEDEMA, 2013) (SEDEMA, 2017)

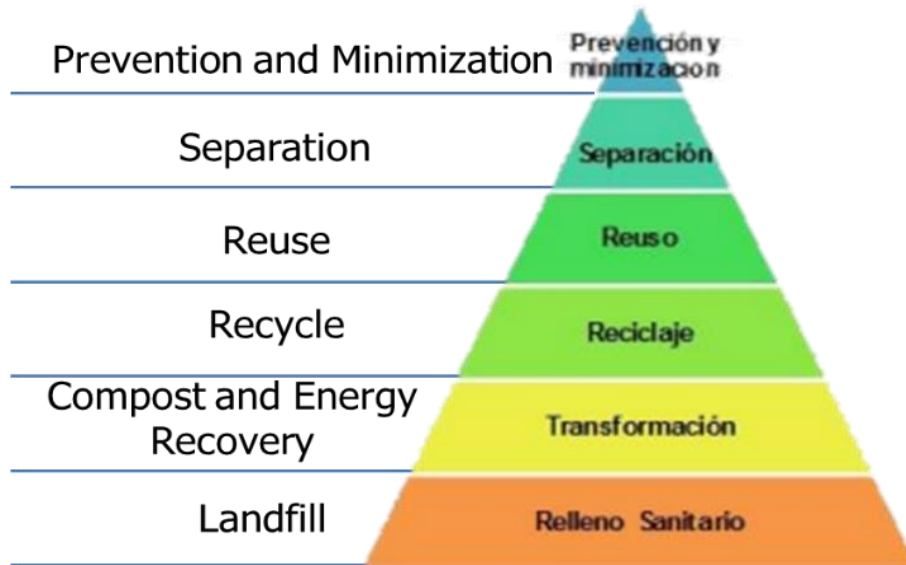


Figure 4.12 Current "Waste Hierarchy" in Mexico City (SEDEMA, 2016)

Landfill

In 2011, it was estimated that 95 per cent of the country's waste was sent to landfills (72 per cent to authorised landfills and 23 per cent to unofficial landfills or dumpsters). This percentage was steadily increasing; in 1997, the waste destined to landfills (authorised and unofficial) represented 77 per cent of the total MSW (SEMARNAT, 2012). In Mexico City, by 2011, the entirety of the MSW was destined to landfill. "Bordo Poniente" used to be the biggest landfill in Latin America. This landfill was created after the devastating earthquake of 1985 to cope with the shattered buildings' debris, and this landfill used to receive approximately 12,500 tons of MSW a day (SEDEMA, 2014).

In 2012, the biggest landfill in Latin America was closed because it had exceeded its capacity completely. After this closure, Mexico City sends its waste to two neighbour cities (the State of Mexico and Morelos) and five different landfills, bringing many social, environmental, and political dilemmas (SEDEMA, 2016). For example, some unauthorised dumpsters in this city contribute to pollution and foul odours that affect the neighbouring population (Cuenca, Alvarado Granados, & Pérez Ramírez, 2015). Some newspaper headlines can be seen in Figure 4.13.

Immediately after *Bordo Poniente's* closure, the percentage of landfills decreased; however, unauthorised dumpsters were created since there was not a place where waste could be disposed of (SEDEMA, 2016). It took six years for the unauthorised dumpsters to disappear in the capital. However, nowadays, all the landfills that MC uses are outside

of the capital. Currently, 63 per cent of the waste in MC ends up in a landfill (Centro Mario Molina, 2015). After the "pre-pepena" and waste separation, waste arrives at one of the several landfills and dumpsters.



Figure 4.13 Different Newspaper Headlines complaining about Waste Management in Mexico City (El Universal, 2017)

Recycling

The percentage of recycling has increased in the last few years in Mexico. In Mexico City, there are two "Selection Plants"; in here, there is some manual recovery of materials destined for recycling. The materials recovered here are PET, cardboard, paper, glass, metals, and aluminium. Around 3,100 tons of waste arrive at these plants; nevertheless, only around 180 tons are recovered. Because the waste already comes "clean" from the "pre-pepena" performed by the chalanés. Consequentially, only 1 per cent (184 tons/day) of the MSW collected in 2018 was recycled through "official" recycling schemes (SEDEMA, 2019).

In the case of more complex materials like clothing or electronics, the percentage that is recovered or recycled is minimal to non-existent. For example, Mexico City's government estimates that 314.89 tons of clothing and textiles are disposed of every day in the capital by big companies (SEDEMA, 2019). Some big companies in MC are under certain regulations in which they have to declare and catalogue their waste every day. Even if they are accounted for differently, zero per cent of those tons of clothing are recycled or

reutilised. The total tons of clothing and textiles that arrive at landfills is still unknown in GMC, and there is no data for how much is recycled or reutilised. In the case of electronics, MC's government estimates that big companies dispose of 6,566.75 tons per year, from which 61.96 tons are recycled or reutilised, which is around 1 per cent of them (SEDEMA, 2019). As we shall see in the following chapters, there have been some efforts to reutilise and recover electronics in the GMC; however, the success of these campaigns have been fruitless and scarce.

Section III

4.4. The light at the end of the tunnel (?)

While writing this chapter, there were new developments and achievements in Waste Management in GMC. The new mayor of Mexico City, Claudia Sheinbaum, seems to be more interested in the environmental impacts of waste than her predecessors; this is reflected in her choice of cancelling the massive Waste to Energy Plant "El Sarape" and a renewed emphasis on recycling. She also facilitated creating a new agreement (and only in its kind) with the authorities of the State of Mexico to regulate waste.

Mexico

23rd of November of 2019

Mexico City and the State of Mexico sign an agreement for an integral Municipal Solid Waste Management

The agreement will try to establish a coordinated effort to reduce the waste destined to landfills and to increase recycling and waste to energy strategies

To improve the MSW Management of GMC, Mexico City and the State of Mexico authorities signed the "Agreement for the Coordination to Improve the Integral Management System of the Waste of GMC". Authorities mentioned that this agreement is the first of its kind between both cities. Therefore, this is the first time both states will join efforts to exchange ideas and experiences to look for sustainable technologies and new organisational systems and facilitate its application. This also has the final objective of improving the environment of the GMC.

Eduardo Hernandez, El Universal

Mexico

5th of June of 2020

New Waste Plant will recycle 76% of trash and will save up to 100 million pesos: CDMX

The government of Mexico City plans on inaugurating a new waste plant by December of 2020, where it will treat 1,400 tons of waste a day.

To avoid letting waste reach the landfills, this new plant will turn 30% of the waste into fuel, 6% into recycling, and 30% into recoverable organics, which adds up to 76% recovered waste. This plant cost 385 million pesos; its construction was halted due to the coronavirus pandemic but was resumed last month.

Arturo Ordaz Díaz, Forbes

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Mexico

1st of January 2021

Mexico City says goodbye to single-use plastics

This Friday, the new law that bans single-use plastic came into force: first, it was plastic bags; now, utensils like cutlery, glasses, and balloons will be forbidden.

From the 1st of January of 2021, the government will only allow the sale, consumption, and distribution of glasses, cutlery, straws, and single-use products only if they are made of compostable materials. These materials should be able to degrade in six months. This new law establishes new sanctions that include fines and even a possible business closure if they do not comply with the new regulations. The authorities have mentioned that they are advising and helping businesses to be able to comply with the new law, so they are not affected by it, especially during the current COVID crisis.

Brenda Yañez, Expansión Política

Although this news might seem encouraging and going in the right direction (especially given past administration's agendas), we believe that the way the administration looks at waste has not changed enough. It still looks at waste as something that must be removed, transformed, and forgotten. It also looks at waste as immovable and only tries to "handle" or "manage" at the end of its life. The new Waste Plant announced by the MC's mayor has mainly been advertised as a recycling plant; however, only 6 per cent of the 1,400 tons of waste that will arrive here will be recycled.

The rest shall be turned into fuel. This Waste Plant is a better option than landfill, but it still only brings an end-of-pipe solution, where resources will not be recovered. Furthermore, this plant has been promoted as a part of the "circular economy". At the same time, this helps waste not end in the landfill; it does not comply with enough

attributes to be considered a circular economy. The only measure that might seem encouraging is the ban on single-use plastics. Nevertheless, this new law has been entirely eclipsed by the pandemic.

Furthermore, many critics mention that this is the worst possible timing for that implementation. Thousands of restaurants and businesses are closed, and the only way for them to continue activities is through takeaways; thus, they heavily rely on single-use plastics. Business owners complain that the new compostable materials are more expensive than single-use plastics, and they are already struggling to make ends meet with the pandemic (Martinez, 2021).

Additionally, it has been pointed out that the instructions have not been clear for consumers or retailers, and this would only bring half solution and could potentially be "*a disaster*" (Heraldo de México, 2020). Although well-intentioned, it looks like the new law will not be implemented as planned. In 2019, the first stage of this law was passed; in this stage, single-use plastic bags were banned in Mexico City. The citizens welcomed this law, and it had a 90 per cent approval rate.

Nevertheless, this law was welcomed because citizens already felt that litter in the streets was getting out of hand. Moreover, many citizens admitted having a "*giant collection*" of plastic bags at home. Therefore, this law did not feel like an imposition but a logical step in the right direction. On the other hand, this new law comes at a terrible time, where consumers feel that single-use plastics is the safest and more hygienic option since COVID-19 is still a present threat.

Consequently, these measures still reflect a miscommunication between consumers and authorities. The latter try to implement new regulations that do not match what consumers can (or want to) comply with. Another key issue evident during the pandemic was communication between MC and SoM authorities. Each state had different ways of dealing with COVID-19, from the risk measuring, addressing their population and now with vaccination. These two neighbouring states did not get along as a team to treat this health crisis even though they share a floating population. Thus, it is hard to believe that they will deal with this crisis as a united front.

To summarise, in this section, we explored the historical context of the GMC, which revealed that there are still ideological and cultural divisions between its constituent states and population. We could also grasp how there was never proper urban planning, and the

city kept growing to its outskirts. These two aspects make the whole waste management system challenging to operate in the capital. We could also appreciate how the policies implemented in GMC tend to ignore the consumer's demands or needs and benefit from strategies where waste is only managed at the end of its journey. The next section will explore why consumers acquire stuff and dispose of it through three materials. Finally, and more importantly, we shall showcase where responsibility should be placed.

INTERLUDE

May 9, 2019

The complicated politics of going zero waste

The zero-waste movement is about sending as little to the landfill as possible, but the labour costs can feel high.

Look at #zerowaste and #zerowasteliving on Instagram, and you'll see mason jars filled with chocolate smoothies and rows of rose-gold straws. You'll see perfectly organised refrigerators with piles of fresh produce and brown glass spray bottles with homemade lavender-steeped cleaning products. You'll see perfect kitchens with white subway tiles and bamboo countertops lined with rows of more mason jars filled with legumes. But "zero waste" isn't just an influencer meme; it's a movement whose practitioners share the serious goal of sending as little to landfills as possible. They studiously avoid the plastic packaging, disposable coffee cups, and paper towels that many of us never give a thought to before stuffing in the trash. They are experts in refusing, reusing, and recycling.

This movement has exploded in recent years as images of plastic-choked rivers, and plastic-choked dead whales circulate on social media, and American cities are burning the recyclables that China will no longer take. Google searches for "zero waste" have doubled since January of 2017, and there are almost 2.5 million posts on Instagram tagged #zerowaste. Zero-waste grocery stores have expanded from their EU foothold to Brooklyn, South Africa, and even Hong Kong and Malaysia. Zero waste helps us reexamine our relationship with stuff in a way that can seem progressive and anti-consumerist.

Any zero-waste evangelizer will tell you that you don't need to upend your life and live in an off-the-grid cabin like an archetypal environmentalist. You just engage in "habit change," rejiggering **almost everything you do every day** — brushing your teeth, cooking meals, getting coffee — to make it waste-free. Ostensibly, you could buy as much stuff as you need to live your best life — beauty products, fashion, food — as long as you can get it without packaging (like the dreaded plastic polybag). In theory, anyone could do it, though that is a controversial statement when you take into account the privilege of having access to bulk bins and the time needed to go to several stores instead of your local Walmart.

It's sort of like a game. How normal can you be while saving the environment? If you can fit all your year's waste into a jar, then you've become the zero-waste zen master. It's essentially another layer to

“having it all”: a career, a family, a perfectly Instagrammable life, and now you’re saving the planet, too. In practice, this can be a lot of undervalued, unpaid work, more added to the “mental load”.

“The reason why people started buying things premade is because they were working longer hours,” Susan Dobscha, a professor of marketing at Bentley University who studies gender and sustainability, says. When I tell her about zero waste and describe the Instagram images of perfect pantries of glass and beans, she compares it to “the 1950s housewife’s ideal of perfection. Back then, the pantry was perfect when they put all these fancy brands in, like Nabisco crackers. But now the narrative has shifted to make having the perfect house more labour intensive.” In order to participate in society without using disposables, a typical zero waster will carry reusable utensils, a reusable straw, a mason jar, a cloth handkerchief, and a metal tiffin for premade snacks or leftovers.

The environmental advocate Bill McKibben has very publicly written off the idea that we need to be perfect in order to be an environmentalist. But we are so afraid of being called out for hypocrisy and failure we feel like we can’t call ourselves an environmentalist unless we’ve brought our daily lives 100 per cent in line with our values. “There has always been this undercurrent of people trying to point out the hypocrisy of others who are trying to do right by the environment,” Dobscha says. “In my own research, I found some of my respondents felt they couldn’t do enough no matter how hard they tried and sometimes got very demoralised about it.”

Since 2010, the fossil fuel industry has poured \$180 billion into new plastics manufacturing facilities, and experts say global plastic production will jump by 40 per cent as a result, irrespective of whether we bring mason jars with us to the grocery store. Those of us that study this figured out 15 years ago that **consumer recycling will not solve the global problem**,” Dobscha says. “We’ve been trying desperately to move the conversation away from what happens at the point of purchase and end-of-use of products to pushing corporations to approach waste from the production side.”

Alden Wicker, Vox

PART II

Chapter 5

Mobile phones

"Practices rather than individual desires create wants."

(Warde, 2005, p. 137)

This chapter forms part of the growing waste literature that focuses on behaviours and attitudes towards the consumption and disposal of mobile phones. Understanding these behaviours and attitudes is crucial to comprehend the drivers behind the escalating of electronic waste. Waste disposal has been black-boxed to govern, treat, and manage; hence, focusing on the end-of-pipe waste disposal strategies will only create temporary "solutions". As Gregson and Crang (2015) point out: *"To create an effective waste policy, we need to address the social and material conditions that generate it"* (p.11). At the same time, Bulkeley and Gregson (2009) highlight a need to *"cross the threshold"* into the household and engage with consumer cultures and the socio-temporal practices that constitute consumption.

Waste generation is commonly described as the consequence of over-consumption and a throwaway society. Several authors consider phones as part of a *"throwaway culture"* in which mobile phone consumption is mainly (or solely) driven by novelty-seeking and fashion-conscious consumers (Arruda-Filho & Lennon, 2011; Katz & Sugiyama, 2006). Nevertheless, recent research shows that consumers tend to buy mobiles for pragmatic reasons rather than acquiring them for their interest in fashion, design, and technology (Wieser & Tröger, 2016).

Further, in opposition to the popular belief that consumers are driven exclusively by individual desires and the pursuit of novelty, this research aligns with the belief that consumers are driven by external factors that might escape their control. Consequentially, this thesis suggests that status and individual desires are not the only factors driving mobile phones consumption, especially in emerging economies. Therefore, to understand

mobile consumption and disposal behaviours, I established the following research questions:

- What are the drivers of mobile phone acquisition?
- How long do consumers retain their mobiles? And why?
- Why do people replace phones while they are still useful?
- What is the conduit to replace them?
- What happens to the replaced phones?

This research uses these questions as a tool to reveal the current situation of mobile consumption and disposal in Greater Mexico City and question if there is a prevalent "*throwaway culture*" of mobile phones in GMC. This chapter will employ Practice Theory to understand the behaviours and attitudes towards acquiring, repairing, maintaining, and disposing of mobile phones in GMC. By analysing the constituent activities surrounding the use of mobile phones, we will be able to understand why consumers dispose of them prematurely. Interviews and "*drawer studies*" were used to comprehend the attitudes and drivers of the citizens of GMC.

Additionally, we will also explore the impact that the socioeconomic level has on the drivers for consumption and disposal and the effects that illicit markets for stolen phones have had in the capital. Therefore, this chapter shall conclude with some suggestions for policy implementation for the GMC. This chapter is divided as follows: Section One briefly reviews the current practices and behaviours that drive consumption and phones' replacement according to literature. Section Two showcases the data collected. Section Three discusses the results, while Section Four provides a discussion segment and some concluding remarks.

Section I

5.1. Literature Analysis

Mobile phones have revolutionised the way we interact among us. They have become the most used electronic device globally (Tan, et al., 2017) and a tool to improve our social connection (Ruiz & Bautista, 2016). The number of people who owns a mobile phone has increased almost exponentially in the last few years. Further, the subscribers of mobile telephones worldwide increased from 11 million users in 1990 to 7.37 billion users in 2016 (ITU, 2016). This sharp increase in demand has resulted in the large generation of Waste Mobile Phones (WMPs) (Tan, et al., 2017).

Even if mobile phones are technically designed to last almost a decade, most users change their phones every 12 to 24 months, decreasing the product's lifespan significantly (Huang, Yatani, Truong, Kientz, & Patel, 2008). These fast changes in mobile models have typically been blamed on consumer behaviour, fuelled by technological obsolescence and fashion trends, often planned by mobile manufacturers (Lagioia, Paiano, & Gallucci, 2006). Additionally, the falling mobile phone prices and the marketing strategies from mobile network operators are thought to have contributed to the increasing demand and lowered the actual lifespan of mobiles (Paiano, Lagioia, & Cataldo, 2013).

There is extensive research focus on the disposal routes and recycling of mobile phones once they are discarded (Jang & Kim, 2010; B. Li et al., 2012; Ongondo & Williams, 2011; Rathore et al., 2011; G. T. Wilson et al., 2017; Yin et al., 2014; Ylä-Mella et al., 2015). Also, there is a substantial literature on lifecycle evaluation on cell phone recycling and repair (Rathore et al., 2011; Sinha, Laurenti, Singh, Malmström, & Frostell, 2016; Soo & Doolan, 2014; Umair S., Björklund, & Ekener Petersen, 2013; Valero Navazo, Villalba Méndez, & Talens Peiró, 2014; Yao, Liu, Chen, Mahdi, & Ni, 2018). As well as comprehensive literature of the behaviours and perceptions towards recycling (Van Weelden, Mugge, & Bakker, 2016; Ylä-Mella et al., 2015), repairing (Sabbaghi, Esmaeilian, Cade, Wiens, & Behdad, 2016; Wieser & Tröger, 2016) and stockpiling (Wilson et al., 2017).

However, questioning whether consumers play a pivotal role in promoting sustainable waste reduction and generation solutions has been neglected in comparison (Echegaray, 2016). Additionally, most of the studies mentioned relied on quantitative evidence from consumers surveys without deepening on the reasons for the observed variation in the consumers' behaviours (Echegaray, 2016; Ongondo & Williams, 2011; Rathore et al., 2011; Wilson et al., 2017; Yin et al., 2014; Ylä-Mella et al., 2015).

Moreover, mobile phones present an interesting challenge when we analyse their potential in a circular economy. Mobile phones are constituted by hundreds of materials, some of which are extremely rare and valuable (gold, palladium, niobium, and gallium)(Takahashi et al., 2009). Nevertheless, recovering, separating and recycling these materials is quite complex. Although separating these materials is technically possible, the majority of phones are sent (often illegally) to other countries for their separation and repurposing (Abdelbasir et al., 2018). Thus, following the lifespan of a mobile phone from "*its cradle to its grave*" might be exceedingly tough.

Furthermore, with a few exceptions, the lack of qualitative data makes results difficult to interpret and limited to a few predetermined factors (Wieser & Tröger, 2016). Besides, most of these studies have been performed in the Global North, with some notable exceptions: Brazil (Echegaray, 2016) and India (Rathore et al., 2011). The analysis of consumption and disposal of mobile phones in the Global South might differ because consumers from developing countries are "*trapped between the consumption-thirsty emerging middle class and increasing environmental problems*" (Echegaray, 2016, p.192).

In these countries, the aspirations of social inclusion through mass consumption could significantly increase mobile phones acquisition (Echegaray, 2016). It is also important to point out that it is necessary to have an international perspective of the common trends of attitudes and behaviours towards consumption and disposal, to be able to know where Mexico stands. This is especially true since Mexican authorities have tried to imitate foreign policies and become more "*Europe-like*".

Nevertheless, as we will see later in the chapter, we differ from those countries and face additional challenges, such as crime fear and the concept of a "*fair*" agreement. Promoting recycling, for example, presents a series of unique challenges in GMC and (ironically) disincentivising second-hand markets. Further, we shall use the concept of *contextualised*

materialities, and I shall talk about mobile phones and their constituent materials. However, I shall not deepen the recycling or acquisition of each of the elements that constitute mobile phones (gold, copper, etc.). Still, I shall allow mobile phones to reveal the practices and behaviours surrounding them in the GMC. Thus, in the following section, we present a literature analysis of the drivers observed in mobile literature on consumption, average lifespan, stockpiling, recycling, and environmental impacts.

5.1.1. Up-to datedness and coping with perceived obsolescence

Mobile phones are typically categorised as a typical up-to-date product, which is goods that are replaced even if they are still fully functioning (B. Li, Yang, Song, & Lu, 2012a; Ongondo & Williams, 2011; Wieser & Tröger, 2016; Wilson et al., 2017). The fast-paced development and availability of more recent software, better cameras, and faster processing capacity make existing phones seem "*slow*" in comparison (Wieser & Tröger, 2016). Additionally, phones are considered an object of fashion due to their closeness with the human body and visibility while continually being carried around (Katz & Sugiyama, 2006).

Moreover, having an outdated phone could be associated with poverty and high age. Therefore, keeping up to date makes people feel like "*being part of a society*"; this involved participating in the conversation about new technologies; being a competent user was even perceived as an essential work-related skill (Wieser & Tröger, 2016). Arruda-Filho & Lennon (2011) suggest that buying a new phone could "*enhance enjoyment and provide ways to signal social status*" (p.254).

Additionally, buying a new phone could provide a feeling of "*attention and differentiation*" (Schau, Muñiz, & Arnould, 2009). Some users might even define their self-worth from the possession of these devices (Mittal, 2006). However, recent research shows that most consumers do not acquire their phones solely based on fashion and novelty. It has been shown that some consumers might experience a feeling of "*apathy*" towards the releases of new mobile phones models, and there is a growing belief that phones should be used as long as possible (Huang & Truong, 2008; Wieser & Tröger, 2016).

Many consumers expressed a compromise between "*the perceived need to be up-to-date and the preference to keep phones for a longer period*" (Wieser & Tröger, 2016, p. 3048), which comes as a response or strategy to cope with the fast obsolescence of new phones.

Further, although choosing a mobile phone is a subjective choice, some factors are vital to driving consumer consumption. Even though people cited functionality and style as the main reason for replacing a phone, most of them only replaced their phones when they received an incentive replacement with a new mobile contract (Huang & Truong, 2008).

Premature replacement occurs typically because consumers are offered a new phone at a discount upon contract renewal. They valued functionality and style as the most important reasons they chose the model from the mobiles **available in the contract** (Huang & Truong, 2008). A Greenpeace (2016) survey found that most consumers agreed that mobile phone manufacturers release too many new models each year and that they would be ok with changing their mobiles less often.

One of the more significant consumers' concerns is their mobiles' perceived obsolescence, which appears to be a more meaningful driver than the desire for novelty. Therefore, perceived obsolescence can drive consumers to replace their phones rather than repairing them or buying a second-hand phone (Wieser & Tröger, 2016). A premature replacement has been linked with the lack of consumer awareness and responsibility for e-waste generation resulting from psychological obsolescence (Echegaray, 2016).

As Echegaray (2016) describes, this "results from consumer's realisation of the declining use-value of goods based upon negative judgements of product desirability, ultimately it can be defined as the subjective evaluation of product perception based on learned experiences" (p.192). This author looks at consumers, not like victims trapped in a throwaway system but rather as willing accessories in the process (Echegaray, 2016). On the other hand, some authors have tried to cast doubts on the prevalence of "*consumerist syndrome*" (Wieser & Tröger, 2016). This research aligns with the latter way of thinking, considering that factors (like coping with obsolescence and stockpiling due to fear of crime) might be out of the consumers' hands.

Table 5.1 Drivers for replacement and acquisition of mobile phones

Drivers	Authors
Fast-Paced Technology (Better Cameras, Software, Processing Capability)	(Wieser & Tröger, 2016)
Object of Fashion	(Katz & Sugiyama, 2006)
Association of Poverty and High Age	(Wieser & Tröger, 2016)
Price, Brand, and Interface	(Echegaray, 2016)
Incentive Replacement	(Huang & Truong, 2008)
Attention and Differentiation	(Schau et al., 2009)

5.1.2. Extending the lifespan of phones

Using phones longer could decrease resource consumption and environmental damage, even considering constant material and energy efficiency (Kwak, 2016). Furthermore, using a mobile phone for one additional year could reduce its overall carbon footprint by 31 per cent (Green Alliance, 2015). In the case of mobile phones, the extension of their service lives is considered the most efficient measure to approach a "*circular economy*" or a "*closed-loop system*" in which resource efficiency is the primary driver (Sinha et al., 2016). The benefits of direct use are explained by The Ellen MacArthur Foundation (2013) as:

"The closer the system gets to direct reuse, i.e. the perpetuation of its original purpose, the larger the cost savings should be in terms of material, labour, energy, capital and the associated externalities such as greenhouse gas emissions, water or toxic substances."

For phones to be part of a successful reuse system, consumers need to use second-hand phones instead of buying them. Secondly, phones need to be handed after replacement to ensure a sufficient supply of second-hand phones (ibid). However, consumers have different perceptions when the product is brand new compared to one that has been previously used. There is a general belief that a used phone may not last as long as a new one and will become obsolete faster than a new model (Van Weelden et al., 2016).

Consequently, some consumers buy the latest model available to cope with technology obsolescence speed (Wieser & Tröger, 2016). Nonetheless, some studies reveal that buying brand new mobiles can produce negative feelings. Inevitably, consumers might benefit from advanced technology, but they might also feel anxious because their devices might soon become obsolete (Mick & Fournier, 1998). Moreover, researchers have found that not many users are willing to use a second-hand phone (only around 10 per cent of Europeans get their phones second handed) (Green Alliance, 2015; Wieser & Tröger, 2016).

Nevertheless, this rejection is not because users want to stay updated with the most recent model but instead of perceiving various risks of buying second-hand. (Ylä-Mella et al., 2015). They listed reasons for not buying second-handed included: not having a warranty or insurance, not personally knowing the seller, and the phone comes with possible bugs

or malfunctions (Huang & Truong, 2008; Wieser & Tröger, 2016). Some researchers point out that the average lifespan of mobiles varies between developing and developed countries by three and two years, respectively (Sarath et al., 2015; Soo & Doolan, 2014).

5.1.3. Maintenance and Repair

Although maintenance and repair may further the lifespan of mobiles (Wieser & Tröger, 2016), the majority of the interviewees expressed some resistance to doing it. From the sample, 24 interviewees reported having repaired their phones in the last two years, and 26 interviewees reported not repairing their phones in the same amount of time. These results are consistent with other studies made on phone repairing. Most people express annoyance with the high costs of repairing and count it as the main driver to avoid it (King et al., 2006).

The interviewees from the middle-income bracket repaired their phones more often than those in the higher and lower-income classes. The majority of those who repaired their phones had a service contract spent a considerable amount of money on their mobiles. Typically, consumers who buy more long-lasting products tend to have a higher propensity to repair those products (Nieuwenhuis, 2008). Another aspect that makes phones a particular case among electronics or other products is that products usually gain consumer confidence after perceiving their quality through usage time (Sabbaghi et al., 2016).

In general, interviewees would only repair their phones if they considered that the price of repairing was significantly lower than getting a new phone. Therefore, repairing costs becomes a considerable deterrent for repairing; hence, some consumers prefer to replace them (Cooper, 2005). Consumer attitudes and behaviours towards repairing depend on many factors such as consumer emotional attachment, eco-conscientious, personality traits (e.g. frugality), product-retention tendency, product-care attentivity and socio-demographic factors (Sabbaghi et al., 2016).

In this sample, some interviewees said they took extra precautions to ensure they would not have to repair their phones or pay for the repair if needed. Meanwhile, in the lower-income class, people said that repairing their phones was "*pointless*" or a "*waste of money*" since the repairing fee would be as expensive as their phones. In Table 5.2. there is a summary of the reasons for and against repairing observed in this sample.

Table 5.2 Reasons for and against repair observed in this sample

For	Against
Emotional Attachment	Extra Precautions
Insurance	High Repair Cost
Spent a considerable amount of money on mobile	The repair cost higher than the value of the phone
Eco-consciousness	Waste of time

5.1.4. Stockpiling

Some researchers have noticed that users tend to store their devices rather than extending their life by using them, giving them away or selling them (Ongondo & Williams, 2011; Wilson et al., 2017; Ylä-Mella et al., 2015). Wilson et al. (2017) defined "*hibernating mobile phones*" as those phones users retain at the end of their lives. In a survey done in Finland, it was observed that "*up to 85 per cent of the users store their non-used mobiles until a possible future use, which may never come*" (Ylä-Mella et al., 2015, p.383). Additionally, the average length of this hibernation phase was four years and 11 months (ibid). That is double the average time of use of a phone, and therefore by the time these phones reached a takeback system, they could have more than six years in existence.

Furthermore, several studies have shown that consumers have more than one phone in storage. These studies suggest that a recently replaced phone might be stored as a spare, but they are eventually also relegated as a spare when a more recent phone is acquired, yet they mainly remain stored (Huang & Truong, 2008; Ongondo & Williams, 2011; Wilson et al., 2017; Ylä-Mella et al., 2015). Thus, stockpiling phones allow mobile phones to be part of a circular economy quite distant. Nevertheless, these phones could potentially be "*reawakened and recaptured*" so their precious resources could be reused (Wilson et al., 2017).

Many authors have addressed this leak in the loop system (Sinha et al., 2016; Türkeli, Huang, Stasik, & Kemp, 2019; Wieser & Tröger, 2016; Wilson et al., 2017), which in general suggest monetary incentives to avoid the stockpiling, these could be in the form of cash payments and vouchers. The mobile phone takeback services would also have to be convenient and easy to use (Ongondo & Williams, 2011). Considering how consumers do not consider their most recent spare phone as stockpiling, these takeback services would only be effective with those phones which cannot be sold, traded, or passed along (ibid).

In the previous sections, we analysed why people acquired and replaced phones and how they do that. Additionally, we could delve into how long consumers retain their phones. We shall see what people do when they no longer use their mobiles in this segment. In general, behavioural patterns in phone disposal in Mexico are comparable to most of the world, as seen in, as seen in Table 5.3. The majority keep their phones ("*hibernating*"), and the rest are customarily given to relatives or friends; the results are shown in Figure 5.1. Finally, trading is the third most frequent way in Mexico to dispose of a phone. Many of the interviewees did not see recycling as an option because they thought that they might need a spare phone in the future.

Table 5.3 Ways of disposing of mobile phone selected countries (%)

Country	Year	Kept	Donate Recycle	Give	Sold	Throw	Stolen	Trade
Mexico	2018	40	4	22	8	6	10	10
Austria	2018	51	18.9	12	6.7	1.4	1.7	-
Mexico*	2017	30	2	37	17	3	10	1
Finland	2015	54.8	18.2	15.8	2.4	-	-	8.5
Brazil	2014	46	7	34	3	5	5	-
China	2014	47.8	26.1	24.8	12.4	6.8	2.0	-
USA	2011	67	12	5	4	4	-	-
India	2011	34.4	0.6	18.9	10.7	5.6	14.8	10.5
USA, Canada	2008	51	12	32	9	21	-	-
Internatio nal	2008	44	3	33	16	4	-	-
Average		46.6%	10%	23%	9%	8%	5%	4%

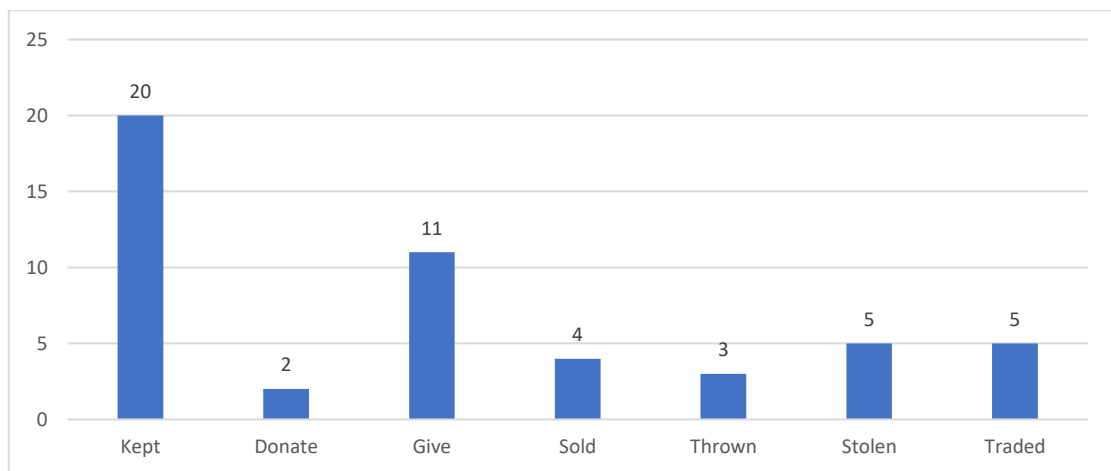


Figure 5.1 Way to dispose of phones in the sample N=50 (Huang & Truong, 2008; Maccari et al., 2014; Rathore et al., 2011; Wieser & Tröger, 2016; Ylä-Mella et al., 2015)

There is a significant circulation of phones among society; giving, selling, and trading phones are crucial in acquiring their "new" phones. This circulation would extend their lifespan, and therefore resources would not be used to make new phones. However, this only stands true with half (or less) than the phones currently owned. The other half is kept dormant, gathering dust in drawers and waiting for future use that might never come. Further, these phones could potentially be "reawakened and recaptured" so their precious resources could be reused (ibid). Additionally, several studies have shown that consumers have more than one phone in storage (Huang & Truong, 2008; Ongondo & Williams, 2011; G. T. Wilson et al., 2017; Ylä-Mella et al., 2015). These studies suggest that a recently replaced phone might be stored as a spare, but they are eventually relegated when a more recent phone is acquired, yet they mainly remain stored (ibid).

5.1.5. Electronic Waste and Waste Mobile Phones

Mobile devices have one of the fastest-growing e-waste rates; the number of mobile users reached 4.78 billion people in 2020 (representing 61.62 per cent of the global population), of which 3.50 billion are smartphones (Statista, 2019). According to the European Parliament's and WEEE (Waste Electrical and Electronic Equipment) Council's electro-electronic waste refers to:

"any electronic substance or object that the holder discards or is obliged to dispose of according to local laws that are in force, including all of their components, subcomponents and consumables that comprise the product at the time of disposal." (Directive 2002/96/EC).

According to a UN report, 44.7 million metric tons of e-waste have been generated globally, which would be equivalent to almost 4,500 Eiffel Towers. Therefore, each habitant produces 6.1 kg of e-waste a year; this report also estimates that e-waste will increase to 52.2 million metric tons by 2021 (Baldé, Forti, Gray, Kuehr, & Stegmann, 2017). Thus, the general growth rate of e-waste is about three times ordinary waste (J. Li, Ge, Liang, & An, 2017). The increasing amount of e-waste comes from technological advances, increasing users, and short replacement cycles.

Additionally, the disposable income in some developing countries is increasing, and the growing middle class can spend more on electronic devices (ibid). The UN report also mentioned that 80 per cent of the e-waste generated is not documented, which means that its fate is unknown. Still, it is likely dumped, traded, or recycled under informal conditions (ibid). Furthermore, the monetary value of the raw materials present in e-waste

was approximately 55 Billion Euros in 2016, which is more than the 2016 Gross Domestic Product of most countries in the world.

In Mexico, there has been an annual growth of 5 per cent of electronic waste. In 2006, 256,286 tons of waste were generated, while in 2018, this grew to 408,824 tons of e-waste. However, only 3 per cent of the electronic waste produced in 2018 was recovered and recycled (SEMARNAT, 2017). Additionally, it is estimated that a citizen of GMC produced 4.7 kg of e-waste on average (SEMARNAT, 2017). By 2018, 83.1 million residents in Mexico had a cell phone, reflecting 73.5 per cent of the population over six years old.

Further, 8 out of 10 of these mobiles were smartphones, representing 69.6 million devices, as seen in Figure 5.2 (ENDUTIH, 2018). In 2019, it was approximated that around 5 million mobile phones were disposed of (515 tonnes) (SEDEMA, 2019). Deloitte (2017) surveyed Mexico estimated that only 5 per cent of the mobiles reached the waste stream by being thrown or recycled. However, this sample only considered top tier brands of mobile phones, and this number may be higher if we include medium and low tier brands since people dispose of them more than expensive brands.

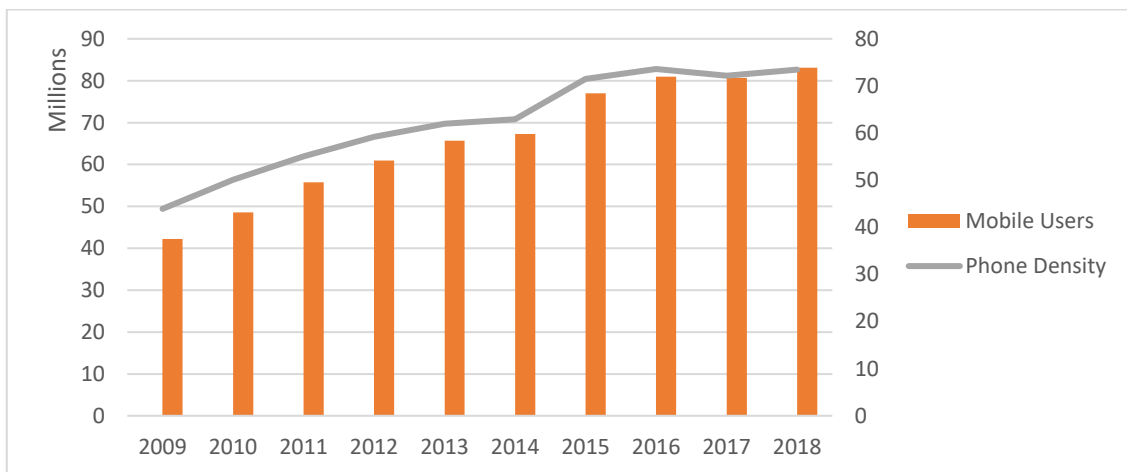


Figure 5.2 Mexico's Mobile Volume and Density (ENDUTIH, 2018) (INEGI, 2019) (MODUTIH, 2014)

E-waste often contains toxic or hazardous materials such as mercury, cadmium, lead, arsenic, dioxins, and furans. If these materials are landfilled, incinerated or improperly managed, they are released into the environment polluting the air, soil and water (Valero Navazo et al., 2014). For example, the cadmium from only one mobile's battery is enough to pollute 600,000 litres of water (Manivannan, 2016). Furthermore, energy consumption

would be reduced, and resource efficiency would be increased if enough phones were recycled.

Navazo et al. (2014) found that "*the energy consumed to recover copper from mobile phones is half of that needed for copper primary extraction and similar or greater energy savings for precious materials*" (p.578). The potential environmental damage is greater in countries without strong environmental regulations, such as China, India, and Ghana (ibid). The way e-waste is recycled in developing countries mainly consists of two ways of treatment. Firstly, they are sold at the secondary market or remote rural areas. Then informal (often illegal) companies process the waste in backyards or small workshops using crude methods like manual disassembly, open burning, and acid leaching to extract the gold, silver and palladium (J. Li et al., 2017). The "*backyard operations*" to recover the precious materials from the phones often imply the burning of wires and plastic; dark fumes containing dioxins are hazardous to the workers and can cause serious health problems. The problem worsens by the large flow of e-waste exported from developed countries to developing countries (ibid).

5.1.6. Waste Trade

Only around 20 per cent of mobile phones are managed correctly in industrialised countries. Additionally, developing countries have increased interest in importing e-waste for reuse and recycling. However, this type of waste ends mostly in landfills after the sorting by informal recycling (which consists of manually taking apart the precious materials)(Sinha et al., 2016). There is also a low overall recovery rate in sorting by informal recycling (Umair S. et al., 2013).

Therefore there is a significant loss of a substantial amount of valuable resources that could be recovered (F. Wang et al., 2013). It is difficult to quantify how much e-waste is being exported from developed countries to developing countries since much of it is sent to informal recycling. However, the UN in 2016 conducted a study in which they monitored 205 deployments of "*used electronics*" from the USA and EU. They discovered that 34 per cent of these deployments moved offshore, 93 per cent went to Asia, and 7 per cent went to Mexico and Canada (Baldé, Forti, Gray, Kuehr, & Stegmann, 2017).

Some developing countries have banned importing e-waste; this is the case of China (J. Li et al., 2017) and Nigeria (Baldé, Forti, Gray, Kuehr, & Stegmann, 2017). However,

the UN research showed that even if Nigeria banned the import of specific electronic devices, hundreds of e-waste tons were still imported to this country (ibid). The Basel Convention was adopted in 1989, and it was the response to the public outcry against the toxic waste movement from developed countries to developing countries (predominantly African countries). This convention aims to reduce hazardous waste generation and restrict transboundary movements of hazardous waste except where it is perceived to follow environmentally sound management principles. Mexico was one of the countries that signed the convention in 1989 (Secretariat of the Basel Convention, 2011). Nevertheless, Mexico has exported an immense amount of e-waste to the rest of the world, especially China, Pakistan, and Malaysia (Mendoza, 2015) (Malaymail, 2020).

Not all the materials on phone recycling can be recovered in Mexico. They have to export e-waste; electronic waste, metal components and hazardous batteries must be exported to other countries (ANATEL, 2018). However, Mexico has also received e-waste from other countries illegally; it is estimated that between 2010 and 2019, the country received 10.5 million tons of illegal waste (Network, Basel Action, 2019). As aforementioned, it is difficult to track the amount of waste entering the country illegally. There have been several instances when deployments of illegal e-waste have been stopped and sent back to their countries of origin (Mendoza, 2015).

Nonetheless, it is problematic that Mexico has not ratified the Basel Convention (section written on the 10th of March of 2020). Experts fear that after China banning several wastes being exported to their countries (Malaysia and Nigeria), Mexico might become one of the main places to receive foreign waste (Network, Basel Action, 2019). Additionally, Mexico's government estimates that only 10 per cent of e-waste is appropriately managed, and 40 per cent of it is treated by "*backyard*" operations ("*chatarros*") (SEDEMA, 2019). Therefore, if Mexico does not ratify the Basel Convention, the amount of e-waste in the country could increase dramatically (some experts suggest it could at least quadruple) (Network, Basel Action, 2019).

5.1.7. Recycling Mobile Phones

Although WMP generation has increased, the recycling systems have not experienced the same growth (Yao et al., 2018). In 2008, Nokia surveyed 6500 people worldwide and concluded that only 3 per cent of the population returned their phones for recycling

purposes (Nokia, 2008). In India, a survey found that the recycling rate did not even reach 1 per cent, and the highest percentage of recycling was found in China with 26.1 per cent (Rathore et al., 2011; Yin et al., 2014). Recycling waste mobile phones can reduce the generation of large amounts of hazardous waste lessen environmental and social problems associated with the extraction of materials, and minimise the depletion of rare materials that are difficult to substitute (Valero Navazo et al., 2014).

Further, it is calculated that around 80 per cent of the materials used in mobile phones can be effectively recycled (Moltó, Egea, Conesa, & Font, 2011). Some of these elements can only be found in specific geographic areas worldwide; for example, China has 95 per cent of the world's rare earth reserves. Therefore, there is a dependency on producer countries that threatens the world supply chain (ibid). Additionally, mobile phones are materially rich, compounded by more than 40 various elements (Wilson et al., 2017). Excluding the battery, 23 per cent of the mobile comprises metals; the other parts are mainly plastics and ceramic material (Maccari, Terezinha, & Mauro, 2014).

For every ton of mobile phones, it is possible to obtain approximately 3.5 kg of silver, 340 grams of gold, 140 grams of palladium and 130 kg of copper (UNEP, 2009). Even though each phone has an average concentration of 44 mg of gold, 200 times more than the concentration found in a gold mine in South Africa (Takahashi et al., 2009), these metals are found in quantities of less than 0.01 per cent on Earth (Valero Navazo et al., 2014). It is impossible to recover scarce materials like rare earth minerals like niobium and gallium because of physical limitations and not economically viable. However, the recovery of the rest of the materials in a phone is only economically feasible for the content of those precious metals (Abdelbasir, El-Sheltawy, & Abdo, 2018). The recycling of mobile phones (like any other object) is driven by economic and environmental interests and limited by physical restrictions of the separation process.

Given the compound phones' materials, we can determine that the disposed phones may still have value. These materials can be recovered and reused if correctly sorted (Wilson et al., 2017). If we consider the number of phones currently hibernating, the energy and materials that could be recovered from them would be tremendous. The profitability of mobile phone reuse is the most significant factor for mobile waste mobile phone collection in the USA and Europe. Moreover, mobile phones' reuse has an excellent profit margin compared to recycling (Sarath, Bonda, Mohanty, & Nayak, 2015).

Many studies have discovered that recycling rates are meagre in developing and developed countries (J. Li et al., 2017; Maccari et al., 2014; Ongondo & Williams, 2011; Sarath et al., 2015; Sinha et al., 2016). In Brazil, it was found that recycling was an extensively discussed theme; however, people still seem to doubt the recycling process (Maccari et al., 2014).

In Finland, consumers also stated that they were aware of an e-waste recovery system, yet half of the sample interviewees chose not to participate in it (Ylä-Mella et al., 2015). Ongondo and Williams (2011) surveyed university students and determined that an extra incentive would increase the recycling of mobile phones. Therefore, awareness seems not to be the only driver for recycling effectiveness; initiatives, strong messaging and the right incentives are necessary to achieve more effective recycling rates (J. Li et al., 2017).

As Yla-Mella et al. (2015) mentioned, "*it seems that the awareness of the importance of mobile phone recycling is considerably high: notwithstanding, awareness has not translated to behaviour*" (p.383). Improving the collection system for used mobiles could also become an essential driver. Further, the proximity and convenience of the collection points of the current recycling systems seem to be currently inadequate (Sinha et al., 2016).

Furthermore, Li et al. (2017) pointed out that strong messaging and the right incentives are necessary to achieve more effective recycling rates. Improving the collection system for used mobiles could also become essential driver proximity and convenience of the collection points of the current recycling systems seem to be currently inadequate since there are only 516 collection sites for recycling in the country. Likewise, incentives like a monetary deposit system could also boost the recycling rate (Ylä-Mella et al., 2015).

Social imitation could provide the impetus for consumers to revisit and update their lifestyles; therefore, policymakers should consider creating a more grassroots-oriented campaign (Babutsidze & Chai, 2018). In general, the literature on consumer behaviours towards recycling suggests that mobile phone manufacturers must work with recycling industries to overcome the low recycling rate. In Table 5.4, we can see the main limitations towards achieving a circular economy and the proposed ways to solve them observed in the literature.

Table 5.4 Leaks and ways to achieve a circular economy

(Ongondo & Williams, 2011; Türkeli et al., 2019; G. T. Wilson et al., 2017; Ylä-Mella et al., 2015)

Ways to achieve a circular economy	Limitations	Proposals
The increasing lifespan of mobiles	<ul style="list-style-type: none"> - Planned obsolescence - Fast technological advances - Contract renewals - Desire to stay up-to-date - Social pressure - Technical problems (e.g. screens breaking easily) - Stolen good 	<ul style="list-style-type: none"> - More durable phones (longer battery life and shock-resistant screens) - Software updates are available for older devices. - Mobile networks companies should make their replacement cycles longer. - The government should help to implement these changes
Repairing	<ul style="list-style-type: none"> - High costs - Costs of repairing higher than acquiring a new phone - The phone is too old to be repaired - Scepticism toward repairing efficiency 	<ul style="list-style-type: none"> - Tax benefits for repair and more information about the reparability of phones. - Mobile companies could offer a mobile "repair" package instead of a mobile renewal.
Buying/ Using second-hand mobiles	<ul style="list-style-type: none"> - It does not help to cope with obsolescence - Various risks due to uncertainty or not knowing personally the person who gives/sells the phone - Not having a warranty 	<ul style="list-style-type: none"> - Creation of formal markets for second-hand phones (regulated by the government) - Continue policies tackling phone theft and give them more visibility
Stop hibernating mobiles	<ul style="list-style-type: none"> - The feeling of "needing" to have a spare phone* - Feeling like a relative might need a spare phone* - Emotional attachment - Unawareness of what to do with used phones * Crime accentuates this feeling 	<ul style="list-style-type: none"> - Monetary incentives by the government or mobile companies (this could be in cash payments and vouchers). - The increasing lifespan of phones, repairing and market for second-hand phones
Recycling	<ul style="list-style-type: none"> - Lack of awareness of where to deposit phones - Lack of national infrastructure to recycle phones - Lack of incentives for consumers - Lack of incentives for recyclers 	<ul style="list-style-type: none"> - Manufacturers, policymakers, and mobile companies have a shared responsibility to collect, process, and dispose of mobiles. - More collection sites, monetary incentives, and more visibility and awareness.

Section II

5.2. Methods

In this section, I shall showcase the results of the interviews performed in GMC regarding mobile phones. As mentioned previously, the main objective of this research was to understand why people acquire and dispose of certain materials. Following the Practice Theory framework, it was crucial to identify the various elements of this theory, such as meanings, skills, and infrastructure. These elements would then help us analyse mobile phones' behaviours, practices, and values. In turn, exploring these practices would allow us to propose strategies or policies to curb the growth of e-waste. To collect information about what respondents do and not what they say they do, consumers were first asked to show their collections of old mobiles. Some had drawers full of old mobiles, and others only knew where their last phone was. After this exchange, the interviews were performed with the respondents. The questions performed in this part of the interview are included in Annex I.

Thus, this segment is divided by the questions that guided the interviews. Firstly, by inquiring why people buy mobile phones, explore the drivers and meanings attached to mobiles. Secondly, how long people use their phones, where we will explore practices towards maintenances and the phenomenon of stolen phones. Afterwards, we shall delve into how people acquire those phones, and this will showcase how contract renewals work in the GMC and how micro-loan stores affect those in the lower-income bracket. Finally, we will analyse how phones are disposed of, in which we will look at an array of practices ranging from recycling, second-hand phones and stockpiling. The main questions asked to the interviewees were:

- How old were they when they got their first mobile phone?
- How did they acquire this phone?
- How do they acquire their phones now?
- Why do they replace their phones?
- What do they do with the mobiles they replaced?

The next section shall showcase the results obtained for the different stages of a mobile's lifecycle in GMC.

Section III

5.3. First Stage: Acquisition

For Shove and Pantzar (2005), the dynamic relationship between the materials, image, and performances of the practices they sustain is the more relevant part of studying the materials involved in a practice. Things are not just communicators of symbolic meaning (Warde, 2005), status or identity (Shove & Pantzar, 2005). Materials are often "*directly implicated in the conduct and reproduction of daily life*" (Shove & Pantzar, 2005, p.44). However, "*products alone have no value, they do so only when integrated into practice and allied to requisite forms of competence and meaning*" (ibid, p.57).

Therefore, the first step in this chapter was to understand the symbolic meaning of materials to understand their implication in everyday habits. Thus, we were looking for the answers to:

- What do mobile phones represent?
- What are the values attached to them?

These questions are particularly relevant in this research since Millennials were brought up with gadgets and devices; therefore, the evolution of meanings and symbols they attach to mobile phones is specific to this generation. Some see them solely as tools or instruments to help with their daily lives, while others see them as status symbols or modernity. At the same time, some might even consider owning a mobile as almost essential.

5.3.1. Why do people want mobile phones?

In this study, the average age when people had their first smartphone was 14 years old, with some possessing them as young as nine years old and as old as 25 years old. People from a higher income class acquired their phones earlier than those in the middle- and low-income class, as seen in Table 5.5 and Figure 5.3. For the people in the high-income class, the average age of acquiring their first phone was 12 years old.

Table 5.5 Age when getting their first phone (years)

<i>Income</i>	<i>Average</i>	<i>Max</i>	<i>Min</i>
High Income	12	15	10
Middle Income	13	15	9
Low Income	16	25	11

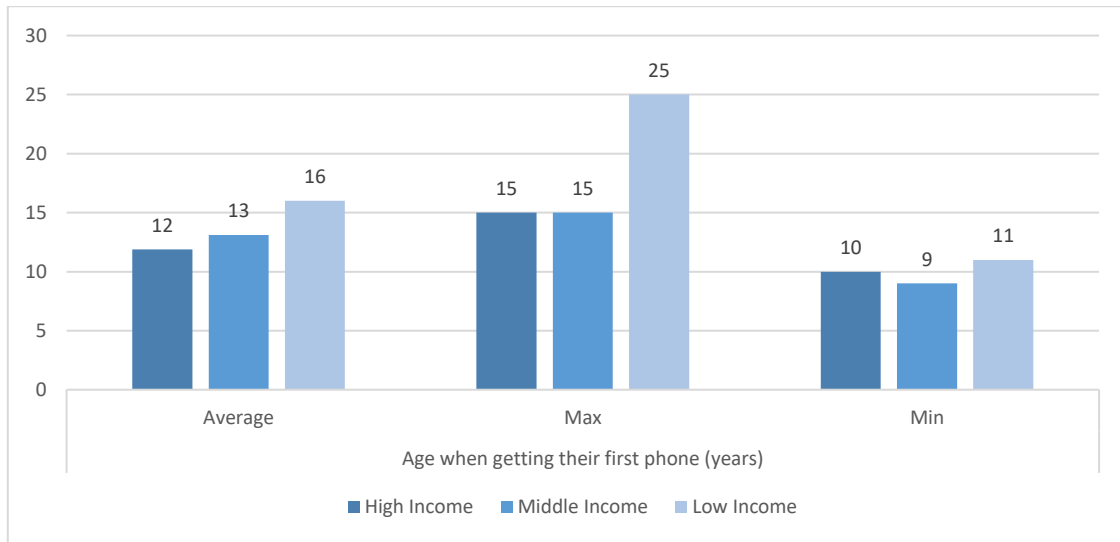


Figure 5.3 Age getting the first mobile (years)

Brook Lyndhurst (2011) found that children often pressure parents to buy a new phone, which Wieser and Troger (2016) confirmed that the influence of friends and family is one of the main drivers to acquire a new mobile. Many high and middle-income interviewees expressed that they succumbed to social pressure to buy the most recent mobile models when they were younger. This feeling of social pressure suggests that millennials owning a mobile at an early age gave some of them a sense of belonging and social status.

However, most of them also stated that this behaviour changed as they aged. A few interviewees expressed that they were not following fashionable trends anymore or were easily persuaded to follow what others do. Nevertheless, there was still a feeling of staying updated, but for more "pragmatic" reasons.

"I still try to keep up to date, but it is no longer to "to fit in". I bought the newest model of iPhone available because I NEED it for my work".

The interviewees claimed that they acquired their phones to fulfil specific purposes; these purposes ranged from the "need" of having a better camera or faster phone to more "basic needs" like communicating with their families. The income class seemed to impact which

purposes were prioritised in this sample. High income and middle-income class interviewees mentioned technology change as a fundamental reason to get a new phone, while in the low-income class, communicating was the main reason. As mentioned earlier, consumers expressed a compromise between "*the perceived need to be up-to-date and the preference to keep phones for a longer period*" (Wieser & Tröger, 2016, p. 3048). This compromise is a response or strategy to cope with the fast obsolescence of new phones. Therefore, some consumers buy the latest model, thinking they can enjoy it for a bit longer.

"When I was a teenager, I was trying to keep up with getting the newest technology, but it was too expensive and exhausting. Someone would always have something better than you."

In contrast, the average age of getting their first phone was 16 years old in the low-income class. For interviewees in the low-income bracket, practicality was the main driver to getting a mobile; some interviewees in this income class said getting their first phone felt like the beginning of their "*adult life*". For some getting a phone was not about "*fitting in*" or being up-to-date, but instead a tool required for working. It was not a feeling of belonging, but it did give them a feeling of self-accomplishment.

"I was 18 years old when I got my first phone. My boss at that time gave me that phone to contact me. I came back home and showed it to all my friends."

Additionally, interviewees in this income bracket said they did not feel pressured to have a mobile when they were younger. They mentioned that it was rare to see someone their age (12-13 years old) having a mobile. Regardless of the income bracket, most interviewees remembered getting their first phone as a pleasant experience; however, the values connected to them changed. As aforementioned, in higher and middle income, there was a feeling of belonging and status, while in lower-income, where most of them had to get their first phones on their own, the feeling was linked with self-accomplishment.

Most of the interviewees showed an evolution of values and behaviours towards mobile consumption. Consequentially, high, and middle-income class interviewees experienced a more significant social pressure to acquire a mobile than those in the lower-income class. This social pressure can be explained by the availability and the presence of mobiles among people their age. On the other hand, people in the low-income class did

not express such a change; for them, a phone always represented a communication tool or work. Furthermore, in this sample, several interviewees expressed an apathy or rejection of the idea of being "*addicted or hooked*" to always getting the most recent models. Some of the reasons this happened were how expensive mobile phones have become and how fast they think they have become obsolete.

Additionally, a few interviewees were concerned with frequent replacements' environmental and social consequences. They expressed a "*desire*" of finding the balance between having a "*good*" phone (depending on which purposes every individual placed on the phones) and not feeling the need to be up-to-date. Therefore, most interviewees would describe themselves as more pragmatic now than when they used to be when they got their first phone. In this sample, some interviewees in the high and middle-income classes bought their phones "*brand new*" mainly to stay up-to-date. These consumers shared a fascination with technology or fashion and were trying to buy the latest device possible.

"I am an "influencer" I need the newest model. It is part of my work, and I consider my phone a tool or an extension. In my line of work, having an old and outdated phone is not acceptable."

Some did extensive research when buying their new phone; they considered buying a mobile as an investment.

"I did have a regular service plan, but I was done with the quality of phones they offered there. They would start failing before my plan was renewed. So, I did some research online. I was looking for the best quality-price ratio, and it took me around a month of research to finally decide."

Some also saw buying the device "brand new" (not with a service contract) as a milestone.

"I knew I wanted the latest iPhone. It means something to me; when I bought it, it made me feel proud of myself."

The following table (5.6) shows the central values and drivers attached to mobile phones observed in the sample, divided by income type.

Table 5.6 Drivers and values attached to mobiles observed in the sample

Low Income	Middle Income	High Income
Practicality/ Pragmatism		Fitting in
Communication	Being up to date/ Novelty	
Work Tool	Desire to find a balance between a "good" phone and perceived obsolescence	
Milestone	Investment	
Feeling of Accomplishment	Feeling of Belonging	

5.3.2. How long do people use their phones?

The National Institute for Climate Change Studies (INECC) estimated the average lifespan of mobiles in Mexico to be 2.6 years (30 months) (SEMARNAT, 2017). This sample comes close to this estimation showing that consumers use a phone 24 months on average in the GMC. Since the metropolitan area is the country with the highest replacement of mobile phones, these results align with the national sources. In table 5.7, we can see that the average mobile lifespan remained the same among the different incomes, but the maximum and minimum values changed among them.

Table 5.7 Average Mobile Lifespan (months)

Income	Average	Max	Min
Upper	29	48	12
Middle	24	36	6
Lower	19	36	6

Therefore, Mexicans replace their phones as often as people from other countries; most phones are replaced even while still functional. In this sample, the number one reason to replace a phone was due to an upgrade from the network operator (36 per cent); followed by the phone being broken (32 per cent) "*and beyond repair*" or not "*worth repairing*", then being stolen (16 per cent), change of technology (10 per cent) or being lost (6 per cent).

While in some surveys the two main reasons for replacement are contract renewal (Türkeli et al., 2019) and broken phones(Ongondo & Williams, 2011), only a survey in India places stolen phones as one of the main reasons to replace a phone (Rathore et al., 2011). Consequently, this strengthens the hypothesis that in developing economies, mobile theft acts as an important driver towards phone acquisition in addition to contract renewal and broken phones.

Mexico City's Fight Against the Theft Of 1,720 Daily Mobile Phones

Like many residents of Mexico City, Dr Ricardo Arizmendi has two cell phones. The phone that he usually uses and a cheaper one that he uses whenever he needs to commute or travel if he gets mugged. A well-thought strategy since a few days ago, he was mugged outside his office. Numbers do not lie. In 2018, 620,000 mobile phones were stolen in the city, according to the National Association for Telecommunications (ANATEL). However, only 3% of the cases were reported. Nevertheless, the official number of open investigations for theft and mugging increased by 50% in 2018 compared to 2017.

Jon Martín Cullell and Darinka Rodríguez, El País



Figure 5.4 Crowded Mexico City, March 2020 (Arau, 2020)

México

14th of May of 2019

Mugging and Pickpocketing in Public Transport of Mexico City increases by 197%

From 1,065 reported cases between December of 2017 to 3,165 reported cases in March of 2018

Mugging and stealing in public transport increased by 197 per cent in the first four months of the mandate of the new mayor Claudia Sheinbaum. The violence in these occurrences has also escalated. That is why people commuting by Metro, Metrobús, microbus or bus are risking getting their wallet or phone stolen and even losing their lives.

David Saúl Vela, El Financiero



Figure 5.5 Full Metro Stations, March 2020 (Arau, 2020)

5.3.3. Stolen phones in Greater Mexico City

As mentioned previously, the main reasons for mobile replacement are contract renewal (Türkeli et al., 2019) and broken phones (Ongondo & Williams, 2011). Only a survey in India places stolen phones as one of the main reasons to replace a phone. However, Mexico also has a massive problem of stolen mobiles, as seen in Table 5.8.

Table 5.8 Estimated Stolen Phones in Mexico every year (2012- 2018) (Cullel & Rodriguez, 2019)

Year	Stolen Phones
2012	156.681
2013	341.740
2014	442.284
2015	609.547
2016	892.316
2017	786.977
2018	627.920

In this sample, people's average time with their current phones was 14 months, as seen in Table 5.9.

Table 5.9 Real mobile lifespan (months)

	Average	Max	Min
High Income	9	37	1
Middle Income	14	24	1
Low Income	8	49	0

While performing this part of the interview, many interviewees pointed out that the reason they had recently replaced their phones was that they were victims of crime. Furthermore, low-income class interviewees reported being victims of crime exceedingly often. In this income bracket, people had only owned their new phones for a couple of months or even weeks. One interviewee even expressed not owning a mobile because "*it would just get stolen again*".

Further, "*passing on*" phones within a family was a common practice between all the income brackets; however, it was only in the low-income brackets that families would use all the spare phones available in the "*mobiles drawer*".

"We always save our old phones in my family because we know someone will lose them or they will get stolen, so we need to have backups. There have been times when we do not have any spares left."

I asked the interviewees if they had been mugged or pickpocketed in the last year. The results are shown in Table 5.10:

Table 5.10 Interviewees mugged or pickpocketed in the last year

Mugged/Pickpocketed	
High Income	<i>13%</i>
Middle Income	<i>13%</i>
Low Income	<i>88%</i>

Very few high- and middle-income interviewees were mugged or pickpocketed last year, while most of the low-income class people had. In this sample, as we can see in Table 5.11, interviewees were asked how regularly they used public transport. A minority of high and middle-income interviewees used public transport more than twice a week in the last month. Meanwhile, all the interviewees in the low-income bracket used public transport as their primary mode of transport.

Table 5.11 Regular Use of public transport

Regular Use of Public Transport	
High Income	<i>13%</i>
Middle Income	<i>23%</i>
Low Income	<i>100%</i>

Additionally, they were asked if these incidents happened in public transport or its vicinities. The results are shown in Table 5.12:

Table 5.12 Mugged or Pickpocketed using Public Transport in the last year

Mugged or pickpocketed using the Public Transport	
High Income	<i>100%</i>
Middle Income	<i>50%</i>
Low Income	<i>100%</i>

There are four modes of transportation in GMC: Metro (underground), bus, minivan ("*peseros*"), taxis or private taxis (Uber, Didi, Lyft). The Metro is the primary GMC transportation mode, with around 1.4 billion trips a year, while buses serve around 200 million passengers (ibid). (Vilalta, 2011). The Metro is considered the most affordable option since its fares are 0.25 USD per trip. Further, a big part of the population of GMC depends significantly on public transport as their primary or only way to commute for their daily activities, and this dependence is likely to increase. Therefore, due to the massive use and dependence on the public transport system GMC, residents become quite

vulnerable to crime (ibid). The perception of public transport being unsafe has always existed in the GMC.

Nevertheless, this perception has increased in the past years. A survey conducted by Mexico's government concluded that in 2018, 75.3 per cent of the GMC population felt unsafe while using public transport (INEGI, 2019).

In 2018, in GMC:

- Crime in public transport increased by 187 per cent compared to 2017 (SESNSP, 2019)
- Pedestrian muggings increased by 127 per cent compared to 2017 (SESNSP, 2019)
- The insecurity perception increased from 46.3 per cent in 2014 to 82.6 per cent (INEGI, 2019).
- Ecatepec, situated within GMC, reported one of the most significant insecurity perceptions in the country with 92.5 per cent (Vilalta & Muggah, 2016)(INEGI, 2019).

GMC has always battled with crimes in public transport and pedestrian muggings but has only recently escalated. This type of crime has also been accompanied by an escalation in sexual violence (+687 per cent), extortion (+87 per cent), kidnapping (+209 per cent) and murder (+38 per cent) (SESNSP, 2019). Some interviewees, being aware of the rise in criminality on public transport, would avoid using it at all costs

"I am terrified of using public transport. I only use it in emergencies where I HAVE to use it, but even then, I am scared."

The perception of fear and insecurity was higher among female interviewees, regardless of the income; this is consistent with other studies performed in GMC where male public transport users were less prone to report fear of crime than female users (Vilalta, 2011). Some female middle and high-income users would say that if they had a trip where they had to use public transport, they would cancel the trip altogether. However, avoiding public transport or using private taxis is an option that only middle and high-income classes can use regularly. The gap between the prices of public transport and taxis is quite significant. Even for some in the middle-income class paying for that kind of service becomes unaffordable.

"I do two hours and a half of commute (each way). Between the costs of gas and highway fees, I am spending a third of my salary on commuting. "

According to INEGI, 51 per cent of millennials (from 1985 to 1995) earn less than MXN 8,000 a month (USD 400 approx.), and only 4 per cent earns more than MXN 13,254 a month (USD 680 approx.) (INEGI, 2019); while the average rent in the city goes from \$5000 to MXN 15,000 a month (Celis, 2019). In Greater Mexico City, living close to your work has become a synonym of a privileged life. Among the low-income class, the regular use of public transport is part of their daily life since they tend to live in the city's outskirts. Therefore, they have the most extended commute hours compared to the other income classes. Additionally, the journey's duration increases fear of crime, particularly after the first 30 minutes. Further, population sectors dependent on public transport are more likely to suffer from victimisation daily (Vilalta, 2011).

Mexico

4th of May of 2021

Mexico City metro overpass collapse kills 23

The mayor said that a metro overpass had collapsed in Mexico City as a train was travelling over it, killing at least 23 people, including children.

Two train carriages were seen hanging from the structure above a busy road. At least 79 people were injured, and seven are in serious condition. One person trapped in a car underneath the wreckage was pulled out alive. This is the deadliest incident in decades in the city's metro system, one of the busiest in the world. According to local media, residents had reported cracks in the structure after a deadly 2017 earthquake.

Will Grant, BBC News

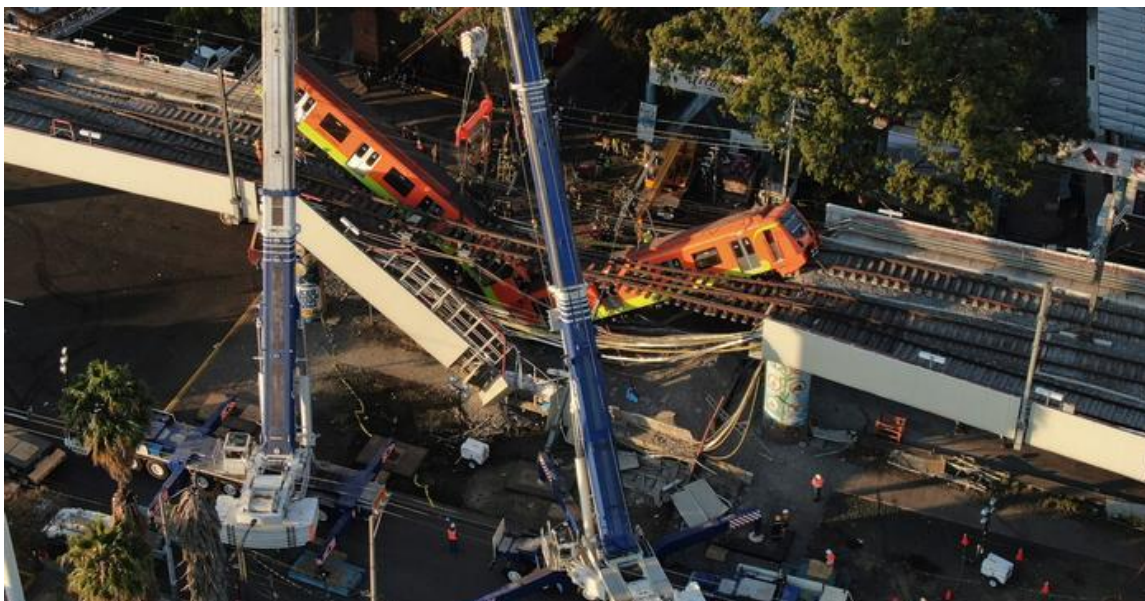


Figure 5.6 Collapsed Metro in GMC (BBC News,2021)

On the 5th of May of 2021, the constant buzzing of my phone woke me up. I always fear getting several messages from home at once since I assume the worst. Sadly, this time I was not mistaken. My friends and family were horrified at the news that a metro overpass had collapsed, and several people had died. This specific line (Line 12) is the newest line of the Metro system, which finally connected the "outskirts" of the city. The borough of

Tlahuac had often been ignored, and residents had to commute up to three hours before this line was created.

Some even said that this line made them finally feel like "*dignified*" citizens. The people who died came home around 10 pm, yet they never arrived. This accident felt like a sharp pain for every chilango. As if the fear of being pickpocketed or mugged was not enough, now we had to fear being killed by the mismanagement and corruption of our authorities. This incident just reminded me of how unequal is the GMC society. A video of a homeless man living close to the Metro became viral, where he said:

"As always, it is us, the poorest of them all, who will endure the consequences of corruption. The government steals, and we suffer."

5.3.4. Measures to reduce the black market of stolen phones

Sinha et al. (2016) suggest that a reverse supply chain and the opening of secondary markets for refurbished/second-hand phones could increase the reuse of phones. However, there are already many secondary markets in GMC specialising in used phones, some of them are formal, but the majority are informal. MC's government approximates that 2,000 phones are stolen every day in the city and are mostly sold in second-hand markets:

"There is a clear demand for second-hand phones. This demand, however, is contributing to the theft of phones" (Gobierno de la CDMX,2019).

In 2018, 22,000 phones were stolen (and reported). Consequently, the current mayor Claudia Sheinbaum started a new campaign named "*Bloquea Tu Cel*" (Lock your phone) to address this situation. The idea is that if a phone is stolen, the consumer can report it, and it will be "*locked*" and will not work anymore. This mechanism would make the phone useless, and therefore, in theory, these black markets would disappear. However, this campaign has not expected impact since it has not resonated among society sufficiently. I asked the interviewees if they knew about this campaign and only 20 per cent of the interviewees said they did. Additionally, the respondents who heard of the campaign said that was not enough for the sealing to stop.

"I followed the instructions and then went to La Plaza de la Tecnología (a famous electronic second-hand market), and some shopkeepers said that they could easily bypass such measures. Whatever the government does, the thieves are three steps ahead."

As Sinha et al. (2016) mention, policymakers must apply broader systems thinking before implementing legislation. In the case of Mexico, the creation of secondary markets, as suggested by literature research, is unnecessary, and this could backfire and create a bigger market for stolen phones. Therefore, the policy suggested by the current Mexican government seems appropriate (although it has not had the effectiveness expected) to decrease the theft of phones.

5.4. Second Stage: Replacement and Disposal

The methods used in replacing phones are as important as the reasons for replacing them. In this sample, most people bought the phone they are currently using (40 per cent); they bought it mainly in microloan stores, mobile companies, or relatives and friends. Contract renewal was the second most common way to get a new phone (34 per cent), followed by getting it as a gift (20 per cent) and trading it (4 per cent). Only one person in the sample did not own a phone. Most of the high-income and middle-class interviewees acquired their mobile phones through a regular service contract, and most of the interviewees of low income-class bought their mobiles in microloans stores. These results are shown in Figure 5.7.

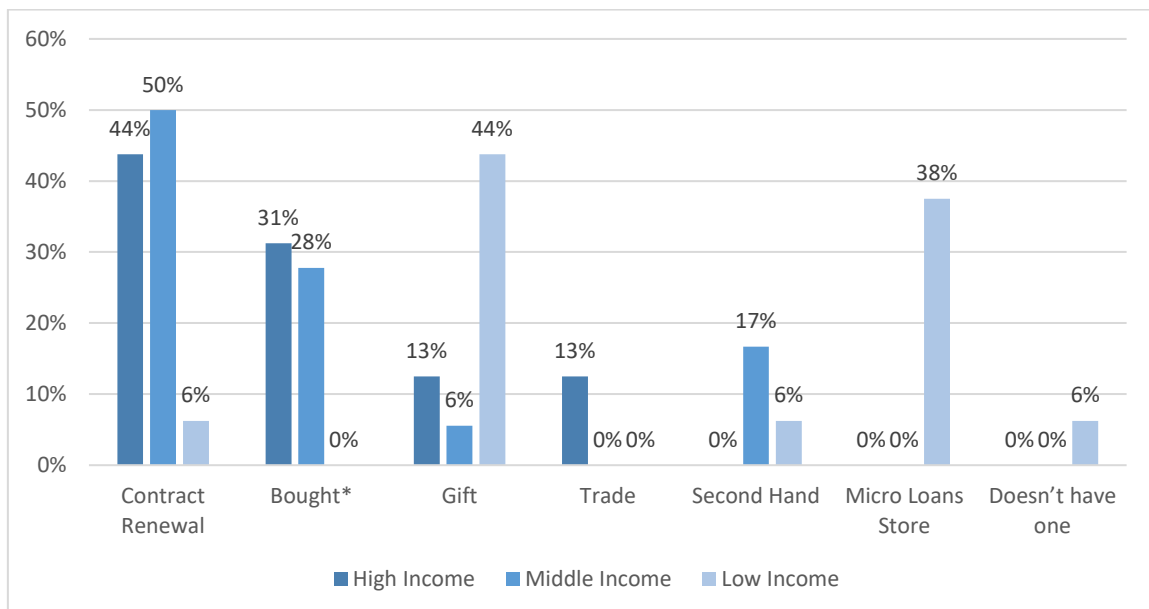


Figure 5.7 Way to Acquire Mobile Phones by Income Class *Bought from retailers, mobile companies and online

A Greenpeace (2016) survey found out that 41 per cent of Mexicans agreed that mobile network providers offered people new mobile phone upgrades too often. In Mexico, evidence suggests that most people in a contract do replace their mobiles according to its renewal. Some interviewees in the sample changed from a year contract to a two-year contract, making them feel more comfortable and less wasteful.

Although some countries believe that service contracts are the main culprit to a shortened replacement cycle (Huang & Truong, 2008; Türkeli et al., 2019; Wieser & Tröger, 2016), in Mexico, only 17.8 per cent of the population has a regular service contract. Mexican companies have tried to increase the number of people with regular service contracts, and plan prices have dropped, making them more competitive. Nowadays, some plans are almost as much as a pay-as-you-go scheme. However, most of the population cannot comply with the minimum credit requirements to have such a contract (El Financiero, 2019).

5.4.1. Buying second-hand phones and micro-loan stores

In general, consumers tend to avoid buying second-hand phones if possible. Among the reasons to avoid it are not having a warranty or insurance, not personally knowing the seller, and the phone coming with possible bugs or malfunctions. This type of reservation towards buying a second-hand phone has been observed in other countries (Huang & Truong, 2008; Wieser & Tröger, 2016; Ylä-Mella et al., 2015). However, in this sample, the interviewees within the middle-class bracket showed a different kind of behaviour.

Although they still had the same concern about acquiring a second-hand phone, they would be more open to buying them second-handed, especially if they had less than a year of use. In the low-income class, buying a second-hand phone was common, especially between friends and relatives. One interviewee even reported buying a phone from his employer and partially paying with labour:

"My boss always sells his old phones. He lets me pay in small instalments. Sometimes I have to tell him I do not have enough money to pay for the month, and he says he is ok with whatever I can give him as long as I keep working for him."

Others would buy them in micro-credit stores, which do not require customers to have a credit history and offers payments in small instalments. However, the "lower prices" only apply if paid in cash and a single payment. Therefore, this comes at a price since phones

would cost even three times more than a normal retail store. Additionally, the contract to acquire a phone in these stores can last from a year up to 3 years. The Mexican government warns that this kind of stores charges from 20 to 50 per cent more than the standard price for these devices. The interest rate for these microcredits goes from 16 to 87 per cent. Therefore, these kinds of loans are among the most dangerous available in the market (CONDUSEF, 2018). Sadly, this kind of scheme is becoming more popular, with a yearly increase rate of 9 per cent (BANXICO, 2019). Some interviewees expressed discontent regarding the price difference between the advertised cost and the price they paid.

"The original price said MXN 3,000, but I think I ended up paying almost double. It felt like I was never going to finish paying for it."

5.4.2. What happens to the replaced phones?

In this sample, it was found that 10 per cent of the phones reached the waste stream and most of the phones that were "thrown" away were low tier brands. The interviewees who threw these mobiles said they were no longer used to anyone, so they could not sell, trade, or repair them. Moreover, respondents expressed that they did not recycle their phones for three reasons. Firstly, many expressed that they would first store, give, sell, or trade phones; interviewees saw recycling as the last option to dispose of a phone

. Secondly, they mentioned they would only consider recycling their phones after being too obsolete to be even considered a "spare" phone; thus, recycling seemed only to be an option for those phones which had been hibernating for a long time. Lastly, they argued that even though they knew there was a possible way to recycle them, they did not know where or how to do that.

Trading phones seemed to make the interviewees feel more willing to do, rather than recycle. Swapping their phones with the mobile manufacturer for a new one or a discount for a new model seemed like a "fairer" option for interviewees. In this sample (Ylä-Mella et al., 2015) mentioned, lack of awareness did not seem to be the main issue towards recycling. Even if consumers knew how to do it and it was reasonably convenient, they would still see this as the last option because of how "illogical" or "unfair" it seemed in GMC.

"I would never think of recycling a phone I just replaced. It still has some value. It would be like throwing away money. Also, anything could happen to my new phone, and I need to have a spare. This city is far too dangerous. Recycling phones is a luxury we cannot afford."

5.4.3. Recycling Mobiles in Mexico

As mentioned previously, GMC residents among all incomes considered recycling as the least viable option to dispose of a mobile. Additionally, the majority pointed out that they were unaware of doing so. Although, some admitted that they would abstain from doing so even if they knew how to. Nevertheless, it was important to explore these behaviours from the perspectives of the recycling campaign and initiatives and understand the latest trends on mobile recycling.

In 2013, the biggest mobile companies in Mexico and the Mexican government joined forces to create a national campaign to recycle mobile phones. This campaign was part of a nationwide endeavour to capture the resources present in mobile phones. However, there are only 516 sites where consumers can drop their used mobile phones for recycling. In the campaign's second year, 1,070,589 mobiles (160.59 tons) were recycled. This has decreased dramatically in the last years; in 2018, 162,472 mobile phones (24.371 tons) were deposited for recycling (as seen in Figures 5.8 and 5.9) (ANATEL, 2018).

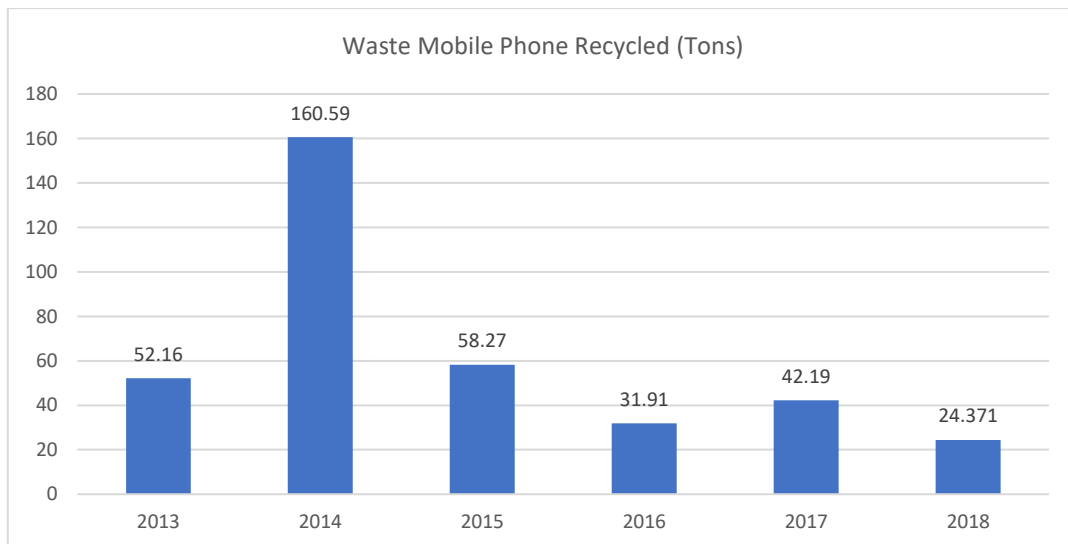


Figure 5.8 Waste Mobile Phone Recycled (Tons) by ANATEL 2013-2018

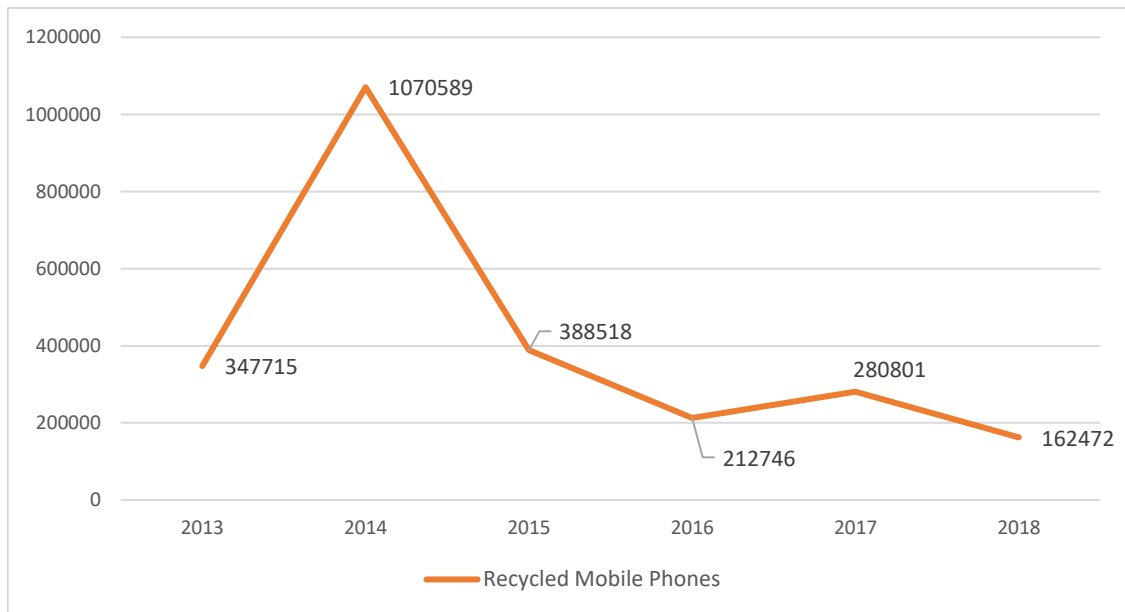


Figure 5.9 Number of recycled phones by ANATEL 2013-2018

ANATEL (2018) (National Association of Telecommunications), the organisation in charge of this campaign, claims that people had avoided recycling because smartphones are already a more significant expense than in 2013 when their campaign began. As aforementioned, Sinha et al. (2016) found that when a phone has a lower price, they are easily discarded (e.g., thrown) than those with higher manufacturing costs. Additionally, phones with higher manufacturing costs might be more expensive to buy for recyclers; hence these phones end up not being attracted to the collection systems.

Another initiative from the government to help improve the collection of e-waste in Mexico City is the "Reciclatrón"; this event happens around ten times a year to collect e-waste. It started in 2013, and since its beginning, it has collected 1949 kg (1.9 tons) of mobile phone waste and has participated more than 64,000 people (SEDEMA, 2019). As well-intentioned as this initiative is, it barely contributes to the collection and recycling of mobile phones in the city since this would represent 0.36 per cent of the disposed of mobiles per year (ibid). After unpacking the results obtained in this research regarding mobile phones, we shall discuss and analyse them in the next section; this shall elucidate some outcomes that might facilitate the implementation of local policies.

Section IV

5.5. Discussion

Waste scholars have traditionally attempted to comprehend and quantify waste generation by focusing on the end and beginning of its lifespan and tend to miss what happens in between. If we were only to understand waste mobile phone generation from looking at the phones that arrive at the landfill, we would completely overlook the practices of extending or shortening their lifespan before disposal. Furthermore, we would be perplexed if we noticed that the mobile phones that wind up in landfills are typically models purchased years, if not decades, ago. These observations might even lead us to believe that consumers used those mobile phones for that period.

However, if we looked at the mobile market and assessed how many phones are sold each year, we would be left with a puzzle. Clearly, something is going on in the interim, but the question is whether it resembles a circular economy. The answer, however, is not black-and-white. There are parts of the mobile economy that resemble a circular economy; we could say there are "*whirlpools*" within the system where mobiles are actively circulating throughout the population (as I illustrate in Figure 5.10).

We would miss by analysing the beginning and end of mobiles how those phones are exchanged, traded, and passed around from consumer to consumer, sometimes without the original owner's permission. Some of the practices and behaviours observed in the GMC resembled those in other countries; for example, on average, people tend to use their mobiles for 18 to 24 months. GMC consumers also expressed being conscious about the perceived obsolescence of their gadgets and took measures to avoid being "*left behind*" technologically.

Another comparable feature is that consumers who have the choice to swap their phones thanks to a contract renewal will almost always do so. Moreover, due to the expensive repair prices, consumers are hesitant to repair and maintain mobile phones. They consider this a viable choice only if the phone's worth is high enough. Recycling apprehension could also be partly explained by a lack of awareness and a scarcity of recycling stations. Furthermore, according to the data obtained, the GMC populations lacked the abilities essential to foster a circular economy. Moreover, we observed a distinct skill set

depending on income; table 5.13 contains a brief review of the less common competencies within each income category.

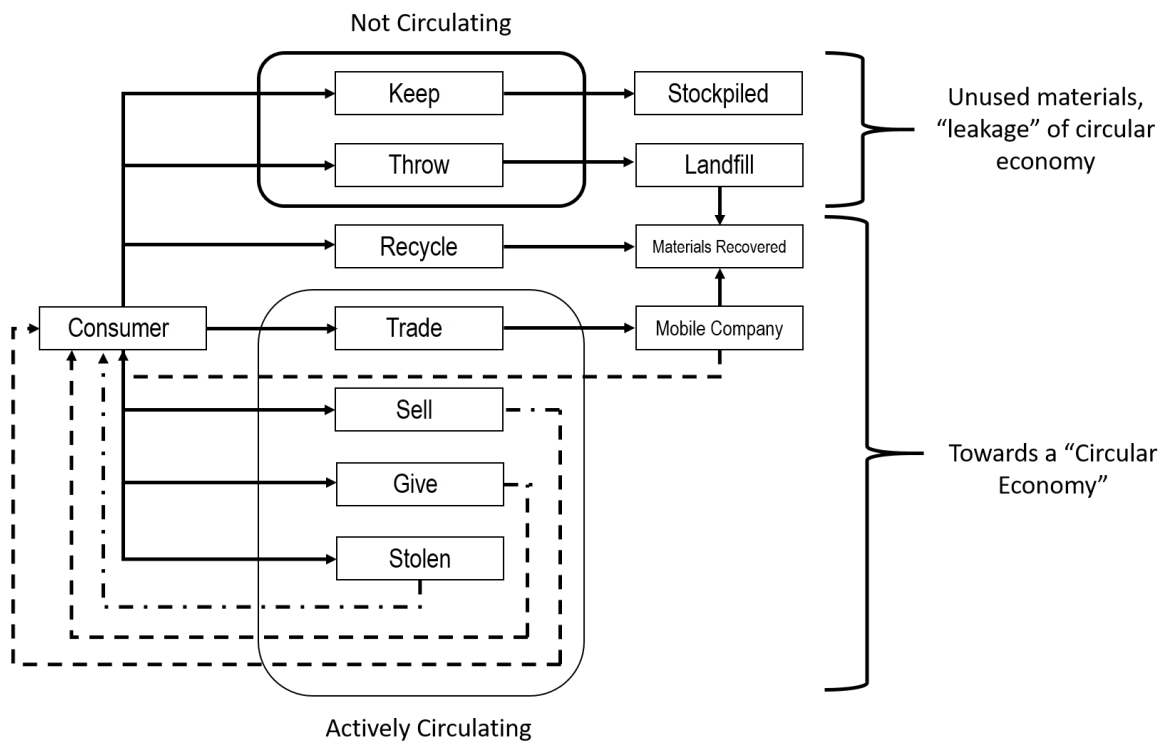


Figure 5.10 Flow of mobile phones after disposal

Table 5.13 Less common competence within income groups

Income Class	Less common competencies per group
Low Income	<ul style="list-style-type: none"> Being able to afford a monthly plan or mobile insurance Having a credit card to get a monthly plan Knowing where/how to recycle mobile phones Knowing how to block a phone if it is stolen
Middle Income	<ul style="list-style-type: none"> Knowing where/how to recycle mobile phones Knowing how to block a phone if it is stolen Knowing how/where to repair phones at a reasonable price
High Income	<ul style="list-style-type: none"> Knowing where/how to recycle mobile phones Knowing where/how to sell or trade mobile phones Knowing how to block a phone when it is stolen Knowing how/where to repair phones at a reasonable price

These skills or competencies have a significant impact on the possibility of fostering a circular economy. For instance, lower-income consumers had no credit history to get into a contract to guarantee a renewal and provide an insurance policy. Whilst interviewees in the middle- and high-income bracket were unsure where to repair their phones at a reasonable price or how to participate in recycling schemes.

In addition, the meaning or symbol of possessing a mobile phone also differed depending on the consumer's income; these "meanings" are the features that interviewees were looking for in the phones they planned to buy. As a result, regardless of how mobiles were acquired, consumers would decide on whatever aspect was more important to them; these meanings are summarised in Table 5.14.

Consumers in the lower-income level, for example, reported a lack of desire to be technologically up to date since they valued their mobile phones for more practical reasons; as one interviewee put it, "*as long as I can contact my mom, it is ok.*" While some middle-income interviewees tried to balance price and novel technology and would value how much time their phones would feel "*brand-new*".

Table 5.14 Meanings attached to mobile phones observed in the interviewees

Practicality	Being able to communicate or a tool to work and socialise
Sense of belonging	Represents social status, education or income, self-accomplishment
Up to datedness	Perceived obsolescence, the desire of finding a balance between " <i>having a good phone</i> " and being " <i>good</i> " with the environment, change of technology, a " <i>smart investment</i> ".

Moreover, in GMC, we observed some practices that seem to be endemic to the region. For instance, we observed that acquiring a mobile represented a significant investment for lower-income interviewees, particularly if it was a smartphone. As a result, it would be reasonable to expect that the replacement mobile phone will have a significantly slower speed among lower-income consumers; however, the replacement rate was nearly identical to that of middle-income customers¹. Thus, there was another factor that was influencing the replacement rates of lower-income respondents.

This riddle relates to phone hibernation, which is a problem that hinders numerous nations from fostering a circular economy. As those countries have discovered, hibernation is primarily motivated by a desire to have a "*backup*" phone if the current one fails or is lost. In other countries, the dread of having a mobile phone stolen is rarely discussed; nevertheless, this concern is extremely pervasive in GMC. It is always on chilangos' thoughts.

¹ It is important to remember that middle-income consumers are concerned about perceived obsolescence and have access to contracts, so they are influenced by several elements to replace items quickly.

Also, as indicated earlier in this chapter, this is not an unfounded assumption; since there is a black market for stolen phones, and hundreds of thousands of phones are stolen each year in the capital. Therefore, as previously stated, fast replacement rates in lower-income consumers are significantly motivated by mobile phone theft. This impacts consumers' mobile behaviours and attitudes regardless of their income. GMC consumers might ask themselves: *Why repair a mobile that might get stolen in some months? Moreover, why get overly attached to it?*

Families in the lower-income bracket would have to constantly reach into the "*mobile's drawer*" to replace their stolen mobile, and these types of behaviours would be echoed in the other income levels. Under these circumstances, recycling a phone becomes unimaginable; thus, hibernation becomes the most sensible alternative. Consumers would justify hibernating phones because they were scared that someone might steal their phones at some point, even if they were not particularly vulnerable to this situation. As previously mentioned, these types of robberies are more likely to occur in those who frequently utilise public transportation².

As a result, the income disparity would easily be reflected in how "*full*" the families' mobile drawers were. For example, one of the middle-income interviewees had such a full mobile drawer that she struggled to close it. Therefore, the networks of trading, selling, passing on, and stealing mobile phones previously described have formed a bubble of actively circulating phones, which extends the product longevity and reduces the environmental impacts.

However, this does not imply ideal or desirable; in this "*whirlpool*" of circular economy, low-income consumers suffer and are dispossessed of their possessions. Consequentially, the "*right*" to retain a mobile phone for a long time seems reserved for a handful. More importantly, this research reiterates that against what some authors have pointed out, consumers are not "*willing accessories*" whose lack of awareness is driving uncontrolled consumption and disposal and fostering a "*throwaway society*".

If we were to understand the lifecycle of mobiles by looking at their roots and end, we would miss out on these types of behaviours, and we might even reduce mobile waste generation to a "*throwaway society*". A key contribution of Practice Theory analysis for

² However, stealing and pickpocketing do occur in other areas, just not as frequently

behaviour change is its capacity to enable researchers, practitioners, and policymakers to avoid criticism of political individualism or "victim-blaming" and not treat behaviour as something individuals are responsible for. In Table 5.15, 5.16 and 5.17, we have summarised how several elements and their consequences influence different incomes.

Table 5.15 Factors Low-income people are "pushed" to and their consequences

Causes	Consequences
Use public transport as their primary way of commute	Becoming vulnerable to crime
Get a pay-as-you-go system instead of a monthly plan	Not obtaining a phone with a retailer
Buy, sell, or trade at second-hand markets	Incentivising crime
Depleting the family "stockpiled phone"	Not being able or interested in recycling phones
Since the phones tend to have a lower price, it makes sense to pay low repairing fees	Looking for affordable places to repair becomes important

Table 5.16 Factors middle-income people are "pushed" to and their consequences

Causes	Consequences
Use public transport only when necessary	Making them less vulnerable to crime
Being able to afford a monthly plan	Getting a mobile phone from the retailer
Being able to retain their phones for longer, making them consider phones as an "investment",	Acquiring a mobile that will ease the feeling of perceived obsolescence for longer
Try to repair their phones with the retailer, since the repairing fee is too "high",	Prefer to wait for the contract renewal rather than repairing
Get a mobile contract	Stockpile phones because the contracts last two years on average
Low recycling incentives and few recycling centres, as well as the constant fear of getting "mugged."	Not seeing recycling as a viable or fair option

Table 5.17 Factors high-income people are "pushed" to and their consequences

Causes	Consequences
Since the majority can afford phones without having to sell or trade the previous ones	They lack the interest to know where they should sell them
Try to repair their phones with the retailer, since the repairing fee is too "high",	Some prefer to wait for the contract renewal rather than repairing

Low recycling incentives and few recycling centres, as well as the constant fear of getting "mugged."	Not seeing recycling as a viable or fair option
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This research has shown that in GMC, consumers are in an environment that makes them replace their mobiles prematurely either by contract renewal, planned obsolescence or theft. Moreover, this underground market incentivises mobile phone hibernation at all income levels, resulting in another "inactive bubble" in which mobile phones do not circulate, thus, halting the development of a circular economy. Therefore, we could ponder, what would happen if the mobile phone illegal market ceased to exist?

Low-income people would be able to keep their phones for longer periods, hence in theory, lowering their replacement rates. Nevertheless, a portion of the circular economy would come to a total standstill. However, this appears to be a reasonable price to pay if consumers are not afraid of losing their belongings. I also argue that consumers of different economic levels would not hibernate their phones as often as they do presently, causing some of the hibernating phones to circulate among the community. *Would this solve the entire phone hibernation issue in GMC?*

No, I do not believe so; there are no "fix-all" solutions to this issue. We would still need to put in place the rest of the recommendations suggested in the literature, such as providing incentives to recycle or trade, establishing legal second-hand marketplaces, and, most crucially, requiring mobile businesses to create products that "feel brand new" for extended periods. Nevertheless, relying on consumers' actions to curb unsustainable practices obscures and distracts from the needed intervention of manufacturers, mobile companies, and legislators.

To close the loop of this market; legislation, policies, and regulations among the main stakeholders (mobile manufacturers, network companies and government) are indispensable (J. Li et al., 2017; Sarath et al., 2015; Sinha et al., 2016; Wieser & Tröger, 2016; Ylä-Mella et al., 2015). In Table 5.17, we can see a summary of the main target actors that could execute the proposal towards a mobile's circular economy, additionally, in Figure 5.11. I present a diagram that identifies the elements of Practice Theory (meaning, materials, and competencies) that could foster a circular economy in GMC.

Table 5.18 Target Actors and their roles in achieving a circular economy

Ways to achieve a circular economy	Proposals	Target Actor
The increasing lifespan of mobiles	<ul style="list-style-type: none"> - More durable phones (longer battery life and shock-resistant screens) - Software updates are available for older devices. - Mobile networks companies should make their replacement cycles longer. *The government should help to implement these changes 	<ul style="list-style-type: none"> - Manufacturers - Mobile Companies - Government - Legislators
Repairing	<ul style="list-style-type: none"> - Tax benefits for repair and more information about the reparability of phones. - Mobile companies could offer a mobile "repair" package instead of a mobile renewal. 	<ul style="list-style-type: none"> - Government - Legislators - Mobile Companies
Buying/ Using second-hand mobiles	<ul style="list-style-type: none"> - Creation of formal markets for second-hand phones (regulated by the government) - Continue policies tackling phone theft and give them more visibility 	<ul style="list-style-type: none"> - Government - Legislators
Stop hibernating mobiles	<ul style="list-style-type: none"> - Monetary incentives by the government or mobile companies (this could be in cash payments and vouchers). - The increasing lifespan of phones, repairing and market for second-hand phones 	<ul style="list-style-type: none"> - Government - Legislators - Mobile Companies
Recycling	<p>More collection sites, monetary incentives, and more visibility and awareness.</p>	<ul style="list-style-type: none"> - Manufacturers - Mobile Companies - Government - Legislators

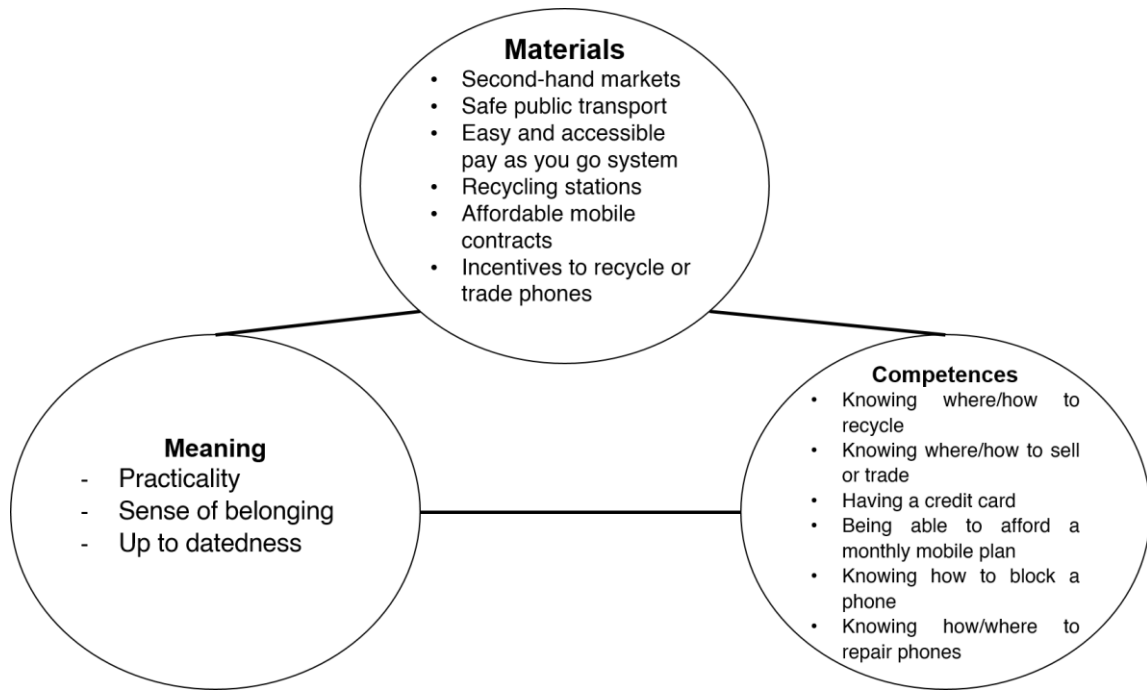


Figure 5.11 Elements that could foster a circular economy in GMC

5.6. Concluding Remarks

It was never my initial intention to separate the respondents by income; nevertheless, it became apparent after the interviews that I was dealing with entirely different realities. Through the story of mobile phones, I uncovered an unequal society, the story of a large part of the population struggling with crime daily, and another part that tries to cope with obsolescence. In a city with such internal differences, as Echegaray (2015) mentions, some consumers might "*be willing accessories of the system*", while others are trapped in a system that pushes them to stockpile and get in debt.

Hence, the key element to tackle would be the speed of circulation. Classic strategies to stop stockpiling will not work in the GMC if they are not tailored to the needs of each income bracket. The academic literature suggests opening second-hand markets to incentivise the flow of hibernating phones. The market for second-hand phones **thrives** in GMC; however, it is mainly fuelled by stolen phones.

Therefore, the existence of those markets has clearly been detrimental in the GMC, and the robbers have easily neutralised the authorities' efforts. Insecurity perception and pedestrian mugging are so high that they have impacted all income levels and significantly increased hibernation and stockpiling. Closing the loop in this city has to do more with **justice**; allowing people to retain their phones longer would significantly

elevate the average lifespan of mobiles. Another measure to promote a circular economy found in the literature is money incentives to trade phones. For this measure to work properly in GMC, monetary incentives would have to be as convenient as getting a new phone, not just a discount, since holding onto their phones is a "*no brainer*" due to the insecurity perception. Thus, the incentives would have to be quite high to give up the idea of having a backup mobile.

Another pressing issue is the behaviour of the predatory retail companies that offer micro-credit schemes with exorbitant interest rates, which seem to be well aware that their target consumer has very few alternatives than to resort to them. These companies also seem to know that there are high chances that these consumers might get their phones stolen before they even finish paying for them. However, they still operate without insurance or repair schemes attached to their predatory contracts.

Further, although we saw significant variations between incomes (meanings, skills, and competencies), in the end, most of the respondents worried about robberies. They saw their mobiles as an important good to keep and trade carefully. Thus, one of the instances in which interviewees of all incomes agreed was recycling; in GMC, the general population sees recycling as unfair and a waste of money. As aforementioned, the main limitation of recycling mobiles is the lack of motivation from consumers to stop hibernating phones and recycle or dispose of them.

As discussed, consumers' awareness of recycling's importance is not enough to change consumers' behaviour (Ylä-Mella et al., 2015). Trading, passing down, or recycling are choices that consumers must consider logical and fair to act on them. Hence, it is not realistic to expect the consumers to recycle just because it gives them a "*pat in the back*" for being environmentally conscious. Respondents have consistently shown that when it comes to mobiles, they think about the long-term consequences for *themselves*.

Therefore, their economy is always valued above the environment or social consequences. However, this does not make them immoral or frivolous. They are in an environment that pushes them to think in such a pragmatic way. For instance, I asked one of the respondents what would be necessary for her to recycle the mobile she recently replaced, and she laughed and said: "*to have been born in another country, perhaps*".

The behaviour of consumers has been scrutinised heavily, seeing them as immoral or unethical. Still, I argue if it is not the authorities and retailers that we should shift our

attention to. A government that cannot ensure the safety of its citizens and gives them at least the confidence to go out in their everyday life without losing their possessions is inefficient, immoral, and useless. I argue that even if there were hundreds of thousands of recycling centres, the recycling of mobile phones in the capital would barely change.

Nevertheless, as we saw, there are still parts of this system that are actively flowing and resemble a circular economy. There is a tension between the existing network of selling, passing on, trading and stolen phones that create a small whirlpool of a circular economy. If we were to halt the secondhand phone market, we would inevitably stop this flow completely, but I argue that would be the only ethical way to move forward. Furthermore, focusing too much on making people recycle might not be the right approach in GMC, but rather how to make them hibernate their phones for less time.

I saw it time and time again: phones being passed down between families, friends, and relatives; the network exists; thus, confidence in keeping a phone for a longer period might have a significant impact on GMC consumers' behaviour. The "*throwaway society*" seems to be fuelled not by society itself but by the companies and authorities that facilitate and oversee these operations. It may have seemed naive to expect "*change*" from the government or retailers, but in this case, the government fails to fulfil one of its primary tasks. At the same time, businesses resort to parasitic and unethical practices.

Consequentially, public policies must be adapted to the country, and they should try to avoid "*copying*" successful experiences directly. Re- conceptualising waste generation might shift the narrative and responsibility to have the biggest impact. Instead of authorities and businesses placing their efforts at the disposal stage, they should acknowledge how they have fostered an environment that can never fully resemble a circular economy. Consumers, manufacturers, distributors, and legislators are indispensable in achieving a circular economy (J. Li et al., 2017).

Therefore, the government needs to act as the "*pacificator*" and formulate policies to ensure the safety of consumers. The government's duty alongside private companies is to establish the necessary infrastructure and mechanisms for collecting, recycling, and disposing of the phones, but mainly to stop mobiles' hibernation and decrease the replacement rate. Manufacturers and mobile companies need to take responsibility, and the government must enforce it.

Moreover, a joint effort would benefit society, legislators, and companies; the government would see a decrease in energy and resources and the creation and handling of idle e-waste. Further, manufacturer companies would benefit economically by using recycled parts, and consumers could get an incentive (preferably monetary) for returning their phones. Lastly, the most vulnerable consumers would benefit greatly by not replacing their phones so often and potentially lower their debts and increase their disposable income.

.....

“The reason that the rich were so rich, Vimes reasoned, was because they managed to spend less money.

Take boots, for example. He earned thirty-eight dollars a month plus allowances. A really good pair of leather boots cost fifty dollars. But an affordable pair of boots, which were sort of OK for a season or two and then leaked like hell when the cardboard gave out, cost about ten dollars. Those were the kind of boots Vimes always bought and wore until the soles were so thin that he could tell where he was in Ankh-Morpork on a foggy night by the feel of the cobbles.

But the thing was that good boots lasted for years and years. A man who could afford fifty dollars had a pair of boots that’d still be keeping his feet dry in ten years’ time, while the poor man who could only afford cheap boots would have spent a hundred dollars on boots in the same time and would still have wet feet.”

Men at Arms: The Play by Terry Pratchett

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Chapter 6

Clothing

“... as corporate markets press us to pack our activities with the maximum number of maximal products, they coax us into habits that clutter our homes, poison our bodies, undermine our independence, pollute our ecosphere, and waste our precious time and energy” (Dawson, 2004).

This research aligns with the idea that a network of elements (formed of skills, infrastructure, temporality, and cultural understandings) enables the practice of unsustainable consumption and disposal. Rather than a “*trap*”, we believe these elements create a lock-in situation, in which technological, political, and social forces co-build an environment that prevents consumers from easily “*escaping*”.

In the previous chapter, I analysed the behaviours and attitudes of GMC residents towards mobiles consumption and disposal; in this chapter, I shall replicate this methodology with used clothing. This chapter shall re-conceptualise clothing consumption practices by distancing from the orthodox view of consumption sociologies, which reduce consumption to an individual preference problem (Jackson, 2015)(Shove et al., 2014).

Further, they showcase everyday lives as unmovable barriers that can be overcome through “*behaviour*” change interventions (Mylan & Southerton, 2018; p. 1134). I consider practices the fundamental social analysis unit (Shove et al., 2014). This chapter will explore consumption and disposal behaviours and practice by analysing their constituent activities. Southerton and Mylan (2018) were able to demonstrate how: “*The identification of constituent activities of a practice enables the systematic exploration of practice performances without reducing that analysis to specific material objects or technologies*” (p.1149).

Thus, activities, objects, and cultural understandings from which any practice comprises are inter-connected and mutually dependent. To examine how the constituent activities of clothing consumption practices are coordinated and sequenced, we have identified the following activities:

- acquisition,
- storage,
- maintenance,
- repair and
- disposal

Each activity is performed concerning various objects, skills, and infrastructure, and they evoke a range of cultural understanding. Using Southerton and Mylan's (2018) methodology and the practice theory framework, this chapter will attempt to deconstruct the complex practice of clothing consumption and systematically compare how those activities are configured across practitioners and societal contexts. This chapter will also suggest how this lock-in system has accelerated the clothing utilisation rate in GMC. It will also shed light on the practices that resemble a circular economy of clothes in the capital.

This chapter is divided as follows: Section One briefly reviews the fashion industry's growth in the last years and the social and environmental impacts it has generated. Section Two introduces the methods used in this chapter. Section Three showcases the data collected, while Section Four discusses the results. Lastly, Section Five provides a conclusion that includes policy implications. This chapter concludes that GMC citizens are immersed in a throwaway environment fuelled by unregulated retail companies that pushes them towards unsustainable clothing consumption practices.

Section I

In this section, we shall explore the growing trends of the fashion industry, how there has been a meteoric expansion of the industry, how it has evolved, and its environmental and social impacts according to the academic literature. This analysis shall provide us with a background and context that will allow us to compare the current situation of the GMC. As seen in the previous chapter, consumers blame the unsustainable practices that generate tons of waste. Clothing might be the classic representation of a throwaway culture that displays the consumer as immoral, frivolous, and selfish.

Therefore, it is not incidental that our behaviours towards clothing have changed drastically and that garments have almost become disposable. As we shall see, this has been designed and planned by the industry to generate more profit, regardless of the social

or environmental consequences. In the following sections, we shall showcase some brief literary analyses of the main trends observed in the industry.

6.1. The Growing Fashion Industry (Fast Fashion)

The fashion industry is one of the cornerstones of globalisation that affects everybody in the world (Brooks, 2015). On a global scale, the clothing industry employs more than 300 million people along the value chain (i.e. the production of cotton alone accounts for almost 7 per cent of all employment in some developing countries), and it is valued at 1.3 trillion USD (Ellen MacArthur Foundation, 2017). In the last 18 years, clothing production has almost doubled; this has been driven by a growing middle-class population worldwide and increased per-capita sales in developed countries.

Furthermore, the “*fast fashion*” phenomenon has contributed to this rise, thanks to their quick turnaround of new styles, collections, and low prices (ibid). The clothing system is entirely linear from production and distribution to consumption. This system involves extracting large amounts of non-renewable resources to produce clothes (which are often used for a short time). Then most of these materials end up in landfills or are incinerated (Ellen MacArthur Foundation, 2017). Moreover, clothing is hugely underutilised; on a global scale, the **clothing utilisation rate** (the average number of times a clothing item is worn before it stops being used) has declined by 36 per cent in the last 18 years (ibid).

Additionally, developing countries generally have a much higher rate of clothing utilisation than developed countries. Some countries like the United States have a dramatically lower **utilisation rate**, with clothing being worn for just about a fourth of the time as the global average. This trend is comparable to what has happened in China, where apparel consumption has dropped by 70 per cent in recent decades. Further, sixty per cent of German and Chinese consumers admitted to owning more garments than they need, indicating that consumers are aware that they are underutilizing their goods (ibid).

Another component that makes fast fashion business strategy successful is the careful monitoring of consumer and industry tastes for unexpected fads (Barnes & Lea-Greenwood, 2006). Thus, fast-fashion retailers can produce inexpensive knockoffs of the most updated high-end fashion and deliver them to consumers every few weeks instead of every fashion week (Byun & Sternquist, 2011). Consequentially, fast fashion’s ultimate goal is to offer “*fashionability*” and product variety to attract more customers

(Bruce & Daly, 2006). By the end of the 2010s, a new model of fast fashion emerged; the “*ultra-fast*” fashion brands, like Asos, Boohoo, and the Chinese giant, SHEIN. These companies even threaten to decimate the original fast fashion companies like Zara, with investors claiming: “*Zara is going to be crushed by fast fashion 2.0*”. These ultra-fast fashion brands use search traffic and customer data to predict trends. They can reach millions of young buyers directly through social media without the requirement for real retail space.

SHEIN was established in China, but it ships to over 220 countries, with the United States being its main consumer market. After a pandemic year that pushed online retail to new heights, in 2020, SHEIN alone made USD 10 billion in sales (Nguyen, 2021). Nevertheless, the clothes’ quality in fast fashion is often such bad quality that items can only be worn once or twice before falling apart (Joung, 2014). Therefore, the fast-fashion model encourages consumers to view clothing as disposable (Bick et al., 2018). Jacometti (2019) describes the way consumers buy clothes “*as buying them as if they were candies, buying more clothes than they need and to treat more and more low-priced garments almost as “disposable” goods*” (p.1). Therefore, we can maintain that clothes manufacturing is extraordinarily wasteful and polluting **by design**.

6.1.1. Environmental and Social Impacts of the Fashion Industry

As mentioned previously, the textile and clothing industry is one of the world’s largest industries, and it is also one of the most polluting (European Commission, 2013). It has been estimated that there are 20 new garments manufacturers per person each year, and we are buying 60 per cent more than we were in 2000 (“The Price of Fast Fashion,” 2018). On a global scale, 80 billion new clothing pieces are purchased each year, translating to USD 1.2 trillion annually for the global fashion industry (Claudio, 2007). Moreover, the textile clothing sector alone is responsible for 2 to 10 per cent of the European environmental impacts (Tukker et al., 2006).

Additionally, the increase in production and consumption of clothing has created an immense amount of waste; for example, approximately 85 per cent of the clothing Americans consume (nearly 3.8 billion pounds each year) is sent to landfills. Nevertheless, less than 1 per cent of the materials used to produce clothing is recycled into new clothing; this would represent a loss of more than 100 billion USD worth of materials each year (Ellen MacArthur Foundation, 2017). Furthermore, an increase in

clothing circulation decreases waste entering dumps and landfills, which has a positive environmental effect (Bianchi & Birtwistle, 2012). For instance, it has been estimated that the purchase of 100 second-hand garments would save between 60 and 85 new garments; and replacing 1kg of virgin cotton fibres through second-hand clothing saves 65 to 90 kWh (Farrant et al., 2010; Woolridge et al., 2006).

In addition to the environmental impacts, there are also ethical concerns and negative social impacts, including the misappropriated lands taken away from food production to workers' inhumane treatment, abuses of human rights, forced labour and deaths from poisoning (Sherburne, 2009). Low and middle-income countries produce 90 per cent of the world's clothing (Anguelov, 2015), and occupational and safety standards are often not enforced due to poor political infrastructure and organisational management.

The reported health outcomes registered in these countries include “*lung debilitating and life-threatening conditions, damage to endocrine function, adverse reproductive and foetal outcomes, accidental injuries, overuse injuries and death*” (Bick et al., 2018). The geographical shift in manufacturing is also likely to have caused a shift in the location of pollution (Mair et al., 2016). Moreover, many brands have passed more risk and pressure to their developing country suppliers to reduce costs and times and thus remain competitive (Morris & Barnes, 2008).

6.1.2. Fashion's symbolism

“Fashion is ambivalent- for when we dress, we wear inscribed upon our bodies the often-obscure relationship of art, personal psychology and the social order. And that is why we remain endlessly troubled by fashion -drawn to it, yet repelled by a fear of what might find hidden within its purposes.” (Wilson, 1985, pág. 246)

Dittmar (1992) stated that “*an individual's identity is influenced by the symbolic meanings of his or her material possessions, and how they relate to those possessions*” (p.205). Further, this author mentioned that fashion clothing had been described as “*possessing something approximating a code*” (p.869), and this code is ever-shifting. Further, being fashionable and up-to-date give us certain prestige or status (Blumer, 1969); fashion and appearance offer a way to examine the dynamics of form and content within the contexts of self-understanding, social situations, and cultural categories (Kaiser et al., 1991). Fashion or style might sound superfluous at first glance; however, we can express ourselves and explore our personalities through fashion. Just as Kaiser et al.

(1991) stated, “*experimentation with appearance not only serves as a means for negotiating a sense of style but also as a mechanism for constructing and reconstructing a sense of self*” (p.161).

Nevertheless, due to the change of pace that fashion has experienced: “Our cultural, collective relationship with fashion might be described as having shifted from serial monogamy to serial polygamy” (ibid, p.162). Social drivers of consumption underscore and support the roles of social groups because: “*Free of fixed social positions, people now consume competitively, endlessly, trying to acquire status by emulating those with more wealth and power*” (Wilk, 2002, p. 6). Inevitably, the materialistic values associated with consumption have become so mainstream that they have led some people to believe that one’s life becomes “*better, the more consumable one possesses*” (Chaplin & John, 2007).

Capitalism and how it praises consumption (has enabled the phenomenon of “*neomania*”, whose ethos is “*the new is purchased value*” (Barthes, 1983). Moreover, as the range of products increased tremendously, fashionable products or appearances might appear interchangeable or disposable (Kaiser et al., 1991). What is fashionable can change with the ages, but what it means to us remains the same. Our access to it has changed the fashion industry entirely, with fast fashion “*democratising*” clothing. Therefore, by having affordable, fashionable, and accessible clothes in the market, *why wouldn’t consumers take the chance to own more?* Expecting consumers to reduce their consumption would go against mainstream symbols and meanings.

6.2.2. Interviews

The interviews for this chapter would generally last from 30 minutes to an hour, depending on the respondent’s available time. However, one of the most insightful interviews lasted almost three hours. I knew it would be a long interview when this respondent received me an assortment of biscuits and coffee at his dinner table. He told me that I had come at a particularly significant time in his life. His dad had passed away four months before the interview.

*“In the last months before my dad passed away, whenever we were passing by a store, I would tell my dad –
Look, pa, that jumper would look good on you. My dad said that he already had everything he needed,
except time.”*



Figure 6.1 Respondent's wardrobe before and after the cleaning ritual

He had gone through a sort of "cleaning" routine of clearing out his wardrobe after his father's death (as seen in Figure 6.1).

"It was like therapy. I started emptying my wardrobe little by little. I realised I had many things I had forgotten about. Things that I did not like anymore, and I was never going to wear again, which did not fit me anymore. I realised that I felt "bound" to these things. I felt responsible for those things. As if I had to wear them to stop feeling guilty."

After this interview, I started to see similar patterns with other respondents. Firstly, many expressed a feeling of having many things that they had forgotten about. Secondly, many kept things they did not like or did not fit anymore. Thirdly, they would only "clean" their wardrobe after special events: moving out, a breakup, getting pregnant, New Year's Eve, or like, in this case, the death of a relative. However, just a minority expressed feeling bounded or responsible for the things they owned. Nevertheless, while going through their wardrobe, many were faced with items they had forgotten about, and they would look a bit embarrassed.

I would always remind the respondents that I could not judge them. In the end, the mission of this research is to figure out why we buy things, why we accumulate them, and why we dispose of them. "Things", of course, are not all the same. Throwing away a jacket is

not the same as throwing away a plastic bottle. *But why? Is it because they are more valuable? Is it because of their connection with us?* After all, a plastic bottle might represent a brief thought, “*I am thirsty*”; whilst choosing a jacket is a much more complicated decision, it is not only about “*being cold*”. In general, we buy clothes not only because of their function but also because of how they look, how they make us feel, and what they say about us.

Clothes have been described as being able to transform the body (Andrewes, 2005), as well as being explored and analysed as “*living garments*” (Küchler & Miller, 2005).

Further, clothing forms parts of our everyday routines and practices; this process has become so automated that it can become invisible to the person who practices it (Gronow & Warde, 2001). We can even feel when our “*body*” identifies something wrong, even when we cannot fully explain why (Klepp, 2008). When I asked the interviewees to show me their wardrobes, many looked nervous, but some looked eager as if they had been waiting for a chance to show someone their collection. While some would open the wardrobe and wait for me to start the questions, some would take the lead and take me on a detailed tour of their wardrobe. They would explain the various sections of the wardrobe and how they organise the space. They would also pick random items to tell me the stories of how, why, or where they bought them

Some items of clothing were stored with much care. For example, one of the respondents had her wedding dress wrapped delicately in a satin bag inside a velvety white box with a tag that said, “*My Wedding Dress*”. While she showed me the box, she was tenderly cradling it in her arms. When I asked her if she would ever wear the dress again, she looked at me puzzled and said: “*No, everybody knows that you only wear wedding dresses once*”.

The box would not show the dress, but she knew the dress was inside; it made her happy to know that she still had the dress. Even if it no longer served a practical purpose, the dress could be worn again; yet, she would adamantly refuse to do so. Selling or (even worse) trading it was utterly out of the question. Clothing, therefore, goes beyond practicality.

Clothing tells us stories. Our stories.

6.1.3. Boredom

“Why do our once-coveted clothes become no longer enjoyable?” (Kwon et al., 2020).

Kwon et al. (2020) propose that individuals tend to become apathetic to almost every type of pleasurable experience through the process of consumption. Additionally, the fast-paced fashion trends and the “*throwaway*” culture and environment make consumers feel quickly bored with their clothing (Morgan & Birtwistle, 2009). Furthermore, limited storage tends to be a reason to dispose of clothes, and “*boring*” clothes tend to be the first ones to be disposed of (Ha-Brookshire & Hodges, 2009).

In 2014 (compared to one in 2000), an average consumer would keep each article in almost every clothing category half as long while purchasing 60 per cent more clothes (Remy et al., 2016). It is crucial to consider the potential impact of boredom on clothing disposal behaviour since this could affect retention recycling (i.e. giving away, donating and selling) (Kwon et al., 2020). After all, boredom motivates individuals to decrease the usage of a product (Zandstra et al., 2004), dispose of a product (Chugani et al., 2015) or seek other alternatives (Kwon et al., 2020).

Consequentially, prior research has identified boredom as one of the primary reasons people do not wear or discard their clothes besides wear out, improper fit, fashion and lack of storage space (K. Laitala & Klepp, 2015; Norum, 2015). Kwon et al. (2020) found that the main drivers of boredom were:

- The repetitive usage or long-term exposure to clothes
- Shifts in fashion change
- Decreased social fit (which could be newfound social inappropriateness resulting from changes in their age or social status)
- A new item of clothing can underwhelm existing clothing to look boring

Nevertheless, some consumers develop a sense of “*guilt*” about consumption and acquire an environmental and social awareness that prevents them from acquiring more things. However, these feelings of guilt might be suppressed because individuals rationalise the choice, diminishing their sense of responsibility (Antonetti & Maklan, 2014). A consumer might experience guilt when realising their purchase might have had adverse outcomes. Nonetheless, as we will see in the following sections, this seldom translates into action.

6.1.4. Avoidance of Consumption

Some consumers are trying to modify their consumption habits and join an “*anti-consumption*” movement. To diminish their consumption, they organise and participate in social movements, and these include “*voluntary simplicity*” and “*green*” consumption movements (Zavestoski, 2002). However, this would be a novel phenomenon since researchers have traditionally suggested that ethical or environmental concerns are at the bottom of consumers’ considerations regarding fashion items.

Thus, their purchase decisions regarding fashion are usually made independently of ethical concerns (Joergens, 2006; Niinimäki, 2010). Joergens (2006) found that consumers seem only concerned about what “*felt good*” on their skin and not good for the environment. Additionally, this author found that some consumers did not perceive workers from developing countries as unethical; they thought companies provided jobs and common welfare and thus showed socially responsible behaviour. Further, consumers were far more concerned for themselves; for instance, they showed more interest in the lower prices and comfortable clothes.

Finally, they stated that they would not be willing to pay more for ethical conduct even though they could financially afford it (ibid). However, some authors suggest that recent changes could indicate that consumers are beginning to value ethical factors in their fashion purchase decisions, including those relating to the environment (Kim et al., 2013; Manchiraju & Sadachar, 2014). Lee et al. (2009) proposed a framework that understands brand avoidance as a multi-dimensional concept.

They categorised brand avoidance's main reasons into three components: experiential avoidance relating to negative experiences, identity avoidance relating to the self's symbolic incongruity, and moral avoidance relating to the brand having a socially negative influence. As mentioned earlier, clothing and fashion help us create a self-identity, communicate personal, interpersonal, or group identity and is a means by which a person is judged by others (Sontag & Lee, 2004). Thus if fast fashion brands are perceived to fulfil delivering symbolic meaning and communicating the self's identity, consumers may refuse to avoid them (Kim et al., 2013). In the next section, we shall delve into what happens to the disposed clothes.

6.1.5. Clothing Disposal

Typically, disposal occurs when an object is no longer used and is thrown away (K. Laitala & Klepp, 2015). In this chapter, when we say something is disposed of, we could also refer to when a garment is passed to a new user. After all, inheriting clothes or passing down clothes among relatives or friends is more common than buying used clothing at second-hand markets (Laitala 2014). We could contemplate all types of reusing (giving away, donating and selling) as “*environmentally*” friendly options since they facilitate the extended use of clothing (Cruz-Cárdenas et al., 2016).

Moreover, studies have found that consumers who have positive attitudes toward the environment tend to participate in clothing recycling schemes such as resale, donation or reuse (Joung & Park-Poaps, 2013). Thus, most consumers prefer to donate clothing for reuse rather than throw them; however, convenience is paramount for this behaviour (Joung & Park-Poaps, 2013; Klepp & Bjerck, 2014; K. Laitala & Klepp, 2015). As Muthu et al. (2014) point out, “*as far as the end-of-life phase is concerned, it lies mostly in the hands of the public.*” (p.485). Cruz-Cardenas et al. (2016) observed in their research that clothing disposal occurs in stages.

Firstly, the consumer needs to determine whether to continue to use a product and how to dispose of it (ibid). Then, consumers consider both relational and financial switching costs when choosing the disposal method (M. Lee et al., 2015). Consequentially, we consider non-monetary inputs (like time and effort) in the decision-making process when considering what should be disposed of. These authors also noticed that most of the wardrobe management is done by the household's female figures. Many studies have emphasized the importance of attachment in understanding clothing disposal behaviour since disposal entails the emotional and physical severance of the product (Ha-Brookshire & Hodges, 2009; Kwon et al., 2020).

Section II

6.2. Methods (Into the Wardrobe)

The term wardrobe has two meanings: one refers to storage spaces and collecting clothes (Klepp & Bjerck, 2014). As I realised throughout the interviews, Wardrobes are a very private and intimate area of the house. They can reflect our personality, regardless of whether we like or care about clothing. Klepp and Bjerck (2014) point out a duality to the clothes and the material frame within which they are kept.

“These frames refer not only to the physical walls of the closet, but to the entire structure of different storage spaces with corresponding criteria, for where, and what clothes should be kept and how clothes should be moved between them. Maintenance, cleanliness, acquisition, and disposal are parts of the structure, as is the practice of dressing in which garments and accessories are chosen and put together” (ibid,375).

As aforementioned, looking into the respondents' wardrobes facilitated getting accurate information on what they do with their clothing. The “*field*” in a wardrobe study is a collection of wardrobes, hangers, lockers, and drawers. Further, the researcher can combine questions with a registration process and connect the materials and explanations. Finally, the information gathered can be further analysed in conjunction with the data obtained from respondents' clothing and general habits (ibid).

In the specific case of used clothing or waste textile, wardrobe studies can be constructive. This methodology aids to achieve a better understanding of the technical (or symbolical) ageing that contributes to a short use. Consequentially, this methodology allows us to see how pre-emptive disposal can be prevented. If we can understand the habits that lead to shortened usage of clothing and pre-emptive disposal, we can reduce the material flow.

“...today's culture is marked by a type of abundance that is materially rather than socially oriented, fostering a perception that the things that matter in life (relationships, delicious food, art) are not enough.”

(Joyner Armstrong et al., 2016)

Fletcher (2009) believes that the acquisition of clothing has become recreational and could even replace social engagement; however, this could only lead to unhappiness and discontent. Nonetheless, millennials also prefer trendy, fashionable, low quality, and cheap clothes, compared to consumers who tend to buy higher quality products (Bhardwaj

& Fairhurst, 2010). This is mainly because millennials have low discretionary incomes that make it difficult to follow their values (Hwang & Griffiths, 2017). We wanted to understand what these consumers valued when choosing a store to buy clothes and if those values contradict each other. This research wanted to understand why people buy clothes, mobile phones, and bottled water, but it is also as important as buying them. We wanted to see if Mexican millennials actually “*vote with their dollar*”, as Sorensen & Jorgensen (2019) suggested, or if there was a value action gap.

6.2.1. The city, through its closets

Through the interviews and wardrobe studies, I was able to get a rare glance at the GMC. An intimate opportunity to enter dozens of houses, from the city’s wealthiest residents to some of the most precarious houses. One of the respondents’ families owned a lumberjack company, and they had bought a vast land to build the factory. They had built next to the company an enormous house (or maybe I should say mansion) that looked entirely out of place next to the small shacks owned by the neighbours.

This interviewee introduced me to her maid, a 20-year-old mother of two, who lived in a small cabin next to the big mansion. She used to commute for almost three hours, so the family offered to build a house. She told me that before moving next to her employees, she lived in the State of Mexico in a small room with all her children; now, the kids shared a room, and she had a room for herself.

“I had to share my wardrobe with my kids. I did not have enough space for my things. It was like my life. I did not have any space for myself.”

Now she had more stuff, her wardrobe was small and completely full, but it was well-organised.

“I sometimes ask jokingly to the “patrones” if they can give me a bigger wardrobe; they said no because I would spend all my money filling it up.”

I asked her how many clothes she owned now than when she was living in a small room.

“I had ten things, I know, I counted them, that was awful. I do not count them anymore; instead, I hugged them”.

She proceeded to hug the hanging clothes. Indeed, she had to stretch her arms a little bit to be able to hug all her clothes (Figure 6.2).



Figure 6.2 A “huggable” wardrobe

After this interview, I came back to my original respondent. When I entered her room, I noticed it was quite empty; compared to the rest of the house, which was full of extravagant decorations, her room was quite minimalistic. When she opened her wardrobe, I saw a sparse, almost empty closet; it was well organised by colours and sizes, as seen in Figure 6.3. She went on for almost an hour explaining her minimalist approach to buying only essential and high-quality clothes. In less than two hours, I had had two incredibly insightful interviews showing me two opposite approaches towards clothing.

In the same area, I had seen entirely different realities, literally living next to each other. Although both had improved their living standards, one felt like that meant having more (regardless of the quality) and the other one having less (only focusing on the quality).

In my field note diary, I wrote that day:

“Maybe it comes in phases. First, you want to own more because you could not before, and then when you can afford more, you become a picky buyer.”



Figure 6.3 A minimalistic wardrobe

However, I had already done two interviews that both proved and disproved this theory. The very first interview I made was with a friend I had met in high school. Her family owned a big athleisure retail company. Her wardrobe was what someone could expect from an extremely wealthy family, a full walk-in closet bigger than an average bedroom (parts of it can be seen in Figure 6.4). She told me that she had changed how she dressed and given many things away since becoming a mother.

“I first ask my family if they want something. I have cousins that are not so well off, so they always want things; then I ask my friends. Lastly, I give it to my maids, and they are always happy to receive stuff.”

She said that she was trying to have a “*simpler*” life. Motherhood had changed her.

“In the end, I just want things that are comfortable; all of the flashy things or short dresses are gone now.”

Most of these short dresses had been replaced with leggings and jumpers; for her, a simpler life did not mean having fewer things, just “different” ones. She said the change had been gradual, but her wardrobe had always stayed full in general. On the other hand, one high-income interviewee told me that he studied abroad for two years.

“I had to live out of two suitcases for the last years, and I liked it. When I came back, I decided to reduce my wardrobe as much as possible.”



Figure 6.4 A full walk-in closet

He had seen several documentaries about minimalism and had seen a Mari Kondo documentary. Mari Kondo became quite popular because of her best-seller book *“The Life-Changing Magic of Tidying Up: The Japanese Art of Decluttering and Organizing.”* This book (which later became the basis for a TV show and some documentaries) introduces the *“KonMari”* method of organising and decluttering. This method suggests that each item should have had a designated space in which it should remain and that

people should only keep items that “*spark joy*”. This method has its foundations in the Shinto religion.

“Treasuring what you have; treating the objects, you own as disposable, but valuable, no matter their actual monetary worth; and creating displays so you can value each object are all essentially Shinto ways of living”

(Mari Kondo)

The interviewee also had a walk-in closet, but this one was almost empty. He said he was trying to follow Mari Kondo’s philosophy and only having things that “*spark joy*”. Indeed, it looked as if someone had only moved in, and this closet had several sections to store ties and many rows to place shoes; however, only half of the closet was used (as seen in Figure 6.5). This interviewee said that since he decluttered his closet, he felt free and not pressured to wear everything. It was the second time an interviewee said that having things made him feel pressured or bound.



Figure 6.5 An “almost empty” walk-in closet

“You know? You are not only the owner of things; things also own you.

It seemed then that it was not the income or the improvement of one’s lifestyle that had motivated these people. But rather, what they considered “*good*”, “*normal*”, and even what displayed someone as “*successful*”. For the interviewee with the huggable closet, there was a painful reminder that counting her clothes was equivalent to lack of money; thus, buying more became evidence of being more affluent. In the case of her employer, she equated quality with being successful and believed that having tons of bad quality clothes was “*distasteful*”. Further, in the case of the recent mother, clothes and morality were not intrinsically connected; she had always had a full walk-in closet, which was

what was normal and expected for her. She was only navigating through the different stages of her life and buying the clothes according to her current stage.

Lastly, the interviewee who followed Mari Kondo's advice did not do so because he considered it better for the environment or society, but it reduced his anxiety. It made him feel good seeing an almost empty closet with limited options. Thus, we can see that consumers are bombarded by different narratives and discourses of what is "good", "normal", or "successful". Nevertheless, there are common trends that try to engage consumers into believing that having *more* is *better*, as we shall see in the following sections.

Section III

To understand our relationship with clothes, we must analyse the stage when we acquire them and our relationship with them in their entire lifespan. After all, in theory, clothes should stay with us for years, and thus, it is a relationship that evolves and transforms. As Laitala et al. (2015) mentioned, the garment's overall life "*has the most to say environmentally*". This research focused on Millennials because they have experienced the fashion industry's transition from regular retail to the normalization and propagation of fast fashion. They also are more aware of environmental concerns; however, as mentioned previously, that does not mean they will act on them. Affordability and accessibility seem to be still the main drivers behind our attitudes and behaviours towards clothes. In this section, we have divided the results of those observed attitudes according to the life stage of garments. We shall identify meanings, symbols, skills, and infrastructure that facilitate the unsustainable fashion industry through those stages.

6.3. First Stage: Acquisition

Warde (2005) mentions that "*consumption cannot be reduced to demand, requiring its examination instead as an integral part of most spheres of daily life*" (p.137). This author also understands consumption as a process of appropriation and appreciation (ibid). Therefore, materials are a necessary part of practices; since things are not just communicators of symbolic meaning (Warde, 2005), status or identity (Shove et al., 2014) but are "*directly implicated in the conduct and reproduction of daily life*" (Shove & Pantzar, 2005, p. 44).

In this sample, we were able to see the three main drivers towards consumption: the social (to acquire status), individual (to meet needs), and culturally (to fit in). These drivers are also the “*meaning*” or “*symbols*” of the clothing consumption practice. We shall look into those symbols and the frequency and place of clothing acquisition in the GMC.

6.3.1. Why do we buy clothes? On the limits of having (and wanting)

In the case of clothing, women are the ones that are typically displayed as the ones who are obsessed with shopping and cannot escape the “*irresistible desire to prowl the malls and department stores*” (Young-Eisendrath, 2014). Moreover, women’s shopping has even been described as a “*female drive*” (ibid); they are generally more involved in fashion (Tigert, King, & Ring, 1980); and consider themselves more fashion innovative than men (Goldsmith et al., 1996).

Cass (2004) suggests this is due to the significant media (magazines, blogs, social media) targeting women and the numbers of clothing stores that market solely to them. Further, this author concludes that “*fashion clothing has more of a feminine image and thus females will place it in a more central position in their lives, and thus females will be more involved in fashion clothing than males*” (p.872). However, other authors point out that one of the reasons why women shop more is because “*women feel a measure of control rarely felt at home*”, since it was through shopping that women were not only “*buying things*” but were encouraged to “*make their own choices*” (Young-Eisendrath, 2014).

After all, women were encouraged to buy at department stores before voting (ibid). Fashion and being up-to-date were once reserved for only the most privileged, but people of all incomes could stay current through fast fashion. For some women, shopping might even feel “*liberating*”; however, we are not in control of the images we are receiving by the media that dictate how we “*should look like*” and that we should “*transform ourselves into*”. Thus, women are not experiencing freedom but rather a new form of subjugation. As Young-Eisendrath (2014) declares, “*modern consumerism creates desire but does not satisfy it*” (p.1).

Nevertheless, this research does not intend to engage deeply in gender discussion, yet it is important to demystify women’s “*active*” role in waste generation. In the previous chapter, we saw that the income level heavily affected how people acquired, maintained,

and disposed of mobiles. In clothing, it is the gender that majorly impacts our relationship with clothes. However, this has not a reductionist biological explanation, but rather it is explained by how women have been targeted by advertising and retail companies. In this sample, men, in general, would express not wanting to buy clothes unless they “*needed to*”. Additionally, they would go have something “*specific in mind*”, rather than just going to see “*if they liked anything in the stores.*” This is reflected in this male interviewee statement:

“I only buy clothes when I know exactly what I need. In general, I only go shopping when my clothes have many holes or are useless. I like buying plain jumpers and shirts that I know will last for a long time.”

Meanwhile, women would want to buy clothes not only for practical reasons.

“I am an influencer, and people can’t see me wearing the same clothes all the time. If I have already been photographed wearing something, I can’t wear the same thing to another event. I would say I buy clothes almost every week.”

In general, women enjoyed going shopping more than men; however, some women in the high-income bracket saw shopping as something they “*needed*” or something common. One high-income interviewee told me she had reserved a part of her salary for new clothes. So, every two weeks, she would use a percentage of her salary on new clothes.

“I planned my budget quite carefully, and a part of it always goes towards buying new clothes. It is something I enjoy, so it is contemplated in it.”

Meanwhile, women in the middle income would see shopping as something they had “*earned*”.

“I was always told to dress for the job I wanted and not for the job I had. Also, it is my money, so I decide what to do with it.”

Whilst women in the low-income bracket tended to be more practical, they would buy clothes when they needed them, and normally, they would have something specific in mind. In addition, they would go shopping less frequently, and they would normally only go for basics. It was also common for entire families to go together shopping in this bracket.

“At the start of every year, I go shopping with my family. We go to a big mall, and my dad gives us money. We only do this twice a year. If we want to buy more clothes, we must buy them ourselves.”

Another consumption driver that I encountered frequently was boredom. The feeling of “*not having anything to wear*” although the closet is almost full. This feeling was quite present between middle- and upper-income women:

“I do not want to sound like a cliché, but I often feel like I have nothing to wear. I feel that everyone must think I wear the same clothes every day. I feel pressured to buy things, so I don’t look like a portrait.”

There were also some extreme cases of consumers that would completely oppose going shopping or owning new clothes: “*You are not going to like my closet. I do not have anything; I do not like clothes.*” This respondent laughed when I asked if I could see his wardrobe and interviewed him on his clothing preferences. He agreed on doing the interview but continuously told me I was wasting my time.

“You should go with someone that likes buying clothes. I hate it. I do not care about how I look. I hate when people put so much effort into their clothing.”

He showed me his “*collection*” of shoes, the smallest collection of the sample: one pair of shoes. He pointed to the shoes he was wearing and said: “*that is my collection*”. For this interviewee, not caring about clothes became a part of who he was. He had equated caring about clothing with being vain or self-centred. In his eyes, this showed that someone was egocentric and dumb, a materialistic person.

Materialism can be defined as “*the importance people attach to owning worldly possessions*” (Solomon, 1996); thus, a materialistic person place great importance on possessions (Cass, 2004). Additionally, Cass (2014) points out that materialism “*could represent a key variable in the development of a consumer’s involvement with products, particularly fashion clothing* (p.871). Fashion clothing is particularly susceptible to the difference in consumption stereotyping and thus to differences in the ability to encode and decode a range of messages (ibid).

Therefore, this would suggest that consumers with more robust materialistic views and tendencies use clothing for impression management and thus have greater involvement or attachment with clothes (ibid). Thanks to this interview, I realised a big debate about caring about clothing and being “*good*”. Schwartz (2010) noted an emergence of citizens who wonder whether they are guilty of any unethical practices associated with their purchases and whether a moral conscience is expressed through purchasing choices.



Figure 6.6 Respondent's summer dresses collection

For example, one of the respondents eagerly showed me her summer dresses collection (Figure 6.6) when she suddenly froze.

“You are going to think I am horrible, right? So many people cannot afford to buy food, and yet here I am showing off my collection of summer dresses.”

I lost count of how many times I had to assure the interviewees that I would not judge them. Since some respondents knew me before the interviews, they seemed nervous to talk about clothes, given my background as an engineer in sustainable development.

“I know buying so many things is bad. I know I should only have the essentials, and that is it. What am I supposed to do? I love buying things, but then I feel terrible. Is there any way I can buy things without being bad to the environment?”

The answer from a “*traditional environmentalist*” approach would probably be “No”. Even asking the question could be considered something either naïve or inappropriate. If you have fewer things, you will contaminate less; fewer materials will be extracted, fewer emissions in producing, storing, and transporting, and less waste to be disposed of. Own less, do less harm. Under this approach, the respondent should be praised with one pair

of shoes. A person that has resisted the “*temptations*” of capitalist society and has only what he needs.

In contrast, someone like the respondent with several summer dresses should be ridiculed and stigmatised, a superficial person that cannot control her impulses and hoards and stores unnecessary things. A more “*modern*” approach could suggest, “*It is ok to own things as long as they are ethically sourced, regionally produced, and as organic as possible.*” Clothing, therefore, becomes a moral issue. As an engineer in sustainable development, I was trained to go along with an environmentalist approach. I should have answered “*No*”.

Nonetheless, I could not answer that because I knew this was a far more complex issue than it seemed. *Is it wrong for people to want things? Is it wrong for people to own things? If we can want and can own, should there be a limit to how much we should want and how much we should own?* Brinkmann (2004) suggested that such moral responsibilities should be viewed as a shared responsibility of businesses and consumers.

This research believes that placing the responsibility solely on the consumers and their practices is reductionist. It obscures big companies' role in creating an environment that fosters consumption practices, which drives them towards a throwaway culture. Throughout this chapter, we will attempt to shed light on how the current consumption practices are born and why they form a lock-in environment from which consumers would not easily get away.

6.3.2. How often do people buy clothes (shopping frequency)

I wanted to explore how Mexican consumers compared to other consumers worldwide in this study; therefore, I asked respondents when they had last purchased any garment. People in this group bought garments every 42 days on average, with women buying clothes more frequently (34) (as seen in Table 6.1).

Table 6.1 Average days passed since the last time of buying clothes per gender and in general

Average days passed since the last time of buying clothes per gender and in general		
Female	Male	Total
34	49	42

According to the findings of this sample, consumers in GMC buy clothing 8 to 10 times each year on average. According to Kantar's (2018) most recent survey, the average Mexican consumer purchases clothing seven times a year and 13 articles (plus five pairs of shoes). The results obtained and the ones available are coherent (since people in the capital buy more frequently on average); thus, this would position Mexico way under the consumption of the US and the UK (as seen in Table 6.2)

Table 6.2 Items of clothing purchased per year per person in selected countries (Common Objective, 2018) (The Atlas, 2016) (Kantar, 2018) (Euromonitor International, 2016)

Country	Items of clothing purchased per person per year
US	66
UK	49
Japan	26
China	20
Mexico	13

Their income and gender influenced the frequency with which people bought garments. High-income interviewees were the ones who bought garments less frequently on average in this sample (every 47 days on average). However, this was because men in the high-income category bought clothes on average every 67 days (as shown in Table 6.3), raising the bracket's average. Women in the high-income category, on the other hand, bought garments every 15 days on average, making them the group of respondents in the sample who bought clothes the most.

Table 6.3 Average days passed since the last time of buying clothes per gender and income.

Average days passed since the last time of buying clothes per gender and income								
High Income			Medium Income			Low Income		
F	M	Average	F	M	Average	F	M	Average
15	67	47	46	31	39	33	48	40

The majority of the customers in the survey stated that they seldom buy only one thing when they go shopping, especially women. Even if only one item were purchased each time, high-income women would still purchase as much clothing as Japanese customers (24 garments per year). If we assume they bought two items each time (48 garments per year), this would be similar to the average British consumer.

6.3.3. Where do we buy clothes?

This section will see some of the existing infrastructures that enable the easy acquisition of clothes, especially those acquired through fast fashion stores. Equally important as to why we buy clothes is where we buy them. The infrastructure element is extremely important since it might be the easiest to modify. As we saw previously, several networks or symbols and meanings attached to clothing might heavily depend on culture, income, and perception. Consequentially, clothes will always have deeply embedded meanings attached to them.

However, how we acquire those clothes has dramatically changed in the last years and how often we do that. In this section, we shall display the results of where the respondents acquire their clothes. Therefore, interviewees were asked where they would normally do their “shopping”, and almost unanimously, both high and middle-income interviewees mentioned going to the “mall”. They mentioned that they would go to their local mall whenever they needed clothes, which was full of fast fashion stores. Thus, an important factor pointed out by several interviewees was the “accessibility” of fast fashion stores.

“I wouldn’t even know where else to buy clothes if it’s not the mall.”

The only difference between middle- and upper-income interviewees was the type of malls they frequented, from the local ones with medium tier brands to the luxury ones with high-end stores and Michelin restaurants. Throughout the interviews, I noticed that even though high-income interviewees could afford to go to luxury brands stores, they would still frequent fast fashion stores like Zara or Mango.

“I buy new clothes almost every week. I do not mind. If not, all my clothes are from a luxury brand. If I am wearing one luxurious thing and the rest are good enough quality, it is fine by me. I know some of those clothes will not last long, but I do not care. I did not buy them to last, and I bought them to look good while they last.”

Fast fashion was almost synonymous with disposable clothes for many in the high-income bracket. They were aware that their quality was not good and that those products’ lifespan would be short; nevertheless, they just needed those products to be functional for a while. Some even saw these products’ short lifespan as something positive since that indicated when to buy more things.

“I will not lie; when one of my shirts looks old or has holes, I get a bit happy about it. It means I can buy more clothes!”

Some saw the environmental and social impacts as something foreign and disconnected from their realities; especially if they bought “*expensive*” clothes:

“I have heard about how bad fast fashion is; that’s why I only buy at department stores and luxury brands. I see all those documentaries of poor people being exploited, and I wouldn’t like to contribute to that.”

Many upper-income class interviewees believed that by buying clothes at luxury stores, they could acquire ethical clothes. However, it has been found that several high-end price brands do not comply with paying their manufacturing employees a living wage, and their whole manufacturing process is as obscure and difficult to evaluate as cheaper brands. As Hoskins (2014) stated: “*a high price tag is no guarantee of ethical practices*”. I saw the greatest number of people aware of the environmental and social effects among higher-income women, and some were completely opposed to shopping at fast-fashion outlets.

“I know I can buy many pretty things at fast fashion stores, but I do not think I would have a clear conscience afterwards. I know I am privileged enough to buy in other stores with better quality clothes. Therefore, I feel like it is my responsibility to not buy at fast fashion stores.”

On the other hand, middle-income interviewees generally saw buying at fast-fashion stores as an excellent quality-price ratio, not as inherently “*cheap*” or with “*bad quality*” clothes.

“There is so much choice, whatever you might need, you only need to go to a mall, and you will find tons of good clothes at a great price. My parents used to complain about the clothing prices when they were young. Isn’t it amazing that we don’t have that problem?”

It is important to point out that most of these results were obtained before the COVID-19 epidemic, and thus they will not reflect the uprising of online shopping. At that point, shopping online was not quite prevalent in the GMC population, even in those who preferred buying at fast fashion stores. Stores like SHEIN were considered to have “*extremely bad quality clothes*”, and thus consumers avoided as much as possible. In this sample, most consumers expressed wanting to “*touch*” the clothes before buying them.

Only one interviewee in the middle-income bracket mentioned that he shopped at thrift stores or local boutique shops. He was in the music industry, and for him having a different look was crucial. He said he had to look “*famous*” or “*different/unique*”.

Therefore, he could not buy things at fast fashion stores because everybody had the same clothes. He mentioned being aware of the environmental impacts that fast fashion had; however, he confessed that was not his primary reason to buy at thrift shops.

“If I am also helping the environment, that is great, but honestly, I do not care much about that.

Wholesale clothes or “*ropa de paca*” is quite popular in GMC. In the City Centre of MC, several streets are devoted to these types of “stores”. Trucks full of clothes arrive with “bricks” of clothes or “*pacas*”, and consumers dig through the mountains of clothes to find hidden gems. In this sample, only one interviewee admitted buying *ropa de paca*.

“I needed maternity clothes, but I did not want to spend much money on them. In the end, those clothes would only last for some months. Prices per item would range from 30 to 100 pesos (1.5-5 USD), and you could choose between regular quality or “premium”.”

This interviewee mentioned that although someone could probably find some valuable items among the mountains of clothes, generally, the quality was not right. She was not aware of any environmental or social impacts of the clothing industry. However, she would avoid fast fashion stores at all costs. She said the markets that sold clothes by the kilo were better quality in general than at fast fashion stores.

6.3.4. The Zero Waste Movement

One of the very last interviews was with a self-proclaimed Zero Waste advocate friend. She told me her journey of a zero-waste life started when she became interested in environmentalism.

“I wanted to know what I could do to help the planet. My first step was to become a vegetarian. It took some time and discipline, but I managed it. Nevertheless, I realised that this was not enough to help the planet. I started to learn about the environmental impacts my consumption habits had, and that is when I decided to try to have a Zero Waste life.”

Between the new “responsibilities” or “duties” she had now that she had pledged to follow a Zero Waste life, she made her shampoo, deodorant, and detergent. Clothing was something that she also had to change. She confessed that she bought her clothes at fast fashion stores before learning about the social and environmental impacts.

“I did not know what I was doing. I was just a teenager that wanted to blend with everyone else, and I just wanted to fit in. The easiest thing to do was go to the same store’s everyone else and wear the same clothes. I

would never go to a fast fashion store anymore. I do not think it is possible to go once you know the social implications. I do not think anyone could live with that in their conscience.”

She mentioned she had a rule of having less than 30 items at a time, and she bought her clothes at small boutiques and outlets. She mentioned that changing her habits on acquiring clothing was one of the most challenging steps she had to take.

“I love clothing. Not buying clothes that I wanted (and could afford) was quite complicated. I think clothing helps you express your personality; however, buying at fast fashion stores would make me feel bad in the long term.

Like other middle-income women, she loved going shopping, but she had completely changed her habits to reduce the frequency and quantity of her shopping and increase her clothes' quality. I asked her if she thought other people could or should try to change her habits like her.

“I think that is the minimum that everyone should do. Taking care of our planet means taking care of other ones. You have to make many changes, but I promise it gets easier.”

I remember the interviewee asking me if there was any way she could buy clothes and not be bad for the environment. In theory, she could follow the lead of the Zero Waste advocate. However, I questioned whether her lifestyle was easily replicable. She invested substantial time, money, and effort to research fast fashion's social and environmental impacts and avoid the fast fashion industry. Additionally, as this advocate confessed, the average price for any of her garments was significantly higher than any garment in a fast fashion store.

“If the price is low, you know there has to be something wrong with it. That price does not reflect the resources or labour put into it.”

However, as mentioned previously, the price tag does not guarantee ethical or sustainable manufacturing prices. Even this Zero Waste advocate confessed she did not buy clothes at thrift stores or second-hand stores.

“Aren't they more of a European thing? I don't know anyone who buys at those, and I would prefer to do my clothes instead.”

This interviewee had totally internalised the guilt and responsibility of consumerism. A system in place encourages people to buy inexpensive, disposable clothing while also bombarding them with information that makes them feel awful about desiring and having

it. As a result, customers would have to exert considerable effort to reduce their emissions and social effects.

On the other hand, fast fashion produces a new collection every week and seeks out countries with lax regulations on manual labour to keep costs down and employ textiles that are not sustainably sourced. Worse, H&M was accused of burning tonnes of unwanted clothing in 2017; according to certain media, the retailer incinerated up to 12 tonnes of unsold clothing per year in Denmark alone. This brand pointed out that burning rejected or unsold clothes were common worldwide (Brodde, 2017).

Since then, several brands have been caught burning their products across the price spectrum, from Louis Vuitton to Urban Outfitters (Nguyen,2020). Furthermore, hundreds of retailers reported experiencing an inventory glut during the COVID-19 epidemic, and some of them secretly destroyed their unsold items, exacerbating the situation. At the same time, some of them flooded charities because brands “*Do not want their unsold products winding up at flea markets or on Craigslist*” (Dalton, 2020). Therefore, the efforts exerted by this interviewee seemed futile. Yet somehow, it is all reduced to the consumers who cannot resist temptation and keep buying clothes

6.4. Second Stage (Storage and Hibernation): The Wardrobe

This section will explore the other materials that influence consumers' behaviours, including one of the most representative: the wardrobe. Bye and McKinney (2007) define the wardrobe as “*the sum of clothing, both worn and unworn.*” (p.483). According to Cwerner (2001), “*the wardrobe articulates, both spatially and temporally, a set of material and symbolic practices that are fundamental for the constitution of selfhood, identity and well-being*” (p.1). This author looks at the wardrobe as a library of the symbols individuals must select from to create their presentation to the world (ibid).

Furthermore, through a daily selection process in our wardrobes, we control how we present ourselves and showcase our identity (Kaiser et al., 1991). Thus, as Bye and McKinney (2007) state, the wardrobe can also serve as a limiter or enabler in creative self-presentation; it “*can serve as an archive of past selves or a hope chest for future selves.*”(p.484). In this section, I shall showcase the practices embedded in the storage and hibernation of clothing and how this affects the circular economy of clothing.

6.4.1. On the shoes we think we have and the ones we actually have (Storage)

“A well-organised closet is the new status symbol in the home” (Bye & McKinney, 2007).

Many consumers have more clothes in our current society than they can wear at once, making the wardrobe a central part of the consumption cycle (ibid). Hence, despite numerous tips and advice available to consumers to organise their wardrobe, *“closets often become chaotic spaces of forgetfulness”* (ibid, 486). I observed that people normally underestimate how many things they have throughout the interviews. Interview after interview, I saw people surprised by the number of things they owned.

The respondents would *“dig”* up shirts or shoes they have not worn in decades, things that they have entirely forgotten about (as seen in Figure 6.7). Interviewees would face things they thought they had given away time ago or things they did not care about anymore. *“Out of sight, out of mind”* seemed to stand true when it came to storing clothes



Figure 6.7 Collection of "forgotten" shoes

Therefore, I would conduct a small experiment to know if the interviewees knew how many things they had, and I asked them how many pairs of shoes they had before they showed me their closets. As seen in Table 6.4, out of the 50 interviews, 12 per cent of the sample accurately guessed how many pairs of shoes they had. Eight per cent of the sample overestimated how many pairs of shoes they had, and the rest of the interviewees (80 per cent) underestimated how many shoes they had.

Table 6.4 Interviewees guessing the number of pairs of shoes owned

Guessing Number of Pairs of Shoes Owned				
Guess	# of interviewees	% of interviewees	Gender	# of interviewees
Underestimate	40	80%	M	21
			F	19
Got it right	6	12%	M	2
			F	4
Overestimate	4	8%	M	3
			F	1

In general, women would have more shoes than men; however, they would underestimate the number of shoes they had on average. Meanwhile, on average, men would predict more accurately how many shoes they owned (as seen in Table 6.5 and 6.6).

Table 6.5 Women Average Guess vs Average Real Number of Shoes

Women Average Guess vs Average Real Number of Shoes	
Average Guess	Average Real
20	25

Table 6.6 Men Average Guess vs Average Real Number of Shoes

Men Average Guess vs Average Real Number of Shoes	
Average Guess	Average Real
12	13

Both with men and women, income class, would impact how accurate the respondents' estimation was (as seen in Tables 6.7 and 6.8). Consequentially, low-income respondents were closer to the actual number of shoes they owned, while high-income respondents would be further away from the actual number.

Table 6.7 Women's average predictions on the number of shoes vs the average real number of pairs of shoes

Women's average predictions on the number of shoes vs the real number of shoes			
Income Class	Prediction	Real	Difference
High Income	31	42	+11
Middle Income	20	24	+4
Low Income	12	13	+1

Table 6.8 Men's average predictions on the number of shoes vs the average actual number of shoes

Men's average predictions on the number of shoes vs the actual number of shoes			
Income Class	Prediction	Real	Difference
High Income	18	17	-1
Middle Income	12	15	+3
Low Income	4	4	0

Some respondents would underestimate only one pair of shoes, but some got this number wrong by a difference of more than 20 pairs of shoes. One of these interviewees was a yoga teacher who also had a wellness channel on YouTube. She thought she had 35 pairs of shoes, but she owned 56 (a part of her collection shown in Figure 6.8). After we counted her pairs of shoes, she looked uncomfortable. She did not ask me to leave, but she rushed the rest of the interview. Some days after this interview, she sent me a message.

"I am sorry that I rushed through your interview. However, I think it is wrong for you to ask this at your interview. You can make many people uncomfortable. It is a trick question, and you should consider taking it out."

I thought for a while, taking it out of my list of questions. However, the rest of the interviewees did not seem to have a problem. They would get nervous in the beginning, but once we counted the pair of shoes, one of two scenarios would unfold:

Scenario 1:

Interviewees would be happy that they were not so far away from the right number of shoes and would ask me how well they did in comparison to other interviewees. Most men wanted to know if there was a "right" or average number pair of shoes for men.

Scenario 2:

They would be a bit shocked about how far away they were from the right number. Some would justify why this has happened; it normally had to do with them having old shoes they had not given away yet. Sometimes they would tell me that some pair of shoes "didn't count".

Figure 6.8 Shoe Collection of the Yoga Teacher



In general, those who have been farther away from the actual number were more likely to give away the shoes. On more than one occasion, after the interview, respondents would send me a photo of a bag of shoes ready to be given away: “*See? I told you I was going to give them away.*” Clothes, as previously discussed, have become a moral issue. Kaiser et al. (1992) explain that “*appearance management*” allows individuals to create and negotiate a sense of self while trying to resolve “*simultaneous and contradictory emotions*” (p.172), and described four types of emotions:

- (1) what we view as both visually pleasing and socially acceptable, and whether we should be concerned with such issues,
- (2) feelings of pleasure about the creative opportunities offered in the arena of style, as contrasted with a sense of guilt about economic wastefulness,
- (3) who we are and how (and if) we fit into the cultural mainstream, and,

(4) social change and whether traditional hierarchies are eroding (for better or worse)
(ibid)

I propose that we should add to those emotions:

(5) the feeling of pride in our clothing versus the guilt originating from the social and environmental impacts.

The yoga teacher gave me a rushed interview, but she wanted to tell me about her “philosophy” on clothing, buying local and promoting small businesses before the interview. Although I did not make any judgement, she felt uncomfortable. She never really discussed her philosophy afterwards.

“As you can see, I am a capitalist slave, and I hoard things like crazy. Do you need to know more about me?”

It was as if the number of her collection of shoes was judging her. She had to face something that she did not want to see about herself. I often wondered how she might have been so far off the actual number; unlike other interviewees, her shoes were completely displayed. They were not in the back of the closet under some forgotten boxes, and there was nothing inherently wrong with her collection. It was her perception that made those shoes something to feel uncomfortable about.

This case may be an excellent illustration of how apparel allowed this respondent to express herself. At the same time, she had to cope with several contradictory emotions. Like the others who were confronted with lost shoes (and instantly tried to relieve their guilt by donating them), this interviewee realised that the image they held of themselves was not mirrored in the goods they had.

6.4.2. (Not) ready to let go

“Consumer’s decision in the disposal phase of clothing is crucial from an environmental point of view since they affect the lifespan of clothing and the potential for reuse and recycling.” (K. Laitala & Klepp, 2015).

Bye and McKinney (2007) mentioned that while there are not many practical reasons to keep clothes that are almost impossible to wear again, other reasons or connections prevent consumers from discarding those objects quickly. Banim and Guy (2010) stated that the move of garments from active use to just being stored is seldom a conscious decision; however, those garments are forced into inactivity. These clothes do not enter

the disposal cycle and are not useful; thus, they are in a limbo. Consumers have a growing amount of clothing, which translates to them having more clothing than they have time to wear; therefore, many of those clothes are “*seldom used, if not wholly unused*” (Laitala, 2014).

Additionally, it has been estimated that most consumers only wear around 20 to 30 per cent of their clothing in a closet; the rest are disposed of or stay in the closet (Joung, 2014). Further, it has been calculated that 21 per cent of annual clothing purchases stay at home (Claudio, 2007). Clothes, like mobile phones, are not serving any purpose at the hibernation stage and do not contribute to creating a circular economy. In this research, we wanted to understand more about this phenomenon, and we started by asking: “*What is the oldest item of clothing you have?*”

After this question, almost unanimously, respondents replied, “*That I still wear, or it does not matter?*”. I found out that this was an important distinction since many respondents store things because they had an emotional attachment to them and not because they ever thought they would wear them again. Among the reasons for keeping clothes that do not fit, consumers typically mentioned:

Table 6.9 Reasons why consumers tend to keep their clothes they no longer use (Bye & McKinney, 2007a)

Investment value	(“I paid good money for it”)
Weight management	(“I keep thinking I will lose the weight”)
Sentimental value	(“It reminds me of a lovely time”)
Aesthetic object	(“I just really love it”)

It has also been noted that consumers who usually do not own expensive items tend to hold on to them because they experience guilt about disposing of them (Bye & McKinney, 2007). When consumers develop an emotional attachment towards clothing, they tend to keep or recycle it or even if it is rarely worn or functional (Bye & McKinney, 2007; Mugge et al., 2010). For example, in the wedding dress case, it was quite clear why it would be stored and not be used again; after all, the practical uses of a wedding dress are quite limited after the ceremony.

Interviewees would store things like jumpers from the uniforms in elementary school or even Harry Potter robes they wore at the movie premiere (Figure 6.9). Almost none of the “*oldest*” items had practical use anymore. One of the interviewees showed me a jacket and a t-shirt that had the signatures of his high school classmates, as seen in Figure 6.10



Figure 6.9 A Harry Potter robe that was only used at the movie's premiere

"I knew from the moment they signed the jacket and the t-shirt that I probably would never wear them again. However, I cannot get rid of them. I thought about framing and hanging them, but that sounds like too much effort. I do not even talk to most of the people that signed them anymore."

Thus, those items were in an *"emotional limbo"*. They were important enough not to be ridden but not important enough to be showcased outside the closet. I asked this respondent what would have to happen to get rid of them.

"I would have to move or something like that. I suppose if I had a tiny closet, I would have to throw those things away. However, I would probably store it at my parent's house. I think I am always going to keep that jacket and t-shirt."

One of the interviewees told me that he had an *"excruciatingly"* ugly jumper that one of his aunts had given to him. He said he would only use this jumper when he saw her.

"It is an emotional payment. I know that if my aunt sees me wearing this jumper, she will be happy. I can make her happy with no effort at all."



Figure 6.10 Jacket and t-shirt signed by respondent's friends of the high-school generation of 2010-2013

Some of the reasons for storing items of clothing were even aspirational. One of the respondents told me she had a dress she would use to travel to Italy. I asked her why she did not wear it in Mexico City, and she said it was too short to walk in the streets or take it to her office. According to her, “it could only be worn in the streets of Italy”. Additionally, other aspirations like losing weight were why people store clothes that they could not use anymore.

Many interviewees had jeans they knew would not fit anymore but would once lose weight (as seen in Table 6.10). Further, some interviewees mentioned that they immediately got rid of their “fat” clothes when they lost weight. Thus, throwing away clothes was seen almost as a ritual or a reward for losing weight.

Table 6.10 Percentage of people who store clothes that do not fit anymore but hope that they will be able to use in the future

Percentage of people who store clothes that do not fit anymore but hope that they will be able to use in the future			
High Income	Middle Income	Low Income	General
63%	61%	38%	54%

In general, both high-income and middle-income interviewees would store their clothes that did not fit anymore in the hopes that at some point, they would lose weight and will be able to use them again. In the low-income bracket, this was not the case; this was mainly due to them taking that as a signal that they should give away those clothes to a relative or friend.

“When something that does not fit anymore, I pass it down to my brother. I do not like having clothes in my closet that I do not wear anymore. I think it is a waste of space.”

Additionally, interviewees in the low-income bracket would also modify clothes if they gained or lost a small amount of weight.

6.5. Third Stage: Care, Storage and Maintenance

Extending the useful life of products can reduce the environmental impact in all supply chain stages (raw material production, manufacturing, distribution, and end of life) (Diddi & Yan, 2019). Thus, clothing repair and mending are essential to increasing clothing's lifespan (Ellen MacArthur Foundation, 2017). There is evidence that increasing the life cycle of clothes by just nine months could bring a 20 to 30 per cent reduction in carbon, water, and waste footprints, thus contributing to resource efficiency during consumer use (Diddi & Yan, 2019).

However, many countries have identified that lack of time and repair skills and the rising associated costs of reaping clothes have discouraged consumers from engaging in clothes mending practices (Gwilt, 2014)(Kirsi Laitala & Klepp, 2018). In this section, we shall investigate the meanings of some activities like repairing and maintenance. Further, we will shed light on the competencies involved in each of these activities. We will discuss how some competencies have gotten lost with time and how this directly impacts consumption.

6.5.1. Care and Maintenance

As aforementioned, most interviews would last from 30 minutes to an hour, but there were some exceptions. One of them was an interview I had with a medical student that lasted almost 2 hours. He wore an impeccable white lab robe; my sister is also a medical student, so I knew getting to that white hue in a lab robe was quite tricky. Even in the smallest moves, he would be careful not to stain his robe. He told me his family had raised some money so he could have his first robe.

“I wanted a good lab robe. In the end, that is the first impression that you have with a patient; you need to look clean and professional. Patients will not trust a doctor with a dirty or cheap lab robe.”

When his family knew he got accepted as a medical student in one of the best Mexican universities, they decided they wanted him to get the same materials as other students. They wanted him to have a “*fighting chance*”.

“When I wear the robe, nobody knows I come from a low-income background. I am just another medical student. Nobody judges me from my wealth, and they will judge me (as they should) for my skills.”

Since he was a child, he had learned to care for clothes; both of his parents worked, so he had to help around the house; he knew how to wash, stitch, and read clothing tags. He also knew which detergent to use for each fabric and how to get rid of difficult stains, and he told me he only had one robe, while most students had 3 to 5 robes. We took the metro together after the interview, and before he sat down, he cleaned the seat.

Some interviewees confessed that they did not know how to properly care for their clothes. They had moved out of their family home, and they had to slowly learn that if clothes are not well taken care of, they will not last long. In general, interviewees from the high-income bracket would not wash their clothes; they would generally relegate that responsibility to their maids or take them to a laundry service. In comparison, 72 per cent and 75 per cent of people of middle and low income washed their clothes (Table 6.11). Some interviewees in the middle income expressed also having a maid that would oversee this responsibility.

Furthermore, most men in low- and middle-income households indicated their girlfriends, wives, or kids would wash their clothes for them. In general, laundry work has remained overwhelming done by women; Scott and Clergy (2012) found that women perform “*all*” or “*most of*” the laundry in couple households. Additionally, doing the laundry requires women to take sensory responsibility for the hygiene and personal presentation of other household members (Pink, 2012).

Table 6.11 Percentage of people who washes their clothes by income

Percentage of people who washes their clothes by income					
High Income		Middle Income		Low Income	
Yes	No	Yes	No	Yes	No
38%	62%	72%	28%	75%	25%

Gender played a big role in determining if someone would wash their clothes and know how to read the labels on clothes. Throughout the interviews, I saw a pattern of women considering washing clothes as their responsibility in the house. Mylan and Southerton

(2018) found in their study that all women in couple relationships took principal responsibility for the coordination of laundry activity sequences, which included negotiating the schedules of household members, improvising concerning the material conditions, and managing its temporal and material flows. When I interviewed men, some would look slightly offended when I asked if they washed their clothes.

“Who do you think I am? No, I do not wash my clothes, that is why I have money, so I can pay someone to do it for me.”

Some told me they did not, but they looked more apologetic or embarrassed about this.

“No, my girlfriend is the one that helps me with that. I do other things at home; I take out the trash, and so on. You know I try to be a feminist ally, but the truth is that I always mess up something when I try to wash the clothes.”

On the other hand, Millennial women (especially middle-class) expressed not being able to take care of the clothes that their mothers might have done.

“ I don’t have the skills my mom had like sewing or stitching. But I also don’t have the time, I work 9 to 5, and it takes me 2 hours to commute. I don’t have time to do the same things my mom did. My boyfriend works the same hours, but somehow, I am the one expected to take care of the house.”

6.5.2. Corte y Confección (Repair)

My mom told me that when she was in junior high school (15 – 16 years old), most women would have to attend a class on how to sew and repair clothes “*Corte y confección*” (Dressmaking and seamstress), while men would attend “*manlier*” classes like “*mechanics*” or “*technical drawing*”. Mexican women, therefore, became a sort of gatekeeper of the clothes that are in a household. Women are the ones that take care of them, and they are the ones that decide what stays, what is given away and what should be disposed of. In general, everything related to clothing is perceived as something “*feminine*”.

Liking clothing or putting much effort into someone’s image is feminine; washing, ironing, and sewing are also deemed feminine. Furthermore, repairing clothes can have negative connotations; some consider it “*women’s work, a domestic and unnecessary chore, and a sign of poverty*” (Diddi & Yan, 2019, p. 4). I did not have to take a module on “*Dressmaking and seamstress*” at school; it is uncommon for schools to have that

module, especially in private schools. However, this is not a phenomenon only experienced in Mexico; for example, in the U.S., with the module of home economics education almost disappearing, clothes mending and sewing skills have declined (Norum, 2013).

Further, it has been reported that U.S. consumers spend less than 2 per cent of what they spend on clothing for their repair and cleaning (Diddi & Yan, 2019). I asked the interviewees if that module was offered in their schools, and only 10 per cent told me that it was offered at their schools. Repairing clothes is also quite affordable in GMC; a couple of pounds are usually enough to repair small clothes' defects.

Given the results in this sample (Table 6.12), I was surprised to see that the percentage of respondents who knew how to repair clothes was high in the middle income (67 per cent). Nevertheless, high- and middle-income interviews would consider seeing a button as knowing how to mend clothes.

“I know how to sew a button if that is what you mean by repairing. For more complex issues, I would go to the seamstress. Are there people who know how to change zippers or parch things?”

Table 6.12 Percentage of people who knows how to repair clothes by income

Percentage of people who knows how to repair clothes by income					
High Income		Middle Income		Low Income	
Yes	No	Yes	No	Yes	No
31%	69%	67%	33%	81%	19%

In a survey conducted in the UK, it was found that almost 30 per cent of the consumers had garments that they had not worn because they needed repair. Additionally, almost one-third reported that they would be more likely to repair clothes if they had the necessary skills. Furthermore, 20 per cent of the consumers surveyed indicated that they could have used half of their unworn clothes if they were repaired; this would be the equivalent of 166 million clothing items in the UK alone (WRAP, 2017).

Therefore, the level of repairing skills interviewees seemed to impact when they would dispose of things. Most respondents mentioned they would dispose of something when it was “*beyond repair*”. Thus, respondents with lower repairing skills would throw away things faster than those with higher skills. One of the respondents told me that she knew that some of the things she had disposed of were probably “*salvable*”, but she did not have the time to take the items to be fixed.

“Look, honestly, if a shirt has a lot of small holes or something like that, I consider it is time for that item to exit my wardrobe. I know some people patch clothing, but I do not have time to take those clothes with the seamstress. Additionally, I do not want to wear clothes that have been fixed a thousand times. Is not that bad luck?”

In Fisher et al.’s (2008) study, some participants expressed that they “*avoid clothes with visible repairs to protect themselves and their families from stigma*”. Moreover, some studies have found that mending and repairing clothes can be associated with poverty (McLaren & McLauchlan, 2015). McGrath (2012) found that millennials in the US had significantly lower sewing skills than older generations.

In GMC, gender and income impacted greatly the percentage of people who knew how to repair clothes; for instance, all the women in the low-income bracket knew how to repair clothes. Additionally, their abilities in repairing clothes were far superior to those in the middle-and high-income bracket (Table 6.13). They would know how to sew a button, but they could modify their clothes if they gained or lost weight or even look more fashionable.

Table 6.13 Percentage of people who knows how to repair clothes by income and gender

Percentage of people who knows how to repair clothes by income and gender					
High Income		Middle Income		Low Income	
Female	Male	Female	Male	Female	Male
50%	20%	89%	44%	100%	57%

This action of repairing and modifying clothes was almost completely lost among the middle and high-income classes. Diddi and Yan (2019) suggest that the fast-fashion style of consumption have brought a loss of connection with our clothes, and we have dissuaded them from transforming them. Additionally, as these authors mention, “*the contemporary consumer culture defined by fast fashion consumption has added to the problem, as consumers no longer feel emotionally attached to their clothes and hence have no incentive to repair and extend their useful life.*” (ibid, p., 4). Alternatively, as Fletcher (2009) stated, “*products themselves are presented to us as complete or “closed”, with an almost untouchable or sacrosanct status; this dissuades us from personalising them to make them our own*” (p.187).

6.5.3. Beyond Repair

As aforementioned, most interviewees would decide to dispose of an item of clothing when it was “*beyond repair*”. However, “*beyond repair*” had different definitions; for some, it was when an item of clothing had an almost unnoticeable small hole, while others said the hole had to be big enough for them to fit in a finger. For some, it meant when jumpers had bobbles and pills, and for others, it meant that clothes had to become almost transparent after many piles of washing. Men and women seemed to have different standards when deciding whether something could still be used and when something had to be disposed of. Thus, it would be more common for women in the sample to dispose of clothes with more minor and almost unnoticeable defects.

When I asked one of the male respondents what the oldest item of clothing he still used was, he showed me one underwear pair that was completely ripped from the waist to one of the leg holes, almost making this item into a loincloth (Figure 6.11). Another respondent showed me his pyjama shirts that had been washed so many times that they had become entirely transparent (Figure 6.12). This respondent was quite proud of this achievement since he believed in using an item of clothing until it was virtually useless

“It is still usable; it has a hole for each leg, and it covers the necessary parts. Therefore, I still use it.”



Figure 6.11 Still "wearable" underwear



Figure 6.12 Semi-transparent pyjamas

“I could buy another pyjama shirt, but I like this one. It has been eight years, and you can see through it, but I am not one of those who throw away things when they have a small flaw. It would have to be completely useless for me to stop using it.”

As aforementioned, men stored things for longer; on average, the oldest item in their collection was ten years old, while women’s oldest item was seven years old, as seen in Table 6.14.

Table 6.14 Average, maximum, and minimum years of the oldest item in the sample

Average, max., and min. years of the oldest item by gender			
	Female	Male	Total
Average	7	10	9
Max	17	30	30
Min	2	2	2

As expected, the income also impacted how old the interviewees' oldest items were. High-income respondents had older items (11 years on average) than the middle (9 years) and low-income (6 years) interviewees (Table 6.15). This is because they could afford to buy things that would last longer; higher-quality fabrics tend to be more expensive. They would also own more things, decreasing the number of times each item would be used.

Table 6.15 Average, maximum, and minimum years of the oldest item in the sample by income bracket

Average, max., and min. years of the oldest item in the sample by income bracket			
	High Income	Middle Income	Low Income
Average	11	9	6
Max	30	25	15
Min	5	3	2

Therefore, in this section, we saw that some capabilities or skills that allow consumers to keep clothing for longer, such as washing, repairing, and modifying, are lost in young consumers (especially among male consumers). Thus, consumers are pushed to opt for fast fashion clothes, which are not designed to be repaired or modified but instead used and quickly disposed of. So far, we have seen an alignment of elements that enable the unsustainable acquisition and use of clothing. In the next section, we shall analyse how people dispose of clothing in GMC.

6.6. Fourth Stage: Disposal

In this sample, most consumers expressed that once they were faced with disposing of their garments, they would follow a set of steps to know what to do with the clothes. If the clothes were still “wearable”:

1. They would ask people in their household (mainly relatives of the same age) if they wanted something from their clothes to be discarded.
2. They would ask relatives, friends, or staff if they wanted something
3. Giving them away to charity

If they were considered “unwearable”, they would follow a different set of steps:

1. They would be used as rags; they could be used to clean the kitchen or bathroom.
2. Some people, who had advanced sewing skills, reported using some of the fabric to create new clothes or accessories.

We shall explore each of these disposal strategies in the following sections.

6.6.1. The Wearable Clothes (Second-hand)

Until recent times, the economy had played an essential role in acquiring and using second-hand clothing due to the high economic value of garments (Laitala & Klepp, 2018). Nowadays, in developed countries, clothing prices have decreased (Cambridge Econometrics, 2015), and it only represents between two and five per cent of household expenditure (European Environment Agency, 2014). Contrastingly, Kantar (2018) approximated that Mexican households invest 4.6 per cent of their income on clothing and 3.8 per cent on footwear (with a combined percentage of 8.4 on apparel). This would mean Mexican consumers invest almost three times as much in their apparel than consumers from developed countries, which would explain why they do not buy as many garments per year.

Furthermore, Kantar (2018) reported that Mexican families spent around 398 MXN each time they went shopping, consistent with the lowest income-expenditure reported in this sample. In Table 6.16, we can observe a significant difference between the average money spent last time shopping between low-income (317.6 MXN), middle-income (1,394.44 MXN) and high-income (1,965.65 MXN) interviewees. It is important to point out that retail and apparel prices in the GMC are the highest in the country; thus, the household expenditure would be higher in this zone.

Table 6.16 Average, maximum, and minimum expenditure in the last time shopping by income in MXN

Average, maximum, and minimum expenditure in the last time shopping by income in MXN			
	High Income	Middle Income	Low Income
Average	\$ 1,965.63	\$ 1,394.44	\$ 317.63
Max	\$ 6,000.00	\$ 4,000.00	\$ 800.00
Min	\$ 650.00	\$ 400.00	\$ 35.00

Most of the available data on second-hand clothes in the academic literature focuses on thrift stores, charity shops or donations. However, we observed in GMC that these mediums of passing on clothes are rarely used; instead, the clothes were passed around within families, friends, and acquaintances. This disposal method is also quite popular in Latin America, which can be explained by the economic conditions typical of developing countries and collectivist societies (Gonzalez et al., 2017).

As Gonzalez and Cruz-Cardenas (2017) stated, giving away clothes “*not only meets individual needs but also strengthens the links between givers and recipients while*

allowing clothes to circulate for longer periods” (p.50). Thus, giving clothes improves both the giver and the garment receiver and positively impacts (Krush et al., 2015). Nevertheless, Brookshire and Hodges (2009) found that the most prominent motivation for used donating clothing was “*to get rid of stuff*” during a “*cleaning spree*” to create closet space for new items. They noticed that closet space seemed to be a common issue among participants, and they would create a new closet space to acquire something new. They noticed that donating clothing was more self-oriented and less socially oriented and seemed to serve a practical function. It could also help alleviate guilt from purchasing rarely worn clothing and from past purchase mistakes (ibid). Therefore, it was essential to analyse the consumer’s behaviour towards second-hand clothing and understand why people choose to use (or avoid) second-hand clothing in GMC.

Especially given that the Mexican households spent twice as much on clothing than an average European consumer, the amount of resources invested in purchasing clothing has a significant effect on how we dispose of clothing (M. Lee et al., 2015). Thus, we asked the interviewees: “*What percentage of your clothes are second-hand?*” The results can be seen in Table 6.17.

Table 6.17 Percentage of given clothes in interviewee’s wardrobes

Percentage of given clothes in interviewee’s wardrobes			
	High Income	Middle Income	Low Income
Average	19%	24%	42%
Max	40%	80%	95%
Min	0%	0%	10%

There was a trend within middle and low-income interviewees of not seeing second-hand clothes in such a positive light in this sample. Researchers have found that wearing second-hand clothing can be embarrassing since some consumers believe it is meant for a lower socio-economic range and fears others’ judgment (Joyner Armstrong et al., 2016; Kirsi Laitala & Klepp, 2018). It meant that consumers were still unable to buy the clothes they wanted, and they had to ask for help from relatives, partners, or friends. Moreover, interviewees from these income brackets expressed being proud when they had a small percentage of given clothes.

“Everything you see here was bought with the sweat of my brow. Nothing here was bought or given by my parents. It makes me happy to know that everything I owned I have been able to buy by myself.”

An interesting pattern within the high-income bracket is that they would not refer to the items that were given as “*second-hand*”; they would be “*inherited*” or as “*gifts*”. Middle-income interviewees would use “*passed down*” items, whilst low-income would say things were “*second-handed*” or “*handed down*”. Therefore, how interviewees referred to their things significantly impacted how they felt about those items. One respondent showed me a 30-year-old leather jacket that belonged to his father. When he showed this item to me, he mentioned that it was one of his most prized possessions.

“I inherited this jacket from my father, and at some point, I will give this jacket to my children too.”

Roster (2001) showed that if a product is emotionally valuable, consumers tend to keep it longer and try to pass it down to someone else to be reused. Thus, consumers in the high-income bracket would try to “*inherit*” some clothing items and not perceive them negatively. For them, it was only passing on luxurious items that “*would be waste gathering dust in some closet*”. In contrast, others (particularly those in the low-income bracket) would not see having given clothes as something good but rather something they had to endure. One of the respondents was the youngest sibling of three brothers and mentioned that he hated having so many “*handed down*” items.

“I rarely buy clothes; all of my clothes are handed down by my brothers. I do not even know my clothing style; I have never developed one. At Christmas, my older brother gets new clothes, my other brother and I know this means that we are getting “new” clothes as well.”

Some interviewees told me they have modified clothes dozens of times, so they would still be wearable. The clothes that were “*inherited*” or “*given*” in the high-income bracket tended to be rare items, such as vintage leather jackets, fur coats or party dresses. They would be luxury items of high-quality material that had endured the passage of time. Other items given in this income bracket were gifts from relatives (especially mothers) and partners. Even if some of these items were not liked, many interviewees expressed not giving them away because they had an emotional attachment. In the middle-income bracket, it was more common to have luxury items or unique gifts and everyday items like jumpers, shirts, or skirts.

6.6.2. The Wearable Clothes (Donations)

As mentioned previously, passing around garments normally happen through personal circles rather than charities or NGOs. Consumers stated not opting for donations to a

charity group or NGOs until they had made sure that no one within their close circle wanted the clothes. Given the friendliness of Mexican customers, getting to that stage was an outlier. As one interviewee mentioned:

“I never ran off of cousins, uncles or friends, and if they do not want my clothes, I will give them to the first homeless person I see”.

Interviewees who would immediately opt for donation and skip asking relatives mainly cited not having enough time to ask around or had a specific charity group in mind. This phenomenon is partially due to the low number of shops or NGOs present in the capital; thus, we could see that the lack of infrastructure significantly impacted how clothes are circulated. In this sample, almost always, a female figure in the household would choose which charity group to donate to.

This behaviour has been seen by other researchers, who confirm that the action of middle-aged and older women (in their traditional roles as mother and wives) were central to the mobilization of unused or unwanted family clothing (Gonzalez et al., 2017). Further, this is a way for them to exercise the role of the caretaker of household relations (Rosenthal, 1985).

“Whenever I go through a cleaning spree, I take all the clothes I have selected for donation and give them to my mom. I am unsure on where she takes them, but I trust she will do the right thing”.

One of the exceptions was an interviewee who wanted to ensure who would use the clothes he donated.

“I do not like the idea of my clothes being torn into pieces and being sold as fabric or something. I am neither fond of the idea of my clothes ending up in a faraway country being incinerated. I want my clothes to be reused, so I try to keep them in good condition all the time. I am very tall, so finding a charity that accepts my clothes has always been difficult. In the end, I found a charity that gives clothes to men that were just released from jail. The last time I went, I met the man directly that most of my clothes were going to, he thanked me, and he said it was also hard for him to find donated clothes.”

However, in general, interviewees would rarely be so invested in the process of donating clothes to charities. Many also complained about how fussy some organisations had become accepting donated clothes. Nowadays, the largest clothes collectors inform that they only wish to get “*reusable as it is*” (K. Laitala & Klepp, 2015). As an interviewee in the sample recalled:

“You go with the best intentions to donate as many clothes as possible. Then, these organisations point out the smallest imperfections that I would have never noticed, and they reject the clothes.”

Therefore, some consumers assume that only clothing they would be prepared to use themselves is donated, therefore, excluding any items that have been usable for others (ibid). Many interviewees mentioned that they went with a mountain of clothes to these organisations (Red Cross, AA, hospitals, or churches), and most of these clothes would be rejected. However, this decreases the collection rates of textiles that could be recycled or reused, as consumers are uncertain where to draw a limit on what is reusable (ibid).

6.6.3. The Unwearable Clothes

“If something is raggedy or in terrible conditions, I feel like it would be indecent to try to donate it or give it to someone else. Those clothes have to be treated differently.”

As previously mentioned, during cleaning sprees, consumers would have to select clothes that they were not going to wear in the future and categorise them as wearable and unwearable. This selection was based on several factors. For example, as Koch and Domina (1999) stated that *“the ease of recycling and familiarity with the method seems to have an influence on which methods are chosen for textile disposal”* (p.356). It has been stated that the most common decisive factor for deciding to recycle or not is convenience, which is related to the availability of recycling stations, collection systems or other organized infrastructures (Kirsi Laitala, 2014). Furthermore, many garments are still thrown away if the consumer feels that they are of no use to others, this can be due to the wear and tear stains or simply because of fashion change (ibid).

Repurposing is a way of reuse, which, as mentioned previously, delays the time of products entering the municipal reliable waste stream, and it also prolongs the product life (Koch & Domina, 1999). Gender and age are quite influential in the disposal patterns, where female consumers are more likely to donate or reuse old clothing for environmental reasons. *“Converting damaged or worn-out textiles into rags is a traditional and universal means of prolonging a textile's life”* (Koch & Domina, 1999, p. 356). However, this way of disposal is more time consuming than donating or giving away clothes. Additionally, it demands some amount of skills that some consumers expressed not having.

“My mom used to take old clothes and transform them into blankets or used them as rags. One time, she even used one of my old dresses and made a little dress for a teddy bear. I don’t think I have the skills to do any of those things. I don’t think I have that time either. I just donate them or throw them away.”

If consumers feel they do not have enough clothes to recycle, they might opt to throw them away (Domina and Koch, 2001); this was often combined with lack of storage space (Domina and Koch, 2002; Fisher et al., 2008; Lee et al., 2013). The type of clothing was another decisive variable when deciding how to dispose of clothes: underwear, socks, and cheap or unfashionable clothing were thrown away more often (Bianchi & Birtwistle, 2012). In this sample, one of the interviewees replied quite dryly to my question about what he did with clothes he would not wear anymore: *“I throw them in the trash, “What? You said I had to be honest, right? I throw it away. I do not use it anymore, so bye.”* I asked him if he had ever considered donating, selling, or trading it, and he replied.

“That sounds like much effort. I do not have the time, but also, I do not care. I do not like it anymore? Trash. It does not fit anymore? Trash. Do I have too many clothes? Trash. I could lie and tell you fantastic stories of how I try to salvage these clothes. If I do not want it anymore, they go in the trash. End of story.”

Section IV

6.7. Discussion: The Social Ordering of Clothing Consumption

The methods used in this chapter allowed us to deconstruct clothing consumption into its constituent activities; this enabled a detailed examination of how those activities were sequenced and coordinated. Further, I revealed significant variations across the participants: income, gender, space, status, and awareness. Our analysis provided some broad societal patterning of clothing consumption. Firstly, I saw how clothing is intimately related to how we see ourselves, how we develop our personalities, how we fit into the culture and how others perceive us. Secondly, I saw that consumers are guided by their social, financial, and practical needs rather than environmental or social concerns.

Thirdly, these needs are normally dictated, fuelled, or guided by the affordability and accessibility of the industry's clothing. This research found that poor performance and deindividuation were identified as having significant effects on the behavioural intention of fast fashion avoidance, and only a minority expressed concern about the environmental or social impacts. This research is consistent with other studies that have suggested that

the main reason to avoid fast-fashion brands have to do more with factors like poor quality of apparel (like stitching, wearability, ease of care, and fit) (Bick et al., 2018; Joergens, 2006; Shen et al., 2012).

Additionally, it has been observed in many studies then that the environmental and ethical concerns do not necessarily influence the individual purchase of behaviour (Anguelov, 2015; Creyer & Ross, 1997; Niinimäki, 2010). So while many recognise and are concerned about the ethical misconduct of fast fashion companies, it does not always translate into action (Joergens, 2006; Kim et al., 2013). In this research, I observed the following reasons to avoid fast-fashion stores:

Table 6.18 Reasons to avoid fast-fashion stores observed in this research

Status:	Some considered these stores “cheap” or “ <i>low-quality</i> ” clothes. Thus, buying in those stores was detrimental to someone’s status
Lack of time	Some interviewees would avoid going shopping so frequently; thus, they went shopping, they went to more expensive stores that had better quality products
Moral/environmental concerns	A few interviewees expressed concern about buying clothes in these stores due to the environmental and social impacts.
Low Quality	Both high income and low-income interviewees expressed their concerns regarding quality and mentioned they wanted more for their money

Therefore, expecting sustainable consumption to rely entirely on consumers' awareness is unrealistic; since consumers will first aim to fulfil their social, individual, financial, and cultural needs. Only a minority of the consumers will be aware of the social and environmental issues, and even fewer consumers will act on these concerns. Moreover, when we consider the accessibility and affordability of fast fashion stores, we can see how consumers begin to get “*trapped*” in this system.

Furthermore, I saw how domestic infrastructures provided storage and constrained performances and demanded significant coordination efforts from practitioners. As a material that facilitates and limits clothing acquisition, we observed how the wardrobe plays an important role in clothing consumption behaviours. People decide how much they can own and when to let go of clothes through their size.

Additionally, a “*clean*” or “*organised*” wardrobe allows consumers to see what they own. Even though this might seem trivial, if consumers cannot see what they own, they might forget about them and keep consuming. We saw that some objects are kept even though they will never be worn again. Although the wardrobe limits storage capabilities, consumers will devote some precious storage to these prized possessions. Competencies were also essential since they limited or enabled consumers to keep their clothes for longer periods.

For example, a consumer with good repairing skills could be more open to buying second-hand clothes or reusing clothes and keeping clothes for longer. A consumer with none of those skills would be pushed to buy disposable clothes, keep clothes for less time, and be less likely to repurpose clothes. In addition, we observed that in clothing management and care, there was a clear gendered division. For example, women tended to take the principal responsibility for coordinating those activity sequences, negotiating with household members, improving the materials, and managing the temporal and material flows.

Finally, I saw that second-hand clothes in the GMC are mostly circulated through personal circles rather than established stores. We could consider these behaviours to assist a circular economy since passing clothes on improves apparel usage. Nonetheless, we believe that enabling and constructing infrastructure that encourages garment donation might increase a circular economy. These social mechanisms are interconnected, and it is via these interconnections that the practice of clothes consumption is organised. As previously stated, these social dynamics foster an environment that encourages unsustainable garment consumption.

Re-conceptualising and reframing consumption are crucial if we want to have a chance at curving the *throwaway culture* and fostering sustainable practices. It is illogical to expect consumers to change their behaviours when constantly surrounded by external factors that drive them towards consumption and a throwaway culture. We saw in this research that few interviewees (1) were aware of the social and environmental consequences of fast fashion and pre-emptive disposal and (2) had the means to act sustainably. In Table 6.19, I summarise the identified meanings, material, and competencies regarding unsustainable clothing consumption.

Table 6.19 Meaning, Materials and Competences of the Constituent Activities of Clothing Consumption Practices

Constituent Activities	Meaning	Materials	Competences
Acquisition	Self-exploration Status Warmth Protection from the elements Cultural connotations Up-datedness To fit-in	Accessible and affordable Fast-fashion stores Unattractive and scattered second-hand stores Passing Down systems from families, friends, and employers Cheap and low-quality clothes	Few people know how to identify suitable fabrics Awareness of environmental and social impacts Purchasing power
Storage	Emotional Attachment Library of symbols on how to present oneself	Wardrobe space (limiter and enabler)	Organisation Know when to let go
Maintenance	Female oriented Status	Space to do laundry Washing Machine and Dryer Clothesline	Know how to wash clothes Know how to read washing symbols
Repairing	Female Oriented Status Stigma	Repairing tools Local seamstress	Repairing skills
Disposal	Alleviate feelings of guilt Environmentally and socially conscious Throwaway culture Status Stigma Collective culture	Few recycling centres NGOs and charity organisations (strict) Bins Landfills Family and friends	Awareness of recycling schemes How to repurpose clothing

6.8. Concluding Remarks

“...instead of individuals and choices, an effective policy concerning waste reduction, minimisation and prevention need to address the social and material conditions to generate it. Rather than blaming the consumer and engaging in politics of morality and moralising, as policy moves up the waste hierarchy, it needs to “cross the threshold” into the household and engage with consumer cultures and the socio-temporal practice that constitutes consumption”.

(Gregson & Crang, 2015, p. 162)

In the previous chapter, we established that increasing the mobile's **active** lifespan would be the most efficient way to mitigate that industry's environmental and social impacts. I also shed light on how some of the practices observed in mobiles might resemble a circular economy but come with a heavy social price. In the case of clothing, we can also ask ourselves: *how do we prolong the life of clothes? Furthermore, why is the utilisation rate of clothing diminishing so rapidly?*

Mexico is an emerging economy, and as we saw in this chapter, the consumption behaviours, including the frequency and investment in shopping clothes, are still low compared to countries from the Global North. However, the extremely low prices of the “*ultra-fast-fashion*” stores make them more appealing than ever to the GMC consumers with aspirational pursues. Nevertheless, we saw in GMC that consumers still want to “*feel*” the clothes before buying them, which was present to an extent in every income class.

For instance, respondents from the lower-income class knew that they had to touch the fabrics to make sure the clothes would last; they would try to buy the best quality they could afford. Meanwhile, high-income respondents could recognize what “*good quality feels like*” and would mostly avoid fast fashion stores. Still, as mentioned earlier, that came from a status differentiation desire rather than environmental concerns. Finally, middle-class interviewees mentioned that they wanted to try the clothes before buying them to make sure they fit and looked good.

Nonetheless, as established earlier, this sample was taken before the COVID-19 epidemic, so avoiding online shopping might change relatively soon, which would lead to a preference for ultra-fast-fashion stores. We also saw a system that circulates clothes

and prolongs the active life of clothing, passing down, inheriting, or giving away clothes between families, friends, or even employers.

Moreover, most of these flows rarely occur in established infrastructure like charity shops or NGOs. However, these flowing markets are not enough to absorb the stratospheric amount of clothes that are being acquired. The constant bombarding of ads that dictate how someone “*should look like*” clearly affects GMC consumers. Before the NAFTA agreement (which is now called USMCA (United States-Mexico-Canada Agreement)), passing around clothes might have been enough to curve the phenomenon of clothes hibernation.

Since the supply of clothes was low, and the prices were high, clothes rarely stayed **inactive** for long. Therefore, the current “*family system*” of passing on clothes is a legacy of pre-NAFTA times, where throwing away clothes or not using them to their maximum potential was frowned upon. After NAFTA, the average price for clothing diminished significantly for consumers, and the brands currently in the country have multiplied immensely ever since (Buitelar, 1998).

Thus, it is not clear if developing infrastructures such as charity shops or NGOs would significantly impact increasing the active life of clothing. The respondents were emphatic that handing down garments could have a stigma attached to them as if being handed down items was only acceptable if they came from a close social circle. Additionally, those clothes are fundamentally “*free*”, the idea of paying for used clothes is something that the GMC consumers does not seem prepared to accept. The other aspect that could potentially prolong the life of clothes is the care and maintenance, and even altering the garments.

Nonetheless, the clothes from fast fashion stores are not meant to be altered; even the most skilful hand would struggle to modify such bad quality clothes. Further, even if they could be altered, the quality is so dismal that those clothes would not be able to last for long after some months of use and wash. If a new “*democratic*” system enables many consumers to buy fashionable clothes at a low price, it is understandable that people would be easily dissuaded by it. Clothes are a representation of ourselves, and they allow us to explore our personalities.

The infrastructure is there: fast fashion stores are available and reasonably priced everywhere in the city. In contrast, thrift shops are hidden, with rows of clothes requiring

a trained eye and skilled hands to see their value. Furthermore, fashion trends change so fast that a traditional clothing manufacturing approach would never keep up. Therefore, fast fashion offers differentiation, a sense of self, and affordability. Consumers thus need to have a radical approach of rejection or avoidance towards these brands if they want to have more sustainable consumption habits.

Moreover, if consumers try to avoid these brands, they rarely do so based on environmental or social reasons; it is mainly because they consider the brand obsolete, cheap, or classless. It has also been seen that even though consumers are aware of the environmental and social dilemmas of fast fashion, they tend to not act on this. Before judging the consumers as inherently bad or amoral, we might have to look at the existing behaviour, skills, and symbols and understand why this practice has been adopted.

Everything is in motion to foster an environment of immediate consumption and a throwaway culture. Thus, only those who cannot afford to shop at these stores will uniformly avoid these places. Throughout this chapter, we have seen that the activities that constitute the practice of unsustainable clothing consumption have materials, meanings and skills that prevent consumers from escaping this lock-in situation easily. In acquisition, we saw how consumers see clothes reflect their personalities and status and put their financial and cultural needs above anything else.

As mentioned previously, fashion and clothes have always had a strong embedded cultural meaning. However, not only the Millennials are experiencing this phenomenon - what has changed is the industry. Then in the care, storage, and maintenance, we saw how skills present in other generations are completely missing in the younger population. Thus, Millennials see clothes as “*unmodifiable*” or not even worth repairing. We also saw how several activities to maintain clothes in good shape are still relegated to women, although women in this sample generally worked the same hours as men.

Therefore, the time needed to repair or properly care for the clothes has been reduced compared to other generations. Lastly, we saw how the lack of skills of repairing and maintaining a few garments are “*decent*” enough to be given away, which drastically reduces the opportunity to generate a circular economy. Thus, focusing on the consumers as the only way to curb clothing consumption is naïve (by the consumers) and even perverse (from the clothing companies).

The fashion industry is ever-growing; it represents millions of jobs and is now a billionaire industry. Understandably, business as usual would be preferred by retailers and governments. However, social and economic impacts are far too significant for this industry to continue to work this way in the long term. Authorities must finally face that continuing their business-as-usual approach drastically endangers the global environment and society.

These industries' impacts have been ignored because several countries (including Mexico) export those problems (waste, low-paid labour, pollution) to other ones. It will only be through the introduction of governmental policies (bans, taxes, and regulations) that there might be a chance at creating sustainable practices. It should be utterly shocking that we can buy a T-shirt for three pounds, but as we saw in this chapter, the change will not come from the consumers, who see this as an opportunity to fulfil their desires.

The unequivocal consequences of climate change and social exploitation should be the ones that drive authorities to regulate this market. Finally, by shifting the current consumption and disposal narrative and reconceptualising sustainable consumption and understanding it as dependent on the network of social and cultural elements, we might finally advance the debate and focus on strategies that might bring real solutions to the “*waste crisis*”.

Mexico City's water crisis – from source to sewer

Each drop of water that passes through the Mexican capital tells a heroic, tragic, unfinished story of urban growth and human development.

When a *tormenta* sweeps into Mexico City, the rain does not just fall; it insists. Gently at first with a mid-afternoon patter on windows and windscreens, then more urgently with an evening downpour that turns splashes into puddles, until finally – with a nighttime climax of thunder and lightning rolling down from the distant volcanos – the deluge gushes through gutters and gullies, transforming trickles in runnels into torrents in tunnels. The floods are a reminder of the natural order of things: water belongs here.

This geological, historical fact is a reason why the Aztecs built a city of floating gardens here 700 years ago that became known as "the Venice of the New World". The vast lakes that once filled the plain were, however, steadily drained by settlers. In the 16th century, Spanish *conquistadores* rapidly accelerated the process, and modern engineers have almost finished the task, replacing the lacustrine marshes with a grey sea of concrete, tarmac, and steel that, in the central city alone, is now home to almost nine million residents.

As a result, supplies for drinking, washing, cooking, and cleaning must be pumped up from hundreds of metres underground or from a distance of more than 100km. Getting the required billions of litres up to this megalopolis – 2,400m above sea level – is one of the world's great feats of hydro-engineering. If mastery over water is a marker of civilisation, then Mexico City is surely one of mankind's most spectacular achievements.

Yet, from the point of view of sustainability and social equality, it is also among the more absurd failures. Discharging a resource that falls freely from the heavens and replacing it with exactly the same H₂O from far away is expensive, inefficient, energy-intensive and ultimately inadequate for the population's needs. It also creates a paradox: although Mexico City has more rainy days than London, it suffers shortages more in keeping with a desert, making the price of each litre among the highest in the world – despite its often dire quality.

The growing costs – social, economic, health and environmental – are a source of stress and conflict. Government leaders and big businesses are pushing ahead with ever bigger hydro-engineering projects that upset conservationists and indigenous groups. Congress and NGOs are fighting over the possible privatisation of water. Meanwhile, shortages and floods are creating social tensions in the Federal District and its surrounding states.

Worldwide, water is now more valuable and more stressed than ever before. The need for new ways of dealing with the problems has never been more urgent. Few places demonstrate that more than Mexico City, where this most fundamental of elements flows through a system that grows more complex and more fraught by the day. From source to sewer, the course of each drop tells a heroic, tragic, unfinished story of urban growth and human development.

Jonathan Watts, The Guardian

Chapter 7

Bottled Water

"Mexicans do not like how plain water tastes. In this country, food is always accompanied by flavoured water. Whoever asks for plain water is breaking tradition, but if, on top of that, they choose to drink tap water, that person is committing an act of bravery. It is said that tap water is not to be trusted; to play it safe, it is always better to drink purified water. It is not important if more money is spent or if millions of tons of waste are generated. Only weirdos dare to drink tap water."

(Estrada-Vivas, 2016, p. 7)

One million plastic bottles are bought worldwide every minute, which is expected to increase by 20 per cent by 2021. In 2016, more than 480 billion plastic drinking bottles were sold globally, up from about 300 billion a decade ago. If we were to place these bottles end to end, they would extend more than halfway to the sun. However, fewer than half of the bottles bought in 2016 were collected for recycling, and just 7 per cent of those collected were turned into new bottles (Laville & Taylor, 2017).

Water scarcity or insecurity in the Global South has often led consumers and even entire communities to consume bottled water. The mass distribution of containers across hydric stressed or infrastructure-compromised areas has gained popularity as a "*mechanism to enact the human right to water*". Therefore, the industry of bottled water is an ever-growing billion-dollar business (Pacheco-Vega, 2015). This industry has had a mammoth growth in Mexico, which has become the number one country in bottled water consumption worldwide (ibid).

This chapter will shed light on how this human right became commodified, accepted, and promoted in GMC. We will also show how this commodification created gargantuan amounts of plastic waste. Additionally, we will dwell on how the recycling narrative has fuelled this industry and shifted all environmental and social impacts on the consumers. This chapter is divided as follows.

In the First Section, we will review Mexico's current water access situation and the plastic industry's global growth (along with their environmental impacts). We will explore the

plastic bottle industry at the national and local levels. In the Second Section, we shall briefly describe the methods used for this chapter. Thirdly, we will explore how recycling facilitates the plastics industry's growth. Lastly, we shall summarise and conclude the chapter with some policy implications

Section I

7.1. The City Built on a Lake

"Something difficult to predict is that a city built on top of a lake would eventually have water-scarcity issues".

We focused mainly on GMC's "waste crisis" in the past chapters. This chapter will explore what happens when two crises collide; we shall delve into the water and waste crisis in the GMC. In Chapter 4, we narrated why Mexico City was chosen as the country's capital, and this decision has since caused several problems. Due to a lack of long-term strategy, this big city is situated in an earthquake-prone area, and the lack of urban planning has created a nightmare for commuters.

If you ask any "*chilango*" about the city's main problems, they will mention waste and water among the five most concerning aspects, along with earthquakes, traffic jams and insecurity. This section will firstly go through some of the main water scarcity concepts and why water has become an issue in Mexico and GMC. Then we shall explore how the plastic industry has benefitted from the water scarcity problems in some countries and how this industry works globally and locally.

7.1.1. Water Access in Mexico

Water is the vital liquid that ensures life on our planet. However, the human idea of water as an unlimited and renewable resource is mistaken. Although our planet is mainly composed of water, 98 per cent of it is saltwater and is found in the oceans; only 2 per cent of the water on this planet is freshwater. If we look into the distribution of this freshwater, we will find that 68.9 per cent is frozen in the form of glaciers and snow; 30.8 per cent is found underground, and only 0.6 per cent is superficial and is located in lakes, lagoons, and rivers (Perevochtchikova, 2016) (As seen in Figure 7.1).

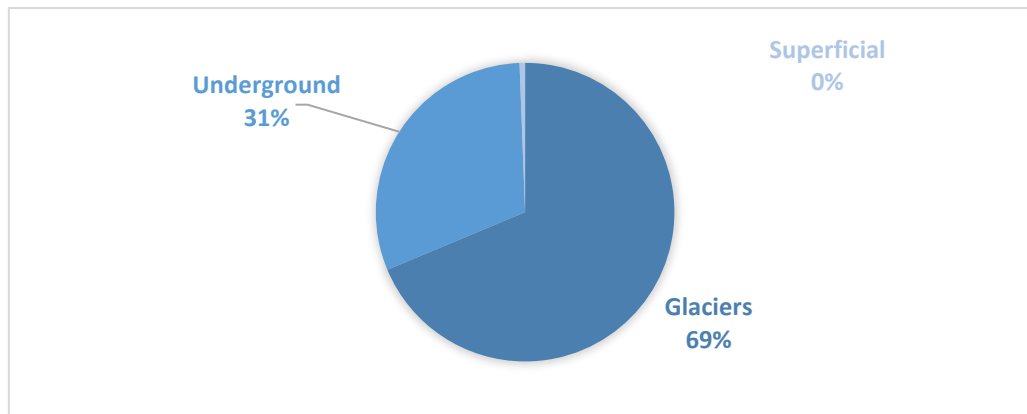


Figure 7.1 Freshwater distribution (Perevochtchikova, 2016)

In Mexico, 12 million people do not have sufficient access to drinkable water; furthermore, 102 out of the 653 aquifers of the country are overexploited (Pacheco-Vega, 2015). Whilst 46 per cent of the drinkable water is lost due to leakages in the water distribution system. In addition, eighty per cent of the country's water bodies show some level of pollution due to industrial discharge and only 1 out of every 100 litres of rainwater is captured (CONAGUA, 2016).

Even if some of the states in Mexico are under severe hydric stress (i.e. in Oaxaca, 33 per cent of the population does not have access to potable water), the Mexican government decided to reduce the budget of the National Commission of Water by 80 per cent in 2016 (López et al., 2017). Moreover, according to the official reports, Mexico has an extensive water purification infrastructure, distribution, collection, and wastewater treatment.

According to these reports:

- 97.5 per cent of the extracted water is purified or disinfected
- 92.5 per cent of the population has access to water (95.7 per cent in urban areas and 81.6 in rural areas)
- 91.0 per cent of Mexico has sewage infrastructure (96.6 per cent in urban areas and 74.2 in rural areas)
- The wastewater treatment infrastructure has been doubled in the last 15 years (CONAGUA, 2016)

Nevertheless, considering these services' qualitative issues, we can see a different reality. Many households do not get water inside their houses; neither do they receive it daily. It

has also been estimated in urban populations with over 100 thousand inhabitants that only 62.1 per cent reported a continuous service, and only 25.3 believe they can drink tap water without getting ill (INEGI, 2015). Therefore, only 51.7 of the country's population considers the water service satisfactory (INEGI, 2016).

Furthermore, the Mexican water management system has been completely overwhelmed by the current population needs. One reason for not developing sufficient water infrastructure is how large industrial/federal projects are done. These projects tend to be planned based on the presidential term of 6 years (Pacheco-Vega, 2019). The lack of a long-term perspective does not allow municipalities and states to develop the water infrastructure needed.

Additionally, there is a system in which municipalities and states depend entirely on federal investment, which relies on rules modified with every change of administration. Thus, a lack of stability or predictability in mid- or long-term infrastructure projects is a pervasive problem. Moreover, these projects often do not require any verifiable or measurable level of impact or performance. Hence, some federal investment is assigned under the questionable criterion that does not follow a formula or protocol to ensure that resources are spent effectively (López et al., 2017).

When water utility infrastructure is compromised, like in Mexico, government officials leave the consumers to solve their water insecurity issues (Pacheco-Vega, 2019). Consequentially, Mexico is also one of the most hydric stressed countries in the world, the availability of water per person a year in Mexico is around 1,700 m³, while in Canada, it is 7,000 m³ (López et al., 2017). This research underscores the importance of Mexico's current water access scenario since it has been established that water insecurity leads to a shift in consumptive patterns towards bottled water (Pacheco-Vega, 2015).

7.1.2. A global phenomenon with local impacts

"How did branded bottles of water insinuate themselves into our daily lives? Why did water become an economic good—no longer a common resource?" (Hawkins et al., 2016)

There are many reasons why bottled water consumption in the world has increased. The main reasons are; due to a natural disaster in which bottled water is needed to compensate for the ruined water infrastructure or the habit of "*ludic hydration*", which is bottled water used at gyms, reunions or daily activities (López et al., 2017). Additionally, Hawkins et

al. (2016) established three main factors through which bottled water have insinuated itself into our lives. Firstly, the creation and adoption of PET as a material to bottle water. Secondly, the development of new markets or production and consumption of bottled water. Thirdly, the change in individual practices regarding water consumption, where bottled water allows us to transport this liquid easily in sufficient amounts to be hydrated in our daily lives.

However, Pacheco-Vega (2015) points out that another critical factor was branding creation and aggressive marketing campaigns. This author also emphasises that the lax institutional and regulatory context in which many international companies operate and market their products is critical in creating bottled water consumption habits (ibid). Additionally, there is the development of an acquired taste for bottled water (Biro, 2019), the weak infrastructure of water transport to households (Prasetyawan et al., 2017) and the institutional and regulatory void (Pacheco-Vega, 2015).

In GMC, as in other cities in the Global South, consumers consider that they should drink water in a bottle rather than risk getting sick (Hawkins, 2011; Prasetyawan et al., 2017). This trend is known as "*inverted quarantine*", where consumers stay away from elements that might injure them, eventually isolating them from the product's potentially toxic element (Szasz, 2007). Inevitably, bottled water has become a staple in our lives. Moreover, this is a global phenomenon and is not only experienced in developing countries, where water infrastructure is not robust (T. Wang et al., 2019). Bottled water has become synonymous with healthy hydration in developed countries and is fashionable and trendy (Race, 2012).

Contrastingly, in some developing countries, governments cannot provide high-quality drinking water (Parag & Timmons Roberts, 2009). Companies capitalise on this fear by creating a safer alternative (Hawkins et al., 2016; Pacheco-Vega, 2019). Therefore as Pacheco (2019) mentions, "*the politics of bottled water consumption is underlined by the combination of governmental failure, industrial entrepreneurship and societal risk aversion*" (p.658). To summarise, the factors that have contributed to the emergence and sustained growth of the global bottled industries are:

- Governmental failure to provide safe drinking water through local water utilities (Prasetyawan et al., 2017)
- Reduced networked infrastructure for water delivery (Walter et al., 2017),

- Powerful and aggressive marketing campaigns (Khamis, 2010)(Reddy & Singh, 2010)
- Regulatory failures and multinational corporations seducing local governments (Pacheco-Vega, 2015)
- The convenience of portability and "better flavour" of healthy hydration (Race, 2012) (Larson et al., 2016)
- A cultural change in which consuming bottled water becomes normalised, despite its environmental impacts (Wilk, 2006)

7.1.3. Bottled Water and Waste

"The ensuing rapid growth in plastics production is extraordinary, surpassing most other man-made materials." (Geyer et al., 2017, p. 1)

Plastic has wholly transformed our way of life and is a symbolic material that, with its unprecedented functionality, has revolutionised our society in the last decades. Plastic's success can be explained due to its low cost, versatility, durability, and lightweight; these factors make plastic suitable for countless purposes on a large scale (Marsh & Bugusu, 2007). The production and consumption of plastic have grown almost exponentially, from 1.5 million tonnes (Mt) in 1950 to more than 300 Mt in 2014 (Carey, 2017). Further, the average global annual growth rate of plastic production varies from 4 to 5 per cent (Wong, 2010).

From 1950 to 2015, 830 million tonnes of plastic were produced (Geyer et al., 2017). The low oil prices have made virgin plastic production cheaper than the processing and manufacturing of recycled plastic (Ellen MacArthur Foundation and McKinsey & Company, 2016). Thus, it has been calculated that 90 per cent of the plastic produced is virgin; hence, plastic production consumes around 6 per cent of the oil and gas used each year globally (Velis & Brunner, 2013). Additionally, most of the world's plastic production is for single-used products (Lebreton et al., 2017).

"...bottled water is a case where sound cultural logic leads to environmentally destructive behaviour." (Wilk, 2006, p. 303)

In modern societies, disposable goods have become symbols of affluence, freedom, and hygiene (Cooper, 2008). Furthermore, convenience is driving most of our everyday products in our societies. The way we treat these kinds of materials may now be linked

to our social and financial status; as Thompson and Beck (2017) mention, "*the social status and intellectual respect are accorded to the person that treats waste in the correct way*" (p.284). One of the most iconic and concrete examples of disposable plastics is plastic bottles, one of the most common items found in debris (Cressey, 2016). Most plastic bottles used for soft drinks and water are polyethene terephthalate (PET) (Laville & Taylor, 2017).

This material is one of the most used for packaging because of its strong, durable, chemical and thermal stability. Additionally, it has low gas permeability and is easy to process and handle. Nonetheless, this stability leads PET to be highly resistant to environmental biodegradation (Orset et al., 2017). Thus, plastic materials pose a significant environmental hazard due to their buildup and resistance to degradation (Webb et al., 2012). Historically, plastics in the environment have been resistant to degradation and are extremely stable. Hence, synthetic plastics contribute to environmental contamination and are often a major issue (Hopewell et al., 2009).

Further, plastics expose humans to harmful components at high risk (Halden, 2010). Generally, the breakdown of plastics begins with photodegradation and progresses to thermooxidative degradation. Sunlight energy in UV radiation is required to initiate photooxidation of the polymer matrix (Raquez et al., 2011). The oxidation process weakens the plastic, which fragments into smaller bits until the molecular weight of the polymer chain is low enough for microbes to consume (Andrady, 2011). Microorganisms either incorporate the carbon contained in the polymer chains into biomolecules or convert it to carbon dioxide (CO₂)(Yamada-Onodera et al., 2001). However, this process can take more than 50 years and is very sluggish (Zhang et al., 2017).

Meanwhile, bottled water consumption is rising globally, and the global bottled water industry is worth 215 to 260 billion USD dollars (Newswire, 2018). As mentioned earlier, Mexico has become the number one consumer of plastic bottles per capita, followed closely by Thailand (Pacheco-Vega, 2015) (Figure 7.2). In 2018, on average, each Mexican consumed 72.4 gallons (274 litres) of bottled water (Statista, 2018). Furthermore, Danone (Bonafont), Coca-Cola (Ciel) and PepsiCo (Epura) have 72 per cent of the Mexican market for bottled water; in 2013, those companies generated more than 133 billion Mexican pesos (Estrada-Vivas, 2016).

The extreme consumption of plastics in our modern societies results in a massive accumulation of plastic waste, especially in urban areas and surroundings (Browne et al., 2015). Thus, plastic debris constitutes between 60 and 80 per cent of global waste (Derraik, 2002). Further, single-use plastic objects represent up to 50 per cent of the European beach litter (European Commission, 2018).

Out of the 830 million tonnes of plastic produced from 1950 to 2015, 21 per cent were incinerated or recycled, while the remaining 79 per cent were disposed of in landfills (Geyer et al., 2017). Every year, only about 14 per cent of the plastic packaging is even collected for recycling, and much of it is "*down-cycled*" into cheaper plastics used for garbage bags or plastic benches (Bureau of International Recycling (BIR), 2016).

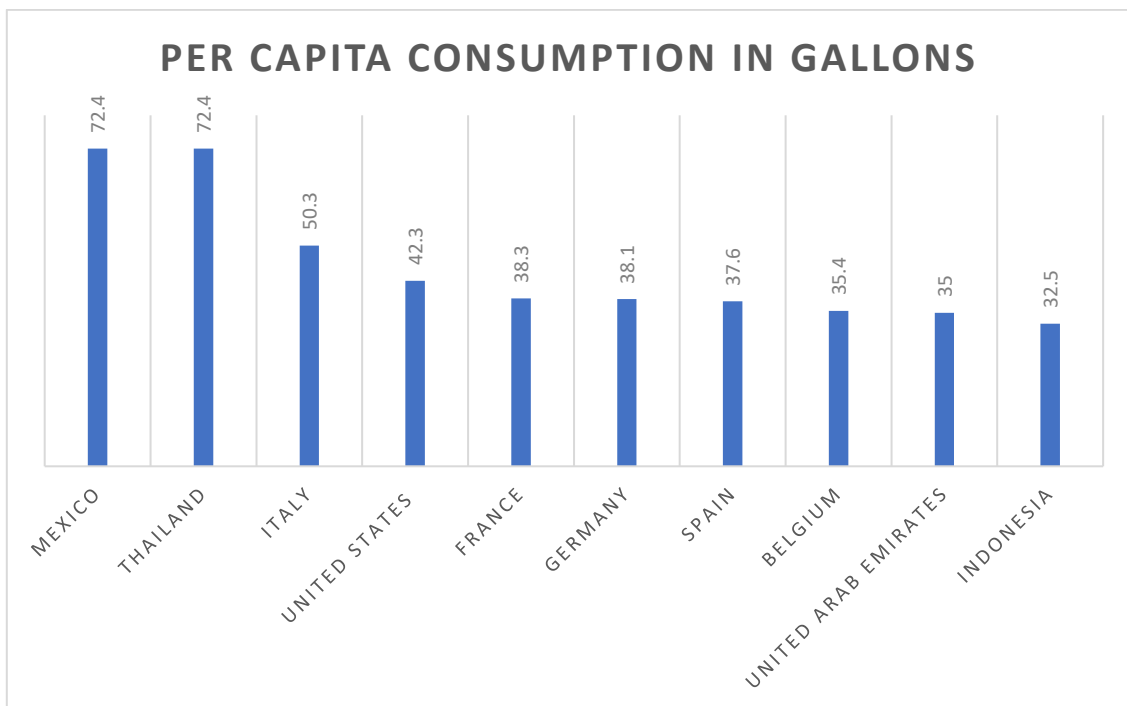


Figure 7.2 Per capita consumption in gallons of selected countries in 2020

Geyer et al. (2017) mentioned that there are essentially three different fates for plastic waste. Firstly, it can be recycled or reprocessed into secondary material. The recycling process increases the products' lifecycle; however, it does not avoid final disposal; it only delays it. Recycling can reduce plastic generation, but only if it displaces primary plastic production; however, this is difficult to achieve.

Further, the combination and mixing of polymer types create plastic with low economic and technical value. Thermally (pyrolysis, incineration with or without energy recovery) is the second primary way to dispose of plastic. This type of disposal can have significant environmental and health impacts, and it strongly depends on the emission control technology of the waste incinerators. The last way to dispose of plastics is to contain or store them away in landfills or uncontrolled dumps (ibid).

“The only way to permanently eliminate plastic waste is by destructive thermal treatment, such as combustion or pyrolysis. This is why the permanent contamination of the natural environment with plastic waste is a growing concern”

(Geyer et al, 2017, p.2)

Plastic contamination has become so remarkable that it has been proposed to indicate the Anthropocene era; even its collection presents its challenges. (Zalasiewicz et al., 2016). Recycling plastic requires much manual labour, and it is subjected to strict environmental and health regulations; this drives the price of recycled plastic up (ibid). Further, there are many restraints to produce cheaper recycled plastic, from sorting plastic to separating different materials from the products.

For instance, various plastics compounds present different recycling challenges, even with sophisticated sorting technology. Moreover, there is a growing presence of packaging containing multiple layers of various plastics that are difficult to separate (ibid). Therefore, as Carey (2017) mentions, *“It is no surprise that most of the estimated 300 million tons of plastic that the world discards every year ends up in landfills, incinerators, or the ocean”* (p.555).

7.1.4. Microplastics

As aforementioned, an ever-growing amount of plastic is consumed and produced globally. As a result, millions of tons of plastic are being accumulated in the oceans and the land. These tons of plastic degrade and are scattered in tiny particles called microplastics. These microplastics are widespread globally and have a potentially unique way of impacting the environment. Several researchers reported microplastics in freshwater beaches, rivers, and lakes in almost every continent (Eerkes-Medrano, Thompson, & Aldridge, 2015). Therefore, it has been estimated that 4 to 12 million metric tons of plastic waste entered the marine environment in 2010 (Jambeck et al., 2015).

Microplastic pollution has been found in different animals, from insects and worms to fish, birds, and clams. Studies have shown similar biotic organisms' effects regardless of where the microplastics are found (oceans, freshwater, or soil), studies have shown similar biotic organisms' effects (Fahrenkamp-Uppenbrink & Hurtle, 2018).

Organisms exposed to microplastics, as explained by Lönnstedt and Eklöv (2016), "*tend to be less active, less responsive to predator cues, more likely to be eaten and less likely to thrive*" some organisms even preferred to eat plastic rather than their natural prey. The presence and distribution of microplastics worldwide is evidence that treating waste as a manageable unit can only bring undead or temporary solutions. Microplastics reminds us that even by using biodegradable plastics and state of the art recycling technology, plastic waste remains. As Gille (2009) points out, "*waste cannot be concealed forever. Waste never really goes away. Waste flows*". Our waste reveals our cultural habits, and our habits must change.

7.2. Gone with the water

"There is a systematic attack on local water utilities' infrastructure, not only on the part of multinational corporations with a stake in commodifying local resources but also local governments who abdicate their responsibility towards citizens." (Pacheco-Vega, 2019, p., 658).

The first advice I usually give to someone visiting the GMC is not drinking from the tap; I learned this mantra since childhood. My parents always warned me that the tap's water was toxic, and I should never drink it. I never really thought much about it since this was always my reality. It was not until I travelled outside Mexico that I realised that not everyone was as scared as I was of water from the tap and that this was a specific issue of GMC. I remember some TV ads airing when I was a child that explained how to purify water by adding some drops of chlorine and boiling the water before drinking it.

Nowadays, this practice has been entirely left behind; it started fading out in the 80s and was almost completely forgotten by the 00s (Estrada-Vivas, 2016). This is mainly because, in the late 90s, the Mexican plastic bottle industry started its exponential growth. Currently, the practice of bottled water consumption is not only our reality but sometimes it is perceived as essential (López et al., 2017). For this research, in 2019, my partner and I moved to Mexico City. We lived in a flat in *La Del Valle*, a middle-income neighbourhood; this was a central location that would allow me to move easily for the

interviews (Figure 7.3). One of the first things that I taught my partner was pronouncing "garrafon" and "agua" and warning him not to drink the tap water at any cost. I was indoctrinating him, just as I have been indoctrinating myself. We found the nearest local shop, and we bought our first garrafon together



Figure 7.3 Our apartment block in La del Valle

He carried the 12-litre bottle up the stairs to the fifth floor, and I told him he was performing a traditional *chilango* ritual (Figure 7.4).



Figure 7.4 A garrafon

In this new flat, I also experienced for the first-time water scarcity. I have lived all my life in Mexico City, but my parents' house is in the suburbs, in one of the few areas with no water access problems. One day my partner told me he was about to shower when he noticed no water was coming out. I checked the shower and the faucets; they were completely dry. I asked my neighbours if they knew what was going on, and one of them simply said:

"As if you had not lived in Mexico City before, neighbour, this happens all the time."

They instructed me where the nearest public tap was to fill some buckets if we needed water to flush the toilets. They told me to go as early as possible since there were long queues for the public faucet, and water would run out by noon. They also said we should try our local gym if we needed to shower. One of my neighbours said he usually went to his in-laws' home in another borough when this happened. There was no way of knowing how long this would last either - sometimes it could last for hours, other times weeks. An old lady lived on the sixth floor, and neighbours would take turns bringing her water buckets for her bathroom.



Figure 7.5 Our local shop

Meanwhile, at the local shop (Figure 7.5), the owner ruled that you could not buy a *garrafon* if you did not bring back the empty container. He would only make exceptions for people that had just moved in. If you did not have the used container, he would charge three or four times as much. However, during water scarcity times, he would completely

refuse to sell garrafontes if you did not bring the empty container back. He would say that some people would get angry at him, but he also had a limited supply:

"Some people want more garrafontes during these times because they prefer to pay rather than queueing. I know there are even people who buy garrafontes to have a bath. Can you imagine? Using drinkable water for a bath, as if they were kings and queens?"

However, *garrafontes* do not guarantee that their water is not contaminated. There is a trust system between you and your local shop; you must trust that your "*water dealer*" is not cutting costs by filling the garrafontes at an illegal water company. These illicit companies even reproduce the original guarantee seals to look like a certified container. In Flint, Michigan, where 97,000 people were told not to use their lead-contaminated water (T. Wang et al., 2019), families went to extraordinary lengths to find places to bathe without fear.

Those who could not find an alternative to bathing were limiting their use, dashing into the shower once a week with their mouths tightly shut, and some would only wash with baby wipes (Goodnough, 2016). Inhabitants of this city have even reported persistent rashes, itchiness, and hair loss due to the extremely polluted water (ibid). In Mexico, we have never had those kinds of reports; however, since I was a kid, my mom instructed me to shut my mouth tight when showering. Somehow, the myth of undrinkable tap water in the GMC has led its inhabitants to believe that bathing with "*drinkable*" water is something of extreme luxury.

The most ironic is that they have probably been bathing with potable water all their lives. Like Estrada-Vives (2016) mentioned, **drinking from the tap becomes an act of faith and bravery in GMC**. After making sure that my zone was within the "*safe*" areas to drink tap water, I decided to try GMC's tap water for the first time in my life. As I filled a glass of water in the sink, I hesitated. There was a part of me who was scared. Another part of me was furious; I felt I was lied to for years, all my life even. After taking a sip, I realised it tasted exactly like any other glass of water. I was 28 years old when I drank from the tap in the city I was born into.

Drinking from the tap became an act of revelry.

Section II

7.3. Methods

For this research, the behaviours and attitudes of water bottle consumption were intended to be explored through the same methods as clothing and mobiles. Through in-depth interviews with GMC residents, that would reveal "*what people really do, rather than what they say they do*". However, due to the COVID pandemic, this part of the research could not be performed similarly, and other methods had to be used. In this section, there are some quotes from some GMC residents that were interviewed before the pandemic.

However, no results are included due to the limited number of interviews; therefore, this chapter is based on archival research. As mentioned in Chapter 2, practices and attitudes do not evolve in a vacuum; they usually originate as a response to a specific development need or trend in development thinking. According to Practice Theory, the formation of practices involves three key elements: images (meaning or symbols), materials (technology or infrastructure), and skills (competence and processes), which are the causes of behavioural change (Warde, 2005).

As a result, an archive study was used as a research approach to gather data on historical and present consumption and disposal habits. In this chapter, archival research will reveal the relationship between bottled water and GMC residents. The principal archive documents used were newspapers, national development plans, and policy reports. The findings from the archival study can be used to build a narrative about how some consumption, disposal, and recycling habits have evolved through time. It also elucidates the evolution and priorities of the many stakeholders.

I was able to identify the prevalent discourse on water usage and the emergence of a multi-billion-dollar water bottle industry by analysing policy papers and local news. It also helped me to place the emergence of a widespread distrust of tap water among Mexicans in perspective. Therefore, this enabled me to chart how the government and companies have moved waste generation responsibilities to consumers. Additionally, this section has some personal anecdotes. As a *chilanga* that has lived all her life in GMC, I hope my experience might shed light on some of the common practices of our relationship with water and plastic bottles.

Section III

7.4. History of the Bottled Water in GMC

In this section, we shall explore how the myth of toxic tap water began in GMC and how the bottle water companies used it to expand their product use. We have already seen how the plastic industry has increased globally, so we shall compare that with the growth in GMC. In addition, we shall discuss the symbols, materials, and infrastructure that have facilitated the adoption of the practice of consuming bottled water in the capital. Finally, this section will explore the historical, cultural, and political reasons of how and why bottled water in GMC became necessary and how it completely replaced tap water.

Mexico City has an immense demand for water globally, with a floating population of almost 9 million inhabitants (plus the millions of people who work there every day), which consume 300 litres of water per person yearly. On top of that, 40 per cent of the water bombed to the city is lost due to leakages (Watts, 2015). Further, almost 70 per cent of the city has less than 12 hours of water access a day, and in the most problematic areas, 18 per cent of the population must wait for several days to get water access for an hour or two.

Moreover, whenever there is a draught, the situation worsens considerably, and some researchers have confessed that this is a quite concerning scenario: "*If there is not a massive intervention in the water infrastructure of the city, the long-term consequences are extremely worrying.*" (Paltán, Basani, Minaya, & Rezzano, 2020). Even the Head of the Water Management System in Mexico confessed that this is a complicated scenario:

"We have serious problems, the city is overpopulated, the water quality is poor, and in some zones, we have to pump water up 300 meters. It is a mammoth task" (CONAGUA, 2016).

Water pressure in the water distribution system seems to be positively related to income. For example, in the city's wealthiest areas like Miguel Hidalgo and Cuajimalpa, where many of the city's golf clubs are located, the water pressure is 14 kg/cm²; this is enough for the water sprinklers to work for hours at the golf clubs. Middle- and high-income areas like Polanco and Benito Juárez must deal with half the water pressure and sometimes experience water scarcity (Watts, 2015). Benito Juárez is the borough I lived in when performing this research and experienced water scarcity.

Nonetheless, this is nothing compared to what other areas must cope with. Iztapalapa has become infamous due to its inferior water quality and complete lack of water access stability. This borough has a water pressure of only 0.5kg/cm² which means taps are regularly dry (ibid). Neighbours of Iztapalapa must continuously rely on water tankers or illegal means of procuring water (such as unauthorised water distributors).

The Mexican Water Management System invests more resources in this area than in any other part of the city (CONAGUA, 2016); however, it is still insufficient given the problem's scale. Iztapalapa was never correctly planned, it developed in the last decades, and almost 1.8 million people (majorly low income) have moved there; thus, infrastructure could not develop at the same pace that the borough was expanding.

Moreover, the wells in this area have a dangerous mix of chemicals (including magnesium, nitrogen, sodium, iron, and sulfuric acid); therefore, an extra step of purification is needed. Even with this extra step, it is expected that water that comes out of the taps smells like rotten eggs and has yellow or red hues (Watts, 2015). The situation has escalated to a point where water tankers and their drivers are kidnapped in the city. One of the drivers narrated how he was threatened and kidnapped by an armed group of civilians:

"They put a gun to my head, and they told me to do as they said or they would kill me. They were desperate and angry, and they blamed me because I had "control" of the water." Adrian Vazquez, water tanker driver
(Watts, 2015)

Inhabitants of low-income boroughs like Tlahuac and Iztapalapa depend on these water tankers to get water since, as aforementioned, the water from the tap is polluted or does not arrive. The kidnapping of water tankers is sadly becoming a common incident. In 2015, there were 50 reports of this type of action; in 2016, it ascended to 90 cases, and in 2017 it reached 126 cases; this means there was an increase of 150 per cent in three years (Bravo, 2018).

Having a shower, flushing the toilet, or doing laundry has become increasingly costly to people living in these areas. Many citizens must travel to the nearest water tanker stations by bus; in theory, this should be a free service, but people have to "tip" bus drivers around 30 to 50 pesos per journey. Therefore, it is no surprise that people prefer buying bottled water or *garrafones* (12-litre jug), which are around 9 pesos (price varies depending on the city area).

So, how expensive is it to distrust tap water in GMC?

Estrada-Vives (2016) calculated how much households spent on average on bottled water. She noticed that households with lower income spent a significant amount on bottled water (close to 10 per cent), while in the highest deciles, households only spent 1 per cent of their income (as seen in Table 7.1). These expenses can increase dramatically if there is a prolonged water scarcity issue in a borough like Iztapalapa or Tlahuac. Therefore, households in these areas spend around 2,500 pesos monthly on water, representing up to a third of the household income (Estrada-Vivas, 2016). Some residents have suffered so much financially due to this "water crisis" that they plan to leave the city.

"We are planning to leave the city. We just cannot afford to live here anymore." Alejandra Salgado, resident of Iztapalapa (Watts, 2015)

Table 7.1 Expenditure in bottled water per person in GMC in MXN ((Estrada-Vivas, 2016)

Deciles	Average income per person per month	Average expenditure in bottled water per person per month	Percentage of income spent on bottled water per month
I	\$458.66	\$34.40	7.50%
II	\$810.00	\$64.80	8.00%
III	\$1,104.61	\$71.80	6.50%
IV	\$1,408.81	\$83.12	5.90%
V	\$1,773.60	\$88.68	5.00%
VI	\$2,145.45	\$94.40	4.40%
VII	\$2,681.00	\$112.64	4.20%
IX	\$4,860.00	\$145.80	3.00%
X	\$12,180.00	\$170.52	1.40%

...

Among the familiar noises that you can hear in the streets of GMC, you can hear the peddlers selling *garrafones* calling

"Aguaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa!"

In the GMC, buying "garrafones" every week is now part of every *chilango* routine. Some fridges have purified water to make ice cubes; if not, buying purified ice is also quite common. Several people even use drops of chlorine in the water that they will use to wash vegetables or fruits. Since garrafones might not be the most aesthetic product, some consumers have a different ("prettier") container to empty the garrafon. A collection of filters and garrafones of chilangos is shown in Figure 7.6.

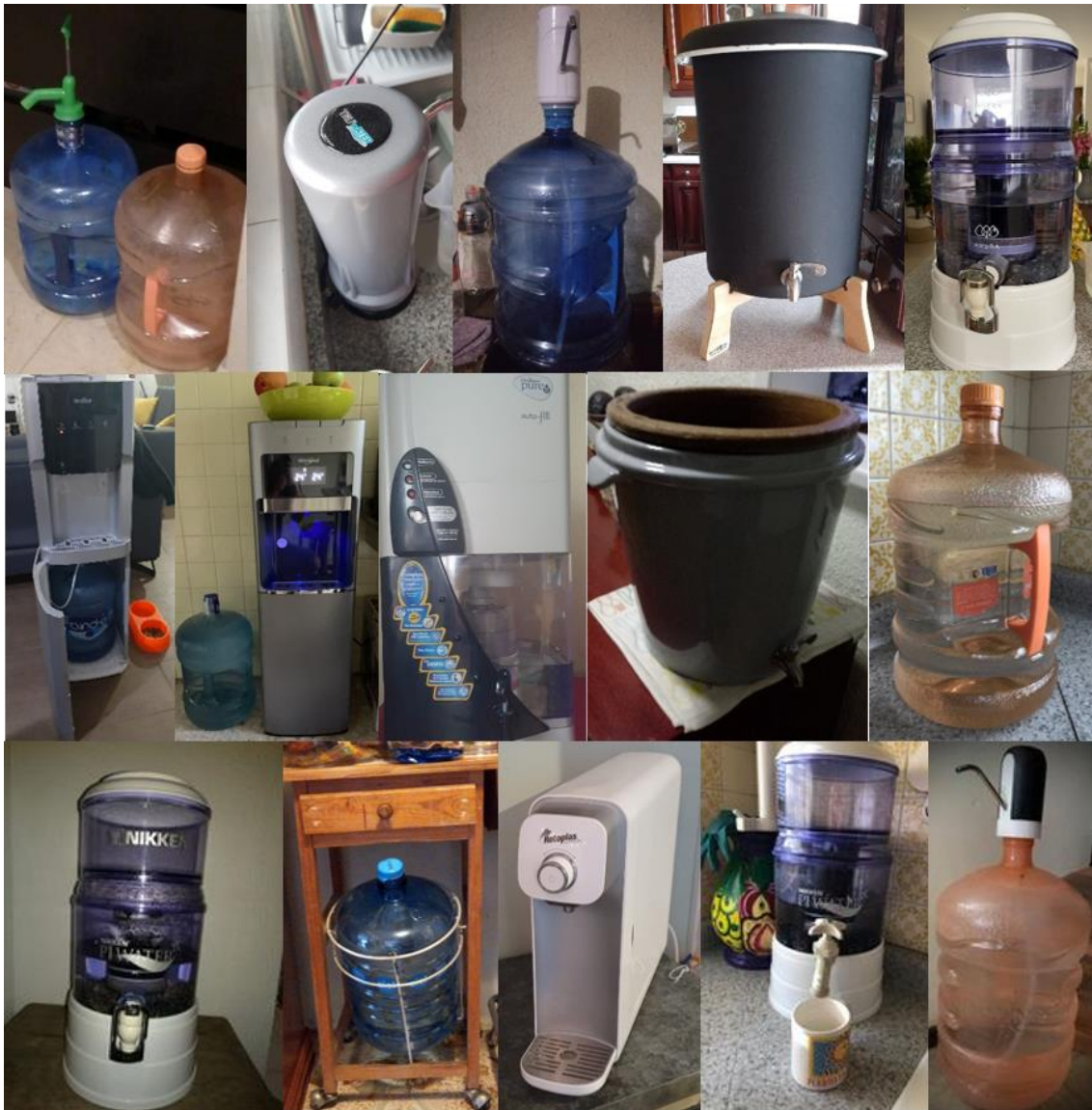


Figure 7.6 How do chilangos drink water? A collection of filters and garrafones

Some households have invested in a water purifier, but they have to change the filters constantly. Some even combine garrafones and filters to ensure that the water they are drinking is not contaminated. A friend of mine told me he was planning on buying a filter but was dissuaded from doing so:

"Someone told me it was not worth it because the water here is so contaminated that the filters do not last long, and it ends up being way more expensive than buying garrafones."

In the case of Mexico, and specifically in GMC, there is a: *"strong and collectively-shared belief that drinking tap water will result in physical harm; this has been ingrained in Mexican citizen's mind throughout the years"* (Pacheco-Vega, 2019, p. 361). In 1985, after one of the worst earthquakes ever experienced in modern history in Mexico, the city

was in shambles. An absent and incapable government, the partial destruction of the city, a lack of knowledge of the actual number of victims, or if the quality of water had been compromised fostered the flow of disinformation and fake news.

Many sewage and water pipes broke along with the many destroyed buildings; thus, some houses were left without water services, while others received cloudy and murky water. Therefore, GMC inhabitants would advise each other not to drink tap water or cook, and it became common to see people carrying *garrafrones* in the street (ibid). Even when the water infrastructure was repaired, the population was still not trusting the tap water, which extended the belief that purified water had to be bought.

Decades later, eighty per cent of GMC inhabitants still report not drinking tap water (Estrada-Vivas, 2016). In her dissertation, Estrada-Vivas (2016) interviewed several GMC inhabitants, and she reported that several expressed fearing drinking tap water from their households and getting ill (with cholera, typhoid, and salmonella). Even if they had never gotten ill by drinking water, they would still refuse to have it. As Estrada-Vivas (2016) mentioned, "*It is the distrust that we were born with*".

However, Pacheco-Vega (2019) states that this practice did **not** become ingrained in the population solely for these historical reasons. He suggests that this was due to:

"... a systematic, repeated cycle where what once was consumed as part of a strategic survival response to an emergency has become commonplace. This behaviour may have been logical one time, but the continued repetition even when infrastructure was repaired and municipalities, specifically Mexico City, were able again to provide safe drinking water is not logical at all." (p., 361).

While the consumption of *garrafrones* increased due to the 1985 earthquake, Coca-Cola decided to open 85 factories in the same year. On a global scale, companies were shifting from glass to plastic to bottle soft drinks. By the late 80s, 2-litres returnable sodas had become a staple among Mexican families. Up to this point, bottles were made of glass, and they were considered a "*luxury product*" (Estrada-Vivas, 2016).

In 1977, Perrier launched a successful advertising campaign in the US, presaging the boom of bottled water's popularity. Perrier had become extremely popular in France and other European countries by the late 60s, thanks to its mass advertising directed to younger consumers and was marketed as a glamorous item. Consequentially, Perrier's success sparked imitation from other brands like Evian and Vittel (BCC Research, 2018).

In Mexico, the bottled water boom coincides with the North American Free Trade Agreement (NAFTA), which facilitated international brands to enter the Mexican market (López et al., 2017). The bottled water ads were focused on the benefits of spring water and how this was far superior to the water consumer could get from tap water. As aforementioned, bottled water was considered a luxury item, and it was mainly imported. However, this exclusivity did not last long since, in 1992, Bonafont became the first Mexican company to sell water bottles for individual consumption.

The ads in the 90s emphasised the quality and purity of bottled water. At the same time, the Mexican Government started a campaign against cholera, and they would place ads on the radio and tv advising people to boil water and add drops of chlorine (Estrada-Vivas, 2016). These were the same ads I remember seeing when I was a kid. However, it was easier to buy bottled water or garrafones than boiling it and adding chlorine drops. Therefore, consumers started preferring bottled water and garrafones because it was more "*cost-effective*" (given the amount of gas needed to boil water), and for many, bottled water also "*tasted better*".

In a couple of years, tap water in the GMC was relegated only to domestic chores, like washing dishes, showering or laundry. Purified water was used to drink, cook, and even bathe babies (Estrada-Vivas, 2016). Furthermore, branding and packaging are crucial elements that enable bottled water consumption in the GMC (Pacheco-Vega, 2015). In general, the packaging is considered to be central to "*reordering the relations between products and consumers throughout the twentieth century*" (Hawkins, 2012, p. 72).

Moreover, packaged goods have created a closer relationship to products, which consumers, through written or visual information, rely on to access knowledge of what they are buying (Cochoy & Grandclément-Chaffy, 2005). Inevitably, packaging has become normalised, and consumption would be impossible without it. Additionally, it has become an integral "*part of the cultural meanings and practices of shopping and its qualification to be hygienic, safe and convenient*" (Hawkins, 2012, p. 72).

As Cochoy & Grandclément-Chaffy(2005) stated, "*Naked*" products would trouble us now: there would be no images to stimulate our fancy and, more seriously, no product guarantee or traceability." (p.649)- Moreover, Hawkins (2012) points out how the PET bottle is both pragmatic and performative: this plastic container has helped reconfigure the meanings and value of water, drinking practices and waste management.

"The bottle played a significant role in assembling and shaping this market not simply because of its material affordances and design qualities, but also because of the dynamics of relationality: that is, how the bottle became caught up in new networks and alliances with water, consumers and other elements that extended its capacity to produce effects". (Hawkins, 2012, p. 72)

To summarise, the main historical reasons why GMC inhabitants are so afraid of drinking tap water are:

- (1) The cholera epidemic that caused thousands of deaths in Mexico City in 1833
- (2) The financial crisis that was produced due to the falling oil prices from 1982 to 1994
- (3) The market opening or neoliberalist approaches adopted from 1982 onwards (Greene, 2014)
- (4) The damaged water distribution infrastructure damaged by the earthquake of 1985 made it almost impossible to get good quality water in the city; this also led to another cholera epidemic in the 90s
- (5) Marketing ads designed to capitalise on these historical reasons

7.4.1. Is the water in GMC toxic?

There remains a collective memory of the hundreds of murky water reports in the city, especially in the city's most impoverished areas. If distrust leads the GMC inhabitants to buy garrafones and bottled water, we need to know if tap water can actually make us sick. Mexico City has one organism that oversees checking the water quality: SACMEX. According to their reports in 2018, most of the city has good quality tap water (or at least good enough according to the national water regulations).

In figure 7.7, we can see a map of the city and the water quality per zone. The blue zones are where water is good enough for human consumption and will not represent any harm. The zones in green are the ones that can still be consumed by humans but are dangerously close to the permissible levels of pollution. The zones in orange represent the zones in which water should not be drunk by humans and can have harmful impacts on human health. As we can see, most of the city is coloured blue, which means that most of the city has access to good quality tap water.

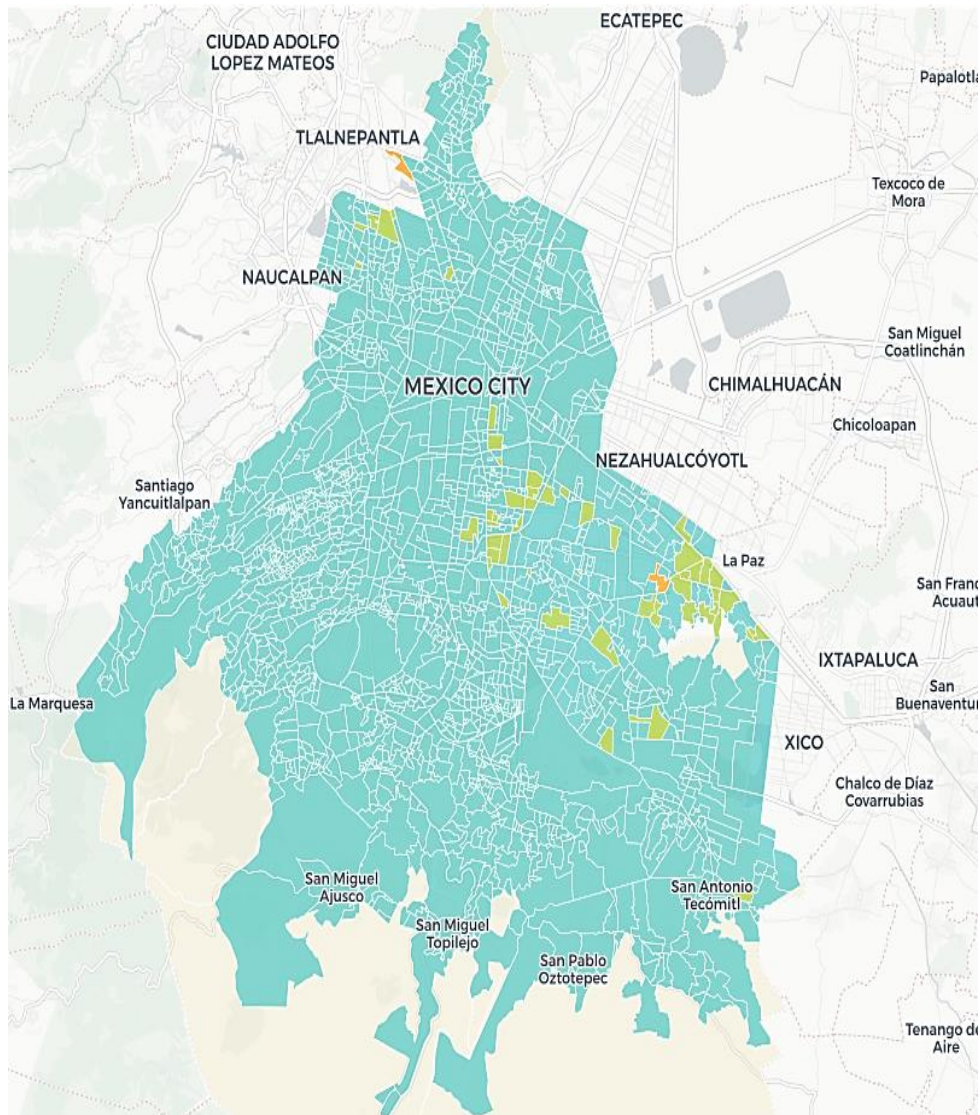


Figure 7.7 Map of water quality in Mexico City, 2018 (Ecosfera, 2018)

However, it is not easy to know if the water in your location is good enough to drink. The water quality reports of SACEMX are neither easy to access nor easy to interpret; knowledge of how policies and regulations work in Mexico is needed to understand these reports. To find these reports, you need to know which governmental entity oversees water quality in the capital. The reports are also "*buried deep*" in their website, and it takes a while to finally find them. The website is also full of glitches, and it rarely works.

The results come in a table citing several regulations divided by borough but not by neighbourhoods; this also shows that SACMEX does not perform daily or even weekly tests as recommended in the policies. In Figure 7.8, there is an example of the water quality reports of the year 2020 in Mexico City. It includes pH measures, turbidity,

hardness, and suspended sediment. By comparing these results with the regulations, we could conclude that 100 per cent of the water tested in 2020 passed the regulations indicators.

Alcaldía	N°		Promedio de las concentraciones en red					
	Lecturas Cloro	Muestras	NOM - 127 - SSA1 - 2000 (Modificada)					
			pH	Turbiedad	Dureza Total	Cloruros	Hierro	Manganeso
			6.5 - 8.5	5	500	250	0.3	0.15
			UpH	UNT	mg/l	mg/l	mg/l	mg/l
Álvaro Obregón	46	46	6.66	0.76	102.48	20.82	0.112	0.122
Azcapotzalco	54	54	6.52	0.57	167.81	38.42	0.101	0.108
Benito Juárez	47	47	5.87	0.57	84.29	13.66	0.100	0.103
Coyoacán	37	37	6.16	0.43	124.66	28.76	0.105	0.086
Cuajimalpa	31	31	2.94	1.13	70.39	13.36	0.104	0.085
Cuauhtémoc	52	52	6.28	3.67	88.44	15.95	0.156	0.099
Gustavo A. Madero	56	56	6.45	0.71	208.30	59.19	0.156	0.116
Iztacalco	34	34	6.11	1.49	89.71	27.83	0.161	0.114
Iztapalapa	77	77	7.01	1.14	148.41	96.38	0.149	0.132
Magdalena Contreras	27	27	6.37	0.77	65.87	11.45	0.097	0.085
Miguel Hidalgo	21	21	5.37	1.45	80.67	10.27	0.114	0.095
Milpa Alta	10	10	7.87	0.50	91.83	12.13	0.100	0.100
Tláhuac	23	23	7.73	0.57	120.80	47.05	0.104	0.104
Tlalpan	37	37	6.04	0.60	111.99	16.68	0.112	0.098
Venustiano Carranza	20	20	7.30	0.49	107.28	25.06	0.101	0.101
Xochimilco	31	31	6.27	0.49	117.41	22.40	0.126	0.100
Total	603	603						

Figure 7.8 Water Quality Reports of SACMEX 2020 (SACMEX,2021)

An NGO made the map that was displayed earlier with the information provided by SACMEX; it is handy; however, it only represents a moment in time (2018) of the city. SACMEX does not provide interactive maps or any graphic form showing their results. This is quite a contrast if we compare it with how air quality is measured and its results communicated among the population. GMC citizens are checking the city's air quality, and in the last years, the air quality has worsened to a point where the government has advised citizens to remain in their houses and not go out to work or school.

There are several monitoring centres in the city, and it is easy to consult the closest to you. An app lets you see the daily air quality and other graphs and information (Figure 7.9) (Gobierno de la CDMX, 2020). Even newscasters show the level of IMECAS (the reference value system for the levels of air pollution in the GMC) every day along with the weather. Nevertheless, in the case of water, this information is not readily available. I asked some friends and relatives if they knew the water quality in their areas, and they all said they did not know, but they assumed it was terrible. A friend asked me

"Can you please check on your research? My girlfriend is not from the city, and she wants to drink tap water.

I argue with her all the time. She will get ill; she does not understand as we do."

When I showed him the map of the zones with good water quality, he was in complete disbelief. "

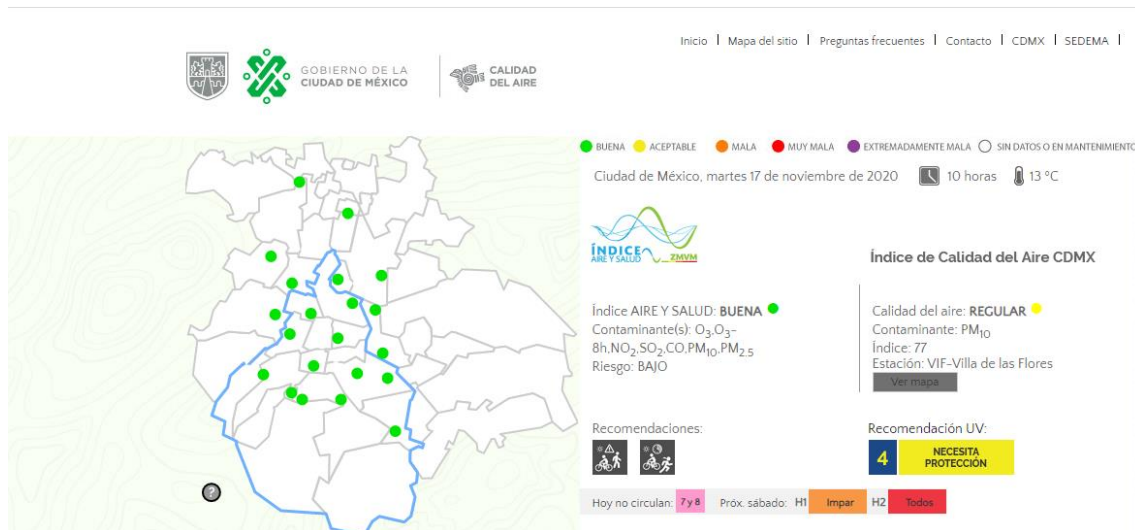


Figure 7.9 Interactive Daily Map of Air Quality of Mexico City and some areas of GMC (17 of November of 2020)

"That must be wrong; that is what they want us to believe, that is not true."

Even after researching and realising that the water quality I lived in was potable, I still feared drinking tap water. I told my parents about my discovery, and they distrusted the information.

"Please promise us you will not drink the tap water; you do not know if the government are lying in their reports. Even if they are not, what if the pipes in your building are too old and the water is polluted anyway?"

There appears to be a current feeling of distrust towards the government in GMC. However, the government seems to be comfortable with the current misinformation flow; at least, they do not seem to be in any hurry to communicate that 90 per cent of the water in the city is potable. Bottled water has become a billion-dollar industry, and GMC is one of its most significant consumers. The readily available air quality information showcases that the city can share information and has developed an infrastructure to test air quality regularly. This system is not an example of the best practices of a Nordic country; this is happening in GMC.

Then, why is the government not trying to show that the water quality in the GMC is not as bad as we think? As we have seen, bottled water consumption in GMC has evolved from a temporary solution for a natural disaster to a long-term necessity. It is seen in that way due to the lack of access and indoctrinated distrust of the city's water quality. Furthermore, the Instituto Politécnico Nacional (IPN) study found that bottled water and garrafones in the GMC contained faecal matter.

There are more than 2,000 small companies that bottle water in the country, which cannot guarantee that their products are safe for consumption. Several of these companies do not comply with the minimum quality and hygiene regulations. Ironically, the GMC inhabitants are trying to avoid tap water due to pollution drink contaminated water from the *garrafones* and bottled water (Martinez-Salgado, 2020).

Most bottled water is produced in Mexico through water extraction from aquifers, which is exceptionally poorly regulated. Furthermore, in Mexico, water is "*owned*" by the nation, and thus the extractive concessions are the federal government's responsibility. However, states have minimal jurisdiction over water governance areas, including protection, extraction and marketisation (Pacheco-Vega, 2019).

Cities usually provide potable drinking water, which is one of the primary public services they must comply with. Nonetheless, in the case of GMC, the local government has "*abdicated*" their responsibility and have left citizens to their own devices (Pacheco-Vega, 2015). A big part of the population does not have reliable and constants access to water. Some citizens can barely afford to pay for their water consumption and often rely on illegal or "*pirated*" water sources (like the small, unregulated water companies or the kidnapping of water tankers).

In this section, we have shown that a natural disaster might have initiated bottled water consumption in GMC. Still, it was sustained and facilitated by poorly designed regulations, poor infrastructure, strong branding and marketing campaigns (Pacheco-Vega, 2019). However, in the next sections, I will argue that recycling has also enabled bottled water consumption and, more importantly, to this research: the increase in plastic waste.

Section IV

7.5. Recycling Reconsidered

"The industry sold the public on an idea it knew would not work — that the majority of plastic could be, and would be, recycled — all while making billions of dollars selling the world new plastic." (Sullivan, 2020)

In the previous sections, we explored how the practice of bottled water consumption was created in GMC, from the historical reasons that detonated it to the companies and the lack of governmental action that sustained it. However, this section will argue that another factor that helps strengthen this practice is the belief that all plastic bottles can be recycled. Companies have misled the public into believing plastic would be recycled, and they gladly fell for it. With the staggering number of plastic bottles used in GMC, consumers notice how much waste they generate.

Nevertheless, whatever guilt they could have felt is quickly dissipated by the promise of recycling. The lack of guilt in consumers is not incidental; bottled water companies spend colossal amounts of money on marketing, and some of their ads centre around the recyclability of their products. As mentioned previously, ads focused mainly on the benefits or advantages of "spring" or "purified" water over tap water. That message has already been established among the GMC citizens. Bottled water companies transmit the new message that their plastic bottles are recyclable and "*good with the environment*".

Therefore, the consumers' responsibility is reduced to merely disposing the product in the right bin. Furthermore, companies (and in some instances, the government) quickly point fingers at consumers for not complying with their responsibility. These entities argue that if recycling is not working as it should, it has nothing to do with how that process works but rather with the consumer's inability or unwillingness to separate its waste. As Nicki Brown, head of sustainability at Coca-Cola in Europe, mentioned:

"We know communication on recycling is difficult, it tends to be quite factual ... there is a bit more we think can be done to change behaviour, around making more of an emotional connection and explaining the benefits of recycling" (Boyd, 2017)

Thus, the responsibility is shifted almost completely to the consumers and only partially to the companies for not fully communicating the benefits of recycling. Nevertheless, as Carina Millstone, executive director at food waste campaign group "Feedback", said:

"The idea of driving public awareness, making it easier for people [to recycle], is not going to cut it ... Coca-Cola will not exist if we achieve sustainability. That is the reality of it" (ibid)

In the case of bottled water consumption, the throwaway society's narrative is not recalled as often as electronics or clothing. In the latter, it is the consumer and its insatiable consumption who are killing the planet. Nevertheless, when it comes to plastic bottles, the argument switches. If the consumer deposits their waste in the right place, they fulfil their moral and environmental obligation, and they can continue to buy as many products as they want because they are recyclable.

There is a growing narrative by the Zero Waste movement to buy reusable water bottles. However, where limited water access in GMC, it becomes almost immoral to suggest that option as an easy fix-all solution. People are not buying garrafones or bottled water because they *want to*, but they *have to*, or at least because they think they have to. In this section, we will review how recycling became established and how it operates in GMC.

7.5.1. Recycling Plastic in GMC

Medina (1999) indicated that *"most Latin-American cities lack policies or officials programs that promote recycling"*. However, in Mexico, this would eventually change in the mid-90s when the Mexican government asked bottlers to start recovering PET and create recycling programs. Additionally, the Mexican government warned companies that without voluntary compliance, mandatory measures would arise. This warning would create one of the few examples where private, for-profit companies pursued social inclusion of waste pickers in their supply chain and achieved creating jobs, improving profits and reducing poverty (Martin Medina & Smith, 2013).

Before this agreement, the recovered PET price fluctuated, making waste pickers deem the material unprofitable. Therefore, water bottle companies kept importing virgin resin since they could not rely on national recycled material. In 2002, after the Mexican government intervention, Mexico's bottling and plastic industries created a non-profit organisation to secure a stable domestic PET supply. This organisation was called the "Ecology and Corporate Commitment" (ECOCE), which would create a collection chain that included over 1,300 suppliers throughout the country (including collection at dumpsites, landfills, and school recycling programs).

Additionally, this NGO decided to cut the middleman by purchasing PET directly from *pepenadores* at a fixed price; therefore, around half of their suppliers are scavengers (Martin Medina & Smith, 2013) (ECOCE, 2018). Nevertheless, at some landfills and dumpsites, waste picker leaders control the sale of materials. They offer the collected material to ECOCE and pay a lower price to the waste pickers. Thus, unfortunately, some *pepenadores* are still at the mercy of the corruption of these leaders.

However, *pepenadores* have improved their situation, and their life quality has upgraded (Martin Medina & Smith, 2013). On the other hand, as a testament to ECOCE's success in the recycling front, in 2002, when the organisation started working, the recovered PET in the country was 8.8 per cent, and nowadays, it is around 53 per cent. This positions Mexico as the leader of PET recycling in the continent (as seen in Figure 7.10) (ECOCE, 2018).

Still, there was an impending issue that would affect this initiative in the future: its reliance on waste exports. In 2002, all the recovered material was sent to China and the US to be recycled. In 2008, the technology of a PET bottle-to-bottle recycling program initiative was implemented in Mexico, with the hopes to close the recycling loop. The director of this initiative in 2011, Jaime Camara, saw this technology as a way to eliminate dependency on volatile international markets, especially the Chinese market (Ortega, 2011).

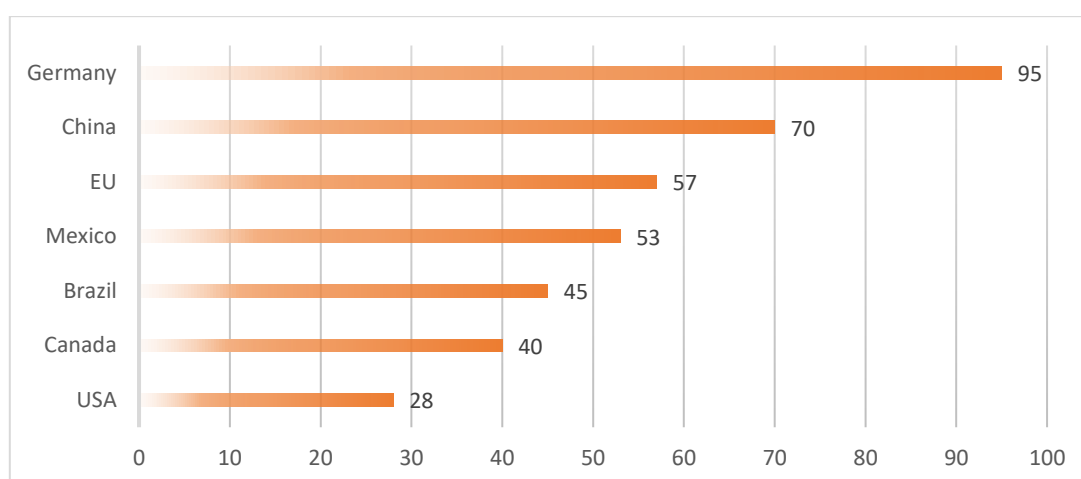


Figure 7.10 Percentage of Recycled PET in selected countries 2019 (ECOCE, 2018)

In 2012, following this initiative, Coca-Cola announced its pledge that by 2015 all packages should contain at least 25 per cent recycled material (Martin Medina & Smith, 2013). Currently, ECOCE calculates that 65.5 per cent of all the PET recovered for

recycling is turned back into a PET container (ECOCE, 2018). Nonetheless, even if Mexico is considered the continent's leader in PET recycling, by 2018, it still exported 27 per cent of the recyclables to other countries (ECOCE, 2018). In 2018, Mexico exported 500,000 tons of waste to other countries, and 47 per cent of those were sent to China.

On the 31st of December of 2018, China's ban on plastics came into effect, and this Chinese national policy has had a global impact on the recycling industry (Boyang, 2018). Many developed countries were highly dependent on China's buying their waste, so they did not have to recycle or treat it domestically (Brooks, Wang, & Jambeck, 2018). Most countries are still exporting their waste to developing countries such as Vietnam, Indonesia, Malaysia, and Thailand, but none of these countries can cover China's purchasing capacity (Parker & Elliot, 2018). Some saw this ban as a significant opportunity to find new solutions to solve the plastic waste crisis (Brooks, Wang, & Jambeck, 2018).

As Boyang (2018) mentioned, "*Countries that export their waste to China might change their focus from exporting their waste to reducing the use and redesigning plastic packaging and products*". However, this wishful thinking did not become a reality. From January to August 2020, US waste exports towards Asian countries with poor waste management infrastructures increased 32 per cent. In the same period, the US waste exports to Mexico increased 29 per cent (Dell, 2020).

This situation is extremely concerning because Mexico does not count on the infrastructure to process nationally produced waste. As previously mentioned, even a fraction of PET waste has to be exported to other countries (27 per cent), which according to ECOCE (2018) the most recycled product in the nation. Another troubling aspect is that the US reports do not match the Mexican ones. Greenpeace and other NGOs have warned that the Mexican Government has underreported these exports by a factor of ten (Greenpeace, 2021).

7.5.2. The devil is in the detail

In 2019, Mexico reported recycling 415,000 tons of PET in the country, another achievement of ECOCE, since in 2002, only 8,157 tons of PET were recycled (ECOCE, 2018). Medina (2013) saw the recycling efforts of Mexico as an inspiring case where: "*corporate social responsibility efforts demonstrate that it is possible to operate a private recycling program that is profitable and, at the same time, generates social, economic*

and environmental benefits by working with scavengers and collaborating with industry via non-profit initiatives" (p.4).

However, in 2019, 790,000 tons of PET bottles were generated (only 53 per cent were collected). From those, only **24.92** per cent (196,917 tons of bottles) were turned into bottles again (without exporting them to another country) (ECOCE, 2018). Even if the Mexican Government likes to show off that we are the country that recycles the most PET in the continent, only a quarter of all the country's bottles are turned back into bottles again (without exporting waste).

It has been estimated that there are 200 PET bottles produced each year; this means that only 50 bottles would be recycled, while 150 bottles per person are not (SEMARNAT,2019). Another key factor to consider is that according to ECOCE (2018), in Mexico City, 96 per cent of the PET was collected. This collection rate was not achieved by the consumer's sustainable habits or successful recycling campaigns, but thanks to the *pepenadores*.

The skilful hands and trained eyes of *pepenadores* "*clean*" the mountains of waste separating anything that can be sold. Thus, even if the consumers are not separating their waste, this does not impact the recovered rates. The "*problem*" that many companies like to point out is why recycling is not working is virtually non-existent in Mexico City. Nevertheless, the recycling rates are the same in GMC as in any other part of the country since recycling companies are already working to their maximum capacity.

The real problem remains that we do not have the infrastructure or markets for recycling so much waste, and even if we did, as Alexander and Reno (2012) stated: "*a significant problem with recycling is the tendency for recyclates to become less and less usable with every iteration of the cycle*" (p.13). Greenpeace (2021) and many other NGOs concluded that for GMC:

"Burning is not recycling, and recycling is not enough. We have to stop consuming and generating waste."
(p.5)

7.6. Concluding Remarks

We have seen in this chapter the different messages and narratives that residents of GMC receive. Firstly, we analysed the geographical background that makes the metropolitan

area prone to water scarcity. Then we showed how the myth of toxic tap water originated in GMC due to historical events like the 1985 earthquake and cholera epidemics. We also delved into how the plastic industry used these factors to boost its profits and embed the belief that bottled water will always be safer than tap water. This narrative has caused an almost religious conviction that we should avoid drinking the water from the tap. Finally, we saw how bottlers companies try to convince GMC citizens that their consumption habits are not bad for the environment if they separate their waste.



Figure 7.11 Ad by ECOCE (2020), "The problem are not the materials, but what we do with them. If we separate them correctly, they can be recycled."

In Figure 7.11, we can see an ad by ECOCE³ (2018) that reads: *"The materials are not the problem, but what we do with them. If we separate them correctly, they can be recycled"*. Their campaign implies that *"the problem is not our product; the problem is YOUR behaviour"*, and thus, "we" (the consumers) are the problem. These companies propose that every problem that might arise with their products is easy to solve with recycling, reuse, or waste separation.

Everything is set up in GMC such that customers do not feel bad about buying bottled water. Consumers are routinely reassured by mass media campaigns that the bottles they throw away will be replaced and that waste will not end up in the oceans or landfills. Therefore, the images of floating islands of plastic might appear to be disconnected from their reality. GMC residents do not know who is responsible for all that rubbish, but it is not them. Maybe, that is also what is more comfortable to believe. As one respondent told me:

³ It is vital to point out that ECOCE was founded with the money of bottle corporations and that there is a definite narrative that they are following and supporting, and that is never to imply that bottled water is bad per se

"As if living here was not hard enough, and now I have to worry about how a bottle I threw is being eaten by a turtle thousands of miles away."

Life in GMC is undoubtedly challenging, and any *chilango* could tell you that. Road traffic, air pollution and "toxic" water have become staples of the city. Depending on where you live, you may face absolute water scarcity and have to devote a portion of your day to getting water. We have seen in this chapter that it is no coincidence that Mexico is the biggest consumer of bottled water in the world. Nevertheless, this is not due to a "throwaway society" or "lazy and vain" consumers.

Many elements aligned to create this phenomenon. It needed a boom to start (1985s earthquake), and then the infrastructure to sustain was established (bottle companies, mass advertisement, lack of information, and an uncaring government). Thus, the myth was created: "*Tap water is not drinkable in Greater Mexico City*". Even if consumers opt for reusable and more environmentally friendly options like *garrafones*, they risk consuming (actual) polluted water. There does not seem to be any way in which *chilangos* can win in this situation.

Then the hero of this myth became bottled water, the cheap and accessible alternative that would rescue the city's inhabitants. A hero so noble that we should not even worry about the waste it produces because it is all recyclable. Consequentially, if the public thinks that recycling is working, they will not be as concerned about the environment. This alternative works so well that we do not stop asking if the water from our taps is drinkable or whether we should feel angry and demand the government constant and healthy access to the most primordial human right: water.

We seem to have fallen in love with bottled water, and we are willing to overlook the environmental and social concerns that are mounting up. This chapter shows the soul of this research, where we want to switch the narrative and showcase how consumers were set up, how they are locked in and how even the systems that seem to provide a solution will still blame them. **It shows the importance of monitoring companies and not letting the market regulate itself.** Bottle water is not as personal as clothing or mobile phones; however, through the story of these three materials, we have uncovered how companies and the authorities have created a scenario that fosters unsustainable consumption and disposal practices in GMC.

It might be naïve to assume that the government or private companies would be willing to change if their system is currently advantageous. Nonetheless, in the instance of the GMC, fulfilling fundamental responsibilities such as providing clean drinking water and ensuring basic safety would go a long way toward curtailing some unsustainable behaviours. Therefore, it is not naïve or utopic to believe that authorities should comply with their basic duties.

However, it would almost certainly necessitate some serious public pressure on the authorities. This pressure might eventually arise from a public cry for fair water distribution; it is no secret that wealthier neighbourhoods do not suffer from water scarcity. Furthermore, citizens are already taking matters into their own hands by kidnapping drivers of water tanks or refusing to pay for intermittent water services.

The price for water might seem low to a middle-income family, but it represents a significant investment for a lower-income one. As we saw in this chapter, the prices paid for *garrafontes* or bottled water might be what tilt some citizens to abandon the capital. GMC has become a boiling pot of social resentment, and it will explode at some point. I propose that a new narrative that focuses on demanding the authorities comply with their job would make a significant difference since the never-ending recycling. Waste separation programmes are unlikely to have much of an impact.

This study found that a lack of willingness, not a lack of awareness, prevents people from participating in these schemes and that willingness is derived from a complex set of personal and financial decisions. Furthermore, these decisions are fuelled by all the elements (skills, symbols, and materials) presented throughout this thesis, and unless those elements change, we will not see a behaviour change. Consequentially, what we require is an institutional change rather than a change in consumer behaviours.

Chapter 8

Conclusion

This dissertation has attended to the question of why people acquire and consume some materials and why they dispose of them. This question was first formulated in the context of the "waste crisis" of the GMC, and then it was approached through the analysis of consumption and disposal of mobiles, used clothing and plastic bottles. The concept of "contextualised materialities" was suggested to be able to find connecting patterns within different types of materials and to reveal the unsustainable practices that foster their consumption and disposal.

It was then handled through Practice Theory and the definition and evaluation of the images, materials, and skills that shape consumers' practices and behaviours. This approach drew out the embeddedness of these elements in practices, and it helped us review and reflect on consumers' responsibility for waste generation. This thesis has widened the waste generation discussion and how it is handled in the Global South by inviting localised understandings of this practice as a social trend in Greater Mexico City. In this concluding chapter, I seek to draw together the key insights from tracing why consumers dispose of certain materials.

Firstly, I attempt to offer some thoughts on how we may re-conceptualise the waste generation crisis and "the dream of a Zero Waste society" from a broader approach before highlighting some contributions and proposing potential areas for further research. Four main research questions were investigated:

1. What are the practices and behaviours towards the chosen materials that GMC is experiencing?
2. What factors have allowed these practices to exist (materials, competence, skills or meaning)?

3. How can the perception of these materials change the city and its relation to waste?
4. Can individual behavioural change have a significant effect on reducing the waste crisis?

This final chapter is laid out in three parts. Section I presents the research summary synthesising the results obtained and how the set research questions were addressed. In this section, I also critically evaluate the strengths and limitations of the study. Subsequently, I highlight the contributions this research has brought to human geography and policy implications and where this research might lead us for further research. Finally, Section II offers some concluding remarks to the entire dissertation.

Section I

8.1. Re-conceptualising the Waste Crisis

From the main research question of this dissertation, I did not intend to conceive the waste crisis simply as an irremediable consequence of population growth, neither as something whose primary responsibility should be placed on the consumers' shoulders. Furthermore, waste management has traditionally seen waste as a homogeneous mix of elements that must be transported from one location to another, particularly in the Global South, where waste removal from "*under our feet*" remains the primary driver.

Thus, waste management tends to see waste generation as immovable and can only be changed if we modify consumer practices. Moving further, I meant to deconstruct the waste generation practices that multiple elements have fostered. To achieve this, I aimed to re-conceptualise the waste crisis generation based on its two main components - consumption and disposal. Consumption and disposal should not be understood or perceived as a discrete choice of an individual; it comes from the overarching and complex array of interconnected factors situated in a specific cultural context.

Reckwitz (2002) pointed out that practices are "*a way in which bodies are moved, objects are handled subjects are treated, things are described, and the world is understood* (p.250)". Therefore, the consumers should be understood as "*carriers*" of practices; however, this does not mean they are not active individuals performing everyday practices. Instead, consumers are skilled agents who interact, negotiate, and perform

practices as parts of their everyday lives (Hargreaves, 2011). Unravelling the multiple layers of framing that aggregate into consumption and disposal of GMC citizens has revealed that GMC society's historical, social, and political framework serves as dispositions that guide an individual to act.

As stated at the beginning of this thesis, I wanted the chosen materials to tell us their stories and reveal the practices and behaviours at different scales that facilitate their acquisition, consumption, and disposal. I wanted to use the concept of materiality not as an analysis of a “*concrete*” matter but as a phenomenon. Even though mobile phones might have hundreds of constituent materials, the story they reveal has several similarities with plastic bottles and clothing.

The common thread that binds them is the cultural, historical, the economic background they are situated in. This thesis revealed that the Mexican authorities and private companies are complicit in fuelling, guiding, and encouraging increased consumption and ignoring issues that create a “*throwaway environment*”. I have pointed out throughout this project that consumers tend to be held responsible for amassing tons of waste in landfills.

Nonetheless, I have demonstrated that this is a much more intricate story by exploring the intertwined elements of the chosen materials. There are several reasons why consumers can be motivated to consume certain materials; this can be done through a desire to fit in or to be up-to-date (e.g., clothing), perceived obsolescence, being victims of theft (e.g., mobile phones), or even fear and propaganda (e.g., water bottles). Unlike the widespread belief that consumers are careless, lazy, and permanent discontent individuals who desperately consume and throw things without remorse, this dissertation has shown how social and economic structures have guided (and pushed) individuals through a consumerism spiral.

Additionally, in this project, we have consistently seen that consumers are merely trying to cope with the aforementioned factors; consumers are active agents that negotiate and perform practices, but the network of elements around them will always constrain them. For example, in **mobile phones**, we concluded that most consumers will always opt to renew their mobile phones every 2 or 3 years if their contracts allow them. However, this does not mean they are not moral individuals or do not care about the environment.

Consumers believe mobiles are essential; this was demonstrated by the fact that most respondents had a mobile phone from a young age. Despite the many values associated

with mobile phones, they are mostly seen as helpful communication tools. Respondents have also been convinced that an old mobile might malfunction at any time; GMC, like the rest of the world, has a high rate of perceived obsolescence. Furthermore, most respondents questioned the benefits of repair, believing that it would only be worthwhile if the mobiles were a significant investment; this is exacerbated by the fact that contract renewals make repairs appear a waste of money.

Moreover, literature has consistently shown that regardless of the geographical context, this is the way consumers will naturally react if offered to renew their mobile. We also showed in **Chapter 5** that there is a clear divide between lower-income and those in middle and higher income. Lower-income respondents cannot enter contract schemes due to their lower credit scores and insufficient income. Therefore, this makes lower-income consumers susceptible to fall for micro-credit schemes, which in the long run end up making them heavily indebted.

In addition, these schemes do not provide any insurance, which means that if the mobile is lost, broken, or stolen, the consumer must cover those expenses. In this income bracket, we also found that repairing did not appear to be an appealing alternative because the repair expenses may surpass the value of the mobile phone. Further, we elucidated a grave problem with robbery and a black market of stolen phones in the metropolitan area. This chapter elaborates on how and why low-income persons are considerably more likely to be victims of crime in the GMC, given their domicile and mode of transportation.

Moreover, given the insecurity and ubiquity of common thievery, there is a significant difference in the length of time that high, middle, and low-income people can retain their phones. Therefore, closing the loop in this city is more about fairness; enabling individuals to keep their phones for extended periods would considerably increase the average phone lifespan. Finally, we learned in **Chapter 5** that recycling is often regarded as the last choice by people of all socioeconomic levels. Recycling is seen as an unfair or unreasonable alternative because consumers receive nothing in return other than absolving their environmental guilt.

Therefore, recycling seems irrational given the limited time that low-income interviewees can keep their phones. On the other hand, high and middle-income interviewees mention that they are unaware of how or where to recycle their phones. Nonetheless, they also admitted that even if they knew this information, most would still not recycle. Perceived

obsolescence, and fear of crime, prevent them from giving up their phones easily; thus, they prefer to stock their phones for a future that might never come.

This chapter showcases that consumers are active participants interacting with the multiple elements surrounding them; crime, unsafe public transport systems, sparse recycling stations, mobile contracts, and high repairing fees have created an environment that pushes consumers towards "*hibernation*" of mobile phones. As discussed in that chapter, hibernating phones make creating a circular economy in mobiles an improbable future. Therefore, we have shown that most individuals will decide what they deem rational and pragmatic, even based on various previously described factors.

As discussed earlier, most strategies recommended to establish a circular economy was focused on altering consumer behaviour, which was a factor that was evident in all the materials studied. Companies and governments generally regard themselves accountable for increasing awareness and only acting or changing their behaviour when the public demands it. On the other hand, consumers do not always have enough information to demand a change; this was especially evident in **Chapter 7**.

This chapter demonstrated that citizens frequently lack access to data that radically shift their consumption patterns and practices. The history of how water became commodified in the capital was examined in this chapter, from the geographical context that makes the area prone to water scarcity to a series of natural disasters that reinforce the notion that water in GMC is unfit for humans to use. Furthermore, we examined how the bottled water industry took advantage of those historical events to establish itself, increase revenues, and modify its message over time to meet citizens' demands.

Following the major natural disasters, these businesses ran ads to persuade people that their water was considerably superior to tap water. In addition, due to a renewed interest in environmental issues, some businesses have responded by ensuring that their products are in line with the public's concerns. As a result, most of their ads presently focus on the recyclability of their products and encourage consumers to properly separate their garbage from contributing to the fight against climate change. Additionally, we elaborated on how the Mexican government urged companies to make their products more recyclable and build more recycling plants.

This endeavour has resulted in some beneficial consequences, such as higher recycling rates and the creation of steady jobs. Nonetheless, this recycling strategy has relied largely

on waste exportation to other countries, particularly China. Consequentially, the new Chinese ban on plastics puts the success of recycling initiatives in jeopardy. Furthermore, even if Mexico has established itself as one of the continent's leaders in PET recycling, it is still insufficient to process the enormous volume of plastic bottles produced and discarded every day.

As a result, in **Chapter 7** how water corporations' marketing developed the ingrained practise of consuming bottled water in GMC, which the government did not oppose. Nevertheless, consumers would not spend as much money procuring drinkable water through other means if they knew the water from their taps was safe. They have also been persuaded that their acts are not harmful to the environment if they separate their trash.

Thus, two clear narratives are going in GMC (1) Tap water is not safe to drink; hence, citizens should try to procure this resource on their own, (2) Bottled water is the safest option, and because of its recyclability, it is an environmentally friendly option. These two narratives, however, are far from the truth. Therefore, **Chapter 7** further disproves the idea that businesses would self-regulate to benefit the environment and society. Hence, GMC is a prime example of businesses and the government working together to create a recycling situation merely as an excuse to keep producing and making profits.

Consumers are in a complete lock-in position in this scenario, and they cannot even begin to escape because they are not aware that they are trapped. On the other hand, our study does not consider that customers bear some responsibility. As a result, clothing was used to demonstrate how consumers, despite being influenced by various factors, consume not only out of bare necessity but also for the symbols and meanings that garments contain. Fast fashion stores have exploded in GMC, as they have in other cities.

As discussed in **Chapter 6**, this is a relatively recent trend, as most apparel stores in GMC were Mexican labels before the NAFTA agreement (designed, produced, and sold in Mexico). Because of their low prices and accessibility, fast fashion stores have helped democratise fashion for customers, and consumers can always stay up to date for a reasonably minimal cost. Clothing is a tool that allows us to express ourselves while also providing a sense of belonging.

Throughout history, every society has had this type of relationship with clothing; however, the accessibility and affordability offered by fast fashion stores tempt citizens into a vortex of endless consumption. Nonetheless, this affordability is only achievable

when someone gets exploited along the route. This cost-effectiveness could only be attained by paying workers unfairly or exporting garbage to countries with weak environmental controls. The chapter investigated the environmental and social repercussions, finding that these types of retailers are wasteful by design and that their business model is dependent on how disposable their items are.

Furthermore, we noticed a significant income disparity in all three empirical chapters, but gender played a larger influence in this one. One of the reasons women tend to buy more garments, according to our findings, is the perception of a sense of control that is not necessarily available at home. Women are also more heavily targeted by the media and believe they must appear differently. As evidenced by the findings, these beliefs are often translated into increased shopping frequency.

However, we also observed that buying more clothes did not translate into sustained levels of happiness or satiety. After only a few months of ownership, some consumers acknowledged being bored with their outfits. Moreover, we observed that closets and wardrobes serve as guardians and limiters on how much a person can own. As a result, there was a tangible link between available storage space and shopping frequency; thus, several consumers reported that having more space in their wardrobes prompted them to buy more clothing.

Garments, like mobile phones, are often stored for long periods without being used, hence, representing a significant barrier to a circular economy. Consumers also tend to forget how many clothes they own. Messy wardrobes encourage consumption since consumers cannot see how many items they have, assuming that they "*have nothing to wear*." It was also shown that individuals generally do not dispose of clothes until they have reached the storage limit of their wardrobes.

When this stage is reached, consumers are encountered to either repair, give or throw away clothes. We identified that maintenance and repair tended to be delegated to women, as these are actions that were deemed as "*feminine*". However, we saw a steady loss of repairing and maintaining skills among the respondents compared to previous generations. Adapting or mending clothes seemed to be skills that were only heavily present among lower-income interviewees. Furthermore, this gendered tendency continued at the disposal stage since gender strongly impacted when a garment was considered "*beyond repair*".

Women in the sample would be more likely to discard clothing with tiny and nearly undetectable flaws; they also typically decided if clothes would be donated or given away. This chapter also demonstrated that giving away clothes had little to do with altruism and was primarily used for utilitarian purposes. Few consumers were concerned about the fate of their discarded garments and considered donation as a means to relieve guilt associated with buying things that were rarely used. Even though some garments had a significant emotional attachment, these garments tended to be special items, like wedding dresses, signed t-shirts or inherited or gifted clothes.

The rest of the clothes (around 90 per cent of the closet) did not have that emotional connection. Thus, because there was little to no emotional link to such clothing, some buyers did not find it agonising to discard them. This chapter also discussed the rising trend of "*consumer avoidance*" and the Zero Waste movement. Even if consumers attempt to modify their practices and behaviours to attain a "*sustainable lifestyle*", the state and companies are hindering these attempts.

Further, we have seen that the fast fashion industry's proliferation means that there are not many alternatives that consumers can turn to, even if they want to. One of the interviewees narrated the sheer effort devoted to curving her consumption habits and decreasing her social and environmental effects. This case study refutes the notion that people are driven solely by self-interest or novelty.

Despite her knowledge of the fashion industry, she fell into the trap of believing that shopping in high-end stores would mitigate those effects. As previously stated, clothing prices did not appear to ensure that it was manufactured ethically or sustainably. Additionally, we disclosed that her efforts might appear futile compared to the unsustainable practices by retail companies, such as burning unsold goods. As a result, living a Zero Waste lifestyle appeared nearly impossible.

The amount of time, effort, and money required to comprehend a single industry is enormous. As MacBride (2012) mentions, "*the materials economy is a complex, global system in which businesses employ people and transform things in highly destructive ways outside the gaze or reach of the savviest consumer*" (p.218). Even if Zero Waste proponents claim that living a "*greener*" existence does not demand a full rearrangement of our lives, purchasing metal straws or reusable bottles is not enough. Every aspect and

every single product we consume in our lives generates waste. Consumers would have to go through an infinite number of hurdles to "*be able to fit their annual waste in a jar*".

Further, as previously stated, these activities are only available to those who can afford extra time, money, or effort. Therefore, by re-conceptualising consumption and waste generation, I propose not focusing on the insidious moral narrative of whether consumption and disposal are acceptable and to what degree. Instead, we should focus on a policy approach to help detoxify and diminish materials' flow. Public awareness campaigns focusing on the consumers and how they can help alleviate the climate crisis by separating their waste have ignited an unfair narrative.

This pervasive narrative holds consumers to a moral standard in which they must find a balance between "*correct consumption*" and "*overconsumption*". Authorities have also played an unjust role on the consumers, seeing them as the leaders that would correctly regulate the markets. Under the maxim of "*the customer is always right*", companies have also shielded themselves from moral responsibility. They see themselves solely as amoral entities that provide products or services.

Although young consumers might be more interested in how their actions impact the environment, their limited resources impaired them from acquiring "*green*" and "*sustainable*" products. Nevertheless, authorities and companies would have to assure consumers that their products comply with fair and humane standards in these instances. "*Green*", "*sustainable*", and "*ethical*" should not be synonym with "*expensive*", "*exclusive*", or even "*better*"; these types of products should not be reserved for a privileged few.

It should not be wealth to be "*moral*" or "*good with the environment*". It is also naïve to believe that citizens might advocate changing institutions when they lack the information to encourage them. They have lived in a world that has convinced them that they are the ones to blame; thus, they accept and internalise this guilt and slowly normalise and embrace that narrative.

For consumers, a Zero Waste society rests on them by changing material-lifestyle practices and encouraging people in moralistic and vague ways to "*think differently*" (MacBride, 2012). This dissertation does not suggest leaving behind some activities that the Zero Waste Movement promotes, like experimenting with design, establishing

businesses, social enterprises, or educating. Alas, the moralism we attached to consumption and waste should change; we should embrace a different perspective.

Rather than ascribing the primary role of lessening waste generation to individuals and their practices, this dissertation believes in attributing that to authorities and companies. Hawkins (2003) pointed out that waste makes the state the "*purifying force*" that establishes its power through its capacity to remove filth, and this system protects us from knowing where our waste ends. For the state, the fate of waste reflects its prestige and value, a state that cannot deal with waste has failed.

Nevertheless, as Howell (2015) found: '*greater distance from actual processes of [solid waste management] results in diminished power to enact a preferred mode of governing.*' (p.2154). This study has highlighted how the distance that authorities have put up from the actual causes of waste generation and increased consumption have created the "*waste crisis*" they dread. Furthermore, individuals have been programmed to think about how their behaviours are harmful to the environment and bear the sole responsibility.

However, as this study has shown, consumers may feel overwhelmed by the large responsibility they have been handed, causing them to assume that they would be unable to fulfil it. Therefore, only through systematic solutions of governance, such as access to data, regulation, and industrial policies, we can expect a diminished material flow.

Following a shift in the narrative, authorities would regulate businesses, providing consumers with more sustainable products. This change in the narrative may liberate citizens to strive for the common good (rather than constraining them). Finally, we would curtail a waste crisis by accepting joint responsibility but primarily focusing on authorities and businesses since they have the highest possibility of making a substantial impact.

8.2. Going Further

While this research's field location was obvious, selecting the items to examine materiality proved significantly more difficult. *Which materials could better represent the current behaviours and practices of the GMC residents?* The concept of materiality brings attention to waste production and allows us to understand the economic, social, and cultural origins of specific disposed materials and the logic of their generation. Waste is hybrid and liminal, as materials are not born to be waste, but rather, they are

transformed into waste by social processes. In short, waste provides a useful lens to understand the underlying social-cultural anxieties (Gille, 2010).

In the end, each material chosen for this dissertation served a different purpose, but it was the synchrony of the stories uncovered that gave us a clearer glimpse of general behaviours towards demand and disposal. For instance, mobile phones usually are one of the more cited examples of a throwaway society, in which individuals replace mobiles at an accelerated speed. The stereotypical approach towards mobile acquisition finds consumers lacking emotional attachment to these devices and whose novelty fades away quickly.

Nonetheless, it was demonstrated that this is untrue among most of the GMC's population, and this only applies to a small group of people who closely monitor new technology breakthroughs. Clothing is also a typical example of a *throwaway society* and tells the story of an "*unquenchable thirst of accumulation and consumerism*". However, we understood how this consumerist spiral was facilitated and how external forces fuelled it. At the same time, there were instances of individuals expressing a lack of guilt towards indiscriminate accumulation.

Finally, plastic bottles were used to dispel fallacies about recycling, collecting, and propaganda, which has flooded the headlines due to the alarming increase in pollution in the oceans and soil. These three materials revealed several stories and narratives that I was not aware of before planning this study. As previously stated, these stories allow us to delve into the realities of GMC. As a result, additional materials would better comprehend this reality. For example, food waste, glass, aluminium, paper, and cardboard would be excellent topics to study and research.

Due to this research's limited time, it was impossible to explore these materials (although food waste is a personal favourite for further research). Another area for future research would be age differences; this study focused on the practises and behaviours of millennials, but other generations would handle things differently. As exposed throughout the document, older generations had different skills that would allow them to repair, maintain, and retain things for longer.

Furthermore, the so-called "*baby boomer*" generation in GMC represents a more significant population share. Thus, understanding their behaviours and practices would prove useful in developing waste management strategies. On the other hand, there is

currently not much research on generation Z or *centennials* and their waste generation habits; and this invites further discussion on how different generations practice waste generation and disposal. Therefore, these factors would offer an avenue for further research on the underlying values driving these practices and activities.

8.3. Contributions and Implications

By posing the question of why people consume and dispose of certain materials, this thesis contributes to the broader understanding of waste generation in two ways: theoretical and practical. This study moves beyond a normative framework that would otherwise consider waste generation entirely dependent on population growth. By adopting the "*contextualised materialities*" analytical framework, this research has asked more fundamental questions to conceptualise, understand, and evaluate the connections between arguments and concerns of ethics, responsibility, and development.

Through the lens of consumption and disposal, this study has linked up the individuals' social, historical, and cultural context to understand what is happening in GMC. Further, by conceiving waste generation as a troubling social trend, this study has offered an analytical framework to understand which approach and strategies could work for the metropolitan area. It draws together the concepts to examine the current practices and behaviours of the GMC citizens and how these came to be, rather than black boxing and overly simplifying the increased waste generation.

It also links up the concepts of guilt, practicality, sense of belonging, and up-to-datedness to understand what motivates individuals to acquire, replace, and dispose of materials. This study also moves the scale from molecular or concrete matter to a higher level of analysis to understand waste as a result of the underlying historical, social and cultural elements of society. *Contextualised Materialities* allowed us to understand how practices were born, transformed and fully adopted in GMC and which parties fostered those practices. Even though these materials are not equivalent, their potential for entering the circular economy is incomparable.

This research answers the call for further theoretical exploration by posing broader theoretical questions and drawing from various disciplines (Crang & Gregson, 2010; Gille, 2010; D. C. Wilson, 2007). This study has opened the discussion to advance the conversation on waste scholarship in the Global South, focusing on waste materiality rather than the transition from formal to informal waste management. As laid out in the

previous segment, the proposed re-conceptualisation of waste generation involves three main elements. Firstly, understanding that the focus should be on waste materiality and practice theory rather than the end-of-pipe solutions.

Secondly, avoid imitation of waste policies that generate lock-in social and technological issues. Finally, by leaving behind any preconceived ideas of the drivers behind creating waste. As aforementioned, addressing waste as a manageable issue condemns it only to be treated by the technological realm, while the social and ethical aspects will be ignored or forgotten (Hird, 2013) (Gregson, N. and Crang, 2010). This kind of thinking could perpetuate a linear techno-economic model, separating policy-making from policy intervention (ibid).

Thus, re conceptualising waste generation through more comprehensive theoretical questions and analytical approaches contributes to developing a more holistic theoretical framework for waste generation. This research also offers some practical implications given the approach taken, waste management has often been simplified, and "*fit-all solutions*" have been implemented without much success. We can design bespoke suit solutions that address the "*waste crisis*" from its roots by utilising practise theory and *contextualised materialities*.

We shall only be able to solve this problem if we thoroughly understand the causes and implications of the waste generation challenge at a local level. The stories and proposed solutions found in GMC might not apply to cities in the Global North or even to other Latin American cities. In many instances, oversimplifying and imitation have worsened some cities' "waste crisis" (Corvellec et al., 2013). Thus, this thesis suggests that if we want to curb unsustainable consumption and disposal practices, we must first analyse and understand the materials that comprise a "*waste crisis*" and their stories.

The primary motivation for undertaking this doctoral study was to analyse practice and behaviours of disposal and waste materiality within the current waste scholarship of a transition between formal and informal waste management through the lens of historical and contemporary GMC practices. Explore different actors' ideas for a better functioning waste management system and offer a constructive critique of the current system. Apart from revealing the current issues within the current waste crisis experienced in Greater Mexico City, this research is intended to have a possible policy impact by opening debate amongst policymakers.

Furthermore, I would expect that such debate would inspire a reflection on the importance of the materiality and possibilities for designing strategies for waste treatment. This debate would call for recognising multiple alternatives and knowledge that should be considered to avoid implementing end-of-pipe solutions. Therefore, this project aims to inspire other geographers to engage waste with a different perspective in the Global South to propose tailored sustainable and holistic solutions.

Section II

8.4. Concluding Remarks

*"... in the context of environmental governance, the role of government in general needs to be reinvented. Even if voluntary agreements were a general solution, someone would have to make sure that the ultimate goal is finally reached. Participation, "voluntarization," and consensus need to be complemented by competent moderation and professional public management. The question of final responsibility for solving the relevant environmental problems has become crucial. **If everybody is responsible, nobody will be responsible.** In this regard, there is no functional equivalent to a national government. Its role has changed, but it has not diminished."*

(Janicke, 2006, pp. 91-92)

When I worked for the government of Mexico City, one of my responsibilities was to provide a summary setting out our projects for the mayor. It had to be a document that could be read in under 15 minutes, detailing our advances, obstacles, goals, and primary challenges. Therefore, I wrote the following prominently on the first page in a size 25 font:

- How can we make people separate their waste more?
- How can we make people recycle more?
- Which technologies should we opt for to manage waste (Waste to Energy, biodiesel, compost, etc.)?

Those questions were misguided; even if we were to magically make every citizen separate or recycle their waste, we would not have been able to process it. The reality is that GMC is already struggling to cope with the current low recycling rate, and we would have been unable to do anything if that rate were to rise. We always assumed that if the

recycling rates increased, we would fix that with more recycling centres. However, even if we built hundreds of recycling centres, there would be no market for the materials, and there would be no funds to hire staff to operate them.

We thought everything could be fixed with more infrastructure: more separated waste trucks, incineration plants or landfills. All those considerations gave the illusion that we were actually "*fixing*" the problem; however, we were mainly delaying it. We were reactionary, and we knew that eventually, we would need more infrastructure or technology. It was a never-ending problem. Given these circumstances, I ended up questioning myself: *should we really direct our efforts to convince consumers to separate or recycle their waste?*

Do we even have time for that?

Climate change, which seemed like an ominous faraway future, is ever more present; it is no longer something other generations will struggle with but rather something we are gradually experiencing (IPCC,2021). When I studied Sustainable Development Engineering back in 2010, the individual contribution or the "*every little bit helps*" approach was preferred. We were convinced that "*small steps*" would eventually bring a cumulative transformation of social systems, institutions, and economic processes. After all, if we (the consumers) were not making the changes to mitigate climate change, *who would?*

Nevertheless, this theory, based on altruistic intention instead of rational change, has not brought the results expected. It created a false dichotomy in which the other only possible alternative comes from cynicism, resignation, and abdication of responsibility. Therefore, it is common for people to feel overwhelmed with such an immense responsibility, and many times they abandon any efforts of having a "*greener*" life. For instance, some people attempting to live a more "*sustainable*" lifestyle may be dissatisfied with the limited outcomes their efforts provide. In contrast, others would like to have a "*greener life*" but cannot afford it.

As Maniates et al. (2003) pointed out, "*environmental crisis' drive[s] us toward individualisation of responsibility that legitimises existing dynamics of consumption and production and ignore[s] critical elements of power and institution*" (p .63). Therefore, conscious consumption is a consumer-controlled example of neoliberal individualism, dissociation from the governmental influence that, in some ways, cuts through the

unpleasant but necessary politics of the problem by encouraging gradual remedies like choice.

The consumer-controlled approach runs deep through the recycling and Zero Waste movement; thus, its advocates might be oppressed rather than empowered by this movement. Moreover, these traditional approaches do not show a substantial change in the steady growth in the extraction and transformation of resources (Krausmann et al., 2009). For example, recycling has been proven to have a low-impact response to the climate crisis. Hence, recycling is unlikely to cause significant change than alternative political or economic responses (Wynes & Nicholas, 2017).

Therefore, waste management strategies that focus on recycling and reusing certain materials do not reduce waste and pollution. We do not have the time for that anymore; we cannot wait for everyone to modify their habits; and even if we did, we would still not fix the problem from the root. Time is running out, and relying on consumers' behavioural change to mitigate climate change is no longer acceptable. As the last report of the IPCC (2022) warns us, “*There is a rapidly narrowing window of opportunity to enable climate-resilient development. (p.32)*”. *Why bother with changing plastic straws for reusable ones when the government is literally burning the ocean? (Figure 8.1)*



Figure 8.1 "Eye of Fire" Gulf of Mexico Ocean on Fire after Underwater Gas Leak, 2nd of July 2021 (Lopez-Martin, 2021)

Our relationships with materials are complex and intertwined; as shown in this dissertation, practices and attitudes are derived from an intricate array of networks (symbols, skills, and infrastructure). Asking consumers to change their habits from one day to another shall never work, especially if the means of doing so is through awareness campaigns. We cannot keep pretending that we are doing enough to modify unsustainable

practices by pasting posters and making jingles. We have proven in this dissertation that consumers are acting in the most rational way given their environment.

Furthermore, we must understand consumers as active participants who logically negotiate their everyday practices. We also need to leave the moral narrative behind since we will never convince enough consumers to change based on *what is good for the environment*. We have tried that approach for decades, and as shown in Chapter 7, this argument could even be used to promote even more consumption. What has to change is not the consumers per se but the environment around them.

In the Zero Waste Initiative, we blindly followed what other countries had done to "*manage*" their waste when we needed not to look abroad but within. To solve the waste crisis in the Mexican metropolis, we need to understand its citizens. The bright side is that in the case of GMC, the solutions are not that far away. We must start with urgent matters before advancing the conversation; thus, we need to tackle insecurity, water scarcity, and regulations on predatory companies. It is time that we address the elephant in the room; the government and private companies must be accountable for the crisis they have created.

This *super wicked problem* that GMC authorities have created must be solved by acknowledging their responsibility. The Mexican Constitution establishes that every Mexican has the right to live in a healthy environment, but given how the authorities have behaved lately, it seems as if the Mexican consumers must "*earn*" that right. Mexico is a democratic country, and it is the obligation of the authorities to provide that right to their citizens. We should stray away from moralism and deem consumers good or bad, given their consumption habits, that harsh judgment should be passed to authorities and companies instead.

Consequentially, we urgently need to change this paradigm that has not brought back results and has backfired into the polarisation of consumers. For consumers, a Zero Waste society rests on them by changing material-lifestyle practices and encouraging people in moralistic and vague ways to "*think differently*" (MacBride, 2012). Needless to say, this dissertation is not suggesting leaving behind some activities that the Zero Waste Movement promote, like experimenting with design, establishing businesses, social enterprises or educating. Alas, the moralism we attached to consumption and waste should change; we should embrace a different perspective.

Lastly, we have shown in this dissertation that there is a disconnect between the authorities, companies, and consumers.; this chasm has only resulted in ineffective and transient answers and methods. Individual action, as a result, will not be sufficient to bring about systemic change. For far too long, the illusion of conscious consumption and its potential reach has been promoted, and we are now paying the price. It is now time to act on these larger-scale policy initiatives and insist that federal, state, and municipal governments regulate the excess of industrial practice. The embracement of this narrative might finally free us and unite us against indiscriminate waste generation.

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Annex 1

SEMI-STRUCTURED INTERVIEW GUIDE: CLOTHING

Length: 45-60 minutes

Primary Goal: To learn about habits and behaviours towards consumption and disposal of used clothing and old mobiles

Quantitative Information to be obtained:

- Gender
- Age
- Borough

Qualitative Information to be obtained:

Participant Observation

- Where do they live? (How many rooms, in which part of the city, how many people live in the household?)

Questions

- What do they wear in their everyday life? Does this have to do with their age or gender?
- Do they have different clothes depending on the areas they work at or their job?
- Do their clothes change depending on the type of transport they use?
- Where do they store their clothes? What type of furniture is it? Where is it in the house?
- Do they have a different wardrobe for summer and winter?
- How much has it been gifted, and how much purchased?
- What is the oldest item they have? Why do they still have it?
- What is the newest item they have? Why did they buy it?
- Where do they buy most of their stuff?
- Who chose these items (themselves or someone else)?
- How are they maintained? Who washes them?
- Are they waiting for an item to be fashionable again?
- Do they give away items?
- Do they donate clothes? To whom? Do they have a pile of clothes ready to be donated?
- Do they separate the wanted from the unwanted?

Annex 2

SEMI-STRUCTURED INTERVIEW GUIDE: MOBILES

Length: 15-20 minutes

Primary Goal: To learn about habits and behaviours towards consumption and disposal of mobile phones

Quantitative Information to be obtained:

- Gender
- Age
- Borough

Qualitative Information to be obtained:

Participant Observation

- Where do they live? (How many rooms, in which part of the city, how many people live in the household?)

Questions

- For how long have you been using mobile phones?
- How many mobile sets have you changed in the past five years?
- What was your main reason for changing your last mobile?
- What was the price for the replaced mobile?
- Did you buy your last mobile? Was it a gift?
- How many phones do you have stockpiled in your house?
- What did you do with your last mobile phone?
- What do you think is the best way to dispose of mobile phones?

