Single-use plastics and the Circular Economy.

An ANT enquiry in disciplining technologies and organisations.

Marta Ferri

Lancaster University Management School

Department of Organisation, Work and Technology

August 2024

This thesis is submitted for the Degree of Doctor of Philosophy

Abstract

Single-use plastics and the Circular Economy. An ANT enquiry in disciplining technologies and organisations.

Marta Ferri

This study problematises plastic materials, business organisations and Circular Economy (CE) ideas within the context of the plastic crisis. Drawing upon CE literature and research (e.g., Murray et al., 2015; Calisto Friant et al., 2020; Dzhengiz et al., 2023), the discipline of humanities and social science in Waste Studies (e.g., Douglas, 1966, Hawkins, 2009; Liboiron, 2021) and the theoretical lens of Actor–Network Theory (ANT) (e.g., Callon 1986; Latour 1987; Law 1994), this research examines the efforts of the business-driven, member-based International Alliance for Sustainable Business (IASB), to tackle the plastic crisis. To do so, IASB attempts to organise a CE initiative focused on single-use plastic waste.

Using empirical illustrations from the IASB case, this study aims to examine how understanding the way organisations engage with the CE informs us about the role of materials, such as plastics, and what the consequences of organisations attempting to adopt CE to address the plastic crisis are. It follows the interrelations between the IASB, their members, CE ideas and single-use plastics, defined here as technologies (Latour, 2013; Beyes et al., 2022), within the organising of a CE initiative

This research contribution is twofold. Analytically, it contributes to the Organisation Studies literature by exploring how organisations engage with the CE and how mundane technology other than IT (Orlikowski and Scott, 2008), such as single-use plastics, affects the process of organising. Using the theoretical lens of ANT emphasises the importance of problematising these technologies and their performative dimension with organisations. Empirically, the research provides insights into how organisations can organise CE initiatives effectively, focusing on the potential for circular agendas to either reinforce existing practices or promote innovation.

Table of Contents

List of Tables

List of Figures

Acknowledgements

Declaration

This thesis is entirely my own work and has not been submitted previously for any other degree at this or any other university.

Chapters 6, 7 and 8 have inspired the following publications:

Chapter 6 - Ferri, M., Hill, C., Stowell, A. and Vurdubakis, T. (*forthcoming*) 'Taming the Monster: 'Disciplined Plastics' and the Organization of Circularity'. In progress.

Chapter 7 - Ferri, M., Stowell, A. and Whiteman, G. (2023) 'Plastic futures: Mobilising Circular Economy contexts to address the plastic crisis', in A. Alexander, S. Pascucci and F. Charnley (eds.) *Handbook of the Circular Economy*. Berlin: De Gruyter, pp. 307–331.

Chapter 10 - Ferri, M. (2024) 'Morality and Discipline of single-use plastics' in Waste Perspectives from social sciences and humanities. Cambridge Scholar Publishing. pp. 191 – 210.

Furthermore, excerpts of this thesis have been presented in the conferences listed below:

Ferri, M. (2023) 'The Future of Plastics and Circular Economy Contexts', *Opening the Bin 3: One Bin, One World?*. Lancaster (UK), 15-17 June.

Ferri, M. (2023) 'Circular Economy contexting and the discipline of single-use plastics', *IX STS Italia Conference: Interesting Worlds to Come*. Bologna (Italy), 28-30 June.

Ferri, M. (2022) 'The Morality of Plastics', *Plastic Future, Plastic Capture*. Virtual conference at Lancaster (UK) and Sunway (Malaysia), 28 November.

Ferri, M. (2022) 'Circular economies in translations. The Zero Waste experience in Capannori, Italy', *Re-opening the circle: an interdisciplinary perspective into the Circular Economy*. Virtual conference at Milan (Italy), 15-16 September.

Bridgewater, G., Cusworth, S., Ferri, M. and Savage, D. (2022) 'The Value of Plastics', *Plastic Waste and Microplastic Research Conference*. Lancaster (UK), 12-14 July.

Ferri, M. (2021) 'Tackling the plastic crisis: organising a Circular Economy to discipline undisciplined plastics', *Re-opening the bin. An international conference on waste, economy, culture and society*. Virtual conference at Gothenburg (Sweden), 10-12 June.

Ferri M., Stowell A. and Vurdubakis, T. (2020) 'Taming the Monster: Disciplined Plastics and the Meta-Organization of Circularity', *15th Organization Studies Workshop - Organizing Sustainably: Actors, Institutions, and Practices*. Virtual Conference at Chania (Greece), 20-23 May.

Vurdubakis T., Stowell A. and Ferri, M. (2018) 'Ghosts of Value: Displacement and the Afterlives of Materials', *13th Organization Studies Summer Workshop - Responding to Displacement, Disruption, and Division: Organizing for Social and Institutional Change*. Samos (Greece), 24-26 May.

Vurdubakis, T., Stowell, A. and Ferri, M. (2018) 'The Hungry Ghosts: Sociomateriality, Organization and the New Economies of Waste', *International Workshop – Uncanny Futures: Speculative Ecologies of Waste*. Bremen (Germany), 24-26 March.

Preface

This qualitative research focuses on single-use plastics and the Circular Economy (CE). It follows a global business-driven, member-based organisation, anonymised here as the International Alliance for Sustainable Business (IASB), and its attempts to organise responses to global challenges, such as the plastic crisis. Commonly, organisations within the industrial landscape invoke Circular Economy (CE) frameworks to address such challenges. Circularity ideas referred to plastics are often associated with technocentric practices (Calisto Friant et al., 2020), i.e., reusing and recycling, with a clear focus on managing waste (Kirchherr et al., 2024), in alignment with organisations' agendas. However, such practices have been employed to deal with plastic waste in the past and did not prevent the emergence of the plastic crisis in the first place. Plastics, once classified as 'waste', do not disappear and continue to pollute, contrary to organisations' expectations, thus demonstrating a certain 'misbehaviour'. Using illustrations from the IASB case, this research investigates how the organising of a CE for plastics occurs, and explores the moral, political, and organisational dimensions of this process.

In this study, I adopt an eclectic theoretical framework (Stinson, 2009), informed by the theoretical lens of Actor-Network Theory (ANT), which lends itself to an ANT-informed methodology designed to follow the movements of technologies and organisations in the organising of a CE.

This preface serves as a 'reading guide' to this thesis by providing contextual information on the global plastic crisis, the research journey, and findings.

The plastic crisis and CE

The United Nations Environment Programme (2018) estimated that about 300 million tons of plastic waste was produced in 2015, approximately 60 times more than in 1950. The significant increase in plastic waste has had numerous negative impacts on natural ecosystems and human activities, such as tourism and fishing. The increasing generation of plastic waste and the mismanagement of such materials (Geyer et al., 2017), leading to leakage, accumulation, and pollution, has led to a global challenge commonly referred to as the 'plastic crisis'.

This global phenomenon, referred to as a wicked problem (Rittel and Webber, 1973), has brought several organisational challenges for plastic businesses. The challenges pertain to monetary losses and a decrease in reputational capital. The financial losses are attributed to difficulties faced by the plastic recycling industry, caused by variations in waste management standards and infrastructure. Additionally, companies involved in the production of single-use plastics face reputational challenges, as they are labelled as 'polluters' by environmental charities, e.g., the Break Free From Plastic movement[1]. Business organisations have recently invoked common solutions to address the plastic crisis, which are based on CE ideas, including the circular philosophy proposed by the Ellen MacArthur Foundation (2013).

The invocation of CE ideas by organisations to respond to the plastic crisis led to the beginning of this research journey, while I was working for an environmental NGO in Italy. I became interested in this area due to my engagement with an initiative that attempted to enact circularity to tackle the crisis at a local level, here anonymised as the Pulper Waste Project (PWP). The PWP was an Italian-based initiative driven by businesses that brought together a diversity of actors, including paper mills, a plastic manufacturer, an environmental NGO, an industrial research institute, and a waste management company. This project demonstrated the issues organisations faced when establishing a CE for paper recycling, specifically regarding the undesirable presence of plastic residuals as well as pulper waste, composed of wastewater, mixed plastic polymers, cellulose, and metals. This byproduct disrupted the paper recycling process and organisations' expectations of establishing a paper 'closed-loop' system within the district. The term 'closed-loop', borrowed from the EMF (2015) CE framework, refers to maintaining the highest possible value for materials at all times within closed cycles, or 'loops'.

Plastics as 'matter out place'

During PWP's attempt to organise a CE for the pulper waste, I witnessed the consequences of the endeavours to implement CE ideas, and how materials played an

---

[1] https://www.breakfreefromplastic.org/.

important role. Plastic was encountered as 'matter out of place' (Douglas 1966), an awkward residue that did not conform to the demands of circularity and thus represented a disruption of the 'right' placement. The PWP was designed with the aim of addressing the issue of pulper waste by establishing a local CE for these plastic residuals. This approach was viewed as a strategy to strengthen the CE for paper in the district and represented an attempt to 'make plastics behave' according to organisations' expectations.

The plastic crisis has highlighted the need for careful attention to materials; moreover, the PWP shows how the misbehaviour of plastics prompts a deeper exploration into the 'wickedness' of the plastic problem. The PWP highlights the need to follow the movements of plastics as an actant to understand how their problematic/nonproblematic status is enacted. In addition, there is a need to move from a localised understanding of the CE to the central locations where it is conceptualised, negotiated, and organised. This has led to focus my research on:

1. How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?
2. What are the consequences of organisations attempting to adopt CE to address the plastic crisis?

An eclectic theoretical framework (Stinson, 2009) has been developed that helps investigate the dynamics between single-use plastics and organisations pursuing circularity.

In Organisation Studies, research has been undertaken to explore the role of technologies (e.g., Orlikowski and Scott, 2008), with a particular emphasis on the role of Information Technology (IT). For example, Orlikowski and Scott (2008) consider the performative dimension of IT within the process of organising and stress the need to study the performance of technologies to understand organisational dynamics. Their research conceptualises technology as a complex notion that encompasses not just things but also their interrelations (Beyers at al., 2022) and 'modes of existence' (Latour, 2013); therefore, technologies are organised inorganic materials that help organise the social world (Latour, 1991). Consequentially, single-use plastics can be classified as

technologies. Plastics are more mundane technologies than IT and have yet to be remarked upon in OS. Given that his research is situated in the site of the plastic crisis, understanding the mundanity of plastic technologies becomes significant.

Adopting the theoretical lens of ANT (e.g., Callon, 1986; Latour, 1988a, 1991, 2005; Law, 1994, 2009), and building an ANT-informed methodological framework capable of following the movements of technologies and organisations, this research examines the interrelations between recalcitrant single-use plastics (considered distinct from IT in terms of materiality), organisations challenged by plastics, responses to those challenges (such as CE agendas), and specific understandings of the plastics issue. This approach emphasises the importance of paying attention to the behaviour of these and other types of technologies when examining organisational dynamics.

The case and methods

The challenges encountered by the PWP members to enact a local CE for recycling paper demonstrated how certain circular solutions become difficult to apply in a certain localised setting. The PWP story enlightens how certain CE ideas cascading down from a reputable 'centre', i.e., the EMF circularity framework (2015), cannot be enacted at a local level. Therefore, there is a need to explore how that 'centre' is organised, why ideas are replicated at a local level, and what needs to change for such ideas to work.

This research journey uses the IASB's attempts to establish a circular initiative to address the organisational and material challenges its members face because they deal with plastics. Similar to the PWP organisations, IASB invokes CE concepts that are widely recognised within the European business sustainability landscape, i.e., the circularity framework proposed by the EMF (2015). These ideas target single-use plastic waste (e.g., Meys et al., 2020; Fellner and Brunner, 2021; Shamsuyeva and Endres, 2021) and focus on keeping materials at their highest value at all times within a 'closed-loop' system (e.g., Esposito et al., 2018; Lacy et al., 2020). The IASB case is derived from data collected during six months of multi-sited ethnographic research. The developed methodological framework is referred to as an 'ANT ethnography', and draws upon elements of traditional ethnography (e.g., Geertz, 1973, 1988; Van Maanen, 1988; Hannerz, 1992; Atkinson et al., 2001; Hammersley and Atkinson, 2019) and the ANT

methodological perspective (e.g., Law, 2003c, 2004, 2009; Law et al., 2010). This framework responds to the methodological demands of adopting the theoretical lens of ANT and it is considered a 'method assemblage', comprising a set of practices designed to deal with the 'empirical mess' in social science research.

Findings: disciplining plastics

To answer the research question 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?', I consider IASB's attempts to organise a CE to tackle the plastic crisis and the role of single-use plastics within those. Because the plastic crisis has shown the 'misbehaviour' of plastics, I problematise the concept of 'discipline'. This concept emerges from the ANT literature explored for this research, specifically from Latour's (1988a, 1991) work and serves to introduce the notion of reliability and a condition for entities to be delegated within an actor-network.

For example, single-use plastics are deemed to be unreliable (i.e., undisciplined) due to their tendency to leak into the natural environment and cause pollution; These materials are unreliable because they are likely to be in the 'wrong' place, therefore, they cannot be delegated within CE initiatives. Similarly, organisations that deal with plastics are often labelled as 'polluters' and considered unreliable because of their role in the misplacement of these technologies – hence, these actors do not meet the condition for delegation. An example is plastic retailers who fail to prevent the leakage of plastics into natural ecosystems, as highlighted by the Break Free From Plastic campaign, and need to rethink their operations to be included within CE initiatives

Following the ANT perspective, the notions of discipline and undiscipline are associated to technologies and organisations, i.e., actants and actors (e.g., Callon, 1986; Latour, 1988a; Law, 1994), behaving or misbehaving according to a certain socio-cultural setting. Within the IASB case, with this organisation's attempts to organise a CE for plastics, the problematisation of these technologies is seen as a problem of human (organisations) and material (plastics' physical characteristics) behaviour, hence the quest for discipline. Therefore, it becomes significant to understand who and what can be effectively 'disciplined', how this can be achieved, and who and what are better left to their "erratic behavior" (Latour; 1988a, p. 300).

Illustrations of the significance of problematising single-use plastics as an issue of human and material misbehaviour are drawn from the analysis of the IASB case. By following the interrelations (how) between relevant organisations (who) – IASB and their members interests, CE ideas (what), single-use plastics (what) and enactments of the plastic crisis (what), IASB's quest for disciplining plastic technologies is outlined in four 'coherent stories' (Law, 2004); the 'IASB's CE agenda', 'Sustainable Organisations Forum (SOF)', 'Plastic Project', and 'Walno'. The 'IASB's CE agenda' and 'SOF' stories are used to show how the notions of discipline and undiscipline refer to entities behaving or misbehaving according to specific invoked contexts (Callon, 1986; Asdal and Moser, 2012). Solutions for disciplining single-use plastics (e.g., CE projects) are organised according to IASB and their members' CE agendas. Consequently, organisations invoke 'CE contexts' that align with their interests regarding plastics. This highlights a political dimension of disciplined technologies and the enactment of certain notions of responsibility associated with their use.

The 'Plastic Project' and 'Walno' stories are used to demonstrate the material, social and moral dimensions (e.g., Douglas, 1966; Thompson, 1979, 1998; Hawkins, 2006; Liboiron, 2016; Gille and Lepawsky, 2021) of single-use plastics. These aspects encompass the physical characteristics of these technologies and their status of 'waste' within a certain socio-cultural setting (with attached moral judgments). Polluting behaviours associated with plastics (Liboiron, 2016) and moral judgments attached to the notion of waste that requires disciplinary codes (Hawkins, 2006) intervene in the IASB's quest for disciplining single-use plastics. Therefore, it is important to consider the moral dimension of these technologies. Attempts to discipline plastics, such as CE initiatives, show a moral dimension.

Findings: context(ing)

Within the IASB case, evaluations of reliability (discipline) and unreliability (undiscipline) occur within the interrelations between organisations, the invoked CE ideas and plastic materials. These relationships perform 'contexts' (Callon, 1998; Asdal, 2012) that are flexible and performative (Asdal and Moser, 2012). The activity between contexts is discussed by Asdal and Moser (2012) as 'contexting'. Examining the contexting activity helps understand how the way organisations engage with CE ideas informs us about the

role of plastic materials (research question one). The significance given to the placement of plastics in evaluating the discipline and undiscipline of an entity reminds us of the role of context in the process of disciplining. Therefore, discipline is contextual and, for this reason, political and moral, i.e., it is about the 'right' and 'wrong' placement of materials according to actors' CE agendas. Judgments related to the evaluation of entities as disciplined or undisciplined, i.e., in the 'right' or 'wrong' place, respectively, depend on the invocation of particular contexts.

In the IASB case, and specifically within the 'IASB CE agenda' story, organisations invoke various CE contexts and present different iterations of the concept of discipline. Hence, they invoke different interactions with single-use plastics to put undisciplined plastics back 'in place'. The contexting activity is explained in the 'SOF' story, which follows the process of negotiations of social (organisations' interests) and material (plastics' material composition) positions within a particular activity at the international event that gives name to this story. By paying attention to the interrelations between organisations, their social position, and the material composition of plastics, it is possible to observe how a particular CE context becomes prevalent and the related definition of discipline.

The analysis of these two stories also informs us regarding the consequences of organisations attempting to adopt CE to address the plastic crisis, the second research question. They demonstrate that within IASB's CE contexting activity, recyclable plastics are enacted as the prevalent conceptualisation of discipline, and recyclability becomes synonymous with circularity. As a consequence, this contexting activity also enacts a certain notion of responsibility that, in accordance with organisations' interests, places blame on the 'guilty consumer' who is responsible for but unable to properly recycle plastics. Simultaneously, it absolves organisations that manufacture, sell, and dispose of single-use plastics, which are difficult to recycle and inevitably leak into and pollute the natural environment. Hence, IASB's CE contexting is a political activity, and disciplined plastic carries a political dimension because it is enacted in accordance with the agendas of the actors involved. This portrayal of the IASB and their members depicts them as actively responding to the issue of the plastic crisis.

Reflections: moralities

By invoking certain contexts, actors mobilise specific understandings of discipline and undiscipline and, therefore, of 'right' and 'wrong' placement. Hence, the invocation of contexts implies certain evaluations of reliability, of discipline. The contexting activity seems to imply certain moral judgements attached to organisational actors and technologies within the IASB case. As moral evaluations are produced within the invoked contexts, entities need to meet certain requirements to be enacted as 'good' (reliable, disciplined, 'correctly' placed) or 'bad' (unreliable, undisciplined, 'wrongly' placed). The 'Plastic Project' and 'Walno' stories represent illustrations of the consequences of IASB's CE contexting as a form of moralising, contributing to answer the second research question.

The 'Plastic Project' story explores how the invocation of various CE contexts leads to considerations of the moral dimensions associated with disciplined plastics. Single-use plastics can be perceived as morally loaded technologies, leading them to be labelled as 'pollution to come', 'bad actors' (Liboiron, 2016), and undisciplined due to their detrimental impact on the natural environment and human activities. Therefore, the CE contexts that are invoked to discipline these materials represent forms of moralising. By invoking their CE context, IASB mobilise specific expectations regarding the 'right' and 'wrong' placement of materials for these to be considered 'good' or disciplined. Such expectations relate to the recyclability of plastics, while organisational actors are called upon to perform recycling activities to put plastics 'back in place'. Organisations become undisciplined if they refuse and get disenrolled from that initiative. Hence, single-use plastics get disciplined according to a negotiation of moral positions around the ideal 'placement' of materials and of the actions of actors' according to the invoked context.

The 'Walno' story exemplifies the negotiation of moral positions toward disciplining plastics and follows the performance between IASB, the member Walno, and moralised single-use plastics. By invoking diverse CE contexts, the actors exercise moral re-positioning according to their agenda on plastics and the related notion of discipline in an attempt to ensure that their circularity context prevails over others. This conflictual negotiation of moral positions results in the enactment of disciplined materials in various ways and transforms the interrelations between IASB, Walno and single-use plastics. The story concludes with Walno being disenrolled from IASB's CE for plastics

initiative due to their enactment of disciplined plastics as reusable materials rather than recyclable ones as expected according to IASB's CE context. The result of the negotiations of moral positions demonstrates the IASB's CE contexting as morally charged. Therefore, this organisation's understanding of recyclability as a way to achieve circularity becomes a moral imperative. Therefore, organising a CE initiative emphasises a moral dimension related to IASB's expectations of single-use plastics being recyclable and disciplined members actively supporting the recyclability of materials.

From the analysis of the 'Walno' story, I underline the importance of considering the interrelations between technologies, organisations, and ideas within the process of organising large-scale global initiatives to solve a specific issue. Giving equal significance to diverse actors, both human and non-human, and observing how they perform with each other sheds light on complex ways of organising and helps identify challenges and possibilities for successfully solving global issues, e.g., the plastic crisis.

Contributions

This study makes two key contributions. From an analytical point of view, it contributes to the Organisation Studies (OS) literature that examines the role of technology in organising. By examining how organisations engage with the CE, it broadens our understanding of technology's impact on organising by incorporating additional dimensions of materiality that can disrupt organisations, e.g., single-use plastic materials. The theoretical lens of ANT provides insights for OS on the importance of recognising both disciplined and undisciplined technologies, and understanding for whom these technologies are disciplined or undisciplined. The thesis picks up the notion of discipline that I argue is implicit in ANT theorising, particularly in discussions of delegation (e.g., Akrich and Latour, 1992; Latour, 1988a, 1991). By placing discipline at the core of the analysis rather than its periphery, the study seeks to elevate its significance within ANT discourse. This sheds light on the significance of paying attention to the context (Asdal and Moser, 2012) and, specifically, how CE contexts are enacted and the emergence of the political and moral dimensions of disciplined technologies as a consequence of how organisations adopt the CE. Empirically, this research proposes insights for the industrial landscape regarding organising CE initiatives. It is relevant to consider organisations' moral positions to understand the CE contexts they invoke. Thus,

it would be possible to see if circular agendas are leading to the reproduction of existing practices and how member-based organisations can organise their members to promote innovations in this area.

To help the reader navigate this research, Table 1 summarises key terms and their definitions for the purpose of this thesis.

Notion	Definition
Circular Economy	An idea with different business models attached often invoked by organisations to tackle global challenges (e.g., the plastic crisis) and promote sustainability. This idea is often seen as a 'closed-loop' system that maintains the highest value of materials at all times and focuses on waste management (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020). Scholars (e.g., Calisto Friant et al., 2020; Corvellec et al., 2020a; Dzhengiz et al., 2023) have criticised the concept of the circular economy often invoked by business, identifying it as a contested paradigm as there are multiple definitions and frameworks that fall under the umbrella of the 'circular economy'.
Context and Contexting	Context is an ongoing process that makes sense of a particular reality and constantly transforms (Callon, 1986; Asdal and Moser, 2012). Contexting (Asdal and Moser, 2012) encapsulates the dynamicity of the interrelations between contexts. By paying attention to the contexting activity, it is possible to understand how certain relationships between actors, materials, objects, and issues are more successful than others (Ferri et al., 2023).
Discipline and undiscipline	The notions of discipline and undiscipline emerge from the ANT literature (Latour, 1988a, 1991) and are understood as the entities behaving or misbehaving according to a certain context.
Plastic crisis	An 'assemblage' (Cooper, 1998; Bennett, 2010) of unintentional interrelations between humans, natural elements (e.g., ocean currents and river flows), and plastic materials that float, do not degrade easily, and accumulate. Due to its impact on human activities and the natural environment, the plastic crisis is also considered a 'wicked problem' (Rittel and Weber, 1973; Tarmeer et al., 2019; Lonngren and van Poek, 2021), particularly given its complexity, moral connotations, and rhetorical functions within the literature on sustainability.

Single-use plastics	Single-use plastics are made from fossil-derived plastic polymers and are commonly used for manufacturing products such as food packaging (Cronin et al., 2022, Table 4, p. 30). Examples include polyethylene terephthalate (PET), used for bottled drinks and water, cooking oil, etc.; recycled PET (rPET), used for similar applications as PET; polypropylene packaging material (PP), used for containers such as margarine tubs and microwaveable meal trays; high-density polyethylene (HDPE), used for milk, bleach, detergent and some shampoo bottles); and polyvinylchloride (PVC), mostly used for making pharma blister packs and cling films.
Technology	A complex notion that implies not just things but also interrelations (Beyers at al., 2022) – organised inorganic matter that contributes to the organisation of the social world (Latour, 1991).
Waste	Waste is matter formed from social relationships and is culturally dependant (e.g., Douglas, 1966; Thompson, 1979; Scanlan, 2005; O'Brien, 2008; Liboiron, 2015). Waste materials are socially, culturally, and historically situated and show a moral dimension, often emphasised by their connection to the Douglasian 'dirt'.

Table 1   *- Summary of key notions and their definitions for the purpose of this thesis.*

Chapter 1 - Introduction

In this chapter, I aim to 'set the scene' and introduce the phenomenon of the plastic crisis and relevant CE frameworks (EMF, 2012, 2015; European Commission, 2015a) and academic research (e.g., Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020; Calisto Friant et al., 2020; Dzhengiz et al., 2023; Kirchherr et al., 2023) that serve to problematise circularity ideas within the European sustainability industry landscape.

This chapter introduces the research journey and outlines how CE ideas, solutions, organisations, and single-use plastic became objects of this study. This research investigates the organising of a CE solution to tackle the plastic crisis and outlines the behaviour of single-use plastics within such organising.

Starting with framing the issue of the plastic crisis and situating the challenges posed by the progressive accumulation of plastic waste in the 'wrong' place (e.g., the natural environment), the chapter then outlines how plastic technologies may behave in ways that contradict organisations' expectations, i.e., escaping waste management networks, leaking into natural ecosystems, and causing pollution. A demonstration of this 'misbehaviour' of plastics could be images of plastic pollution in the ocean (see Figure 1). In these images, plastics are depicted as being in the 'wrong' place by organisations and are therefore considered 'disobedient'. This 'disobedience' highlights the need for an analysis that engages with this phenomenon of the plastic crisis.

Organisations' reactions to the challenges brought by global plastic pollution often invoke CE ideas. By organising CE initiatives, organisations attempt to 'make plastics behave', to move this technology to the 'right' place (i.e., to discipline) according to their expectations.

Although the CE has many definitions (Kirchherr et al., 2023) and relates to diverse frameworks and discourses (Calisto Friant et al., 2020), within this research, it refers to a business model (Dzhengiz et al., 2023) invoked to promote sustainability and tackle global challenges, e.g., the plastic crisis. Because circularity ideas are often identified and adopted by businesses (Calisto Friant et al., 2020; Corvellec et al., 2020a), this concept is seen as a 'closed-loop' system (EMF, 2015) that maintains the highest value

of the materials at all times and focuses on waste management (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020).

This chapter concludes with an outline of this thesis' structure.

The plastic crisis

Within this research, the plastic crisis is a global phenomenon characterised by the pervasive presence of plastic pollution in natural environments and its disruption of human activities (Beaumont et al., 2019). It represents the consequences of the liberal, take–make–dispose business model adopted by the plastic industry since the 1950s (Fischer, 2013; Davis, 2015). It is also a reminder of a specific agenda enacted by organisations in designing, manufacturing, using, and disposing of plastics, which has backfired as plastics have become a disruptive technology when in the 'wrong' place.

Despite being classified as disruptive because they pollute the natural environment and disrupt human activities, plastic technologies represent organised materials. These are designed and manufactured in certain ways and for particular purposes; for instance, food plastic packaging is designed to be lightweight, often transparent to show the product, and protective of its contents. Single-use plastics contribute to the process of organising various aspects of daily life, such as a person's sandwich or salad bought for lunch by providing convenience and ensuring food safety, a retailer's food shelves by occupying space efficiently and prolonging product shelf-life, and plastic recycling company's operations by being easy to recycle. Plastic technologies have become so embedded in our organisations that they are almost invisible and often taken for granted (Gabrys et al., 2013; Hawkins, 2017); however, these materials have become visible again as they pose significant challenges to organisations in the shape of the plastic crisis.

The plastic crisis lacks a clear, universal definition, with varying terminology used by different sources (e.g., 'plastic pollution crisis' or just 'plastic pollution'). However, media, NGOs, think tanks, and academia are in consensus that the plastic crisis is a global challenge characterised by the significant and growing presence of plastic leakage into the natural environment. This leakage disrupts human activities (e.g., fishing and

tourism) and natural ecosystems (e.g., Davis, 2015; BBC One, 2017; Parker, 2019; Beaumont et al., 2019; IUCN, 2022; Break Free From Plastic, no date).

Before the plastic crisis became a global concern, plastics were considered 'wonder materials' (Gabrys et al., 2013), a "[…] fantasy of ridding ourselves of the dirt of the world" (Davis, 2015, p. 349), highlighting how these technologies were perceived as

Figure 1 -   Plastic pollution in the Pacific Ocean creates a 'path'. Credits: Forbes 2019

obedient, i.e., behaving according to organisations' expectations. The first synthetic plastics, e.g., Bakelite, appeared in the early twentieth century, and single-use plastics such as polypropylene (PP), polythene (PE), and polyethylene terephthalate (PET) became common after the Second World War (Geyer et al., 2017). Approximately 8,300 million metric tons of plastics have been manufactured since the 1950s, a period often referred to as the 'Plastic Age' (Mulder, 1998; Fischer, 2013; Gabrys et al., 2013; Davis, 2015; Geyer et al., 2017). In the 1960s, the global shift from reusable to single-use food containers contributed to the growth of the plastic packaging market (Geyer et al., 2017; Brooks et al., 2018), which is now the largest segment within the plastics industry (Plastics Europe, 2019). The production of single-use plastics in Europe has increased exponentially in the last 70 years, reaching 40% of the total plastic production in Europe in 2018 (Plastics Europe, 2019). This has contributed to the success of the plastic

industry, which, in 2018, employed 1.6 million people and generated a turnover of approximately 360 billion Euros (ibid.).

Because of their qualities, e.g., being lightweight as well as easy and cheap to produce, single-use plastics have become fundamental within organisations, becoming pervasive (Parker, 2018a) and, progressively, taken for granted as most objects are made or contain plastics. Considering the constant presence of these materials, Hawkins (2017, p. 15) states that plastic is "the definitive material of the twentieth century and the rise of synthetic modernity". She argues that plastics, especially single-use plastics, could be seen as an "anthropocenic marker, part of the living archive of human impact on earth systems" (Ibid.). Recognising plastics as an "anthropocenic marker" stresses the impact of these technologies on our society and organisations.

From the 1970s (NUCIF, 2005), discourses around single-use plastics moved from these materials as products (in terms of manufacturing and consumption) to waste. This was due to the pervasiveness of plastics and their tendency to accumulate once disposed of (Gabrys et al., 2013; Davis, 2015; Eschner, 2017). The problem of accumulation was the consequences of plastic waste on the environment, including potential risks to human health, animals, plants, and essential resources that support local economies (EPA, 1990). Therefore, when in the 'wrong' placement, single-use plastics emerged as a disruptive technology.

The negative consequences of plastic accumulation, i.e., the release of toxic substances (Almroth and Eggert, 2019) into waterways and air, have been known about since the mid-1960s. To avoid ceasing the production of plastics, European organisations saw recycling as a solution, the way to 'make plastics behave', despite its high costs and dangerous processes (Davis, 2015). The attempt to answer the call to reduce garbage through recycling activities (Hardin, 1998) initially fostered a positive attitude toward plastic waste, reframing these materials as more sustainable and a possible resource for organisations in the business landscape. Furthermore, recycling efforts aimed to reduce the amount of plastic waste leaking into the environment, thereby mitigating pollution in natural ecosystems and minimizing disruptions to human activities (Beaumont et al.,

2019), e.g., tourism and fishing. Hence, recycling was also seen as a means to address environmental regulations, e.g., the British EPA.

However, recycling plastics comes with challenges related to different types of design, uses, and additives (Brooks et al., 2018; Hahladakis et al., 2019), amongst others. The European recycling network was too expensive in comparison to exporting these materials (Brooks et al., 2018) where labour was cheaper. As Hawkins (2013, p. 64) argues, "What makes recycling such a labour-intensive practice, and therefore often concentrated where labour is cheap, is the demands […] plastic makes on the human, the ways in which it refuses to cooperate in processes of [...]recycling". In consideration of costs, during the 1990s, relevant European organisations started shipping plastic waste to China (Velis, 2014; Parker, 2018b) as a cheaper option than organising a European single-use plastic recycling network (Wang et al., 2020). However, European plastic waste started 'reappearing' in South-Asian waters as pollution, defeating European organisations' aim to make plastic waste disappear. In late 2017, the situation worsened after the Chinese government banned the import of most types of single-use plastic waste from foreign countries (Parker, 2018b; Wang et al., 2020; Wen et al., 2021), as a result of efforts towards decreasing pollution and environmental degradation (Mak, 2018; Chen et al., 2019), often connected to illegal waste imports and smuggling, which resulted in contaminated plastic waste cargos (Velis, 2014; Brooks et al., 2018).

The increasing visibility of 'ocean plastics' led various organisations, e.g., research institutes, governments, and civil society, alongside environmental organisations, to view plastics that leaked into the environment as a possible danger to human health and the environment. In particular, the global movement Break Free From Plastic, launched in 2016, amongst other initiatives and as part of their goal of shifting the narrative from consumers' responsibility to plastic producers' responsibility, had been targeting multinational corporations responsible for the plastic waste collected from beaches and the open water (especially in Southeast Asia), characterising them as polluters.

Hence, organisations associated with polluting plastic technologies were flagged as polluters; because single-use plastics 'misbehaved' and were considered 'disobedient' materials, so too were organisations associated with these technologies.

The plastic crisis gained more attention due to growing media coverage, e.g., the widely watched episode of David Attenborough's *Blue Planet II* series dedicated to showing plastic pollution in the ocean (BBC One, 2017). Plastic in the environment represents a challenge because of its peculiar polluting abilities, i.e., "It influences its environment while remaining mute to that environment's influence" (Davis, 2015, p. 352). This meant that plastics, through their toxic substances and pervasive material presence, have been polluting lands, rivers, and oceans whilst remaining almost unaltered; for example, it takes approximately 450 years to degrade a plastic bottle (WWF Australia, 2021). Businesses, governments, environmental movements, and think tanks have been attempting to respond to organisational and environmental challenges brought by the misbehaviour of plastics and the consequent plastic crisis. Focusing on business responses within the European sustainability industry landscape, in the next section, I explore the solution invoked to tackle this global crisis – the CE framework.

CE

The CE has become a popular agenda in industry and policy spheres as a mechanism to address resource use challenges within the European sustainability industry landscape. Popular circularity agendas are the ones proposed by the EMF (2015) and European Union (EU), e.g., the Action Plan for the CE (European Commission, 2015a). The Plan represented a call to action for business enterprises to shift to a CE and was based on the EMF's (2015, p. 2) concept of a CE, seen as an economic model that was

> 'restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption.'

By enhancing the flow of goods (biological cycle) and services (technical cycle), the EMF considered the CE as a business model that could rebuild capital, whether financial, manufactured, human, social, or natural, through three principles (EMF, 2015, p. 6):

1. Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows.

2. Optimise resource yields by circulating products, components, and materials in use at the highest utility at all times in both technical and biological cycles.

3. Foster system effectiveness by revealing and designing out negative externalities.

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE 1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows. ReSOLVE levers: regenerate, virtualise, exchange

PRINCIPLE 2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles. ReSOLVE levers: regenerate, share, optimise, loop
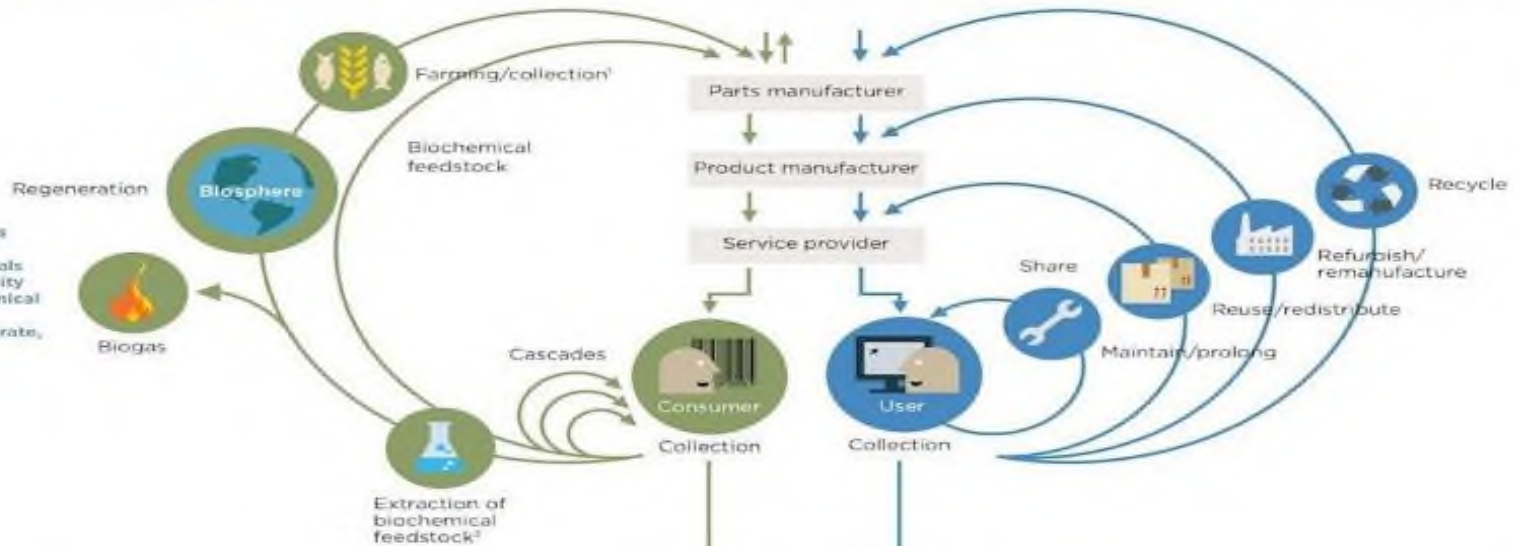
PRINCIPLE 3

Foster system effectiveness by revealing and designing out negative externalities. All ReSOLVE levers

Renewables   Finite materials

Regenerate   Substitute materials   Virtualise   Restore

Renewables flow management   Stock management

Farming/collection[1]

Regeneration   Biosphere   Biochemical feedstock   Parts manufacturer

Product manufacturer

Service provider   Recycle

Biogas   Share   Refurbish/remanufacture

Reuse/redistribute

Cascades   Maintain/prolong

Consumer   User

Collection   Collection

Extraction of biochemical feedstock[2]

Minimise systematic leakage and negative externalities

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input

Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C)

Figure 2 -   The EMF's 'butterfly diagram'. CE System Diagrams, www.ellenmacarthurfoundation.org

These three principles were proposed to organisations in terms of rethinking their business models, i.e., operations and policies, and needed to be considered within the overall circular system proposed, as summarised in the 'butterfly diagram' (named after its shape) presented in Figure 2.

Drawing upon these ideas, the EU Action Plan focused on inspiring business enterprises to adopt a circular approach to their operations. Focusing on material management, the EU documentation on the CE portrayed this as a business model toward progressively minimising waste by generating closed-loops that maintained the value of materials through recycling and reuse practices (Kirchherr et al., 2017, 2023). Energy recovery through incineration and pyrolysis methods were considered inefficient as these processes 'burned' residual materials rather than maintaining their value. Reusing/recycling were seen as ways to avoid pollution created by resource extraction and as business and organisational models that create competitiveness and market value for post-production materials, thus avoiding the generation of waste (Lacy et al., 2020).

CE literature and research
Within the European sustainability industry landscape, the reason why the CE has become a mainstream solution resides in the versatility of this term as well as the wide interpretations this concept can have according to businesses' agendas.

The origins of the term 'CE' are still uncertain, although accounts agree that concepts now associated with the CE have existed for a long time (e.g., Murray et al., 2015; Calisto Friant et al., 2020). Scholars researching the CE indicate the presence of a number of definitions (Calisto Friant et al., 2020; Kirchherr et al., 2023), the impact of scholarly research in conceptualising circularity (Dzhengiz et al., 2023), and a noticeable shift in understanding this notion (Kirchherr et al., 2023).

Within the Westernised CE literature, the term dates back to the nineteenth century (Murray et al., 2015), a period in which the first President of the Royal Society of Chemistry advocated that factories should make use of their waste, aiming to generate profit rather than waste. Pearce and Turner's 1989 publication 'CE' is one of the first academic pieces in business and management research to associate the term with a

closed system of economy–environment interactions, a concept that can be easily connected to ideas of a 'closed-loop' economy. Concepts such as Industrial Ecology (Frisch and Gallopoulos, 1989), Industrial Metabolism (Ayres and Simonis, 1994), Industrial Symbiosis (Chertow, 2000), 'Cradle to Cradle' (McDonough and Braungart, 2002) and the Performance Economy (Stahel, 2010) have gained significant attention and introduced ideas that are now commonly associated with circularity, i.e., the notion that materials should be included within closed-loops that avoid and minimise the generation of waste and that material lifecycles should be considered complex systems, or metabolisms, that connect diverse industrial activities and create interrelations between business sectors (i.e., 'one's waste is another's resource' is the 'motto' of Industrial Symbiosis).

Although this term has become common within industrial and policy spheres, its conceptual origin is still under debate. Murray et al. (2015) claim that the CE ideas have emerged from legislation and are connected to the concepts of sustainable development (this connection is substantiated further, e.g., Schoggl et al. focus on the discussion on how the circular contributes to sustainable development, 2020), while Calisto Friant et al. (2020) recognise that the concept has mostly been shaped by business practitioners. Their article discusses diverse discourses related to circularity and introduces the concept of 'circular society'.

These authors propose a chronological and conceptual outline of the diverse frames, ideas and discourses that informed the term CE. In the timeline table (Ibid.:7), covering the period from 1945 to the late 2010s, Calisto Friant et al. (2020) interrogate several pertinent bodies of literature connected to the current formulations of the CE. They identify three frames and connected circularity discourses:

a. 'precursors of circularity', which includes diverse literature on dealing with our planet's limits and the finitude of resources (e.g., Hardin, 1968; Meadows et al., 1972);

b. 'techno-fixes to waste', which examines the literature on strategies for eco-efficiency and waste management (e.g., Frisch and Gallopoulos, 1989; Pearce and Turner, 1989; Chertow, 2000);

c. 'Integrated socio-economic approaches to resources, consumption and waste', which considers the literature that takes a holistic view on the CE, incorporating a business-driven perspective, environmental well-being, and social aspects (e.g., McDonough and Braungart, 2002; Latouche, 2009; Stahel, 2010; Pauli, 2010; Rifkin, 2013).

The timeline identified by Calisto Friant et al. (2020) and Murray et al.'s (2015) discussion on the origin of the CE highlights the multiple sources, concepts, and ideas that constitute this term. It appears that the CE is not a unique concept but multiple, sometimes contradicting, concepts at once. It has several meanings (Blomsma and Brennan 2017) and could be defined as an 'umbrella term'. Therefore, there is no single definition of the CE, but several diverse notions that can be invoked depending on the socio-cultural, historical, and political setting.

Recognising the multiple and diverse definitions connected to the notion of the CE, Kirchherr et al. (2017, 2023) undertake an analysis of hundreds of CE definitions to identify common trends and challenges. In their earlier paper (Kirchherr et al., 2017), they found fragmentation in the way the concept of the CE was understood, whereas most definitions picked up by businesses considered circularity as a set of technocentric, material-focused practices that promoted actions such as reuse and recycling. Whilst reuse and recycling practices have been confirmed as the core principles of the CE in Kirchherr et al.'s (2023) revisited work, the authors also identify a shift in conceptualising the CE. There is increasing acknowledgement that diverse actors (i.e., 'enablers') are relevant to the transition to a CE, i.e., businesses, governments, consumers, and academia, whilst definitions that invoke sustainable development as the main goal of the CE are growing. However, it is not clear how the CE could promote both sustainability and economic development. Consequently, the discourse surrounding the applicability of the CE primarily resides in academic literature, lacking practical solutions for the industry.

Dzhengiz et al. (2023) examine how scholars' approach affects research on the CE. They discuss the underlying assumptions in the research on circularity to prompt a more critical understanding of this notion. Three prevalent assumptions held by most academics studying the CE were identified:

a. 'in-house', emphasising the CE as a business model;

b. 'root metaphor', including circularity and industrial relationships that resemble biological metabolisms;

c. 'ideological', specifically related to neoliberalism and ecological modernisation.

Three prominent themes emerged from these assumptions, serving as a useful analytical framework to explore the literature on the CE that has been reviewed for this research. The themes are a) the CE as a business model; b) the CE as a 'closed-loop' system; and c) the CE as a transition based on reframing waste. The reason for utilising these ideas is that they emphasise a focus on discarded materials, such as plastic waste, and the business perspective, which is an object of analysis in this research.

In this regard, it is possible to notice how the studies and research conducted on CE concepts and definitions imply a material-focused and technical approach. A large portion of the CE literature has been produced within the Global North and often focuses on examples from Western countries. Although CE research produced within and about the Global South exists (e.g., Gutberlet et al., 2017; Schröder et al., 2019), this study focuses on the literature on circularity from the Global North because it is pertinent to the business case I present in this research. The case refers to a business-driven, member-based global organisation operating within the European sustainability industry landscape.

CE as a business model
The CE was a term used to identify multiple business models within the industrial landscape, often described as able to 'transition' productivity and efficiency toward a sustainable approach to saving our planet (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020). This could be seen as a generalised understanding of the CE as a business model. Assumptions regarding circularity, i.e., mainstream definitions of the CE within the business landscape, are examined.

The CE model is frequently referenced as a means to transition from a linear economy model to a sustainable, circular one that converts "natural resources into waste, via production" (Murray et al., 2015, p. 371). Lacy et al. (2020, p. 35) follow up on the concept of a linear economy and describe it as the "take, make, waste" approach. They

argue that companies should reject this model as it promotes mass production and consumption, which puts a strain on the Earth's physical limits (Esposito et al. 2018, p.5).

The idea that a CE business model should take into account the biogeochemical/biological and recycling/technical/manufacturing cycles or circles (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020) represents a common understanding in business circularity concepts. The first category of cycles/circles refers to 'natural cycles' of resources and byproducts (e.g., water or biogas) and frequently refers to renewable materials/energy. The second category involves the process of resource cycling, e.g., reusing/recycling and repairing waste materials that cannot be released into the biosphere without disrupting the natural environment, i.e., they pollute (Esposito et al., 2018; Lacy et al., 2020, p. 6).

CE as a 'closed-loop' system

Considering circularity as a 'closed-loop' system, the following sources examine how that model could be achieved through continuously reusing, recycling, and recovering materials.

Lacy et al. (2020, p. 35) view the CE as an economic model to keep "products and resources in use for as long as possible, and, at the end of use, cycling (or 'looping') [...] materials back into the system in a zero-waste value chain". On the same wavelength, Esposito et al. (2018, p. 6) refer to the CE as definable "by its focus on maximizing what is already in use along all points of a product's lifecycle, from sourcing to supply chain to consumption to the remaining unusable parts for one function and their conversion back into a new source for another purpose". These models characterise the CE as a 'closed-loop' system where materials are used and reused. Such CE models often refer to the waste hierarchy (Defra, 2011; Lacy et al., 2020), which includes prevention, re-use, recycling, other types of recovery (e.g., thermal recovery), and disposal (i.e., landfilling or incineration), as indicated in Figure 3.

Figure 3 - *Waste Hierarchy, Defra (2011)*

The CE is often cited as being associated with creating "waste-free technical loops that resemble biological loops and make waste disappear at the same time as being restorative and regenerative by design" (Corvellec et al 2020a, p. 97).

Therefore, a 'closed-loop' CE model focuses on post-consumption business activities, e.g., waste management, with specific attention to how materials can be handled to avoid becoming waste (e.g., recycling, included within a 'zero-waste value chain' or 'looping' or reusing goods), addressing circularity discourse techno-fixes to waste (Calisto Friant et al., 2020).

CE as a transition based on reframing waste
It could be challenging to understand how the CE as a business model reframes waste materials due to the presence of diverse definitions and related underlying assumptions. We already saw how Kirchherr et al.'s (2017) analysis argues that the CE mostly focused on reducing, reusing, and recycling waste. Blomsma and Brennan (2017) also draw attention to waste as they define the CE as an 'umbrella' concept that brings together different waste and resource management strategies. Hence, the CE is enacted as a practice to manage post-consumption materials "to extend the productive life of

resources […] […] to delay or prevent landfilling or permanent disuse" (Ibid., pp. 603–608) of materials (recognised as resources), e.g., recycling.

Gregson et al. (2015) discuss the CE as a policy goal that seeks to shift to a system that reframes waste as a resource through recycling and reuse, which are defined as resource recovery practices. Bringing the example of the EU aiming to become a recycling and recovery society by 2020, they identify a CE for resource recovery as a 'moral economy', where certain practices of recycling and reuse are judged as either 'right' or 'wrong'. For instance, the EU rejects global recycling networks, viewing them as potentially harmful or ethically questionable, and instead prioritises resource recovery processes within its own borders.

Fellner and Brunner's (2021) research into plastic waste argues that to reframe waste materials, it is important to reorganise operations within the collection and sorting, rather than having faith in recycling, usually identified as the top circularity practice. They suggest that recycling does not bring as many advantages as thought and conclude by identifying thermos-treatments (i.e., incineration) as a solution to give value to plastic waste and stop the increasing generation of these discards and related environmental issues.

In a similar vein, Meys et al. (2020) advocate for the use of chemical recycling to deal with plastic waste (especially plastic packaging) and address the growing generation of such waste. These authors contend that plastic packaging represents a difficult material to recycle because of its material composition and regulatory restrictions governing the use of recycled plastic packaging in specific sectors, e.g., the food sector. Chemical recycling is seen as a strategy of circularity and the best option to make plastic waste valuable whilst reducing the impact on global warming.

It is pertinent to note that sources linking waste with the CE often view circularity as a set of technocentric (Calisto Friant et al., 2020) practices, focusing on waste management practices such as recycling. The relevance of associating the idea of circularity with recycling in the context of plastics is evident. Within business research, circular materials are often synonyms of recycled materials.

Critiques and limitations

The above approaches to the CE are criticised due to:

a. The lack of attention to the social dimension of circularity (Murray et al., 2015; Schoggl et al., 2020; Böhm et al., 2023),

b. The prevalent material-focused and business-led approach (Calisto Friant et al., 2020; Corvellec et al.,2020a),

c. The lack of consistency to transition toward a real change (Mah, 2021; Shamsuyeva and Endres, 2021),

d. The need to problematise this notion (Dzhengiz et al., 2023).

The first area of critique regards that the lack of attention to the social dimension has implications for sustainable development.

Murray et al. (2015) argue that while the CE can promote sustainable development for business, it has limitations related to the absence of the social dimension. Although "sustainable development, to which the CE concept is often connected, clearly includes the social dimension" (*Ibid.*, p. 376), the CE

> is virtually silent on the social dimension, concentrating on redesigning manufacturing and service systems to benefit the biosphere. While ecological renewal and survival, and reduction of finite resource use clearly benefit humankind, there is no explicit recognition of the social aspects [...] (Ibid.).

The CE appears to overlook the social aspects, prioritising material management as a business model. This lack of attention raises issues of "inter- and intra-generational equity, gender, racial and religious equality and other diversity, financial equality, or in terms of equality of social opportunity" (Murray et al., 2015, p. 376). It is not clear how the CE model commonly invoked by businesses will lead to greater social equity in the future.

Schoggl et al. (2020), in their contribution to the discussion on the relationship between the CE and sustainable development, observe that the literature on the CE can be divided into management and technical-oriented studies. They emphasise that because

of such attention to managing and technocentric practices (in particular, recycling), the social aspects "form a periphery" (Ibid., p. 1) within the CE literature.

Böhm et al. (2023) concur with Schoggl et al. (2020), suggesting that even though the CE often mentions wider social goals (e.g., the EMF's claim that circularity would address important social needs), much of the literature and approaches primarily focus on technical and material-based approaches. The authors advocate greater attention to the social dimension of the CE, specifically to the people who "perform an essential role in propagating, diffusing and implementing CE approaches" (Böhm et al., 2023, p. 243), such as ecological entrepreneurs and community activists. Contending that the transition to a CE is often 'messy', i.e., non-linear, Böhm et al. (2023, p. 244) argue that circularity is a 'field of multiplicity and a space for grassroots activism', identifying entrepreneurial and grassroots activism as a way to include the social dimension in the CE model.

It follows that the idea of the CE commonly engaged in management research relates to the material-focused and business-led approaches, the second area of critique. This is significant because the CE has been recognised as constituted by diverse frameworks and discourses (Calisto Friant et al., 2020) that highlight the social and environmental elements other than the material and business. Thus, why do businesses within the European sustainability industry landscape invoke ideas of circularity that are mostly technocentric and material-focused? Reasons rely on the CE term being an "empty signifier" (Corvellec et al., 2020a, p. 97), which allows for a range of interpretations and approaches to be bundled together under the term 'CE'. Despite the 'emptiness' of such a concept, which allows for this term to be invoked in diverse circumstances that include the organising of social, environmental, and economic elements toward sustainable development, the CE has been hegemonised and narrowed down to ideas related to 'waste-free technical loops' (Corvellec et al., 2020a). Academics and practitioners are called to go beyond the coalescence of CE discourses that focus on technocentric practices to manage waste.

This attention to technocentric and material-focused circularity strategies results from CE discourses mostly developed by governments and the private sector with specific

agendas (Calisto Friant et al., 2020). Calisto Friant et al. argue that this has led to the failure of creating a systemic and holistic understanding of the implications of the CE, causing this term to be a 'go-to concept' and to be easily discredited as greenwashing. For this reason, they contend that the CE is a contested paradigm (Calisto Friant et al., 2020; Corvellec et al., 2020a), as it may have different meanings and address diverse interests.

The third set of critiques focuses on the lack of consistency in transitioning toward real changes. Because of the ambiguous meaning attributed to the notion of the CE within the European sustainability industry landscape that could fit diverse agendas and interests, circular practices and theories seem to show a lack of consistency regarding guiding organisations toward real changes. For example, Shamsuyeva and Endres (2021) identify limitations of the current CE model, which is mostly based on recycling methods, standards, and markets for plastics. Although the model resulted from growing environmental awareness and legal regulations, their findings highlight how the lack of consistency across world regions in terms of waste management systems, recycling regulations, and standardisation rules for the use of recycled plastic packaging has led to the progressive failure of the CE for plastics at a global level. To overcome these challenges, Shamsuyeva and Endres suggest paying attention to synergies between material scientists, regulators, and manufacturers to create an effective CE for plastics.

Still with a focus on circular plastics, Mah (2021) criticises the CE for plastics as a paradox, suggesting that the most popular circularity strategies around plastics do not lead to meaningful transformation. The author defines it as a dominant corporate sustainability concept, which seems to promote innovation and solutions to move on from the linear economy's 'take–make–waste' system but effectively reproduces existing practices that do not "give up on unsustainable growth" (Ibid., p. 121).

The fourth set of critiques focuses on the need to problematise the concept of the CE. Because the CE is a contested paradigm (Calisto Friant et al., 2020; Corvellec et al., 2020a) that does not show a clear pattern toward implementing real change, scholars call for this term to be problematised (Dzhengiz et al. 2023). Dzhengiz et al. find that the CE concept has often been considered almost omnipotent and invoked as a given

solution to environmental challenges without being practically deployed. They discuss how most of the scholarly research on circularity does not consider the underlying assumptions, e.g., 'in-house', 'root metaphor' and 'ideological' assumptions, that academics imply when researching in this field and, therefore, do not recognise these assumptions' influence on academic works related to the CE. Acknowledging and identifying scholars' 'in-house', 'root metaphor' and 'ideological' assumptions would help reframe and problematise research on this subject.

CE - a summary
The CE has been outlined mostly as a business model (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020) to transition toward sustainable business practices. It offers insights regarding how to move away from the traditional linear economy model, which generates waste through production, and shift to a circular model that emphasises resource efficiency and minimises environmental efforts. This approach involves keeping products and resources in use for as long as possible through continuous reuse, recycling, and recovery efforts, by creating 'closed-loop' systems. However, while CE ideas offer promising solutions, their implementation remains uncertain, with scholars like Calisto Friant et al. (2020) and Corvellec et al. (2020a) critiquing the predominant focus on material management and business-led approaches. These critiques, along with the observations of Schoggl et al. (2020) and Böhm et al. (2023) regarding the neglect of social dimensions, underscore the need for a more holistic understanding of circularity. Furthermore, challenges in implementing a CE reveal the complexities and inconsistencies within current circularity strategies (Shamsuyeva and Endres, 2021; Mah, 2021). Dzhengiz et al. (2023) argue for a critical examination of underlying assumptions and ideological frameworks driving CE discourse, emphasising the importance of reframing and problematising research in this area. Thus, while the CE offers potential benefits, its implementation necessitates clearer guidance and a more comprehensive consideration of social, environmental, and practice implications.

Thesis Structure
This thesis is composed of nine chapters, the first one being introduced. Chapter 2 explores how CE ideas were invoked whilst I worked at No Waste, i.e., as a framework to respond to a local iteration of the plastic crisis. The project's members attempted to

organise a local CE for plastics which drew on technocentric solutions, i.e., the EMF's CE philosophy and the EU Action Plan. The PWP story denotes the beginning of this research journey. Chapter 3 presents the theoretical tools needed to pursue this research on plastics, the role of technologies, and organisations, and the process of disciplining by critically engaging with research in Waste Studies, OS, and ANT. Chapter 4 explains the methodological 'toolkit' developed to conduct this research, i.e., the methodological framework, data collection techniques pertinent to exploring the interrelations between plastic materials, organisations, CE ideas and the process of 'making plastics behave', research and data analysis design. Chapter 5 follows up on Chapter 4 and describes the research case as well as how methods have been applied within the research field and outlines the data analysis. It concludes by presenting limitations to this research. Chapter 6 uses elements from the data analysis and reflects on the complex interrelations that lead things and organisations to be disciplined and undisciplined. Chapter 7 elaborates on the interrelations pertinent to answering the research questions by exploring the concept of 'contexting' (Asdal and Moser, 2012). Chapter 8 reflects upon the implications of the concept of discipline developed in this research and presents the findings in light of the literature considered in Chapter 3. Chapter 9 concludes this study, presents its contributions, and suggests future research topics.

Chapter 2 – Doing CE

This chapter presents my experience of 'doing CE', i.e., participating in a CE project that focused on plastic waste. Such circular project is here anonymised as the Pulper Waste Project (PWP) and explores the role of materials and how these interrelate with the organisations that organise the CE initiative in an attempt to 'make plastics behave' according to their expectations. This also represents the beginning of this research journey.

The PWP was an industry-led initiative based in Italy I worked at whilst at No Waste. It represented the starting point to observe how a business endeavour attempted to organise a CE to 'make plastics behave'. Despite the focus on plastic waste, the PWP involved organisations from the paper and plastic sectors. As a practitioner, it was significant to observe how, while organising a CE for recycling paper, organisations within a paper mill district in Italy encountered issues connected to the undesirable presence of plastic residuals. The PWP CE initiative represented a way to discipline (Latour, 1988a, 1991) plastics. How businesses considered circularity models for managing misbehaving plastics was highlighted by the PWP members' efforts to organise a local CE for the pulper waste.

Examining the pulper waste's performance with the project's members raised important questions connected to the role of technologies, such as single-use plastics, within the organising of initiatives to tackle challenging phenomena like the plastic crisis, e.g., CE projects. These considerations prompted further exploration into the interrelations between plastics and organisations, CE ideas and modes of organising materials according to the interests of business-led, member-based enterprises.

The Pulper Waste Project

The PWP story explains how I became interested in CE ideas, plastic technologies and organisations and how these elements interrelate. Through this project, it was possible to observe certain iterations of disobedient plastics (i.e., the pulper waste), which are difficult to deal with and recycle, as well as challenges they pose to organisations and the solutions implemented within a business setting.

The PWP was an EU-funded initiative that ran between 2016 and 2019[2] and gathered diverse organisational actors collaborating to find a solution to the disposal of the mixed plastic residuals contained in the pulper waste, a byproduct of the recycling of paper. The PWP's main aim was to develop a local CE according to the EU framework (European Commission, 2015a), where the pulper waste would have been recycled into plastic pallets for logistics operations.

I worked as a project facilitator at the PWP between 2016 and 2017 whilst employed at the environmental NGO No Waste. No Waste promoted local projects regarding sustainable waste management and was part of an international network of environmental NGOs that actioned toward sustainability and waste. Being based in one of the biggest paper mills districts in Europe, No Waste's attention often focused on how the paper mill district byproducts, especially the pulper waste, were managed.

The district has a long history of papermaking spanning hundreds of years and now focuses on producing tissue and white paper (PWP Final Report, 2019). In the mid-2010s, the issue of pulper waste became more pronounced due to the increasing generation of this residual and the decreasing number of sites able to receive it. Italian regulation (Decreto Legislativo 3 aprile 2006, n. 152, 2006) currently classifies pulper waste as a hazardous waste, requiring it to be disposed of in specific landfills and incineration plants. The PWP involved several organisations, including No Waste and various industrial and research companies presented in Table 2 (p. 47), which details their sector, expertise, and interests within the project. The next section explains how pulper waste, a byproduct of the paper recycling process, is connected to the issues surrounding the plastic crisis.

---

[2] My participation in the Pulper Waste Project ended in October 2017, when I started this PhD. I had the chance to attend to the Project's public events and gather materials publicly available after that date.

Member	Sector	Expertise	Interests
Lux	Industrial research (paper)	Specialised in papermaking and recycling practices	To support Servo in solving the issues brought by pulper waste
Eco-pellets	Plastic manufacturing/ Industrial Research (plastics)	Manufacturing of goods from virgin and recycled plastics. Industrial research on mixed plastics and pulper waste to produce goods.	To vary their network (connecting with the paper sector), production and market (e.g., the making of recycled plastic pallets) and being included in an EU-funded project
Servo	Industrial consortium (paper)	Representing local paper mills within the district	To support their members (paper mills) in solving their issues with the pulper waste
No Waste	Environmental NGO	Sustainable municipal waste management strategies	To serve as a 'moral guarantor' for the project to ensure that the EU standards regarding disposing of industrial waste and the application of CE ideas are followed
All Plastics	Municipal waste management	Know-how and official permits to treat plastic waste and experience making mixed plastic flakes for the manufacturing of goods	To vary their network (connecting with the paper sector) and market (i.e., the making of 'pulper waste' flakes)

Table 2 - *List of PWP member organisations. Sector, expertise and interests within the project*

The pulper waste crisis as an iteration of the plastic crisis

In the production of paper, as with any other manufacturing process, waste generation has always been a factor. However, the introduction of plastic polymers in the manufacturing of books and magazines made the disposal of the paper mills' waste and,

in general, the recycling of paper more complicated (McCool, 2020; Fischer, 2013). Pulper waste constitutes 6–7% of the weight of recovered paper and is composed of 70% mixed plastics, water, metals, and organics. The plastic residuals within the pulper waste make this particular byproduct very difficult to deal with and impossible to eliminate through paper recycling. Therefore, plastics appear to be in the 'wrong' place according to paper mills' agenda, i.e., in paper products destined for recycling. This seems to make the pulper waste a problematic yet pervasive form of single-use plastic waste within paper recycling activities.

Because of their 'wrong' placement, within the PWP setting, plastic technologies were seen as a 'matter out of place' (Douglas, 1966), 'misbehaving' and 'undisciplined' because of the insistence on appearing within the paper recycling process to which they did not belong according to the paper mills in charge of the recycling efforts.

Drawing upon Douglas' (1966) idea of dirt – that is, pollution – considering the positionality of waste within a certain social setting, the author discusses the value of matters as cultural and with moral traits, as something judged as 'out of place' according to norms of hygiene related to theological definitions of dirt. Dirt is enacted by behaviours that go against the idea of the sacred, i.e., God (*ibid*.). Because it is considered unworthy and dangerous for the order of the world, dirt is identified and pushed 'out', awaiting its decay and removal from social systems. Dirt seems to become 'homeless', i.e., a value that has momentarily been forgotten (Douglas, 1966; Thompson, 1979; Hetherington, 2004; Scanlan, 2005; Stowell and Brigham, 2018, pp. 79–80; Ferri et al., 2023). However, when value is given again, dirt has the potential to disrupt and create chaos. It can be argued that being 'out of' and 'in' place relates to 'misbehaving' and 'behaving' performances and is connected to matters of organising.

For example, within the Italian paper mill district where the PWP was run, the pulper waste represented matter 'out of place' because it disrupted organisations' interests in creating a recycling 'closed-loop' system for the recycling of paper and, because of its high percentage of plastic residuals (i.e., material composition), did not decay and disappear as paper mills expected once pushed 'out' from the paper recycling process. The pulper waste was 'homeless' and its value 'forgotten' until the increasing generation of this byproduct became a financial problem for the paper mills. After that, it became

the centre of normative attention and represented an increasing financial issue for paper mills. The Italian waste regulation recognised this industrial waste as hazardous (Decreto Legislativo 3 aprile 2006, n. 152, 2006); therefore, it needed to be disposed of in special landfills or sent to a specific incineration plant, which was considered expensive by the paper mills in the district (Salotti, 2018). Interestingly, the pulper waste, a byproduct of the paper recycling process, was considered as an industrial residual within the paper sector (Decreto Legislativo 5 febbraio, 1998, agg. 2006) rather than being included within the plastic waste legislation. This means that the pulper waste had to be managed according to the Italian industrial waste regulation and, therefore, disposed of in special landfills and incineration plants that required higher fees than plants receiving urban solid waste (which was regulated differently than industrial discards).

Even if recycling was an option, because pulper waste was categorised as industrial hazardous waste, the Italian regulations did not allow for such byproducts to be included in municipal recycling processes. Furthermore, the complex composition of such residuals, made of different materials, posed significant recycling challenges. These complexities have made the paper mills' attempts to create a 'closed-loop' difficult. Therefore, the material composition of the pulper waste made the recycling of paper extremely difficult, as paper mills were legally required to dispose of this byproduct, 'breaking' the recycling cycle with the generation of hazardous waste. Like other types of plastics, the pulper waste posed a risk to human health and the natural environment (hence the categorisation as a 'hazardous industrial waste'), financial losses for organisations, and disruption to recycling activities. The physical characteristics of this byproduct demonstrated its complexity, pervasiveness, and difficulty to manage, parallelling the challenges brought by single-use plastics' physical characteristics and illustrated through the plastic crisis. It was impossible to make and recycle paper without generating pulper waste, which disrupted paper mills' attempts to create paper recycling 'closed-loops'. This circumstance re-evoked a common situation within the plastic sector, for example, the difficulty in keeping fresh food safe without producing types of single-use plastics (i.e., plastic packaging) that were difficult to recycle and manage as waste (Geyer et al., 2017; Brooks et al., 2018; Chen et al., 2019). Hence,

pulper waste disobeyed organisations' expectations like single-use plastics misbehaved at a global level and generated the plastic crisis. Thus, the pulper waste issue within this Italian district could be seen as a local iteration of the global plastic crisis described in the previous section.

The organisational problems connected to misbehaving pulper waste (i.e., its material composition was difficult to recycle and dispose of) and the large portion of mixed plastics (up to 70%) composing this residual (PWP Final Report, 2019) showed how the pulper waste being 'out of place' was about organising and, therefore, required organisational intervention to make this type of waste 'behave'. Over time, within the PWP paper mill district, diverse organisational actors came together to solve the pulper waste issue. With similar timing to European recycling efforts for plastics, there have been several proposed solutions, beginning in the 1970s.

Solutions to tackle the increasing generation of pulper waste within the district varied over time.

Local solutions to a local plastic crisis
Over a span of 50 years, three main solutions to the pulper waste crisis have been identified. The first proposal emerged in the 1970s, the second in the 1990s, and the third in the mid-2010s.

Solutions 1: Incineration (1970s)
Incineration was proposed at the end of the 1970s by the local cooperative of paper mills, Servo. It featured organisational attempts to build an incineration plant in the Italian district to manage the increasing generation of pulper waste and create revenue for the local economy. However, Servo did not consider the possibility of resistance from the local community and councils that, together with No Waste, started fighting back against the idea of a huge plant burning mixed plastics. Because No Waste and the local councils needed scientific proof to justify their opposition to the incineration plant, No Waste reached out to a US-based global environmental group, Verde. They sent an environmental scientist, a chemistry academic from the USA and a Verde activist. At that time, no environmental scientists in Italy were able to explain the risks to human health brought by incinerating plastics. The US scientist was already a veteran of a won battle against an incineration plant in the States, and he explained how burning plastics

released certain invisible and unascendable molecules in the air, which, if inhaled, were toxic and could cause cancer. This was before the era of global information and wide accessibility to the internet; since this sort of knowledge was difficult to obtain, a professor's words were good enough for policymakers and the local community to decide that they did not want an incinerator in their 'backyard'. With the population of the villages and towns in the paper mills district, No Waste built up a civil movement against Servo's project, supported by the local councils. After almost a year of protests, parades, public fora, and more visits from the US scientist, Servo's project failed, as did the first solution to deal with the pulper waste issues. Solution two focused on attempts to include these residuals within a plastic recycling network.

Solution 2: Recycling to goods (1990s)
The second solution to 'make pulper waste behave' was proposed in the late 1990s by Lux, in collaboration with Servo and the local Regional Council[3]. In this period, the Italian government aligned the national waste regulation with the EU waste management requirements (Risoluzione del Consiglio del 24 febbraio, 1997) regarding introducing recycling practices in industrial waste management. Recycling networks for certain materials, such as glass and metals (cans) and polyethylene terephthalate (PET) – the only type of plastic recycled in Italy in the 1990s – were already in place within local and regional settings. The Italian government wanted to scale up these recycling efforts and organise diverse materials networks at a national level (although 'how' to do that remained unclear). Therefore, Servo and Lux saw the opportunity to deal with the pulper waste by taking advantage of the national attempts to align with the EU waste regulations and organised a project to show how the pulper waste, understood as mixed plastic residuals, could be recycled into products. To address the changes in Italian waste regulations to contribute and create a national recycling network for most materials, they started a collaboration with the local Regional Council.

Servo and Lux collaborated with the Regional Council to recycle pulper waste into garden furniture. However, the composition of pulper waste did not provide the

---

[3] A Local Regional Council in Italy is equivalent to the size and remit of a County Council in the UK.

required qualities for manufacturing these items, which were quite heavy and easy to break. They were also expensive to produce in comparison to virgin plastic garden furniture. They did not sell, which resulted in financial losses for Lux and Servo. The pulper material composition represented a challenge as its heterogeneous composition (i.e., mixed plastics) made it a difficult technology for manufacturing goods. These products were lower quality and more expensive than the virgin plastic counterparts and did not pass as a great solution for dealing with the pulper waste. Hence, the second solution to tackle the pulper waste crisis failed. Although financially disastrous, this experience taught Lux and Servo about the complexities of recycling the pulper waste because of the mixed plastics portion within it. The third, and final, solution to pulper waste was the PWP. The project drew upon the lessons learnt from the past 50 years and aimed at finding a sustainable solution to recycling the pulper waste into goods.

Solution 3: the Pulper Waste Project (2010s)
PWP started with the revisited interest of Servo and Lux in recycling pulper to goods, despite the disastrous garden furniture attempt in the 1990s (Solution 2).

These organisations' interests in promoting recycling solutions to deal with the pulper waste related to three main reasons connected to the challenges the paper mills were facing:

1. Incinerator closure. The hazardous waste incinerator used by Servo to dispose of the pulper waste was about to close down as it was not meeting the European health and safety requirements and standards (IEEP, 2014).

2. Landfill at maximum capacity. The hazardous waste landfill was used to dispose of another portion of the pulper waste and was about to reach maximum capacity; therefore, the price per ton for disposal increased significantly.

3. Increase in waste and decrease in recycling facilities. The increasing generation of pulper waste was due to the improvement of the recycling of paper technologies and decrease in disposal facilities (or the increase in the price for the service).

Although at that time many Italian businesses shipped their mixed plastics waste to China (before the China import ban for European plastic waste in 2017), Servo and Lux

did not opt for that solution. They decided to align with the Italian government's policy favouring industrial waste recycling within the national borders (Direttiva rifiuti n. 98, 2008), supported by specific regulations that prioritised the recycling of byproducts generated during recycling activities (Decreto Legislativo 3 dicembre n. 205, 2010). Such regulations were supported by the EU, which was co-funding industrial projects that organised local circular economies. The EU CE Action Plan (European Commission, 2015a) did not support incineration as a solution to closing the material loop as it was considered a waste of potential resources. This made bringing on board No Waste easier for Lux and Servo. The reason for them to collaborate with the NGO was that the EU Call (2015) required an environmental NGO to participate as a 'moral guarantor' for the proposed project to ensure the EU CE ideas were followed – and avoid any 'burning' solutions.

In the 2010s, CE ideas spread in Italy, mostly through environmental movements and charities (e.g., No Waste) and EU-funded projects. Circularity became the mantra of environmental movements, and, at the same time, businesses seemed to be attracted to this philosophy thanks to the EU initiative based on the EMF's (2015) CE principles. The focus of the PWP was on recycling pulper waste; therefore, the CE was understood as a geographically situated 'closed-loop' recycling process. The main aim of this project was to use pulper waste as a resource capability to produce recycled plastic pallets for sale to the European Logistic Industry. Pulper was now seen as a potential secondary material within the plastic recycling network toward an effort to shift to a local CE for the plastics contained in pulper waste. For that to happen, the pulper complex material composition needed to be sorted, i.e., individual materials separated, according to the Italian plastic recycling regulations. However, the recalcitrant physical characteristics of this byproduct made that difficult as it did not obey the general standards adopted to recycle plastics, making pulper waste a misbehaving material. This led the PWP to go through three stages.

In stage one, Servo, Lux, and Eco-pellets carried out a series of studies on the residual named dirty pulper to understand the pulper waste composition and identify materials useful for recycling into pulper pallets, i.e., to 'make pulper waste behave'. The dirty pulper denomination became clearer once the researchers successfully managed to

clean it, i.e., to remove metals, most of the cellulose, and wastewater, leaving the plastic residuals and small portions of cellulose and wastewater. They identified the output material as clean pulper. The reason for 'cleaning' the pulper was that, in spite of the extremely heterogeneous composition of the pulper waste, only certain substances were useful for manufacturing recycled plastic pallets, i.e., the mixed plastics and a small portion of wastewater and cellulose. However, not all the excluded material from the dirty pulper went to waste; cellulose and water components were reused directly in the paper mill process (PWP Final Report, 2019). Demonstrating how plastics, cellulose, and wastewater were included within a circular 'closed-loop' reinforced the idea that the PWP was aligned with the EU's CE agenda.

Stage two outlined efforts to meet the Italian hazardous waste regulations, which indicated that the dismantling, sorting, and recycling activities needed to be handled by an entity with the right permits. To meet legislative requirements, Servo, Lux, and Eco-pellets recruited All Plastics, a waste management company with the permits to operate with hazardous waste and experience in making mixed plastic flakes for recycling purposes. Meanwhile, Eco-pellets developed a machine called an 'extrusor' to melt (at low temperatures) clean pulper through a process known as extrusion[4]. The liquiform substance was then shaped into a pallet. However, Eco-pellets and Lux, the two organisations mostly involved in technical recycling activities, realised that the clean pulper pallets could not meet the European standards for pallets, and they could not sell the pulper pallets to the EU market as planned. Although recyclable, the clean pulper still did not meet the secondary resource requirements according to EU EPAL standards[5], i.e., 800 mm by 1200 mm (model type EUR 1) and 1000 mm by 1200 mm (model type EUR 2). To solve this new issue, it was decided to mix the clean pulper with PET and polyvinyl chloride (PVC), i.e., the recyclable plastics coming from the urban waste

---

[4] Plastic extrusion is a manufacturing technique used to melt plastic into a mold through a narrow and long pipe, called the extruder, to create a plastic part.

[5] More information at https://www.epal-pallets.org/eu-en/load-carriers/epal-euro-pallet.

collection network All Plastics operated. This mixture created a composite of mixed plastics, and it was used to make another prototype of the pulper pallet, now featuring 50% PET and PVC and 50% clean pulper. Although mixing the clean pulper with plastics coming from other geographies and not from the paper mills district went against the idea of circularity that the project members seemed to initially propose (i.e., a local CE), the use of recycled plastics to create mixed plastics was legitimised because it saved PET and PVC possibly destined to go to landfill or incineration. This contributed to addressing the EU Call for Circular Projects (2015) expectations of supporting a CE where waste became resources, even if it was not a localised endeavour. The PWP contributed to making other types of plastics (i.e., PET and PVC) along with pulper waste behave.

Stage three was the final step of the project. The mixed plastics pallet was a success because it was considered sustainable (i.e., not polluting) and circular, having been produced using a circular model. The plastics contained in pulper waste, PET, and PVC from municipal waste collection became obedient as, together, they enacted a composite, mixed plastics, that allowed organisations to produce the pulper pallet and, therefore, created a CE for these technologies. Although not addressing the circularity ambitions expressed in the original project proposal, the EU Projects committee was convinced of the success of the mixed plastic pallets as suitable progress. After this valuation (and assurance of funding), Lux and Eco-pellets, with some technical contribution from All Plastics, developed another five types of mixed plastics pallets, which they called 'pulper pallets' to emphasise the success of the CE for pulper waste. Finally, in 2018, the perfect pallet that fully met the EPAL logistic requirements was designed, i.e., 800 mm by 1200 mm (model type EUR 1) and 1000 mm by 1200 mm (model type EUR 2). No Waste performed as a moral guarantor, ensuring that the EU's CE concepts outlined in the project were fulfilled, i.e., decreasing the generation of waste and transforming waste into resources (through recycling).

Figure 4 - Four jars showing (from the right) the dirty pulper, 'clean' pulper, and mixed plastics pellets. Credits: Marta Ferri, 2018.

Figure 5 -   *The last iteration of the pulper pallet. Credits: Marta Ferri, 2017*

2.3 The PWP is an exemplar of 'making plastics behave' through a CE project

The PWP exemplifies the relationships between CE ideas, plastics, and business organisations attempting to create one type of solution to tackle the plastic crisis. Thus, it helped draw attention to elements relevant to this research, i.e., CE ideas, the role of

plastics, organisations, the role of technologies, and the process of 'making plastics behave' according to organisations expectations.

CE considerations

Paying attention to the relationships between the pulper waste and organisations is crucial for understanding how CE ideas may change alongside materials and organisations. Invoking the European Commission (2015a) and EMF (2015) CE philosophy allowed for the PWP members to design a project inspired by these circularity ideas. However, in the efforts to make the pulper waste behave (i.e., to reposition the plastics in the 'right' placement – away from paper and together with other types of plastics), these ideas transformed from a 'local pulper waste closed-loop recycling' model to a 'wider plastics closed-loop recycling' model. The invoked CE ideas changed according to the material and organisational needs toward manufacturing the pulper pallet. Hence, invoking the EU CE framework was useful in designating the PWP as a circular economic initiative and securing the EU funding associated with such an attempt. It seemed that the definition of circularity was decided by the business organisations' interests within PWP, i.e., Servo, Lux, Eco-pallets, and All Plastics, as demonstrated by No Waste transformation toward CE ideas. The charity had to choose between maintaining a rigid approach to circularity – developing a local CE and thus considering the plastics handled by All Plastics, as well as the PET and PVC plastics sourced from different regions, as problematic – or acting as a guarantor within the PWP, where it could monitor Servo and Lux movements in case of a new incineration plant proposal. No Waste chose to remain within the PWP, translating their idea of local circularity into a wider one alongside the project members.

Organisations and 'making plastics behave'

The PWP demonstrated how the pulper waste had to be repositioned to the 'right' place, i.e., with other types of plastics such as PVC and PET, to be translated (from dirty pulper to clean pulper and mixed plastics) into a material that 'behaved' according to EU recycling expectations for manufacturing EPAL standard pallets. However, by interrelating with the pulper waste's physical characteristics, the project's members also transformed, showing how the process of 'making plastics behave' changed organisations as well as materials.

For example, Eco-pallets' internal organisation changed. From a straightforward manufacturer, they became an industrial research site; they added a lab, employed a research team with expertise in recyclables, and learnt about the Italian legislation in waste management (which was not needed prior to the project as they worked with virgin materials). All Plastics engaged with new partners, diversifying their network, interrelated with new materials (the pulper waste is an industrial byproduct, while All Plastics previously worked with municipal waste), and diversified their operations. Lux and Servo changed as well, in the sense that they became acquainted with the plastic portion within the pulper waste that became evident in clean pulper and mixed plastics iterations. Therefore, their performance within the project widened their knowledge beyond paper material.

The PWP helped draw attention to the process of 'making plastics behave' as relational and about organising, i.e., the pulper waste is 'in' and 'out of place', in the 'right' and 'wrong' placement according to ways of organising that are performed by the interrelations between project members and technologies and depending on members' agendas. By interacting, entities transform; therefore, it is possible to say that 'making plastics behave' also impacted on organisational actors' performance, not just on the technologies' behaviour.

In line with the CE ideas commonly invoked by industry-led initiatives within the European sustainability industrial landscape, the PWP members looked at circularity as a business model (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020) able to solve operational challenges by proposing practices perceived as sustainable. Because the challenges these organisations faced were related to a waste material, i.e., pulper waste, they focused their attention on circularity discourses that considered techno-fixes to waste (Calisto Friant et al., 2020) and material management (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020). Hence, the CE was invoked as a 'closed-loop' system (EMF, 2015; Corvellec et al 2020a; Lacy et al., 2020) able to close the material loop of paper by deploying a circular model for the pulper waste – the main byproduct in the recycling of paper.

The PWP members saw circularity as a model based on reframing waste (Blomsma and Brennan, 2017; Kirchherr et al., 2017; Fellner and Brunner, 2021), i.e., to reposition the

pulper waste in a way that organisations saw it as 'in place', a resource (i.e., a recyclable material to make EU EPAL standard pallets) rather than a problem (i.e., an increasing and expensive byproduct of the recycling of paper).

The PWP story is in line with research (e.g., Calisto Friant et al., 2020; Corvellec et al.,2020a) that shows how industry-led initiatives within the Global North showed a prevalent material-focused and business-led approach, for example, by emphasising waste management and recycling as circular solutions.

Plastic technologies matter
The PWP story also highlighted the significance of plastic technologies within organising processes. It showed how difficult it was to let plastics go unnoticed when these technologies were clearly invasive, 'out of place' (Douglas, 1960), and disruptive (in the iteration of the pulper waste) within paper mill operations. Because of their 'wrong' placement and pervasiveness, plastics became disobedient, causing problems even in the recycling of unrelated materials, i.e., paper. The high percentage (70%) of plastics within the pulper waste supported the idea that the PWP members had to face a local iteration of the plastic crisis. Therefore, the project represented a localised industry-led effort to tackle that phenomenon and the related issues brought upon organisations by these materials. Hence, the PWP story showed how plastics, particularly the mixed plastics contained in the pulper waste, impacted organising processes and underscored the significance of plastic technologies.

Becoming interested in plastics, businesses and the CE
The pervasiveness and disobedience of plastic technologies within the PWP became topical for No Waste. Although No Waste was already a supporter of the global initiative Break Free From Plastic, before the PWP, their focus was not predominately on plastics but on challenges related to broader waste-related issues. With the PWP, plastics became largely predominant in No Waste's agenda and projects, leading my work at the charity to focus on plastic waste in an increasing manner. My previous studies in Cultural Anthropology, which centred on social and cultural ideas, directed my attention to the social and cultural dimensions of waste materials and related issues, i.e., how a material becomes 'waste' within a certain socio-cultural setting. However, working at No Waste and the role as facilitator at the PWP sparked an interest in plastics that considered

problems connected to the material aspect of waste, i.e., the pulper waste's physical characteristics played a significant role within the PWP by disrupting the business-led enterprise activities. The recognition that the challenges related to plastic waste are both social and material led to the decision to pursue further studies on the interrelations between plastics and organisations and how they attempt to 'make plastics behave' to tackle issues related to the plastic crisis.

CE ideas were seen as the way to change the pulper waste's misbehaviour and transform it into a 'circular' material, i.e., make it recyclable for manufacturing EU EPAL 'pulper' pallets. Considering the importance given to CE ideas invoked within the PWP and the impact of such ideas on the No Waste agenda, I became interested in how circularity philosophies are invoked and by whom.

The following paragraph outlines the research aim, objectives, and questions of the PhD study carried out at Lancaster University.

Research Outline

The PWP showed not only the pervasiveness of plastic waste but also how plastic misbehaviour affected different industrial organisational actors. To address the performance of plastic waste and their relationships with these enterprises, this doctorate research aims to outline how organisations consider the issues brought by plastics and focuses on the interrelations between these technologies' physical characteristics, organisations' agendas, and the process of 'making plastics behave', i.e., to put plastics in the 'right' placement, to discipline these technologies. It also considers how, and by whom, certain CE ideas are invoked whilst organising responses to the plastic crisis.

The research questions of this thesis are as follows:

1. How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?
2. What are the consequences of organisations attempting to adopt CE to address the plastic crisis?

This study contributes to OS literature that focuses on the role of technology in organising in two ways. First, it expands our understanding of technology to broader

contexts of organising by including other key dimensions of materiality that can disrupt organisations. The reason this is important is that our world relies on diverse technologies that play a significant role and impact on how things are organised, e.g., single-use plastics. Second, the theoretical lens of ANT (Callon, 1986, 1998; Latour, 1988a, 1988b, 1991, 2005; Law, 1994, 2003a, 2003b, 2007, 2008, 2009) adopted in this research informs OS about the need to pay attention to disciplined and undisciplined technologies and to whom these are disciplined or undisciplined. The PWP story showed how technologies disrupt or support organisations and highlights the contextual performance of organisational actors and materials and the role of different moralities in the process of organising. Paying attention to moral implications enlightens how sustainability is enacted in practice through CE contexts.

Chapter 3 – Problematising the concepts of the plastic crisis and waste technologies

In this chapter, I problematise the concepts that emerged from my work on the PWP, such as the plastic crisis, waste technologies, single-use plastics as a technology, and how organisations and materials interrelate by using an array of literature and relevant theoretical approaches.

To make sense of the complexities that arose from the organising of CE for paper in the PWP story, significant literature sources are discussed. First, pertinent ideas are outlined to problematise the plastic crisis (Rittel and Webber, 1973; Cooper, 1998; Bennett, 2010; Tarmeer et al., 2019; Lonngren and van Poek, 2021). With business organisations having to face challenges brought by the plastic crisis, i.e., the PWP members, Chapter 2 has already discussed the pertinent literature around the CE as defined by the PWP organisations, i.e., with a distinct focus on materials management and technical operations, such as recycling and related critiques (e.g., Esposito et al., 2018; Kirchherr et al., 2023; Calisto Friant et al., 2020; Corvellec et al., 2020a; Dzhengiz et al., 2023). The chapter moves forward and considers sources within the fields of social science and humanities in Waste Studies (Douglas, 1966; Thompson, 1979, 1998; Hardin, 1998; Hetherington, 2004; Scanlan, 2005; Hawkins, 2006; O'Brien, 2008; Stowell, 2012; Liboiron, 2016, 2019; Stowell and Brigham, 2018; Gille and Lepawsky, 2021; Ferri et al., 2023) to make sense of single-use plastic waste.

With single-use plastic waste being enacted as 'disobedient' within the PWP story due to it being considered 'matter out of place' (Douglas, 1966), these technologies' misbehaviour is examined through the theoretical lens of ANT (e.g., Callon, 1986; Latour, 1987, 1988a, 1991; Law, 1994, 2009). ANT aids me in following the movements of plastic technologies whilst interrelating with organisations, CE ideas, and understandings of the plastic crisis. The concept of 'discipline' emerged from the explored literature (Latour, 1988a, 1991, 2005; Hawkins, 2009; Hodder, 2012), and the counterpart, 'undiscipline', was introduced to make sense of 'right' and 'wrong' placements of plastics according to organisations' expectations.

Because ideas from different bodies of literature and schools of thought are invoked, I explain this approach by drawing upon the concept of theoretical eclecticism (Stinson, 2009), which is linked to Law's (2004) argument for developing a theoretical and analytical toolkit to explore the 'mess in social science'. The chapter concludes with a summary of elements to consider in this research and the identification of the main literature gap pertinent to this research and the research aim.

Problematising the plastic crisis

The plastic crisis was introduced as a global phenomenon given by the pervasiveness and 'wrong' placement of plastic materials (according to organisations' interests) that accumulated when leaked into the natural environment. The PWP story showcased how pulper waste, as an iteration of single-use plastic waste, was not easy to manage through existent waste management systems. Considering the pulper waste crisis as a local instance of the global plastic crisis helped to show the disruptive consequences of single-use plastics' physical characteristics on organisations' activities when accumulated.

In this section, it is argued that the plastic crisis is a phenomenon concerning plastic movements and organisations' performance. The plastic crisis is enacted by several human and non-human entities, e.g., materials, organisations, ocean currents, rivers, and animals, and could be understood as an 'assemblage' (Cooper, 1998; Bennett, 2010), derived from the Greek *submbolon*, 'the act of bringing together separate parts'. Cooper (1998) discusses an assemblage as a 'collection of parts', bringing the example of the human body. The attention is not on the multiple parts but on the 'between', i.e., the interrelations between the multiples; therefore, assemblages could be defined as a multiplicity. By focusing on the interrelations between the multiples, Cooper suggests that assemblages constantly move to reproduce themselves, like the human body through the act of eating. This movement is seen as "a state of being but always an ongoing that never arrives anywhere, never completes itself" (Cooper, 1998, p. 103). Hence, an assemblage will reproduce itself through a dynamic of incompleteness, i.e., by attempting to be complete, it constantly reproduces itself.

Drawing upon Cooper's idea of assemblage, Bennett (2010) discusses how that is 'vibratory', emphasising how the different members of the assemblage, the multiplicity,

have their trajectories that led them to encounter each other and constitute the assemblage. She brings the example of the *shi* in the Chinese military tradition, i.e., "a configuration of moods, winds, historical trends, and armaments: *shi* names the dynamic force emanating from a spatio-temporal configuration rather than from any particular element within it" (Bennet 2010, p. 35). The *shi* is a good example of the multiplicity of humans and non-humans, which interrelate without intentionality but constitute a recognisable assemblage. Similarly, there is no intentionality in the plastic crisis assemblage, and its movement of reproduction happens through the dynamics of the trajectories, i.e., the 'in between' discussed by Cooper (1998), enacted by the unintentional interrelations between humans, natural elements (e.g., ocean currents and river flows), and plastic materials that float, do not degrade easily, and accumulate, contributing to the plastic crisis assemblage.

A wicked problem

Viewing the plastic crisis, an assemblage, presents itself as a complex, unique phenomenon within this research. Because of the complexities brought by the lack of intentionality, i.e., being constantly in becoming and reproducing itself, this global phenomenon presents various organisational challenges outlined by considering the literature on the 'wicked problem' (Rittel and Webber, 1973) and related critiques (Tarmeer et al., 2019; Lonngren and van Poek, 2021).

Rittel and Webber (1973) coined the term 'wicked problem', which they define as complex; there is no one formulation for a wicked problem as this is unique and composed of several smaller issues that are difficult to deal with because they are all interconnected. However, the authors suggest considering the 'morality' of such problems, i.e., problems are wicked when "it becomes morally objectionable […] to refuse to recognise the inherent wickedness of […] problems" (Rittel and Webber, 1973, p. 161). In other words, wicked problems are recognisable as they imply going against certain social and moral values. Another characteristic of wicked problems is that different actors can identify a problem as wicked while bringing different reasons for considering that issue as wicked.

Rittel and Webber (1973, p. 161) also suggest that wicked problems are defined by their possible solutions:

> The information needed to understand the problem depends upon one's idea for solving it. That is to say: in order to describe a wicked problem in sufficient detail, one has to develop an exhaustive inventory of all conceivable solutions ahead of time.

Yet, these do not have easy solutions as they are composed of many different issues, localised in different situations and geographies, and involve diverse actors, 'voices' that need to be brought together to "achieve the required system transformation" (Stowell and Brown, 2022, p. 35).

The concept of the wicked problem has been connected to a wider debate that critically reviews such a term (Tarmeer et al., 2019) and connects it to other bodies of literature, i.e., those in sustainability (Lonngren and van Poek, 2021). This connection is relevant to this research due to its association with responses to the plastic crisis, including the CE (Mah, 2021; Kirchherr et al., 2023).

Tarmeer et al. (2019) view the concept of wicked problems as an inspiration for research in different fields. However, this notion has become a 'buzzword' and is often dissociated from a clear theoretical concept. This attitude has led to the identification of existing policy approaches as solutions to wicked problems while overlooking that only 'small wins' are achievable in practice when it comes to tackling wicked problems. The authors suggest that "developing dimensions of wicked problems (i.e., conflict, complexity and uncertainty) into more analytically precise research tools […]" (Tarmeer et al., 2019, p. 167) might help enlighten ways to utilise this notion in a more effective way and solve the conceptual confusion around that.

On a similar wavelength, Lonngren and van Poek (2021) look at the wicked problem as a concept that has generated confusion as there is no consensus on its theoretical definition and epistemology. Exploring the wide use of this notion within the sustainability literature, the authors find that different meanings are attributed to the wicked problem (e.g., 'social messes' and 'sustainability issues'), although the

connection between this notion and 'complexity' (i.e., wicked problems as 'complex challenges' and 'complex issues') is significant. They also consider diverse epistemological positions that invoke this notion in an a-critical way, because the concept of the wicked problem has no clear epistemology. Another aspect explored is how this idea covers rhetorical functions in the sustainability literature explored by Lonngren and van Poek. They identified two main functions, i.e., the rhetorical idea of the wicked problem used as a challenge to existing, dominant approaches (e.g., Rittel and Webber's critique of the then-dominant systems analysis approach to problems of social planning, 1973) and in support of alternative approaches (e.g., Kazlauskas and Hasan's argument regarding the usefulness of the discipline of knowledge management for tackling wicked problems, 2009). Considering the use of this idea, the authors argue that the 'wicked problem' could represent an analytical tool but needs "to be clearly defined and positioned in the landscape of the wicked problems literature" (Lonngren and van Poek, 2021, p. 493).

Taking into consideration the literature and critiques just explored, within this research, the plastic crisis is considered as a wicked problem because it is unique given that it has never happened before (Rittel and Webber, 1973), is complex, and does not have a clear definition as it is defined differently depending on who talks about it (Rittel and Webber, 1973; Tarmeer et al., 2019; Lonngren and van Poek, 2021). For example, whilst environmental NGOs address marine pollution as the main issue of the crisis (e.g., Break Free From Plastic, no date), governments see the (mis)management of plastic waste as the issue (e.g., European Commission, 2015b, 2018). These two issues coexist as part of the plastic crisis, and NGOs and governments identify the crisis through these problems. Although actors may have diverse agendas in identifying the plastic crisis, everyone realises that it is a wicked phenomenon. Furthermore, anything related to the plastic crisis seems to be moralised, starting with plastic materials. For example, plastics in the ocean are morally objectionable because they kill marine life (Liboiron, 2016) and disrupt developing countries' economies (e.g., by negatively impacting fishery and tourism). Therefore, the plastic crisis is wicked as it would be morally 'bad' to refuse to consider its 'wickedness' because of the consequences such an assemblage creates.

Another aspect that identifies the plastic crisis as a wicked problem is that solutions to this crisis are not easy as they would involve multiple actors (with diverse agendas) and spread through various geographies, e.g., the UK's plastic waste management may affect the plastic ocean pollution in Southeast Asia (e.g., Break Free From Plastic, no date).

Another element that makes the plastic crisis a wicked problem is that it can be used rhetorically as a concept to criticise the dominant existing approach (Lonngren and van Poek, 2021) related to plastic production, consumption (e.g., most plastic items found in the natural environment are single-use) and disposal of (e.g., plastic waste escapes official waste management networks, leaks and pollutes the natural environment) single-use plastics. It can also be used to support alternatives to the current approach (Ibid.) of producing, consuming and disposing of plastic waste, for example, the 'linear economy' (Esposito et al., 2018; Lacy et al., 2020), which is a system that produces items made to be used once and then disposed of in landfills that can leak into and pollute the natural environment and exacerbate the plastic crisis. Thus, the plastic crisis serves as an instrument to highlight the usefulness of a specific solution (Lonngren and van Poek, 2021), i.e., the CE agenda that considers reusing/recycling materials within a 'closed-loop' that does not generate waste (Esposito et al., 2018; Calisto Friant et al., 2020; Corvellec et al., 2020a; Lacy et al., 2020).

To conclude, the plastic crisis could be problematised as an assemblage, i.e., it is an unintentional multiplicity of diverse entities, and a wicked problem in consideration of this phenomenon's complexity, moral connotations and rhetorical functions within the literature on sustainability.

The next section considers the relevant literature to examine the complex nature of waste as it emerged from the PWP.

On Waste
The PWP story brought instances of how plastic waste materials (in the form of the pulper waste) can be associated with negative and positive values, i.e., plastics, from being in the 'wrong' place, a material 'out of place' (Douglas, 1966) that disrupts the recycling of paper, became a resource to create a CE. Recognising that waste is socially

and culturally defined (e.g., Douglas, 1966; Thompson, 1979, 1998; Scanlan, 2005; O'Brien, 2008; Liboiron, 2016, 2019), this section looks at the fields of social studies and humanities within the Waste Studies literature, which help situate 'waste' as a complex notion with a social and moral dimension. This approach helps address the ambivalent meaning of waste that emerged in the PWP story, i.e., as an 'obedient' and 'disobedient' technology.

Waste in the fields of social studies and humanities is a new academic field of research (Gille and Lepawsky, 2021). The etymology of the term 'waste' comes from the Latin word *vastus*, meaning 'unoccupied' and 'immense', and Sanskrit word *vaste*, meaning 'deficient'. Although it is not easy to outline what waste is as it does not have a universal definition, it is possible to recognise discarded matter when seen or smelled (Ibid., Ch 1).

Scanlan (2005) discusses the connections between disposal practices and Western culture, commenting that garbage is everywhere, whilst O'Brien (2008) observes how waste is central to our society and omnipresent: "In my daily life I can walk nowhere, […], be nowhere without [rubbish] cluttering up my every horizon" (Ibid., p. 1). The concept of waste has acquired negative connotations due to its etymology, as well as its connection with pollution and 'dirt' (Douglas, 1966) and the related dangers for humans' health and social order associated with behaviours that enact pollution and that go against the idea of the sacred, i.e., God (Ibid).

Because of its pervasiveness within human society, academics have associated waste with matters of social relationships and cultural dependence (e.g., Douglas, 1966; Thompson, 1979, 1998; Scanlan, 2005; O'Brien, 2008; Liboiron, 2015, 2021). To differentiate their object of analysis from the negative judgement around the concept of 'waste', which made it difficult to deconstruct, scholars studying the material and social relationships of waste originated various terms, e.g., 'rubbish' and 'garbage' (Stowell, 2012). These denominations stress the social dimension of waste, without overseeing the material one that constitutes waste and has contributed to the problematisation of this concept and open to research on how "waste *is not*, but it *is* made" (Gille and Lepawsky, 2021, p. 5). Emphasising the social dimension of waste

contributes to the enactment of this material as socially, culturally, and historically situated.

Although there are several studies on the social dimension of waste (e.g., Douglas, 1966; Thompson, 1979, 1998; Gille and Lepawsky, 2021), this research also recognises its moral dimension (Hawkins, 2006, 2009), which could be both negative and positive, although attached with judgements around waste and pollution (Douglas, 1966; Liboiron, 2016).

The next section explores the social dimension of waste and outlines the complexities of the relationships that enact matters as waste and pertinent critiques.

Waste as 'matter out of place'

As mentioned, Douglas' (1966) idea of 'matter out of place' to identify dirt and pollution is helpful for understanding plastic waste within this research. Thompson's (1979) discussion on rubbish also helps us understand the value shift associated with the plastics contained in pulper waste. Thompson posits that rubbish is a transient category in which materials can 'move in and move out'. Therefore, matter can become rubbish within a certain arrangement and transform back into 'objects' if circumstances change, e.g., the pulper waste can become recyclable and used to make pallets, i.e., put back 'in place' within the social order. Significantly, like Douglas, Thompson stresses that waste is socially defined and that "there is nothing inherent to the material itself that will tell us whether or not it is waste" (Thompson, 1998, p. 58). His ideas were attached to Western society social elites that made judgements on the categorisation of waste. This could be related to Douglas's (1966) concept of 'out of place' as she discusses how a certain societal group decides what is 'in' and 'out of place' – "there is no such thing as absolute dirt: it exists in the eye of the beholder" (Douglas, 1966, p. 2) – and O'Brien's (2008, p. 1) initial disquisition on how waste, despite the general consensus labelling it with a negative value, has many values and qualities as "it is not necessarily useless or worthless in itself and generating […] institutions for its regulation and industrial processes for its utilisation are […] central elements of how societies are constructed […]".

On identifying waste as a socially defined matter, Thompson (1998) discusses how waste is considered as such because it is entangled in society's 'social life' and is judged

according to the norms of respectability of that society's elites. He sees waste as 'defiling', a 'negative good' that could compromise respectability. When dealing with waste, both physically and academically, "our design, if we care for our respectability […] is to come out as cleanly as we may" (Ibid., p. 59). Providing the example of waste pickers that are considered 'untouchable' in Indian culture, he shows how managing, even touching, rubbish can lead to the definition of people as 'outcastes', emphasising the role of social elites in determining norms of respectability and, therefore, the (negative) value of waste.

Douglas' and Thompson's ideas show how understanding who the actors are is significant as the definition of dirt changes according to who judges materials as waste. The rules around health and hygiene (denoted as 'respectability' by Thompson) are enacted through a system that replicates particular ideas (e.g., Douglas' 'social norms') that serve to judge the destiny of materials. Dirt is symbolic, a herald of disorder that makes visible the social system (Stowell and Brigham, 2018). Characterising an item or matter as dirt requires a social judgement to recognise what is 'in' and 'out of place' in specific situated social and cultural settings (Douglas, 1966; O'Brien, 2008; Ferri et al., 2023).

Critiques

Douglas' work has impacted the development of Waste Studies (Gille and Lepawsky, 2021, Ch: 1) in the fields of social science and humanities and continues to influence waste scholars as a starting point to discuss the diverse dimensions of waste (e.g., Hawkins, 2006; O'Brien, 2008; Liboiron, 2019). The concept of 'out of place' has constantly been considered within this discipline, sometimes as a 'dictum', as criticised by O'Brien (2008), who argues for a larger consideration of this concept's theoretical and analytical context when mentioned. Liboiron (2015, 2021) also discusses the relevancy of the Douglasian 'out of place', arguing that waste is always in place depending on the situation and, quoting Douglas, "rubbish is not dangerous. […] it clearly belongs in a defined place, a rubbish heap of one kind or another" (Douglas, 1966, p. 160 in Liboiron, 2015, p. 93). Douglas' idea of pollution is not necessarily synonymous with environmental pollution; these two concepts are brought together by social norms

that reflect a certain moral judgment depending on a material's placement (Liboiron, 2016). For example, "recyclability makes disposables like polystyrene 'in place'" (Liboiron, 2021, p. 35); by being recyclable, a type of plastic, once thrown away, is considered in place because there are norms that make it behave – it is useful to the recycling industry. Hence, materials seem to behave and misbehave according to a socio-cultural setting and the related normative values.

O'Brien (2008) follows up on the role of the social and, in particular, social relations, in conceptualising waste. He argues that such relationships are not one-dimensional, where waste is seen as matter to throw away. He sees waste as important from a cultural, personal, social and industrial perspective and looks at ways of valuing waste materials – from waste pickers' reusing practices, a way of survival of an 'outsider' economy within the industrial one, to meaningful personal relationships of individuals with their rubbish, to the recycling industry revaluing matter once discarded into a commodity. Waste is not only omnipresent but is also part of the contemporary culture and individual's lives, the economy and policies; it characterises Western society from different angles, which, O'Brien suggests, is a 'rubbish society'.

Liboiron's (2015, 2016, 2021) and O'Brien's discussions emphasise how waste materials appear to behave and misbehave according to the value attributed to these depending on the social setting, normative values and social groups these materials interact with. Waste can have a negative connotation that social judgments may attach to it, e.g., when it goes against norms of hygiene and respectability (Douglas, 1966; Thompson, 1979). For example, in the PWP story, pulper waste was seen as disobedient because it was not easy to recycle and was difficult and expensive to dispose of. Waste can also be a resource for survival (e.g., for waste pickers), a material for the reusing/recycling sector (e.g., pulper waste in the PWP story was a resource to make recycled pallets), or a meaningful memory-related object for a person (O'Brien, 2008), thereby gaining a positive value. The ambivalence attributed to discarded materials emphasises the moral dimension of waste and leads to considerations on the morality of waste.

Considerations on the moral dimension of plastic waste

This section explores Waste Studies research that considers the morality of waste relevant to understanding plastics. It starts with Hardin's (1998) and Hawkins' (2006) discussions on how a certain morality (or the absence of it) is attached to waste materials and practices and concludes with Liboiron's (2016) ideas on plastics identified as 'bad actors'. These authors' discussions lay the basis for conceptualising the notion of morality related to single-use plastic waste within this research.

Hardin (1998) looks at responses to the global call to reduce garbage and discusses how actors (e.g., producers, consumers and governments) decide what type of garbage is worth reducing according to their interests. Despite the call for garbage reduction implying moral expectations and possible public shame when such expectations are not met, Hardin concludes that the interests carried out by actors mostly conflict with these moral expectations, which would see any sort of waste reduced and eliminated. The pessimistic conclusion of his analysis is to have hope in technology as a way to decrease "the harms of garbage disposal that will likely work much better than moral […]" (Hardin, 1998, p. 22) requirements. Human actors' interests matter because they enact materials as waste by performing similarly to Thompson's (1979) social elite and Douglas' (1966) social norms of hygiene.

Contrary to Hardin's argument, Hawkins (2006) explores the meaning of waste in everyday life, emphasising the moral prospects connected to behaviours around waste. The author stresses how making certain choices significantly changes how waste is dealt with and the moral expectations attached to such change. For example, choosing a paper bag over a plastic one makes us feel 'righteous', while buying a plastic bottle and not being able to recycle it makes us feel 'guilty'. While still considering waste as culturally and socially defined, Hawkins shows how garbage is insignificant from a moral point of view because it is framed as a technical problem rather than a moral one. The moral judgements attached to waste are normative. Hawkins (2006, p. 32) sees waste as "a complex assemblage of actions", e.g., separating the diverse waste materials (e.g., glass, cans, paper, plastics, etc.), rinsing them, putting these into special containers, removing labels and lids and sorting them into the right bins, etc. As this brief list of actions shows, the process behind waste is about obeying disciplinary codes (e.g.,

municipal norms regarding how to sort and dispose of materials) to which everyone must adhere, implying a sense of duty and responsibility. While these codes, mandated by governments and called for by environmental NGOs, could be seen as decided by Thompson's (1979) social elites, the idea of a legislated morality enacted by disciplinary codes re-evokes Douglas' (1966) social norms of hygiene related to theological definition of dirt. Thus, matter 'out of place', that misbehaves, is enacted by behaviours that go against the idea of the sacred, i.e., God. Therefore, it is ascribed negative moral judgements and treated as a danger to the social order, stressing the importance of following rules around waste and the act of wasting. In this respect, Hawkins (2006) observes that there are specific moral actions that make the act of waste correct within a household:

> Collecting all the paper and cardboard (clean only) and putting them in their special container, rinsing the bottles and cans, removing the labels and lids and allocating them to their container, putting the food scraps in the compost or worm farm (no meat), wheeling out the bin for everything else (Hawkins, 2006, p. 31).

Such technical actions become moral because not sorting materials and rinsing bottles would lead to feeling guilty, going against the established disciplinary codes. It becomes a matter of individual conscience, a moral problematisation, that Hawkins connects to the emergence of waste management discourses and self-discipline around waste.

On a similar wavelength, Liboiron (2016) discusses plastic pollution and how plastic waste has been framed as a 'bad actor' according to certain social judgements with normative connotations. Although the features of plastic materials are complex because of their "ubiquity, longevity, and scale of production" (Liboiron, 2016, p. 87), the author argues that there must be something else that makes it enough of a 'bad actor' to radicalise academic, civic society and advocacy organisations (e.g., the Break Free From Plastic movement). To explain this, they discuss how the complexity of plastics' physical characteristics is intertwined with the social system, which attaches negative moral judgements (dependent on norms of hygiene) to plastic materials found in the natural environment. For example, by being in the ocean, plastics could be considered

pollutants and, therefore, 'bad actors'. However, Liboiron suggests considering whether the issue lies with the materiality of plastic monomers and polymers themselves – are they actually polluting the ocean? Or does the polluting 'behaviour' of these materials relate to moral expectations of cleanness, i.e., the desire to see the ocean uncontaminated? The moral judgements connected to certain environmental NGOs' 'anti-plastics' agenda (e.g., Break Free From Plastic global movement) stress how, even when studying the social dimension of plastic waste, the moral judgments attached to waste (intended as pollution) lead to considerations of waste's morality.

The next section investigates the pertinent literature that helps pay attention to the positioning of plastic waste and how these technologies perform with organisations.

Plastics agency

The PWP showed how pulper waste, and, therefore, single-use plastics, demonstrated a certain ability to perform with the project organisations and the idea of the CE they invoked. These interrelations happened through these materials' physical characteristics and their being in the 'wrong' placement, 'out of place' according to organisations' agendas. As observed, pulper waste was difficult to recycle, complicating organisations' efforts to apply their definition of the CE based on closed-loop material cycles. Pulper waste had to go through a transformation process, through which it was repositioned into the 'right place', i.e., together with other types of plastics, whilst its material composition changed. The pulper waste became obedient and apt to make the pulper pallets as organisations intended.

To take this research forward and make sense of movements of single-use plastics noticed within the PWP story as well as the interrelations of these technologies with organisations and ideas of the CE, I draw upon the theoretical lens of ANT on technologies' performativity and Liboiron's (2016) discussion on plastic pollution as a link between the explored fields of social studies and humanities in Waste Studies and the ANT perspective.

ANT looks at ways to conceptualise technologies as performative and stresses their role within the organising process. Exploring how this approach observes things as enacted as 'actants' (e.g., Law and Callon, 1982; Callon, 1986; Latour, 1987; Law, 1994), i.e., non-

human actors, can aid our understanding of the behaviour of materials with organisations. This ties back to the research question 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?' by recognising the performativity of plastic waste. Considering plastics as an actant with a performative dimension helps explain these materials' 'polluting' behaviour or 'disobedience', which is based on how their physical characteristics perform with organisations and CE ideas.

Liboiron's (2016) argument on plastic pollution as a performative agent represents a significant connection between the considered literature in Waste Studies and the theoretical lens of ANT. The author contends that to understand issues brought by plastic waste and attempt to find solutions to this, it is crucial to consider the physical characteristics of such materials. They discuss the 'matter of plastics' and argue that labelling plastics as 'bad' or 'good' is not enough as the social judgement on these materials alone cannot grasp the influence they have on society (Liboiron, 2016). Plastics' material compositions and chemicals represent a challenge for researchers studying pollution because monomers and plasticisers do not often interrelate with other matter in a predictable way. Liboiron (2016, p. 87) states that "[...] the material characteristics of objects – their density, their size, and the strength of their molecular bonds [...] – are central to their agency". Therefore, it is possible to conceive solutions to the plastic crisis only by considering the sociomaterialities, the performativity of plastics, i.e., how these materials interrelate with other entities and 'behave' within the social system, or, in other worlds, how these materials are operating within the organising of a CE initiative to tackle plastic pollution.

Plastic is Technology
As mentioned, single-use plastic waste is a technology (Latour, 2013; Beyes at al., 2022), an organised matter that contributes to the process of organising.

To understand how single-use plastics are seen as technology in this research, I draw upon Beyes at al.'s (2022) discussion regarding the role of technology in organisations. They begin by questioning what technology is, demonstrating that its meaning is not self-evident, beginning with the etymology of the term, from the ancient Greek *techne* (skill, art, cunning of hand) to *logia* (study). Following the *-logia* element within the

notion of technology, they consider Nye's (2006, p. 15 in Beyes et al., 2022, p. 1002) idea that the term 'technology' in English is translated from German *Technik*, i.e., "the totality of tools, machines, systems and processes used in the practical arts and engineering". This definition widens the idea of technology from not only tools and machinery but also processes, "sets of practices and skills, and ways of thought attached to and shaped by such tools […] and machines" (Ibid., p. 1002). The authors continue by looking at the work of French philosopher Stiegler (1994), who defines technology not as a tool but as a "generative force that takes shape through processes of mediation" (Beyes et al., 2022, p. 1002). Therefore, technology is a complex notion that encompasses not only things and tools but also processes and interrelations.

Within the OS literature, technology has been considered and investigated as part of the process of organising (e.g., Orlikowski and Scott, 2008). Orlikowski and Scott (2008) argue for considering a performative dimension of Information Technology (IT) within the process of organising. They mark the importance of studying the performance of technologies within an organisation and note the paradox in the lack of consideration of this in management and organisation journals, given the pervasiveness and embeddedness of IT in our social lives. Orlikowski and Scott attempted to solve this paradox by adopting a sociomaterial approach "which posits the inherent inseparability between the technical and the social." (Ibid., p. 454). They contest the traditional approach that saw technology in an organisation mostly as automated and draw attention to "how relations and boundaries between humans and technologies are not pre-given or fixed but enacted in practice." (Ibid., p. 462). These authors understand technologies as performing within a certain 'social entanglement' (i.e., organisations) and focus on the social practices related to that.

Although Orlikowski and Scott's (2008) work helps draw attention to technology when studying organisations, their research lacks consideration of other key dimensions of materiality, e.g., single-use plastics. Like IT, plastic is pervasive and embedded in organisations' daily life. We heavily rely on plastic items, e.g., electronics used in offices are made of plastics and retailers use plastic packaging to keep their products safe and fresh. ANT (Law and Callon, 1982; Callon, 1986, 1998; Latour, 1988a, 1988b, 1991, 2005; Law, 1994, 2003a, 2003b, 2007, 2008) can help consider different key materials

within the organising process as this approach looks at the relationships between 'heterogeneous entities', both human and non-human. For example, Latour's (1988a, 1991, 2013) discussion about the performance of materials as 'technology' expands the focus from the role of IT in organisations to a broader understanding of technology. He discusses non-human actants as 'technologies', modes of existence (Latour, 2013), i.e., organised inorganic matters that contribute to the organisation of the social world (Latour, 1991). Hence, technologies show an agency that could be defined as 'distributed', i.e., the performance of things (actants) and people (actors), while interrelating, becomes indistinguishable because both actants and actors contribute to organising the social world by making alliances between things and humans (Latour, 1987, 1988b). However, although their performance is intertwined with other entities, he recognises that technologies can independently support or disrupt humans' actions, i.e., technologies are their own actants.

The notion of 'distributed agency' stresses the importance of paying attention to the material dimension of things with the process of organising, e.g., single-use plastics' physical characteristics, as addressed by Liboiron (2016). For example, as shown in the PWP story, plastics are 'their own actants' as they support or disrupt project members' attempts to organise a CE for pulper waste dependent on these material's physical characteristics. The 'dirty pulper' misbehaved by not being recyclable and representing a challenging byproduct of paper recycling. Likewise, the 'clean pulper' had to be translated into 'mixed plastics' to behave according to organisations' agenda to produce EU EPAL standard pallets, showing that materials matter. In this respect, the performance between the pulper waste and project members becomes difficult to differentiate, e.g., the 'clean pulper' and the 'mixed plastics' are enacted like that not only from a material point of view (their physical characteristics) but also from a social perspective – in other words, organisations interrelate with plastics toward promoting their agenda (i.e., to make 'pulper pallets' they need certain physical characteristics) – addressing Latour's (1987, 1988b) idea of technologies' agency as distributed. This concept helps acknowledge the social and material dimensions of single-use plastics and presents these materials as a performative technology that is enacted in a certain way when interrelating with specific actors.

Within the process of organising (e.g., a CE initiative like in the PWP story), the complexity of the interrelations between single-use plastics and organisations becomes apparent and relevant. ANT aids in following these movements. The next paragraph considers the ANT literature on observing such interrelations.

On Interrelations

The theoretical lens of ANT helps make sense of organisation and plastic interrelations while paying attention to the complexities of such relations, i.e., material and social dimensions. ANT is "a multifaceted theoretical and empirical stance to analyse social and physical reality in terms of networks" (Corvellec et al., 2020b, p. 267) and focuses on the relationships between technologies (actants) and human actors (e.g., organisations). The observed interrelations are seen as an 'actor–network' in which both human and non-human actors have agency in organising the social world (Law and Callon, 1982; Law, 1994, 2009; Latour, 1987, 1988a, 1988b, 1991) and there is no "ontological distinction between natural and social phenomenon" (Corvellec et al., 2020b, p. 267).

According to ANT, there is a certain interchangeability across humans-things divides that could be clarified by the concept of 'delegation' (Akrich and Latour, 1992). Ribes at al. (2013) introduce this term as the broader ANT taking on the organisational theory's meaning[6] and based on the understanding that the performance of human actors and technologies is interchangeable in the process of organising.

The symmetry related to organisational actors and technologies and their performance within an actor–network is also explored by Law (2009, p. 141), who talks about ANT as

> 'a disparate family of material-semiotic tools, sensibilities, and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located.'

This definition also connects with ANT regarding STS ideas around material semiotics (Law, 1994, 2003a, 2007, 2008, 2009). It emphasises the significance of material

---

[6] Organisational theory refers to delegation as the "allocation of authority and responsibility downwards in the organizational chain" (Ribes et al., 2013, p. 2).

semiotics as a tool to observe and understand the implications of the interrelations between entities within the process of organising, i.e., the delegations that involve diverse actants and actors. Law (2009) defines material semiotics as the nexus between 'what things are' (i.e., ontology) and 'how they are arranged' (i.e., epistemology), i.e., those relationships that are simultaneously material (between things) and semiotic (between concepts). Actors and actants are enacted as materials and meaning within a particular setting. Therefore, material semiotic relationships are both a way to describe and enact the social world, i.e., "It is arguing that realities (including objects and subjects) and representations of those realities are being enacted or performed simultaneously" (Law, 2008, p. 635).

Material Semiotic relationships as an analytical tool

Within this research, the ANT notion of material semiotic relationships mentioned in the previous paragraph represents an analytical tool that helps consider the performance between actors (organisations), actants (plastic technologies) and CE ideas by observing and following

> 'the enactment of materially and discursively heterogeneous relations that produce and reshuffle all kinds of actors including objects, subjects, human beings, machines, animals, 'nature', ideas, organisations, inequalities, scale and sizes, and geographical arrangements.' (Law, 2009, p. 141).

Within these 'messy' practices of relationality and materiality (Callon, 1986; Latour, 1987), i.e., the material semiotic relationships, the distinction between actors and actants is made for analytical purposes, as an actor–network draws upon material semiotics as a "toolkit for telling interesting stories […] a sensibility to the messy practices of relationality and materiality of the world" (Law, 2009, p. 141).

Material semiotic relationships can be followed through enacting a certain actor–network. This is a different concept than 'assemblage' (Cooper, 1998; Bennett, 2010), used to make sense of the plastic crisis. Whilst an assemblage is unintentional and performs without a final goal, an actor–network performs with a purpose, i.e., it has a final objective, which depends on interests performed by actors and actants. Reaching the final objective would mean that the actor–network has stabilised. Callon (1986) and

Latour (1987) argue that stabilisation is complex and implies a process of 'translation' (Callon, 1986; Law, 2003b; Latour, 1987) performed by several 'moments'. These moments involve making new associations between actors and actants through the dynamics of 'enrolling' and 'mobilising' (Callon, 1986; Callon and Law, 1982) an increasing number of 'allies' (Latour, 1987). Thus, both humans and things can be enrolled and mobilised, and thus delegated (Akrich and Latour, 1992). Allies are delegated, i.e., enrolled, when they show interests related to the final objective of the actor–network.

However, through translation, while encountering barriers and difficulties and, inadvertently, mobilising unwanted entities within the network (Law, 2003b), interests may gradually change. Consequentially, the purpose of the actor–network transforms with the result of enacting a different reality than the one originally planned. Law (Ibid.) suggests that a translation process may conclude with 'betraying' the original plan and stabilising the actor–network as something very distant from the original idea. Thus, translation becomes a *trahison* (French for 'betrayal'), stressing how things and ideas might maintain the same name but change in the way they work. The idea of translation as *trahison* helps understand the implications of the enactment of 'obedient' and 'disobedient' plastics and the CE ideas organised to 'make materials behave', elements that emerged from the PWP story and that will be studied within this research.

Following up on the ideas of 'obedient' and 'disobedient' plastics, the next section explores the notions of discipline and undiscipline connected to the theoretical lens of ANT adopted in this research.

'Discipline' and 'Undiscipline'

As it is observant of the material semiotic relationships between entities and transformations that entities go through by performing with each other, ANT helps make sense of the ambivalence associated with single-use plastics' (mis-)behaviour (e.g., 'disobedient' and 'obedient' technology as it emerged from the PWP story) and can aid our understanding of the notion of discipline, linking back to the research question: 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?'.

As seen in the PWP story, plastics can represent an environmental and organisational issue (e.g., 'dirty pulper'), i.e., being 'out of place' (Douglas, 1966) or have positive connotations, i.e., being 'in place', (e.g., 'mixed plastics' represent a resource to manufacture EU EPAL standard pallets). Paying attention to the material semiotic relationships between single-use plastics, organisations and their interests illuminates the process of 'making materials behave', i.e., how materials are enacted as 'disciplined' (Latour, 1988a, 1991) and 'undisciplined'. Disciplining the pulper waste was, for example, the final objective of the PWP, and the project finished, i.e., the actor–network stabilised, once the members delegated the 'right' allies to enact 'mixed plastics'.

This section explores the notions of discipline and undiscipline by focusing on the interrelations between entities.

Hodder (2012) discusses his taking on 'entanglements' that can be observed through tracking the relationships between four relational elements, i.e., humans depend on things (HT), things depend on other things (TT), things depend on humans (TH), and humans depend on humans (HH). He reflects upon the interrelations between humans and things with a focus on the behaviour of the latter, rather than on how things and society co-produce each other (e.g., Appadurai, 1986; Keane, 2003). The author suggests that, although things depend on humans to be built, used and maintained (and disposed of), "the behavior of things [...] traps humans into various forms of care, regulation and discipline" (Hodder, 2012, p. 69). Because things are needed for specific functions, things have to perform according to humans' expectations and constantly require maintenance to keep performing as people want. Hodder brings the example of seventeenth-century air pumps that, although considered a great innovation, kept malfunctioning and so often needed human interventions that people's performance had to change according to the air pumps' needs, "[...] a human behavior adjusted to, even at times regulated and disciplined by the behavior of things" (Ibid., p. 69). It could be said that humans get disciplined in an attempt to discipline things and, thus, in their interactions with technologies and their 'unruliness'. Therefore, "[...] dealing with the unruliness of things in relation to humans leads to regulation and discipline" (Ibid., p. 104).

By being dependent on each other, humans and things are locked in a dynamic and constantly ongoing relationship that reproduces the dependency for things to work according to human expectations, and for humans to maintain things so that they work as expected. Although Hodder's ideas of relationships between entities are pertinent analytical tools to explore the notion of discipline within this research, his notion of 'entanglement' based on human–thing co-dependency can be enriched by considering discipline as a result of material semiotic relationships; these interrelations enact entities from a material and conceptual perspective.

For example, within the PWP story, entities are disciplined and undisciplined within a particular relationship. The pulper waste is undisciplined because the physical characteristics of this material disagrees with the paper mills' expectations that it should be easy to recycle pulper waste and thus tackle the increasing generation of this byproduct and its related issues. The pulper waste is undisciplined within that particular interrelation because it performs with the paper mills and their interests.

These dynamics are helpful to explain how paying attention to technologies performativity led to understanding the way things and organisations get disciplined. In this respect, from a more explicit ANT perspective, Akrich and Latour's (1992) concept of delegation may help understand how human actors and technologies get progressively enrolled and mobilised within the process of organising.

Latour (1988a) discusses the process of delegating humans and things while observing the performance of a door closer at the main entrance of a luxury hotel. Starting with customers being enacted as unreliable to close the hotel door, a human door closer (a groom) was employed. However, even the groom demonstrated unreliability according to the hotel management's expectations, as they fell sick, went on strike, and took breaks. Therefore, an automatic door closer was delegated because it was enacted as the most reliable (and therefore disciplined) solution. It was programmed to behave according to the hotel manager's agenda, i.e., it was always there to open and close the door. However, even the machine could misbehave by not opening the door quickly or by being blocked or broken. Even if programmed to be disciplined, this technology demonstrated a certain agency through interacting with actors, supporting their

performance, e.g., entering/leaving the hotel, or disrupting this process, or locking out guests, or hitting them by being too quick to open/close.

Another significant example that helps us outline the idea of discipline in this research is Latour's story on the stratagem used by certain hotel managers to retrieve room keys when guests check out (Latour, 1991). Latour observed that hotel managers delegated heavier key rings that helped guests remember to return their room keys. Undisciplined guests got disciplined by transforming the materiality of room keys from small and light (and, therefore, forgettable) into a heavier technology. Thus, by delegating new allies (heavier key rooms), hotel managers started to retrieve a larger portion of these and cut replacement costs. Hence, the performative dimension of room keys was significant to solving that organisational issue; through changing the keys' materiality, i.e., disciplining them, hotel guests also became disciplined. These dynamics also address entities' distributed agency (Latour, 1987, 1988b) that sees technologies and actors' performance indistinguishable as they both contribute to enact an actor–network, i.e., contribute to the process of organising. Hence, actors get disciplined or undisciplined alongside those actants they interact with.

Although Latour (1988a, 1991) and Hodder (2012) do not discuss the concept of discipline, their respective works are significant for identifying 'discipline' and 'undiscipline' within this research. In particular, this study focuses on the misbehaviour of single-use plastic waste and organisations that interact with these materials, looking at ways to rectify and thus discipline these technologies' performance according to their expectations.

Discipline and the material dimension of plastic waste
The concepts of discipline and undiscipline are enacted according to the material composition of plastics, i.e., single-use plastics are disciplined and undisciplined according to the performance of their physical characteristics with other entities and their interests.

Plastic waste was noticed by the public and judged as 'dirt', 'out of place' (Douglas, 1966), and undisciplined because of the environmental, social and economic challenges brought by its accumulation and pollution. Plastics' physical characteristics were seen as

the source of these troubles, being a 'nearly immortal material' (Geyer et al., 2017) that does not degrade and accumulates in the natural environment. The same reasons that led to plastics being perceived as 'disciplined' during the 'Plastic Age' (Mulder, 1998; Fischer, 2013; Gabrys et al., 2013; Geyer et al., 2017) – resistance, flexibility, and ease of disposal – have become the reasons for plastics being seen as undisciplined since the mid-2010s. Discarded plastics have not disappeared after disposal as organisations expected; they have endured, leaking into the natural environment and accumulating.

Plastics are often judged as either disciplined or undisciplined depending on how likely they are to leak into the natural environment once discarded. This is the case for single-use plastics such as plastic bottles. For example, Hawkins et al. (2015) start their analysis of bottled water by focusing on to the plastic bottle rather than the content. They pay attention to the future of that bottle and, in particular, the possibility for that technology to leak into the environment and become litter. The plastic bottle seems to be considered as 'pollution to come', future plastic waste that potentially leaks into the environment and contributes to the plastic crisis assemblage. Rip's (2009) idea of prospective ontology helps to understand the performance of plastics as technologies that embody the expectations of the actors they interact with. Expectations around single-use plastics refer to the performance of this actant's material composition in the future (i.e., they are likely to become pollution by not degrading and accumulating in the natural environment) rather than in the present (e.g., plastic bottles useful to keep hydrated whilst out). For example, in the PWP story, pulper waste is enacted as future pollution; the mixed plastics in this byproduct are undisciplined given their anticipated difficulty in disposal, not their present state or function. Plastics' physical characteristics contribute to enacting these technologies as disciplined and undisciplined when interrelating with social actors, e.g., organisations. This connects to the social dimension of plastics.

Discipline and the social dimension of plastic waste
From a social dimension, plastics are disciplined and undisciplined when performing with other entities. These technologies are not simply 'out of place' (Douglas, 1966) but are enacted as 'bad actors' (Liboiron, 2016), i.e., undisciplined, and their undiscipline is characterised according to their performance with other entities; therefore, plastics are

disruptive only because there is something to disrupt, i.e., actors' agendas. The relationship between humans and things represents a reciprocal interaction (Hodder, 2012), where humans get 'disciplined' whilst attempting to discipline 'unruly' things (e.g., the air pump example – Hodder, 2012, p. 69). Arguably, nowadays, individuals and organisations depend on single-use plastics (like they depended on air pumps in the seventeenth century), despite the 'unruly' behaviour of these things. It is humans' dependence on plastics and their need to maintain the use of these technologies that lead organisational actors and plastics toward a performative process of discipline and raise the interrogative of how single-use plastics are enacted as disciplined and undisciplined. This may lead to other questions regarding the performance of actors and plastics. Are plastics undisciplined because humans (individuals and organisations) pollute by producing, buying and throwing away plastics? Or is that because of plastics' physical characteristics, i.e., that they do not degrade? Is the enactment of undiscipline and discipline dependent on the organisations' performance or plastics' material composition?

It is relevant to consider technologies' distributed agency (Latour, 1987, 1988b) and that actors get disciplined or undisciplined alongside the actants they interact with. For example, within the plastic crisis, plastics are undisciplined because organisations displace them (e.g., illegal dumping into the natural environment). Thus, there are no undisciplined plastics without undisciplined organisations, and vice versa. This means that 'disciplined' is not a characteristic of technologies but is related to the performative dimension of actors and actants within a particular actor–network, an organisation.

As will be illustrated, the answer to the above questions is that both organisations and plastics are disciplined and undisciplined at the same time because of these technologies' distributed agency. In this respect, organisations produce, buy and discard materials that cannot degrade and, when leaking, pollute the natural environment, leading to the plastic crisis. Humans become disciplined whilst attempting to discipline 'unruly' things (Hodder, 2012) that they create; organisations become disciplined when attempting to discipline single-use plastics that they manufacture, use and dispose of.

Discipline and the moral dimension of plastic waste

The concepts of discipline and undiscipline imply the presence of norms and expectations to obey and could be linked to the moral dimension of plastic waste. Because plastics have certain moral judgements attached to them (Douglas, 1966; Hardin, 1998; Hawkins, 2006, 2009; Liboiron, 2016), single-use plastics are 'bad', 'out of place' (Douglas, 1966), and undisciplined or 'good', 'in place', and disciplined depending on the involved actors, their agendas, and which materials perform.

Hawkins' (2009) discussion of plastic bags as 'moralised intermediaries' helps moving the concepts of discipline toward understanding how plastics could be conceptualised as 'good' (disciplined) or 'bad' (undisciplined). Following up on her argument around the moral significance of waste (Hawkins, 2006), the author sees plastic bags as mundane objects that become a moralised intermediary "between an interior reception and an ethical command and the mobilisation of the will to abide by it" (Bennett, 2001, p. 56, cited in Hawkins, 2009, p. 48). Hawkins' argument on moralised intermediaries helps understand the concept of discipline from a moral perspective; plastic bags perform as intermediaries of the moral notions of discipline and undiscipline within a certain setting. She brings two examples of plastic bags being an intermediary; the Australian 'Say No!' campaign and an Adidas commercial[7].

In the 'Say No!' campaign example, Hawkins describes how movements to ban plastic bags have shaped consumer behaviour and the perception of plastic bags. Being recognised as one of the most likely plastic items to pollute the natural environment, plastic bags are seen as hazardous, and people advocate for banning them. According to a certain shared system of values that demonises plastic bags, shoppers must use reusable bags. When someone forgets to bring their reusable bags, they apologise. This stresses the performance of "[…] fixed oppositions such as environmentally friendly/environmentally hazardous, and it appeals to categorical imperatives such as protecting nature […]" (Hawkins, 2009, p. 47). The mobilisation of 'categorical imperatives' seems to enact a system of prohibitions that leads to judgements on plastic

---

[7] Available on YouTube: https://www.youtube.com/watch?v=4tyoaxiNHg8.

bags as undisciplined because they go against the social norm of endangering nature by being extremely likely to leak into the natural environment and pollute it. Thus, plastic bags have become a moralised intermediary of the concept of undiscipline.

In the Adidas advertisement example, Hawkins looks at the performativity of plastic bags transformed into a football by a child who collects them from a road in a South American slum. Although the material composition of plastic bags has not changed (they are still the same objects demonised in the 'Say No!' campaigns), in this example, they are not the moralised intermediaries of the concept of undiscipline; instead, they symbolise possibilities, creativity, experimenting. Through a 'collaborative process' (Hawkins, 2009), i.e., "processes whereby material presence is enacted into being in distinct relations and practices." (Ibid.:51), plastic bags cease to be 'bad' while interacting with the child. They become 'good' because they are used for something morally positive, like 'giving' a child a toy. It is possible to argue that plastic bags could be seen as moralised intermediaries of the concept of discipline.

These two examples support the idea that discipline is about interrelations between entities that show a moral dimension, e.g., plastics, and that morality reflects social expectations toward the behaviours of people and materials.

The next section reflects upon the relationships between social and cultural theory investigated to make sense of the social dimension of waste materials and ANT perspectives and explains why this research adopts the theoretical lens of ANT rather than a sociomaterial one.

Reflections

In this section, I reflect upon diverse elements that emerged from the literature review and that need further consideration. First, the link between the conceptualisation of discipline and undiscipline and the enactment of a specific context, where these ideas are produced, is considered. It follows an outline of how the ideas of an eclectic theoretical framework (Stinson, 2009) and 'mess in social science' (Law, 2004) help justify the use of diverse bodies of literature and disciplines, i.e., the fields of social and humanities in Waste Studies, social and cultural theories and ANT. A table of relevant authors and ideas and how these contribute to building this research argument is

proposed. Then, a discussion is proposed on the reasons for connecting aspects of social and cultural theory (Douglas, 1966; Thompson, 1979, 1998; O'Brien, 2008) with pollution and matter 'out of place'. Finally, I go through the reasons for adopting ANT over sociomateriality.

Discipline and Context

Technologies like single-use plastics are 'bad', 'out of place' (Douglas, 1966), and undisciplined or 'good', 'in place', and disciplined (Latour, 1988a, 1991) depending on the actors involved, their agendas, and which materials perform. It seems that the conceptualisation of the notions of disciplined and undisciplined depends on the context actors and actants interact within.

The Douglasian idea of 'out of place' is dependent on a certain socio-cultural setting and relative normative values, i.e., the wide meaning attributed to the idea of 'context' in social sciences. In this field, context is often referred to as a particular setting where social interactions happen (Given, 2012). This notion helps researchers describe a particular social phenomenon and explain the actors, relationships, rituals, and values. In this regard, the context has become an explanatory tool for scholars to make sense of a social fact.

However, this idea of context has led to criticisms, i.e., those promoted within ANT. ANT scholars' (e.g., Callon, 1986; Callon and Law, 1982; Latour, 1988a; Asdal and Moser, 2012) main critique related to the idea of context as a 'fixed' and 'given' element in social sciences that ignores the role of the actors' performance in the making of a certain reality. For example, Callon (1986) discusses how actors and their performance enact a certain reality that can be transformed through an ongoing process. Instead of a fixed context, Callon suggested an ongoing process that makes sense of a particular reality and constantly transforms. This change in approach is significant because it shifts the focus to who the actors are, their interests, and the dynamics of the interrelations between different actors, materials, objects, and issues. Consequently, it becomes possible to examine how a particular context is enacted, rather than 'rhetorically' using the term to explain the social relationships.

Asdal and Moser (2012) build upon Callon's (1986) idea that contexts are particular and can change according to the actors' interests. Asdal (2012) argues that actor–networks enact a specific 'context', i.e., a set of shared values or interests, something that Law (1994, 2007, 2008) defines as modes of ordering. Therefore, contexts are performative, enacted and reproduced by the material semiotic relationships between certain actors, their interests, materials, objects, and issues. By paying attention to the performative dimension of contexts, it is possible to identify networks that attempt to get stabilised toward a similar goal and set up contexts that interrelate. Hence, it is possible to say that there is activity between contexts. Although contexts may compete, they may also interrelate and support one another. To clarify the complex dynamics between contexts, Asdal and Moser (2012) propose the idea of 'contexting', i.e., the activity between contexts. Successful contexts will be able to mobilise more actors and become predominant. Thus, specific contexts prevail over others because particular practices are enacted rather than others.

The ANT taking on the idea of context as enacted and reproduced by the interrelations between technologies and actors is used within this research to observe how notions of discipline and undiscipline are produced and translated alongside the movements of single-use plastics (actants), organisations (actors), CE ideas (object) and understandings of the plastic crisis (issue). Therefore, it is possible to say that within this thesis, the concepts of discipline and undiscipline refer to entities behaving or misbehaving according to a certain context, and tracking the contexting activity aids in understanding how a certain notion of discipline becomes predominant over others.

The theoretical toolkit[8]

Law's (2004) mess in social science and the call to develop a 'toolkit' to make sense of the world observed, i.e., the interrelations between single-use plastics, business-driven organisations, CE ideas and understanding of the plastic crisis, compliments Stinson's (2009) argument on theoretical eclecticism.

---

[8] To help summarise and clarify the different theoretical ideas and approaches used to build this research theoretical toolkit, see Appendix I.

Theoretical eclecticism is discussed by Stinson (2009) as a way to develop a theoretical framework that provides the language to articulate a complex research argument which one single theoretical approach could not do. The author explains his eclectic framework as a well-planned mixture of complementary theories that, although coming from diverse paradigms, work together to help elaborate and explain the research. Stinson also stresses the relevance of considering the eclectic theoretical framework as strictly connected to the methodological one as drawing on certain theories leads to the adoption of certain methodological tools. The connection between my theoretical toolkit and the methodological approach will be explored in Chapters 4 and 5.

Theoretical eclecticism is here linked to ANT scholar John Law (2004), who calls for social scientists to develop a 'toolkit' of theories and analytical approaches that helps make sense of the world observed. Recognising the complexity and 'messiness' of the world observed and studies by social science, Law advocates for a fluid and 'messy' methodological approach and related theoretical framework. This toolkit is seen as able to point and articulate "a sense of the world as an unformed but generative flux of forces and relations that work to produce particular realities" (Law, 2004, pp. 7–8). The emphasis on the 'unformed' and 'relations' in the citation implies a certain ongoingness given by diverse entities interrelating within the process of translation. This represents the objective of this research: to track the movements of single-use plastics, its interrelations with organisations, and ideas of the CE and the plastic crisis and observe how these enact plastics and organisations as disciplined and undisciplined within the process of organising a CE to tackle the plastic crisis.

Social and cultural theory and ANT
This section offers a reflection upon the social and cultural theories explored in this review and ANT. These fields are on opposite theoretical spectrums, making it relevant to outline the significant differences between the culturalism of Douglas (1966), Thompson (1979, 1998) and O'Brien (2008) and the theoretical lens of ANT outlined in this thesis.

To start, social and cultural theory does not attribute agency to things. For example, Douglas talks about materials as judged as 'dirt' and pollution according to social actors'

perspectives: "there is no such thing as absolute dirt: it exists in the eye of the beholder" (Douglas, 1966, p. 2); things do not perform but represent either order or disorder according to social norms within a certain socio-cultural setting. Neither Thompson nor O'Brien discuss a performative dimension of things. As seen before, for Thompson, waste is a transient category as materials shift their value depending on the social elite's judgment; things are, therefore, socially shaped, and their value and categorisation as 'waste' is defined according to social constructs and independent of their material composition. Similarly, O'Brien recognised the social dimension of waste matter and argues that discarded things may hold diverse meanings within Western society, e.g., waste can be a resource for survival (e.g., for waste pickers), matter for the reusing/recycling sector, or a meaningful memory-related object for a person. Like for Douglas and Thompson, there is no consideration of the material performativity of waste technologies; the value and meaning is attributed to these objects through social relationships within a certain socio-cultural setting.

In ANT, as discussed in in this chapter, actors and actants are considered equally able to perform within a material semiotic relationship; all entities contribute to organising the social world. Furthermore, technologies show distributed agency (Latour, 1987, 1988b), i.e., the performance of objects (actants) and people (actors), while interrelating, becomes indistinguishable. Thus, Douglas' social values and the ones identified by adopting the ANT lens differ.

For social and cultural theory, social values are determined by human agency as it is humans who enact norms of hygiene and judge when matter is waste (Douglas, 1966; Thompson, 1979, 1998; O'Brien, 2008). ANT, as seen before, sees everything as social, and social values are enacted by the material semiotic relationships (Law, 1994, 2009) and actants' distributed agency (Latour, 1987, 1988b) within a particular setting. Hence, actors and actants show material and social dimensions within the process of organising.

Recognising these ontological differences, it is relevant to emphasise that this research does not subscribe to either school of thought but draws upon Law's (2004) idea of 'mess in social science' and Stinson's (2009) argument of a theoretical eclecticism, mentioned previously. The elements of social cultural theory used to make sense of the

notion of waste and ANT are tools within the theoretical and analytical approach developed to make sense of how organisations organise a CE for plastics to tackle the plastic crisis. In other words, whilst adopting an ANT perspective, I borrow elements of social and cultural theory to understand the interrelations between organisations, technologies and ideas. Without having to align with Douglas', Thompson's or O'Brien's theoretical frameworks, the concepts of 'out of place' and 'pollution' help identify waste within a socio-cultural setting and give relevance to actors' 'interests' (Law, 1994; Latour, 1987), i.e., agendas, by considering their social judgements (i.e., social values) on plastics in the performance between materials and organisations.

Additionally, Law's (1994, 2009) ideas on material semiotic relationships draw upon Douglas' (1966) thought around the material semiotic tradition. She considers rituals (written and oral) as performances where materials and people are given a certain joint meaning. Similarly, Law sees the material semiotics as the nexus between 'what things are' (i.e., ontology) and 'how they are arranged' (i.e., epistemology), i.e., those relationships that are simultaneously material (between things) and semiotic (between concepts). Materials are important for Douglas because, when associated to human action, they can symbolise order and disorder within a certain socio-cultural setting. For example, matter becomes 'dirt', i.e., disorder, when it is considered 'out of place'. Similarly, material semiotic relationships identify things as part of the social arrangement and materials performance reflects a particular organisation's stability or instability. They can support or disrupt such organisation by being disciplined or undisciplined (Latour, 1988a, 1991) and contribute to enacting order or disorder within an organisation, i.e., stabilise or maintain the instability of a certain actor–network. Hence, the concepts of discipline and undiscipline could relate, respectively, to Douglas' notions 'in place' and 'out of place'.

Overall, the elements from social and cultural theory used to make sense of the idea of waste and ANT, although representing different schools of thought, show some meaningful connections and have become significant tools in this research theoretical and analytical toolkit.

Why ANT and not Sociomateriality

It is worth recognising that there are approaches other than ANT that could have been adopted in this research, such as Sociomateriality (e.g., Barad, 2007; Orlikowski, 2007, 2010; Orlikowski and Scott, 2008; Leonardi, 2012). This section compares these approaches whilst explaining how ANT represents a more suitable approach for the purpose of this study.

ANT and Sociomateriality are both STS approaches that look at the relationships between materials and organisational actors. Both perspectives have been used to study organisations and the role of materials within the process of organising; each body of work recognises that things have been overlooked in this body of literature and that they require to be 'seen' to make sense of an organisation (e.g., Barad, 2003, 2007; Orlikowski, 2007; Orlikowski and Scott, 2008; Callon, 1986; Law 1994; Latour, 1987).

Although both approaches look at the relationships between the organisations (social dimension) and things (material dimension) that contribute to the organising, they present differences in terms of how technologies obtain meaning. ANT sees entities (actors and actants) as symmetrical; things have agency and participate in enacting the interrelation within a certain network. Sociomateriality recognises that social practices shape the meaning of things; however, materials do not exercise agency and can be only enacted.

In this research, single-use plastics perform a certain degree of agency related to being disciplined and undisciplined. Plastics' distributed agency shows in any interrelations these materials perform in through the process of organising. For example, the plastic crisis, despite being an unintentional assemblage (Cooper, 1998; Bennett, 2010), demonstrated plastics' disruptive agency concerning the natural environment (e.g., marine animals and ecosystems) and organisations (e.g., fisheries, tourists and companies dealing with plastics); marine ecosystems became polluted, fisheries were impacted, and plastic companies were targeted as 'polluters' by environmental charities campaigning for ocean conservation. Likewise, in the PWP story, the pulper waste disrupted organisational actors' attempts to 'make it disappear' and became disciplined only when mixed with other materials (i.e., PVC and PET from municipal collection) and organisations' CE agenda translated (i.e., from a local CE to a national circular initiative).

Because plastics demonstrate a performative dimension, it is relevant to consider an ANT lens to carry out this research. Such an approach helps understand the performance of materials by recognising these technologies' distributed agency and how that affects organisational attempts to respond to the plastic crisis. Whilst Sociomateriality could outline how plastics get diverse meanings depending on the interrelations, it does not fully recognise these materials' performative dimension; plastic wastes are social materials that help enact their own meanings as well as those of the organisational actors these materials perform with.

Research Directions

In this final section, the relevant highlights from the literature that show the direction for further research regarding understanding plastic waste materials, the plastic crisis, business-driven organisations, the CE and the interrelations among entities are discussed. These elements constitute the key points of this research, i.e., they represent the object (the CE), issue (the plastic crisis), actants (single-use plastics), actors (business-driven organisations) and relevant interrelations that are explored in this thesis. Adopting an ANT perspective, I borrow significant elements from social and cultural theory, research around the CE within the business landscape, and the fields of social science and humanities in Waste Studies to make sense of the observed dynamics between technologies, organisations and ideas.

The object

As the PWP story showcased, material-focused and technocentric CE ideas were invoked solutions by business-driven organisations to tackle the plastic crisis in a localised setting. Although the CE is a contested paradigm (Calisto Friant et al., 2020; Corvellec et al., 2020a) and has multiple definitions (Kirchherr et al. 2017, 2023), frameworks and discourses (Calisto Friant et al., 2020) invoked by diverse actors (Murray et al., 2015; Schoggl et al., 2020; Calisto Friant et al., 2020), it is possible to identify common themes within how researchers approach the CE within the business landscape (Dzhengiz et al., 2023). These are a) the CE as a business model, b) a closed-loop system and c) a transition based on reframing waste.

Critiques emphasise the lack of attention to the social dimension of circularity (Murray et al., 2015; Schoggl et al., 2020; Böhm et al., 2023), how circularity is prevalently

focused on materials and a business-led approach (Calisto Friant et al., 2020; Corvellec et al., 2020a), the lack of consistency toward transitioning to real change (Mah, 2021; Shamsuyeva and Endres, 2021), and that the CE notions need to be problematised (Dzhengiz et al., 2023). It has emerged how the circular approach to plastics is still widely related to the idea of creating 'closed-loops' through recycling and incinerating processes (Meys et al., 2020; Fellner and Brunner, 2021; Shamsuyeva and Endres, 2021), stressing the business-led tendency of focusing on creating economic models that aim to reframe plastic waste.

If considering the moral judgement attached to waste materials and practices around wasting (Hardin, 1998; Hawkins, 2006; Liboiron, 2016), the CE could be seen as the way to put materials that are enacted as 'out of place' back 'in place' (Douglas, 1966), to discipline (Latour, 1988a, 1991) the unruliness (Hodder, 2012) of plastic technologies.

Identifying the complexities behind the conceptualisation of the term 'CE' within the business-driven landscape helps map how the enactment of circularity ideas transforms throughout the organising of a project to discipline plastics.

The issue
The recalcitrant nature and disruptive performance of plastic waste takes multiple representations; for example, the pulper waste within the recycling of paper process as indicated in the PWP story, or as marine pollution within the narratives of environmental NGO campaigns (e.g., Break Free From Plastic global movement) (Chapter 1). These iterations of the misbehaviour of plastic waste are representations of the same global phenomenon, the plastic crisis. This assemblage (Cooper, 1998; Bennett, 2010) is composed of an intertwining of diverse entities: materials, marine life, human performance (e.g., fishermen and tourist operators), and ocean currents. Although unintentional, the plastic crisis assemblage brings several complex issues, and it is therefore considered a wicked problem (Rittel and Webber, 1973; Tarmeer et al., 2019; Lonngren and van Poek, 2021) that requires solutions that involve multiple actors (with diverse agendas) and spread through various geographies.

Recognising and conceptualising the complexities of the plastic crisis supports an analysis that considers diverse entities (e.g., business-driven organisations, single-use plastics, CE ideas) and their interrelations.

The actants

The plastic crisis made it significantly hard to ignore the complex issues brought by plastic waste. Part of the problem with these materials is that they show social, material and moral dimensions; therefore, issues related to plastics are complex and part of wicked problems. Firstly, plastic waste is the product of socially and culturally situated relationships (Douglas, 1966; Thompson, 1979; Scanlan, 2005; O' Brien, 2008; Liboiron, 2015, 2019, 2021) between discarded materials and human actors. There is no waste without a society, to paraphrase Douglas (1966), as matters can be 'out of place' (Ibid.) only according to certain rules. As discussed, such rules, e.g., norms related to hygiene and decency (Douglas, 1966; Thompson, 1979), seem to imply a moral judgment about the waste that becomes a 'bad actor' (Liboiron, 2016) within a certain social and cultural setting. The moral dimension of plastic waste relates to these materials' moralisation, i.e., they imply moral obligations that people must follow to avoid public shame (Hardin, 1998) and relate to normative codes and practices that inspire a strong sense of duty and responsibility (Hawkins, 2006).

The social and moral dimensions connect with the material one because the reason for plastic waste to be socially enacted and moralised links with the way these materials' physical characteristics interact with organisations and their interests (Liboiron, 2016). For example, plastics' material composition disrupts organisational efforts to 'make it behave', to enact it as disciplined. Plastic waste is recalcitrant discarded matter that refuses to go away as per organisations' expectations.

Single-use plastic waste is seen as a technology (Beyes et al., 2023; Latour, 1988a, 1991, 2013) with a performative, moral and social dimension that could be observed by following these materials' distributed agency within the process of organising. In this respect, considering single-use plastic waste as a performative actant helps map the dynamics between these technologies and business-driven organisations and track the translation of disciplined and undisciplined plastics (and organisations).

The actors

Although several actors aim to tackle the plastic crisis, it is important to consider business-driven organisations that form an alliance to address the issues brought by this phenomenon. For example, the PWP members came together in a project to tackle the issues brought by the increasing accumulation of pulper waste. Like in the case of the paper mills within the PWP story, organisations that deal with single-use plastics are often enacted as 'polluters' alongside plastic waste (seen as pollution) and share the same judgement as the materials they interact with – i.e., undisciplined.

Similarly to Lux, the research organisation, and Servo, the entity that represented the paper mills, that participated in the PWP, organisational actors that represent the interest of a group of companies commonly invoke CE ideas. These ideas are seen as helpful for their members to deal with the plastic crisis challenges and interrelate with diverse types of single-use plastics. Hence, the collective nature of member-based organisations makes them a relevant candidate for enacting complex solutions to discipline plastics, e.g., CE initiatives. Looking at how a business-driven, member-based organisation organises such solutions from a material semiotic perspective (Law, 1994, 2009) aids the understanding of how plastic technologies perform with organisations' interests, which CE ideas are invoked, and how the concept of disciplined is enacted.

The interrelations

Observing the interrelations between technologies, organisations and their interests, the invoked CE ideas and the wicked problem of the plastic crisis are relevant to understand how and why single-use plastics get disciplined. The theoretical lens of ANT (Law and Callon, 1982; Law, 1994, 2007; Latour, 1987, 1988a, 1988b, 1991) discussed in this thesis aids in this study. Material semiotic relationships represent the analytical tool to explore the web of interactions between actors, actants, the object, and the issue.

Hence, the idea of disciplined things (Latour, 1988a, 1991; Hawkins, 2009; Hodder, 2012) stresses an important tension regarding the performance of plastic waste with organisations; plastics are 'bad', 'out of place', undisciplined depending on what actors they perform with. Similarly, 'good', 'in place', disciplined plastics are enacted as such because of actors' agendas. The moralisation of plastic waste as a 'bad actor' (Liboiron, 2016) has demonstrated the disruptive performance that such technologies can have;

plastics are disruptive only because there is something to disrupt, i.e., actors' agenda. In this respect, plastics show a distributed agency (Latour, 1987, 1988b) as organisations are enacted as disciplined and undisciplined alongside these technologies. This means that 'disciplined' is not something that plastic is per se, but a concept that makes sense only within a certain context (Callon, 1986; Asdal, 2012) and through performing with certain organisational actors. Within the plastic crisis, these materials are 'out of place' because organisations displace them (e.g., illegal dumping in the natural environment). Thus, there are no undisciplined plastics without undisciplined organisations, and vice versa. This opens to further research exploring ways for large business-driven, member-based alliances to discipline plastics and their members dealing with these materials through a CE project.

The main gap and research aim
Through the outlined literature, the main gap identified is within the field of OS regarding researching the role of technologies. By adopting an ANT lens, it is possible to explore other key dimensions of materiality than IT (Orlikowski and Scott, 2008), e.g., single-use plastics. These performative technologies disrupt through the plastic crisis, making plastic waste significantly visible, and acted as a call for considering plastics' role within organisational processes. The literature on the CE of plastics (Meys et al., 2020; Fellner and Brunner, 2021; Shamsuyeva and Endres, 2021) has moved toward including plastics in the study of organisational solutions (for example, by focusing on how to manage plastic waste), but as a passive material, which lacks a performative dimension.

The aim of this research is to observe how a business-driven, member-based global alliance organises a CE project to discipline single-use plastics. Plastics are seen as a contributing actant to such organising. Following the material semiotic relationships that perform plastic waste and organisations as disciplined or undisciplined could lead to an understanding of how certain CE ideas are invoked and circularity projects are organised to tackle the plastic crisis. It is pertinent to observe and make sense of the interrelations (i.e., material semiotic relationships) between actors (member-based, business-driven organisations), actants (single-use plastic waste), the object (CE ideas), and the issue (the plastic crisis), the key elements identified to continue this research.

Summary

Building on my experiences as a practitioner, this chapter connects relevant theoretical tools to define and problematise concepts of the plastic crisis, CE, and waste that I encountered while working at the PWP. The literature outlined in this chapter helps build the eclectic theoretical framework (Stinson, 2009; also see the notion of 'mess in social science' – Law, 2004) used to make sense of the elements of this research, i.e., the plastic crisis (the issue), CE (the object), single-use plastics (the actants), business-driven organisations (the actors), and the interrelations between these factors.

The developed theoretical toolkit contains complementary theories and approaches and does not subscribe to any particular school of thought but draws upon Law's (2004) idea of 'mess in social science' and Stinson's (2009) argument on the benefits of a theoretical eclecticism to navigate the complexities of research.

Furthermore, the reviewed literature helped make sense of the elements that emerged from the PWP story, such as the (mis-)behaviour of single-use plastics toward business-drive organisations' interests, the CE as a way to 'make plastics behave', how these technologies are enacted as 'obedient' and 'disobedient', and the implications for organising a certain understanding of circularity. The sources discussed in this chapter also helped highlight research directions to expand on what emerged on the PWP and explore that at a global level with this research.

First, I looked at the literature that helped conceptualise the plastic crisis. This phenomenon was defined as an 'assemblage' (Cooper, 1998; Bennett, 2010); however, considerations on the consequences of such an unintentional gathering of elements have led the plastic crisis being seen as a 'wicked problem' (Rittel and Webber, 1973; Tarmeer et al., 2019; Lonngren and van Poek, 2021).

Second, I explored relevant theoretical ideas to conceptualise 'waste' within this study. Pertinent notions in the fields of social science and humanities in Waste Studies literature (Douglas, 1966; Thompson, 1979, 1998; Hardin, 1998; Hetherington, 2004; Scanlan, 2005; Hawkins, 2006; O'Brien, 2008; Stowell, 2012; Liboiron, 2015, 2016, 2019, 2021; Stowell, 2012; Gille and Lepawsky, 2021; Ferri et al., 2023) were considered and

problematised, and I observed how certain authors have explored the moral dimension of waste (Hardin, 1998; Hawkins, 2006; Liboiron, 2016).

Third, I investigated the performative dimension of single-use plastic waste (Liboiron, 2016) and linked the literature in Waste Studies and ANT within this research. Then, plastic waste as technology (Orlikowski and Scott, 2008; Latour, 1988a, 1991, 2013) was discussed and the literature on ANT (Callon, 1986, 1998; Latour, 1987, 1988a, 1988b, 1991; Law, 1994, 2003a, 2003b, 2007, 2008) introduced. The theoretical lens of ANT helped consider different key dimensions of materiality than IT (Orlikowski and Scott, 2008) within the organising process as this approach looks at the relationships between 'heterogeneous entities', both humans and non-humans. It also helped explore the social and material dimensions of plastics as technologies. Finally, the concepts of 'discipline' and 'undiscipline', and the link to plastics' moral dimension were outlined.

The chapter continued with reflections on the benefits of the eclectic theoretical framework (Stinson, 2009; 'mess in social science' – Law, 2004) developed to carry on this study and clarified my theoretical position as an ANT-er that borrows elements of social and cultural theory to understand the interrelations between organisations, technologies and ideas without having to align with any school of thought.

Finally, I discussed the pertinent insights from the explored literature and outlined the key elements to consider for further research on plastics and the CE. Such elements are the object (i.e., CE ideas), issue (i.e., the plastic crisis wicked problem), actants (i.e., single-use plastics), actors (i.e., member-based, business-driven organisations), and interrelations between these entities.

This chapter concludes with identifying the main literature gap pertinent to this research and outlining the research aim.

Chapter 4 – The methodological framework

In this chapter, I draw upon the eclectic theoretical framework (Stinson, 2009; 'mess in social science', Law, 2004) developed in the previous chapter to outline this research's methodological framework. Such a methodology is explained as based on the theoretical lens of ANT (e.g., Callon, 1986; Law, 2004; Law et al., 2010) which lends itself to ethnography (e.g., Geertz, 1973; Atkinson et al., 2001; Hammersley and Atkinson, 2019). It is designed to follow the material semiotic relationships between organisations (actors), invoked CE ideas (objects), single-use plastics (actants) and iterations of the plastic crisis (issue) and track the process of translation (Law, 2003b; Latour, 1987). Law (2004) advocates for a fluid and 'messy' methodological toolkit, clarifying that drawing on the theoretical lens of ANT leads to the adoption of certain data collection and analysis techniques. The significant methods identified are fieldwork (e.g., Geertz, 1992), observant participation (Czarniawska, 1998, 2004) and shadowing (Czarniawska, 2007), document analysis (Bowen, 2009), semi-structured ethnographic interviews (e.g., Sherman Heyl, 2001) and informal conversations, and fieldnotes (e.g., Emerson et al., 2001).

Finally, I discuss the ANT perspective as a 'method assemblage' and the requirement of a 'messy approach' in social science research (Law, 2003c, 2004; Law et al., 2010). I conclude by outlining ethical considerations.

Following the interrelations: From PWP to PhD

Within the PWP story, the performance of single-use plastics became relevant. Considering the agency of non-humans, in this case single-use plastics, was not a philosophical choice as the materials' agency of these materials mattered (Callon, 1986; Latour, 1987, 1988a, 1991; Law, 1994, 2009). Additionally, the PWP story demonstrated that materials could make themselves noticeable through their physical characteristic's misbehaviour, i.e., by being undisciplined (Latour, 1988a, 1991). Thus, organisations cannot ignore the material semiotic relationships between materials, organisations, CE ideas invoked to discipline plastics and iterations of the plastic crisis.

The philosophical position adopted in this research was relational ontology[9] and a material semiotic epistemology. The relational ontology draws upon Law's (2004, 2008) ideas who suggested that "materiality cannot be prised apart from the enactment of relations" (Law, 2008, p. 1). In this fashion, entities are enacted in a particular way while interrelating within a network. This emphasis on relationality as an ontological paradigm helped me look at the world as "[…] an unformed but generative flux of forces and relations that work to produce particular realities" (Law, 2004, pp. 7-8). This ontological perspective allowed me to recognise the ongoingness and dynamicity of the movements between heterogeneous entities within the process of translation and toward enacting "particular realities" (Ibid.), i.e., to stabilise the observed actor-network. In this sense, the epistemological approach adopted related to the material semiotic relationships (Law, 2009) as they highlighted complex associations between technologies, organisational actors and ideas and highlighted the material and social values these interrelations performed. Taking the PWP story as an example, this research philosophy led me to notice the performative dimension of plastic technologies, the multiple values associated with waste materials, the need to problematise the plastic crisis, the complexity linked to invoking CE ideas and how organisational actors performed according to their interests. Hence, mapping the material semiotic relationships within my doctoral research led to following the material and social values associated to certain delegations throughout the process of translation and toward the stabilisation of the actor-network, i.e., the organisation of CE for single-use plastics.

From a methodological perspective, relational ontology and material semiotic (Law, 2009) epistemology aligned with Law's (2004) call for social scientists to develop a 'toolkit' of theories and analytical approaches that help make sense of the world observed. Drawing upon my previous studies in the field of Cultural Anthropology (e.g., Mead, 1953; Geertz, 1973, 1988; Van Maanen, 1988; Hannerz, 1992) and the eclectic literature outlined to make sense of the elements of focus of this research, i.e., the plastic crisis (the issue), CE (the object), single-use plastics (the actants), business-driven

---

[9] Although I recognise that relational ontology can be found across diverse disciplines (e.g., Sidorkin, 2002; Wildam, 2006; Benjamin, 2015; Cooren, 2018; Pernecky, 2023), the wider discussion is not addressed in this research due to space constraints in relation to the word limit for this thesis.

organisations (the actors), and the interrelations between these, I identified methods that help track the material semiotic relationships between technologies, ideas and organisations. Ethnography (Geertz, 1973, 1988; Van Maanen, 1988; Hannerz, 1992; Atkinson et al., 2001; Hammersley and Atkinson, 2019) was recognised as a significant methodological approach. Ethnography, a traditional data collection approach associated with Cultural Anthropology, as well as several tools related to it (e.g., fieldwork, participant observation, interviews, etc.) have been used in ANT (e.g., Callon, 1986; Latour, 1987, 1988a, 1991; Law, 1994, 2003c, 2004, 2009; Law et al., 2010), Social and Cultural Theory (e.g., Douglas, 1966; O'Brien, 2008) and Social Science and Humanities in Waste Studies (e.g., Liboiron, 2016; Hawkins, 2009); these theories and disciplines constitute my eclectic theoretical framework. In this respect, it is possible to link the theoretical toolkit developed for this research to the methodological framework laid out in this chapter.

Ethnography

Ethnography (Geertz, 1973, 1988; Van Maanen, 1988; Hannerz, 1992; Atkinson et al., 2001; Hammersley and Atkinson, 2019) is a qualitative approach that implies prolonged contact and building relationships with the community's members, i.e., being physically situated in the research field and living with the participants (e.g., Mead, 1953; Atkinson et al., 2001; Hammersley and Atkinson, 2019). The main goal of an ethnographic study is to gain the research subjects' perspectives on socio-cultural aspects of their society (Geertz, 1973); common methods used to achieve such a goal are fieldwork (Geertz, 1988, 1992; Van Maanen, 1988; Coffey, 1999; Atkinson et al., 2001; Faubion, 2001; Hammersley and Atkinson, 2019), interviews (Sherman Heyl, 2001; Hammersley and Atkinson, 2019), participant observation (e.g., Coffey, 1999; Emerson et al., 2001; Hammersley and Atkinson, 2019), and fieldnotes (Van Maanen, 1988; Sanjek, 1990; Coffey, 1999; Emerson et al., 2001).

The ethnographic approach considers the socio-cultural settings and how social actors perform within it. Such a setting is often referred to as a 'culture' (e.g., Geertz ,1973, 1988; Van Maanen, 1988; Hannerz, 1992) that is "[…] expressed (or constituted) only by the actions of and words of its members" (Van Maanen, 1988, p. 3), and it is the ethnographer's job to interpret this. Geertz (1973, p. 5) sees culture as a semiotic

concept, the complexity of interrelations between humans, the socio-cultural setting and things that await to be understand, i.e., "[…] man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs […]". Ethnography is the interpretative science that aims to make sense of such webs. Following up on Geertz's idea of culture as webs, Hannerz (1992) discusses it as a network composed of a polyphony, i.e., different voices, perspectives and artefacts, that constantly interrelate with the social actors in creating a certain culture, which is in ongoing negation.

Although Geertz's (1973) and Hannerz's (1992) discussions on culture and ethnography consider the study of interrelations within a certain setting, they both focus on the human performance and seem not to consider the performative dimension of things, which is fundamental in observing meaningful interrelations between actors, actants, the object, and the issue considered in this research. For example, Geertz studies complex webs within humans' performance but specifies that they are a product of human action. Hannerz examines the polyphony of the cultural network, but artefacts seem passive and with attributed symbolic meaning rather than a certain degree of agency.

ANT and Ethnography
To the theoretical lens of ANT adopted in this research it follows certain methodological demands concerned toward problematising the interrelations between heterogenous entities, e.g., plastics and organisations. Following up from the concept of material semiotic relationships, Law (2004, p. 143) sees methods as performative and enacting certain realities based on the "[…] resonances and patterns of one kind or another, already being enacted, and it [methods] cannot ignore these". Such realities are composed by the performance of the heterogenous entities, that include the researcher and their research agenda. Therefore, if ethnography requires the researcher and research participants to 'be there' within a certain socio-cultural setting and to interrelate for the ethnographic research to happen, ANT explores the various ways of 'being there', i.e., the movements of actors and actants within a certain context, with emphasis on letting the various entities 'speak' to articulate "a sense of the world as an unformed but generative flux of forces and relations that work to produce particular realities" (Law, 2004, pp. 7–8). As mentioned before, the emphasis on the 'unformed'

and 'relations' in the quote implies a certain ongoingness given by diverse entities interrelating within the process of translation.

ANT informs ethnography and helps follow the interrelations between materials (actants) and organisations (actors) as a) it does not assume the nature of the network and, therefore, the performance between plastics and organisations could be observed as it is and without preconceived ideas; b) both human and non-human actors have agency and, thus, the performance of plastics is as relevant as the organisations; and c) ANT "abandon any ontological distinction between natural and social phenomenon" (Corvellec et al., 2020b, p. 267). Through the theoretical lens of ANT, I can make sense of the performance between plastics and organisations through the "enactment of materially and discursively heterogeneous relations that produce and reshuffle all kinds of actors including objects, subjects, human beings, machines, […] organizations […]" (Law, 2009, p. 141). An interesting application of ANT to ethnographic research was made by Czarniawska (1998, 2004, 2007), who designed mobile ethnology, a methodological tool that reframes traditional ethnographic methods, i.e., participant observation and shadowing, according to an ANT point of view. For example, the idea of 'observant participation' was considered as a relevant method that aligns with ethnographic techniqueswhilst recognising the importance of observing the interrelations between heterogenous entities. The term draws upon the traditional ethnographic method of participant observation (e.g., Coffey, 1999; Emerson et al., 2001; Hammersley and Atkinson, 2019), a methodological tool that allows immersive observation of socio-cultural dynamics within the field, and the theoretical lens of ANT, which considers the performance of both human and non-human entities within the research field. Participant observation is considered a core practice within the ethnographic fieldwork (e.g., Coffey, 1999; Hammersley and Atkinson, 2019) and implies "gaining access to and immersing oneself in new social worlds" (Emerson et al., 2001, p. 2). If participant observation acknowledges that researchers' observations are informed by their presence in the field, observant participation is different because the researcher is part of the field, alongside participants and technologies (Czarniawska, 1998, 2004, 2007). Observant participation helps obtain "a rich and detailed record of the observed activity […]" (Czarniawska, 2004, p. 90) inclusive of the various documentation and

verbal activities that might be produced during research within an organisation. Another traditional ethnographic method that Czarniawska (2007, p. 106) informed with an ANT perspective is shadowing. This tool is seen as a technique within observant participation, 'a way of doing research that mirrors the mobility of contemporary life' within an organisation, an 'ethnography on the move'. She looks at shadowing as a helpful methodological tool to follow not only people but also technologies within the field. Shadowing materials and people, in this respect, means following the performance of the various human and non-human participants.

Furthermore, Czarniawska's (1998, 2004, 2007) conceptualisation of observant participation and shadowing addresses the ANT perspective as it considers the role of the researcher within the field (e.g., Callon, 1986; Law, 1994) and technologies within the organising process (e.g., Callon, 1986; Latour, 1987, 1988a, 1991; Law, 2009).

ANT is helpful in observing and tracking the performances between actants, actors, objects, and issues through a process of translation. This perspective is found to be effective for achieving this research's goal and informs the ethnographic approach in designing this study's methodological outlook.

The Research Field

The 'field' is an expression used by ethnographers (e.g., Geertz, 1988; Van Maanen, 1988; Amit, 2000; Atkinson et al., 2001) that relates to the research experience of fieldwork. The ethnographic field presents similar characteristics. For example, Geertz (1988) suggests that ethnography requires 'being there', i.e., in the field, which makes the research situated and dependent on specific socio-cultural characteristics. Similarly, Van Maanen (1988) sees the field as the physical and socially shaped place where ethnographic research takes place. This is socially constructed by the relationships between the researcher and the participants within particular socio-cultural and geographic settings. Amit (2000) considers that the traditional definition of the 'field', in Cultural Anthropology, often converges with the term 'fieldwork' and intensive participant observation (Clifford, 1992). The field is a distant, 'exotic' place (Okely, 1992; Hastrup and Hervik, 1994; Gupta and Ferguson, 1997), where the researcher performs with the research participants through social relationships and learns and observes certain cultural traits. Of a different opinion, Atkinson et al. (2001) consider the notion

of the field as any relevant setting, which does not have to be in a distant or 'exotic' place. The field is simply where the ethnographic research happens, which coincides with where the research participants live and perform with the researcher.

These authors' understanding of the field as relational and performative as well as a given socio-cultural and geographical setting is helpful to start outlining this research field. However, these definitions seem to imply a certain rigidity as the field is seen as socially constructed and determined by geographical boundaries, marginalising the performative aspect of the research experience highlighted by ANT scholars (Callon, 1986; Law, 1994, 2004). Because this research entails following the interrelations between plastics, organisations and CE ideas, the field could not be geographically bounded, as, within this research case, entities moved virtually and travelled through digital and physical sites situated in different geographies, making this a multi-sited research piece. Additionally, this research field could not be considered 'fixed' as ANT recognises that interrelations between entities change and translate, constantly re-enacting the setting by mobilising new actors and actants, which also transforms the setting (e.g., Law, 2003b, 2004, 2009). The field, like the ethnographic research, is ongoing and translates within the relationships between participants, materials and the researcher. These relations are complex, and Law (2004) argues that ethnography lets us see the 'messiness' of interrelations, practices and interrelations between actors and actants that participate in the research. Furthermore, the field could not be seen as enacted by human performance alone, as plastic waste demonstrated a certain degree of agency (Liboiron, 2016) and a social dimension (Douglas, 1966; Thompson, 1979, 1998; Gille and Lepawsky, 2021). Therefore, there is the need to consider an approach that looks at single-use plastics as performative actants – which ANT (e.g., Callon, 1986; Latour ,1988a, 1991; Law, 1994, 2004) provides. For example, Callon (1986) discusses field research as enacted by the interrelations between objects, animals, humans and their interests, the researchers and their agendas, whilst Law (1994, 2004) considers the field as enacted by the researcher's agenda and the material semiotic relationships (Law, 2009) between the relevant actors and actants.

The field of this research is that space where relevant material semiotic relationships to the researcher's agenda happen. The global, member-based, business-driven

organisation IASB was identified as the organisation to track the movements of single-use plastics (actants), organisations (actors), CE ideas (the object) and understandings of the plastic crisis (the issue).

The next section explores the journey behind planning this research and outlines the methodological approach.

Research planning and methodological approach

Field research was planned for a period of six months and designed as an ethnography informed by ANT. The methods chosen to conduct this research were designed before entering the field. Techniques included fieldwork, observant participation, semi-structured interviews, document analysis and fieldnotes. These proved useful for the researcher while being in the field. Being in the field is immersive as the researcher not only observes but also participates in the research process together with participants (Van Maanen, 1988; Atkinson et al., 2001; O'Reilly, 2012) and things (Callon, 1986; Law, 1994, 2004).

Access to the research field required a process of negotiations (Blaxter et al., 2006) that that lasted 12 months and was carried on during the field research to maintain and gain a higher level of access within the IASB. Negotiations included the IASB's definitive approval of the research plan, which stipulated the researcher's involvement as an unpaid intern within this organisation's CE initiative, ethics approval from Lancaster University, and the signing up of a Non-Disclosure Agreement (NDA) between Lancaster University, the researcher, and the IASB. Obtaining the role of the intern at the IASB meant conducting fieldwork while wearing two 'hats', i.e., 'the intern', employee at the IASB, and 'the researcher', the doctorate researcher.

Methodological approach

In terms of the methodology, this research approach included traditional ethnographic fieldwork methods (Geertz, 1988; Van Maanen, 1988; Hannerz ,1992; Atkinson et al., 2001; Hammersley and Atkinson, 2019) informed by the theoretical lens of ANT (Callon, 1986; Latour, 1988a, 1991; Law, 1994, 2003c, 2004, 2009; Law, et al. 2010).

Fieldwork (Geertz, 1988, 1992; Van Maanen, 1988; Coffey, 1999; Atkinson et al., 2001; Faubion, 2001; Hammersley and Atkinson, 2019) is the ethnographic process of

collecting data within the field. It is an immersive experience based on "establishing and building of relationships with significant others in the field" (Coffey, 1999, p. 56). Paying attention to the significance of relationships during fieldwork, it is relevant to notice how ANT proposes a fieldwork-based approach (Jóhannesson, 2005, cited in Beard et al., 2016) "with its emphasis on detailed examination and description of relationships between actors [...]" (Beard et al., 2016, p. 98). Looking at the performance of people and technologies (i.e., single-use plastics), an ANT perspective considers relationships among people and things, e.g., Callon's (1998) and Latour's (1991) fieldworks included relationships between humans and, respectively, scallops and hotel keys. When researching a heterogenous set of entities, i.e., single-use plastics, CE ideas, organisations and their interests and people with different roles within those organisations, it is important to consider methods that align with the ethnographic perspective but also consider the ANT 'messiness' of interrelations (Law, 2004).

Fieldnotes (Van Maanen, 1988; Sanjek, 1990; Coffey, 1999; Emerson et al., 2001) were considered as they represent a significant method to report what was observed during the observant participation, interviews, and informal conversation and whilst reading documents. Emerson et al. (2001, p. 1) see fieldnotes as a "written accounts and descriptions that bring versions of [...] [the researched] worlds to others", whilst Coffey (1999, pp. 119, 121) considers fieldnotes as a description of "places, and people and events [...]" and useful to "provide a structure and a purpose to day-to-day field experiences". Fieldnotes are also a written space where the researcher can privately note down personal thoughts and experiences that, although pertinent to fieldwork, belong to a different, more private sphere that still helps to make sense of the ethnographic research experience, e.g., by annotating anxieties and controversies that might emerge (Van Maanen, 1988; Coffey, 1999).

Document analysis was considered as a significant methodological technique to gather relevant data related to the possible everyday work in office as 'the intern'. According to Bowen (2009, p. 27), "Document analysis is a systematic procedure for reviewing or evaluating documents - both printed and electronic (computer-based and Internet-transmitted) material". Documents contain words and images and, like interviews scripts and fieldnotes, require interpretation according to the researcher's agenda.

Ethnographic interviewing (Sherman Heyl, 2001; Hammersley and Atkinson, 2019) was also considered to reach out to relevant research participants. This is a process of co-production, as the information and the sense given is seen as co-constructed by the participant (the interviewee) and researcher (interviewer). Sherman Heyl (2001, p. 1) sees ethnographic interviews as a way for the researcher and the participants to have a "genuine exchange of views" and explore and make sense of the "events in their worlds". The duration of the research, frequency of contact, and quality of the relationship between the researcher and interviewees differentiate ethnographic interviews from other forms (Ibid.). Hence, through this technique, the researcher attempts to know what the participants know in the way they know it (Spradley, 1979, p. 5 in Sherman Heyl, 2001, p. 1).

Considering the ethnographic approach informed by the ANT perspective described so far, the next section clarifies the research methodology of this study as the 'ANT ethnography'.

The ANT ethnography

As the eclectic theoretical framework was developed to navigate the complexity of this research, the methodological toolkit developed in this chapter reflects the need of the researcher to make sense of the 'empirical mess' (Law, 2003c). That is constituted by the raw data and the beginning of the data analysis, without losing their 'actor–network state of mind' (Latour, 1987), methodological symmetry (Law, 2004). To do so, Law et al. (2010, p. 2) suggest considering methods as social because they are "shaped by the social world in which they are located" and "they in turn help to shape that social world". Drawing on the idea of a 'messy approach' in social science research (Law, 2004, p. 13), Law defines a 'method assemblage' as a set of

> […] practices that can cope with a hinterland of pre-existing social and material realities […] have to be built up and sustained. I call the enactment of this hinterland and its bundle of ramifying relations a 'method assemblage'.

This study aimed at observing the relationships between materials (single-use plastics), organisations, ideas (CE agendas) and a certain enactment of an issue (the plastic crisis) within the process of organising a CE for disciplined single-use plastics. Drawing upon

Law's method assemblage idea, certain methods were identified as more 'fitting' (Law, 2003c; Law et al., 2010) in relation to the research's goal. To follow the relevant interrelations between significant participants (actors and actants), a methodological and analytical toolkit was developed: the ANT ethnography. This toolkit included elements of ethnography, i.e., observant participation and shadowing, fieldnotes, semi-structured interviews and informal conversation and document analysis, and a material semiotic approach within the ANT perspective, i.e., 'methodological symmetry' (Law, 2004).

The aforementioned ethnographic methods helped in collecting data regarding the interrelations of relevant entities, objects and issues, leading the methodological journey toward enlightening the process of translation of the concepts of discipline and undiscipline. At the same time, because methods help shape the 'social world' under study (Ibid.), the selected techniques contributed to enacting the research.

The ANT ethnography showed how the theoretical lens of ANT lends itself to traditional and revisited ethnographic methods (e.g., inspired by Czarniawska's mobile ethnology - 1998, 2004, 2007). Therefore, this approach was able to capture the complexity of the interrelations between organisations and technologies (where technologies demonstrated agency and a performative dimension). Hence, it is possible to state that my theoretical, analytical and methodological position is that of an ANT ethnographer.

Data analysis plan
In line with the ANT ethnography, the data analysis plan envisioned tracking the process of translation toward the stabilisation of the observed actor–network (Callon, 1986; Law, 2003b; Latour, 1987). This was to avoid "[…] imposing a pre-established grid of analysis upon and considered the actors in order to identify the manner in which these define and associate the different elements by which they build and explain their world […]" (Callon, 1986, p. 201). Law (2004, p. 102) defines this approach as "methodological symmetry" and specifies that "What there is and how it is divided up should not be assumed beforehand. Instead, it arises in the course of interactions between different actors". Drawing upon Law's and Callon's methodological symmetry, data were analysed by avoiding assumptions and let the relevant interrelations between heterogenous

entities emerge from the data. This approach could be defined as an actor–network state of mind (Latour, 1987).

Data analysis was planned to occur manually and be divided into two steps. Step one was about the consolidation of the data collected and identify codes that would help track the material semiotic relationships between relevant entities and interrelations, i.e., plastics and organisations and the invoked CE ideas. To identify and follow the relevant material semiotic relationships between single-use plastics, organisations and the CE ideas invoked within the vast array of the collected data, I tried to "[…] remain as undecided as possible on which elements will be tied together, on when they will start to have a common fate, on which interests will eventually win over which" (Latour, 1987, p. 175). The research question 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?' would have guided this first step of the analysis. Appendix III illustrates samples of coding within the data analysis process. This was envisioned as nonlinear, with the two stages overlapping and intertwining, according to the ANT ethnography approach adopted.

Step two focused on how codes enacted 'coherent stories' (Law, 2004) that helped observe the material semiotic relationships identified in step one. These show the translation of the concept of disciplined (plastics and organisations) and CE ideas through the organising of a CE for single-use plastics. These stories were defined as 'coherent' because they did not follow the chronological order of the events, as these could overlap during data collection, but order information according to the research agenda logic (Law, 2004). Therefore, they are 'coherent' accounts of a specific research thread and follow the events, entities and interrelations that explain how plastics and organisations get disciplined in a particular context (Callon, 1986; Asdal and Moser, 2012). The coherent stories were intended to show the process of translation that organisations, the invoked CE ideas, and single-use plastics performed within a particular research site. The next paragraph reflects on significant ethical considerations within this research.

Ethical considerations

This research was conducted according to Lancaster University's Research Ethics Code of Practice and data managed according to the University regulations and in agreement with the General Data Protection Regulation and the UK data Protection Act 2018. The research plan and related documentation were approved by the Research Ethics application by the FASS-LUMS Research Ethics Committee. Interviewees were given

Participant Information Sheets and Consent Forms to ensure that they were fully informed about the study and how the data were used and disseminated (Blaxter et al., 2006; Mason, 2018).

Confidentiality and anonymity issues were considered (Murphy and Dingwall, 2001; Mason, 2018; Hammersley and Atkinson, 2019) and addressed throughout the fieldwork, data analysis and writing up period, with the approval of the Research Ethics application and the signing of an NDA between Lancaster University, the researcher, and the organisation where the research would have happened. Within this thesis, names of participants, organisations and relevant documentations are anonymised, and pseudonyms were used throughout the research process. Furthermore, direct quotations do not feature any details that would help identify organisations, participants, or publications (Arksey and Knight, 1999).

Ethical considerations regarding the researcher's position during fieldwork, i.e., 'double hat', as 'the intern' and 'the researcher', highlight the significance of providing clarity to the participants regarding which 'hat' the researcher wears at the time of their interactions. Although I recognise the broader debate concerning the researcher's positionality as part of the 'reflexive turn' within ethnography[10] (e.g., Coffey, 1999; O'Reilly, 2012), this work does not address that debate, due to the word constraints of this thesis and there being insufficient space to develop these reflections adequately.

Other ethical considerations relate to the documentation produced whilst working as an intern at the PPT. This documentation reflected the researcher's agenda and interests within the PPT workflow. Furthermore, this documentation, together with pertinent email conversations, is part of the data collected during fieldwork; most of these correspondences became relevant within the data analysis process and impact on the findings. This ethical issue is not unfamiliar to ethnographic research; fieldnotes, interview notes and other materials written by the ethnographer are commonly considered part of the research (Geertz, 1988; Sanjek, 1990; Coffey, 1999; O'Reilly, 2012).

---

[10] The 'reflexive turn' (e.g., Coffey, 1999; O'Reilly, 2012) in ethnography refers to the acknowledgement that the researcher is part of their study and the need to reflect upon the possible impact on the findings.

Summary

The chapter outlined the methodological framework as in connection with the eclectic theoretical toolkit developed in the previous chapter. It considered significant methodological concepts, focusing on outlining relevant discussions on ethnography (Geertz, 1973, 1988; Van Maanen, 1988; Hannerz, 1992; Atkinson et al., 2001; Hammersley and Atkinson, 2019) and how ANT informed traditional ethnographic methods (Callon, 1986; Latour, 1987, 1988a, 1991; Law, 1994, 1999; 2003a, 2003b, 2008, 2009). I continued with explaining the methodological approach as an ethnography according to an actor–network state of mind (Callon, 1986; Latour, 1987; Law, 2004), the ANT ethnography, and the data analysis approach. Finally, ethical considerations regarding measures to assure anonymity and confidentiality (Arksey and Knight, 1999; Murphy and Dingwall, 2001; Mason, 2018; Hammersley and Atkinson, 2019) were considered.

Chapter 5 – The IASB case

In this chapter on the IASB case, I utilise the ANT ethnography approach (Law, 2003c, 2004; Law et al., 2010) to make sense of the various interrelations within the IASB research field.

I begin by introducing the organisation, outlining the IASB's governance and structure, and continue by presenting the research case and detailing the four stages of negotiating access to the field. Following the methodological journey within the research sites – the IASB, Plastic Packaging Team (PPT), an external event anonymised as the Sustainable Organisations Forum (SOF), the annual Members Update, and Pro Members meetings – significant participants (actors and actants), documents collected during the fieldwork, and data from semi-structured interviews and informal conversations are analysed per site, revealing insights into the IASB case. Fieldnotes, written up at the end of each day, were essential in navigating the complexity of IASB field research and the diverse sites.

I proceed by outlining the data analysis process, which culminates in identifying four 'coherent' stories (Law, 2004) based on the data gathered in the field. These stories form the narrative of the IASB case and are used to highlight relevant interrelations between plastics, organisations, and CE ideas. These material semiotic relationships map the movements of translation towards conceptualising the notions of discipline and undiscipline. The chapter concludes by offering reflections on the limitations on the overall research process.

The International Alliance for Sustainable Business (IASB)

The IASB is a business-driven, not-for-profit, member-based large organisation working around sustainability issues designed in consultation with their members' agendas. At the time of this research, a managing director defined the IASB as:

> […] a group of companies that creates solutions to sustainability to address the challenges they face…climate change, plastic waste etc. […] IASB helps companies to understand how to progress, […] to develop tools and interact […](Interview with Managing director Nadia, p. 1).

The managing director's words stressed how the IASB supported collective action created through consensus, and produced services that promote knowledge/business solutions. Additionally, the extract highlighted the collective action the IASB organised to support their members in solving the challenges they faced and stressed plastic waste as one of these. Solutions to organisational issues were faced together ("[…] a group of companies that creates solutions"), with the IASB leading the way to promote sustainability.

The IASB's vision was to develop a system for the world population to thrive within environmental and social limits by 2050. The IASB's mission was to accelerate the transition to a sustainable world by promoting scalable and replicable business models through collaboration (IASB, 2019). 'We are not here to save the planet', Flavio (Director of the Membership Team) stated, 'but to push businesses to do so. Our language and actions are business-like and having business mentality is the key [for our job]. Ideally, the pursuing of sustainability would make businesses more successful' (Fieldwork Diary 2019, p, 117).

The IASB had a total of five offices: two offices in Europe, one of which the headquarters, one in North America, and two in Asia. Most of this research was conducted at the headquarters, which had around 70 employees, accounting for about 70% of the total number of employees at the IASB. The IASB managed member relationships and stayed informed about regional policies and events related to their members' operations and organisation's mission of promoting sustainability in businesses through its regional office.

The IASB had a hierarchical pyramid-like structure with the Executive Committee at the top. The Committee counted diverse IASB members' CEOs, Chiefs and Presidents involved within the decision-making process. Next came the Senior Leadership, formed by the IASB's CEO and vice presidents and chiefs. The hierarchical structure continued with the IASB's Program and Cross-Program Directors, Team Directors, Managers, Associates and Interns in order. The graph below shows the IASB's structure.

Figure 6 - The IASB's organisational structure

The decision-making process was overseen by the IASB CEO and Executive Committee. This Committee was given the responsibility for supervising the IASB strategy and allocating resources to new projects and programs on the recommendation of the CEO. For a new project or program to be mobilised, a certain number of IASB members needed to demonstrate support (IASB, 2019).

With hundreds of partners and members, almost half of the IASB membership was in Europe, about a quarter in North America and Asia, respectively, and the remaining members, partners and networks were based in South America, Africa, the Middle East, and Oceania.

IASB members came from 22 diverse business sectors, as the figure below shows:
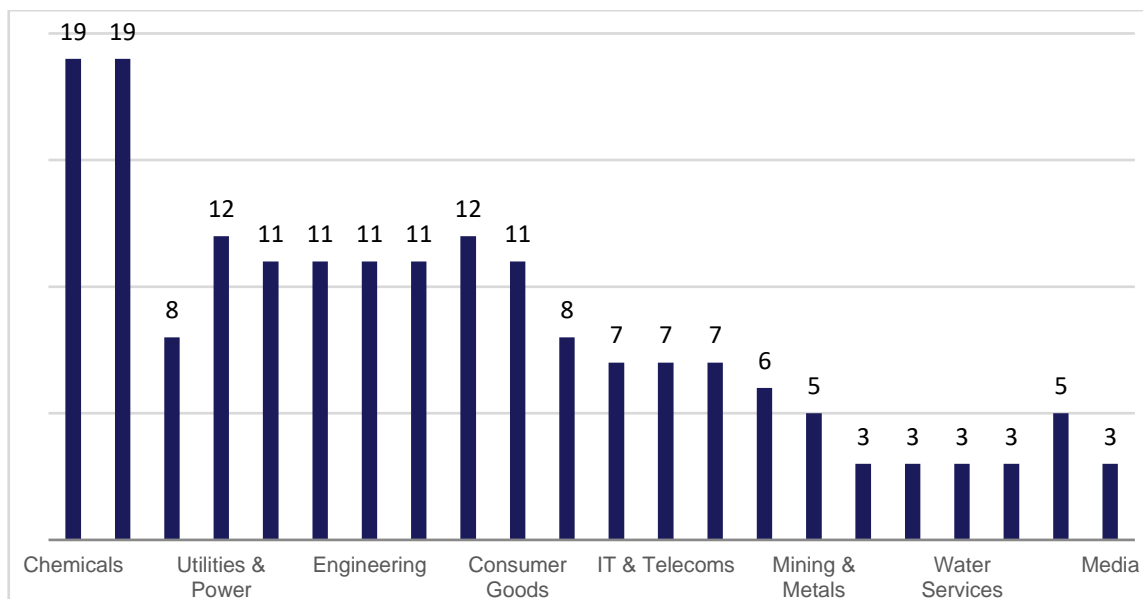
Figure 7 -   Membership overview by sector

Most of them were part of the Chemicals, Food and Beverages and Agriculture sectors, followed by Utility and Consulting sectors.

Members could access different levels of support depending on their membership type, i.e., Basic, Medium and Pro membership. Whilst SMEs could usually afford the Basic and Medium Membership, founder organisations and large (in revenue) corporations were usually Pro Members. Pro Members were included in the IASB Executive Committee and were involved in the decision-making process regarding the IASB's vision and future initiatives. Relationships with members were managed by the Membership Team distributed between the IASB headquarters in Europe and the North America and Asia offices.

Other than members, there were further organisations associated with the IASB, e.g., they were involved in projects, various initiatives and some of the events organised by the IASB. The first type were regional partners and constituted a large portion of the IASB membership network and were managed by the Partner Team. Partner organisations and networks paid a smaller fee than the one required for becoming a member and connected to the IASB by demonstrating alternative value added to this organisation's operations. For example, they represented a business cluster formed by hundreds of SMEs or policymaking bodies within a specific geographical region. The

second type were defined by the IASB as 'prospect' members, i.e., organisations that wanted to become a member and were at any of the three stages within the membership pipeline. The membership pipeline included three stages. The first one involved conversation regarding mutual benefits; the second stage was about deciding the type of adequate membership and initiatives the prospect members was interested in; the third one was signing up the membership contract and being ready to collaborate with an IASB-specific program and project(s). Twice a year, the IASB organised international meetings, the Annual Members Update Meeting and the Pro Members Meeting. The Members Update Meeting was held in the same European city every year and represented working meetings to discuss and share progress. All types of members attended this event. Differently, the Pro Members' meeting location changed every year, and the event focused on strategy setting. Participants attended only under invitation and there were no plenary sessions – attendees participated in specific thematic streams relevant to their sectors.

The IASB organised their support to their various members and partners through nine Programs and four Cross-Programs teams. Programs included Consumer Behaviour, Development, Finance, Agriculture, Forests, Energy, Construction, Mobility, and CE. Cross-Programs Teams included Human Resources, Partners, International Events and Membership. Programs operated through the four regional offices and established teams comprised of employees from the five offices. Therefore, teams gathered individuals from different nationalities, ethnic groups and religious beliefs. Each Program ran a certain number of projects involving IASB members working in the respective business sectors, e.g., Agriculture, Construction, etc. Sometimes, projects involved the collaboration across different sectors and engaged members from various programs. For example, at the time of this research, Agriculture and the CE Programs ran a joint project focused on reducing food waste by creating a closed-loop system for fresh produce discards.

IASB's CE Program
Although the IASB covered a wide range of programs, projects and joint projects, this research specifically focused on the CE Program (CEP) because the CE is a key topic of this research.

During data collection, the CEP team had the goal to design and update the IASB's CE agenda. The IASB's CE agenda represented a response to help the diversity of members from various business sectors transition toward circular business models. It was the responsibility of the CEP to manage members' requests regarding CE issues and topics, as well as examples promoting members successful CE practices. The CEP enacted the IASB's vision on circularity by publicising the publication 'Organisation Guide to Circularity'.

After the release of the Guide publication, IASB Executive Management tasked the CEP to design and scope several projects targeting the most relevant issues related to the CE. These projects included:

- Global Trade Materials – focusing on the issue related to how businesses use and dispose of resource materials;

- E-waste – targeting operational problems within the automotive and electronic sectors disposal habits;

- Plastics – examining issues related to the plastic crisis and how businesses could stop that.

In 2019, IASB Executive Management established the Plastic and Packaging Team (PPT), under the CEP umbrella, to target plastic-related challenges in their members' operations.

5.1.2 Research sites

With their complex organisation sustainability focus, the IASB represented the perfect research field for the following reasons:

- Their mission and vision focused on sustainability in business, addressing CE ideas as one of the responses to issues related to sustainability with the CEP;

- They recognised that plastic waste represented an issue for their members' operations;

- They had a diverse membership that included companies working in the plastic sector and dealing with single-use plastics;

- The organisation was complex, being member-based and including Pro Members within their decision-making strategy.

By observing IASB operations involving single-use plastics and plastic business, I was able to track the movements of these technologies, organisations, and the CE ideas invoked as responses to tackle the plastic crisis.

Being a multi-sited organisation and interacting with various external enterprises, my research took place at several sites:

- Annual Members Update Meeting and Pro Members Meeting organised by the IASB for their members and partners. These events mobilised different representatives of the IASB's membership and partnership and represented relevant sites to understand interrelations between organisational actors, which CE ideas were invoked and materials (among which, single-use plastics) were mobilised.

- 'External' sites (i.e., not part of IASB initiatives) significant to follow the IASB's interrelations with plastic business, single-use plastics, responses to the plastic crisis, i.e., the CE and understandings of the plastic crisis.

- The IASB's main headquarters, where the senior leadership and most of the staff were located, frameworks developed, and projects carried out.

- Virtual sites, e.g., websites, publicly available content, and internal documents in which it was possible to follow the digital relationships between technologies (plastics), relevant organisational actors and ideas.

The IASB case

Fieldwork started in Spring 2019, at the Annual Members Update meeting, and concluded in the Autumn of the same year, at the Annual Pro Members meeting, for a total of 26 weeks of field research. During this time, I collected a total of 49 interviews and informal conversations, for a total of 37 informants representing 20 organisations, and 362 documents between emails, reports, PowerPoint presentations, excel documents, pdf documents related to CEP, IASB internal meetings (e.g., IASB all staff meetings) and the PPT internal working documents. During events, such as the Members Update and Pro Members meetings, I gathered printed materials, e.g., flyers, leaflets

and the event schedule. I wrote 600 pages of fieldnotes, inclusive of photographs, photos of handwritten office notes (produced in the capacity of 'Marta the Intern'). Handwritten office notes were collected in five notebooks.

The research was guided by the Lancaster University research ethics standards, and all data were anonymised to preserve confidentiality and commercial sensitivity.

The following paragraphs outline the development of the research proposal and the process of negotiating access, which is split into four stages.

First Stage. The initial research proposal
First, it was relevant to consider the research field and if the organisation of choice – the IASB – represented an accessible research field (Blaxter et al., 2006; Mason, 2018). Through the synergies created within an academic cross-disciplinary initiative at Lancaster University, which supported research in diverse fields of sustainability across different business sectors, it was possible to negotiate access with the IASB. Hence, contact with a relevant participant employed within the IASB, the CEP's Director, Berry, was secured. A research proposal that presented relevant topics to the CEP and IASB was submitted to Berry. Including elements that addressed the CEP team's attempts to design a CE for single-use plastics followed Blaxter et al.'s (2006, p. 14) discussion regarding the significance for the researcher to "[…] understand the perspectives and motivations of those who facilitate […] access".

The initial research proposal included an ethnographic analysis of one of the Program's initiatives focusing on plastics, the 'Secondary Plastic Demand-Supply Coalition' project that fed into the 'Plastics' workstream and project that the CEP worked on as part of the IASB mission to support their members. This investigation was envisaged to be about understanding how heterogeneous plastic waste could be used as resource capabilities and how world-leading companies in plastics manufacturing and recycling were mobilised. The main aim was to investigate how IASB members working with plastic re-designed their production process while trying to avoid leakages into the environment and analyse the following:

- How members engaged in collaborative teams;

- How the demand for secondary plastics was created;

- How the reduction in plastic post-products was considered;

- How a relevant IASB project contributed to the transition of the current plastics value chain toward a more circular model.

Initial research questions included the following:

- How do members re-design their production process considering: (a) the use of secondary plastics; (b) the reduction in plastic post-products; and (c) the aim to avoid leakages into the environment?

- How does a relevant CEP project contribute to the transition of the current plastics value chain toward a more circular model?

This proposed research required collaboration with the CEP team whilst working on the Secondary Plastic Project for up to nine months. The plan was to observe discussions and attend office and members' meetings. In this respect, data collection techniques from the ANT hemisphere, i.e., Czarniawska's (1998, 2004, 2007) observant participation and shadowing, were considered.

Having access to the project documents and the workflow at various stages was also considered fundamental. Document analysis (emails, reports, documents pertinent to the project workflow) was seen as helpful during fieldwork. By interpreting the documents accessed and produced through my position at the IASB, relevant data were extracted, useful to follow the significant material semiotic relationships between single-use plastics, CE ideas (e.g., the EMF's and IASB's circularity agendas) and member organisations.

In addition, scheduled interviews with key decision-makers such as project managers, consultants, the CEP director and employees, and key members were also planned. Semi-structured interviews were designed according to the ethnographic approach to catch participants' accounts. Semi-structured interviews were designed to leave space for participants to explain their ideas whilst specific themes were prepared to guide the discussion toward the research topics. The interviewees' answers were planned to make sense of the interview experience overall, which would have included silences, tones and body language. Socio-demographic information related to the gender interviewees identified was documented to reaffirm the diversity of data collected and produce an

enriched understanding. The interview guideline is provided in Appendix II. Informal conversations were considered a plausible way to collect data more informally.

Gatekeepers (Blaxter et al., 2006; Mason, 2018; Hammersley and Atkinson, 2019), i.e., those participants who help the researcher gain various levels of access within the field, were provisionally identified as Berry, the CEP Director, as he could ensure a certain degree of cooperation from himself, as the director, and the rest of the team.

Despite the research proposal going through transformations according to the process of negotiating access, the data collection techniques remained as described above.

Second Stage. The researcher position and assurances of confidentiality and anonymity

After preliminary approval of the research proposal, more access issues needed to be considered (Blaxter et al., 2006) regarding the role of the researcher within the IASB. Further consultations with the CEP Director Berry took place, focusing on the role the researcher could cover within the IASB, and how to assure anonymity and confidentiality during the research process (Murphy and Dingwall, 2001; Mason, 2018; Hammersley and Atkinson, 2019). Firstly, an agreement was reached regarding the researcher covering the role of an unpaid intern at the IASB. This assured a consistent level of access for the research to happen; additionally, the IASB temporarily acquired a new employee and was provided with a final report featuring the research insights from an organisational and business perspective at the end of the fieldwork. Secondly, an NDA between Lancaster University, the researcher and the IASB was stipulated along with the submission of the research ethics to Lancaster University Ethics Committee that assured anonymity and confidentiality for any data, individual and organisations part of this research.

Third Stage. The final research plan

A third round of negotiations happened when circumstances changed within the IASB and CEP, and the research proposal had to change accordingly. These negotiations focused on the allocation of the researcher as the intern within either the CEP team or the newly set PPT. Because the plastic issue had become so impactful, the IASB Executive Management team decided to relieve the CEP, which was working on three complex and large projects simultaneously, and set up a specific team, still under the CEP umbrella, that worked only with members dealing with plastics, i.e., plastic members. The

'Secondary Plastic Demand-Supply Coalition' project was dismissed, and the work around plastic waste and the IASB's CE agenda was taken up by the PPT, which was composed of James, the Director; Gerry, the manager; and Cody, the associate – all based at the IASB headquarters. During the fieldwork, the team increased to nine employees. Table 3 shows the PPT members in hierarchical order (senior to junior).

Participant name	Title	Office
James	Director	Headquarters
Brian	Director	Asia Office
Nicola	Manager	Headquarters
Gerry	Manager	Headquarters
Ayushi	Manager	Asia Office
Lola	Consultant	Asia Office
Simon	Consultant	Headquarters
Cody	Associate	Headquarters
Marta (myself)	Intern	Headquarters

Table 3 -   The PPT members in hierarchical order (senior to junior)

The PPT worked mostly onto two workstreams, the Plastic Project, based at the headquarters, and the No Plastic Waste Coalition, based at one of the Asia offices. The Plastic Project aimed at supporting plastic members by helping them to solve some of the material issues related to single-use plastic waste. This workstream was the focus of this research. The second workstream, the No Plastic Waste Coalition, involved businesses, NGOs and policymaking organisations beyond the IASB membership. The Coalition's goal was to stop the global generation of plastic waste and find ways to recycle or reuse the plastics that had already leaked into the natural environment.

Within this enterprise, the PPT was a representative of the IASB, which partnered with the Coalition[11] in developing solutions to the global plastic pollution concern.

At one week in the field, I assured access by working as an intern at the PPT. The following six months were spent focusing on the PPT's attempts to organise a CE project for single-use plastics.

Furthermore, there was a need to identify further access issues and new gatekeepers within the PPT. In terms of issues, access was uncertain as the new identified gatekeeper, the PPT Director James, was new at the IASB at that time. This was envisaged as a possible problem as James needed time to get familiar with the IASB vision and structure and found it challenging having a new intern who also was a researcher as part of his newly set up team. This situation led to constantly negotiating access.

Fourth Stage. Constant access negotiations
When starting fieldwork, it became noticeable that gaining access to research at the IASB and the position as the intern at the PPT was only the first step. Constant negotiations to maintain or gaining progressively higher access were needed (Blaxter et al., 2006; Mason, 2018; Hammersley and Atkinson, 2019) and considered in light of the commercial sensitivity attached to the PPT activities. James initially decided to allow me with a low level of access to maintain confidentiality for IASB's members the PPT worked with, until he was more familiar with the IASB vision and members' expectations. The situation improved with the introduction of a new manager at the PPT, Nicola, who became a significant gatekeeper within this research, granting further access to the team's activities as she needed the intern to support her work on designing and scoping the 'Plastic Project'. The Project aimed at helping IASB plastic members tackle the issues brought by the plastic crisis, i.e., loss of reputational capital, as they were portrayed as the 'polluters' (e.g., the Break Free from Plastic movement), and financial losses

---

[11] Although a certain amount of data concerning this second workstream was collected, the Coalition will not feature in this dissertation for reasons related to word limits and the timeframe for submitting this thesis.

depended on, e.g., poor waste management, different infrastructure standards depending on world regions, and organisations' level of commitment to sustainability.

The next paragraphs outline how the ANT ethnography approach was carried out through these research sites and which relevant actors and actants and interrelations between these have emerged through the methods.

5.2.5 Research site A: the IASB's Annual Members Update and Pro Members meetings

These two physical sites marked significant moments within the fieldwork. The Annual Members Update meeting represented the beginning of this research fieldwork and the Pro Members meeting the end. To safeguard the commercial sensitivity of their members' interests, the IASB run both these meetings under the Chatham House Rule[12], and ensured a confidential and pre-competitive space for their members to network.

The Annual Members Update meeting (Spring 2019) presented with the opportunity of networking between IASB employees, members, partners and other organisations and focused on updating members regarding relevant progress in projects and enterprises, as well as launching new initiatives. This event usually featured diverse workshops and meetings with different levels of accessibility. For example, there were plenary sessions with keynote speakers and workshops on themes of interest (e.g., the CE, the automotive market or forestry policies) open to all participants, whilst private meetings were organised to discuss specific issues with a restricted number of interested parties. The IASB designed a specific social media platform that helped members to communicate without relying on more open and less confidential platforms, e.g., Facebook or Twitter. This meeting saw the emergence of single-use plastics' misbehaviour through the challenges posed by the plastic crisis to IASB plastic members. Consequentially, this event marked the official launch of the PPT, which was, at that time, composed by James (the Director), Gerry (a manager) and Cody (the associate). A CEP representative also attended, such as Nadia (the Managing Director) and Berry (the Director). Fieldwork was mostly focused on understanding the dynamics between the

---

[12] Chatham House Rule is used to regulate debates and conversations on controversial or sensitive topics, ensuring anonymity and confidentiality.

PPT, CEP and IASB's senior management with the IASB members. Plastics was an emergent actant, visible through the material semiotic relationships between the PPT, CEP and plastic members attending the meeting. Another actant was the IASB's CE agenda. During this meeting, fieldwork activities included observant participation, collection of relevant documentation (e.g., handouts from the CEP during the meeting) and informal conversations with the CEP and the newly formed PPT.

The Pro Members meeting (Autumn 2019) presented the IASB's reaction to tackling challenges related to single-use plastics within their members, and the solution proposed by the PPT, i.e., the Plastic Project. Pro Members were involved in decision-making processes, and this meeting represented an important opportunity for the IASB's diverse teams to show the value they added to the IASB and their members through the initiatives they carried out to support these organisations. Networking was encouraged through in-person events and direct personal channels (e.g., private email addresses) and there was no use of the IASB social media platform employed in the other annual meeting. During this meeting, it was possible to observe the final translations of the concepts of disciplined and undisciplined plastics and organisations within the IASB case. Fieldwork focused on the interrelations between single-use plastics, the IASB's CE agenda revisited and focused on recycling practices, James and Nicola, the plastic members enrolled within the Project. During this meeting, fieldwork activities included the collection of relevant documentation, observant participation, and informal conversations with the PPT team and CEP representatives (see Appendix IV).

Documents collected were physical handouts related to the sessions attended. These were produced by the ASB's plastic members, CEP, and PPT and were significant to understand the process of translation toward organising a CE for misbehaving plastics. Additionally, such documents showed which actors and actants got mobilised within IASB activities, particularly in relation to the CE initiative to tackle the plastic crisis.

During the Members Update meeting, I had informal conversations with the PPT and CEP representatives, including one with Berry regarding the IASB's CE agenda and the next steps for the CEP toward including more of the IASB's members to join. Fieldnotes

described presentations from Nadia (CEP Managing director) and Berry (CEP Director) during the event panels.

By focusing on the interrelations between the PPT, CEP and IASB's senior management with IASB members, plastics emerged as an actant because challenging IASB and plastic members' activities with their recalcitrant physical characteristics, e.g., difficulty to recycle and a propensity to escape official waste management channels and leak into and accumulate in the natural environment. There were discussions regarding organising a CE initiative around plastics because of the challenges brought by this material to plastic members. To tackle such challenges, another actant emerged, i.e., the IASB's CE agenda, which was invoked by this organisation and most of the plastic members.

During the Pro Members meeting, I could observe interrelations between plastics, organisations attending and presenting at the meeting, James and Nicola, and the revisited the IASB CE agenda according to the PPT's Plastic Project, which was focused on recycling practices. Because I was still part of the PPT (as the intern), at this event, I functioned as notetaker for the PPT for the last time and wrote the report about the PPT session in which the team launched their Project. That report was the last document collected for this research.

Research site B: the IASB headquarters
The IASB research site merged a physical site, i.e., the IASB headquarters, and three digital sites, i.e., the IASB website, the CEP's webpage and significant external organisations, such as the EMF website and publications related to this organisation's CE philosophy. These digital locations presented significant documents for this research, i.e., the Organisations Guide to Circularity, which contained the IASB's CE agenda.

The IASB's main headquarters represented the major physical site where this research was conducted. It was the IASB office where most of the staff and leading executive teams worked at. Main decisions were discussed and carried out at this office situated in a newly built, large building in a European city. The IASB headquarters occupied an entire floor of the building, counting around 70 desks, mostly positioned within the large, open-air space divided into two large halls according to the building architecture.

Only the CEO had a closed office; the rest of the Executive Management Team and Directors had a private desk allocated with their own team. Teams usually sat together, creating 'desks islands' of various sizes, depending on how large a team was. There was then a dedicated desk island for temporary staff, such as interns and the consultants that joined certain teams and projects for a period.

Data collected within the IASB research field constituted observations annotated in the researcher's fieldnote diary, physical and digital documents collected on the IASB's website, relevant external organisations website (i.e., the EMF), semi-structured interview transcripts, and informal conversation notes.

Regarding observant participation at the IASB headquarters, I could participate in the office daily life, which included the PPT weekly meetings, relevant calls with members and partners, staff meetings, lunch and coffee breaks, and various social events involving IASB employees. Situations that represented the major sources of data were staff meetings, PPT weekly meetings, and calls with relevant plastic members to develop the Plastic Project.

Staff meetings happened almost every week and represented a space where all IASB teams had the opportunity to update each other regarding their work; this included projects (in scoping and active) and dissemination activities (i.e., attendance to conferences, international events targeting the team's area of expertise, meetings with governments and significant organisations).

Ten IASB employees (excluding the PPT team, who will be accounted for in the next paragraph) were interviewed (see Appendix IV). The interviews were designed to catch significant information according to the interviewee's role and involvement in initiatives related to the CE, plastics and the IASB's sustainability agenda. Interviews focused on:

- Establishing the interviewee's understanding of a CE, single-use plastics waste and the plastic crisis;

- Seeing whether and how the initiatives the interviewee was mobilised in were connected to the idea to organise a circular initiative/response to tackle the plastic crisis;

- Understanding whether and how the interviewee considered IASB as an influencer in an external network, e.g., circular initiatives/responses to the plastic crisis.

Informal conversations, instead, happened without planning and following a specific set of themes and questions with relevant participants. The three relevant conversations I had with IASB employees at the headquarters were with three interns from the Sustainability Reports team and occurred over breaks, or before/after staff meetings, and focused on the meaning of sustainability within the IASB and the role of the organisation's CE agenda.

From the documentation collected from the IASB website, it was possible to gather significant information about the IASB's structure, mission and vision, programs and teams. This helped gain an understanding of how this organisation organised their activities. The CEP digital site represented an important research field for retrieving documents, i.e., the Organisations Guide to Circularity, which contained the IASB's CE agenda. This publication featured some of the plastic members, i.e., Fly (recycler), Star (retailer), Blue (consumer goods company) and Square (producer–recycler). These four plastic members brought examples of how IASB CE ideas could help transform single-use plastic waste into a sustainable material.

Furthermore, to understand how the IASB enacted their CE agenda, further investigation regarding the EMF's CE philosophy proved to be relevant as the IASB based their agenda on the EMF definition of circularity. This led me to collect digital material from the EMF website and any related report and digital publication to circularity issues pertinent to IASB CE ideas.

For clarity and to help navigate the various documents and their purposes, see Table 4. The table outlines the documents collected, who wrote them, and their significance within this research (i.e., what these contribute to). Significance is determined by these

documents showing a) the IASB's structure, mission and vision; b) which actors are mobilised by the IASB to enact their structure, mission and vision; c) how the IASB's CE agenda is enacted; and d) which actors and actants are mobilised by the IASB to enact their CE agenda.

Document type	Author(s)	Significance	
IASB website (web pages related to mission, vision, governance, and programs)	IASB Executive Management; IASB c-suite management	IASB structure, mission and vision	Actors mobilised to enact the IASB structure, mission and vision
IASB website (web page related to membership)	IASB Executive Management; IASB Membership team	Actors mobilised to enact the IASB structure, mission and vision	
Onboarding material (PowerPoint presentations, my office notes)	IASB Membership team	Actors mobilised to enact the IASB structure, mission and vision	The IASB structure, mission and vision
IASB website (CEP web page)	CEP	How the IASB's CE agenda is enacted	
CEP's Organisation Guide to Circularity		How the IASB's CE agenda is enacted	Actors and actants mobilised by the IASB to enact their CE agenda
EMF's website and CE-related digital publications	EMF team	How the IASB's CE agenda is enacted	Actors and actants mobilised by the IASB to enact their CE agenda

Table 4 -   IASB research site: documents, authors, and the significance of those documents

These documents were fundamental for my research for three reasons. First, documents connected to the IASB's structure, mission, and vision helped illuminate internal organising processes. For example, the material collected confirmed the IASB hierarchy, the collaborative decision-making process mentioned by Nadia, and the 'business with a vision' approach brought up by Flavio. Second, documents related to the enactment

of ISAB's CE agenda had a mapping function as I could follow the CEP process of translation toward enacting a CE agenda for the IASB. Third, they represented a performative source of data that showed how the CEP enrolled and mobilised actors and actants, showing how plastic members and single-use plastics emerged from the IASB's circularity agenda. According to this process of mobilisation (or disenrollment), it was possible to identify relevant material semiotic relationships toward understanding how the concepts of discipline and undiscipline were enacted within the PPT activities.

Research site C: the PPT
Another fundamental research site for this study was the PPT and related activities. This site is composed of a physical site, hosting the PPT activities within the IASB headquarters, and digital sites, i.e., plastic members' websites, sustainability reports and email conversations. Although PPT-related data were considered as part of the IASB site, the PPT site emerged as considerably significant to follow the interrelations between single-use plastics and organisations and CE ideas. Most data concerning the research question 'What are the consequences of organisations attempting to adopt CE to address the plastic crisis?' were collected when working on PPT-related issues; therefore, it became relevant to identify the PPT as a research site distinguished from (although connected to) the IASB one.

Although several IASB employees featured in this data collection, the PPT represented the most significant group of participants for collecting various data regarding the diverse enactments of single-use plastics and organisations, and how these interrelated within the IASB case. Throughout the fieldwork period, the PPT increased in number and reached eight employees, divided between the headquarters and one of the IASB's Asia offices (herein referred to as the 'Asia Office'). Employees at the Asia Office mostly worked on the No Plastic Waste Coalition workstream (which does not feature in this thesis).

Through the intern position, I engaged with the PPT workstream related to designing the Plastic Project and supporting James and Nicola, who became the most relevant gatekeepers within this research.

Data collected within this site represented observations annotated in the fieldnote diary, physical and digital documents collected during the PPT weekly meetings, meetings with James and Nicola, calls with plastic members, documents from the PPT's shared folder, email conversations with plastic members, their websites and sustainability reports, semi-structured interview transcripts, and informal conversation notes.

As the intern, I engaged with the PPT daily life activities (e.g., weekly meetings), especially in relation to James' and Nicola's workflow and the Plastic Project. Weekly PPT meetings, which had the purpose to update team members regarding their activities and progress, became a relevant source of the main participants' perspective about significant organising issues around plastics and the CE. These meetings represented an important field for observing which actants and actors emerged through the process of organising a CE for disobedient plastics.

The eight PPT members were interviewed with the aim of catching significant information according to their roles and involvement in the PPT activities, i.e., the two workstreams – the Plastic Project and the No Plastic Waste Coalition. Like the rest of the IASB employees, the PPT members were asked questions regarding their understanding of the CE, and how they saw single-use plastic waste and the plastic crisis. Another topic related to their view on how the Coalition, or the Plastic Project, was connected to the idea to organise a circular initiative, i.e., a response to tackle the plastic crisis, and how they saw the IASB supporting that.

In terms of informal conversations, these happened with Cody (the PPT associate), James and Nicola before or after the PPT weekly meetings and calls with relevant plastic members, in the relative privacy of the meeting pods in the office. The relevant informal conversation with James regarded the position of the PPT within the IASB, whilst the four significant informal conversations with Nicola focused on how to scope the Plastic Project and sharing information on the significant plastic members. The conversation with Cody, instead, revisited the same theme as the one we had during the Members Update meeting, i.e., the PPT's (representing the IASB) connections with external initiatives on a CE for plastics initiative.

The PPT enrolled several plastic members to scope the Plastic Project, through email conversations, scheduled phone calls, their sustainability reports and contribution to the Organisations Guide to Circularity. I attended these meetings as the notetaker and had the possibility to track single-use plastics performance with members, the CE ideas invoked and conceptualisations of the plastic crisis. Most of them consolidated the IASB's circularity agenda regarding the plastic CE, i.e., recycling practices were preferred.

In total, the PPT enrolled 16 companies from diverse sectors within the plastic value chain and interacted via email and phone calls with 16 representatives. Four of these companies (i.e., Fly, Star, Blue and Square) were enrolled virtually, i.e., James and Nicola considered them for their ideas on the CE and their performance with single-use plastics through the CEP publication 'Organisations Guide to Circularity', and these organisations' sustainability reports, without engaging them in email correspondence or phone calls. Amongst these sixteen members were three recyclers, three producer–recyclers[13], one consultancy agency, four consumer goods companies[14], and five recyclers. For the complete list of plastic members enrolled by the PPT for scoping the Plastic Project, see Appendix V.

Relevant plastic members for this research were Blue, Fly, Square, Star, Walno and Happy. These corporations were all IASB Pro Members except for Walno, which was a Medium Member – not for financial reasons, but to ensure a certain degree of independence within their operations. These companies featured in this research because they: a) contributed to the IASB's CE agenda by presenting their operations related to plastics in the Organisations Guide to Circularity and b) were contacted by the PPT for scoping the Plastic Project.

---

[13] Organisations that operate in both the manufacturing and recycling of materials, e.g., plastics.

[14] Include organisations involved in food processing, packaging, clothing, automotives, and electronics, products intended for consumers' direct use.

Blue was an international consumer goods company dealing in a variety of packaged products, from food and beverages to electronics. They targeted plastic packaging with a series of internal CE initiatives and by joining coalitions to end plastic waste. One of their goals was to phase out any plastic packaging material that could not be reused or recycled, aiming to generating zero plastic waste.

Fly was a European waste collection and recycling company that aimed at reducing waste that went to landfill. Their initiatives promoted CE ideas around correct sorting of waste materials with particular attention paid to single-use plastics. Proper sorting was seen as the best way to promote efficient recycling, i.e., using recycled materials to manufacture goods or to generate energy (thermal recycling).

Square was a global producer–recycler company that focused most of their operations on single-use plastics. They were interested in 'closing the loop' of plastic materials, i.e., using recyclable plastics to manufacture new goods within their facilities. They looked at the CE as a way to create closed material loops and collaborate with global initiatives regarding ending plastic waste.

Star was an international retailing company dealing in packaged fresh products. They focused on internal initiatives to progressively phase out plastic packaging that could not be recycled or reused. They were also part of various global CE initiatives targeting plastic packaging and promoting sustainable packaging.

Walno was an international retailer with a large global partner network focusing on packaged goods, from fresh food to clothing and household essentials. A promoter of several internal sustainability initiatives toward phasing out non-recyclable and non-reusable single-use plastics within their stores, they also participated in global alliances toward ending plastic waste and promoted sustainable practices around plastic packaging.

Happy was a large, international recycling company dealing with several recycling materials but interested in addressing the issues brought by single-use plastics, technologies recognised as difficult to sort properly and recycle. Although not having a specific CE agenda, they were interested in collaborating with the IASB and adopting this organisation's CE agenda to solve their issues with plastics.

Within this research site, a few actants emerged, whose agency became difficult to ignore as they were constantly interrelating with single-use plastics and invoked by James and Nicola while developing the Project. The actants were specific iterations of single-use plastics, the IASB's CE agenda and the EMF's CE philosophy, which the IASB's agenda was inspired by.

The single-use plastics performing with the plastic members and, therefore, the PPT activities, were the materials identified from the IASB's Organisations Guide to Circularity, i.e., the ones that most impacted on the plastic members activities. These were polyethylene terephthalate (PET – used for bottled drinks and water, cooking oil, etc.), recycled PET (rPET – used in similar ways than PET), polypropylene packaging material (PP – used, for example, in margarine tubs and microwaveable meal trays), high-density polyethylene (HDPE – used of milk bottles, bleach, detergents and some shampoo bottles), and polyvinylchloride (PVC – mostly used for making pharma blister packs and cling films). These plastic polymers were commonly used for manufacturing single-use plastic products, among which were diverse types of rigid and flexible plastic packaging. Figure 10 (Cronin et al., 2022, Table 4, p. 30) shows the names of polymers and applications for relevant plastic polymers identified with single-use plastics significant for this research.

ASTM International Resin Identification Coding System (RIC) & name of polymer	Applications	
POLYETHYLENE TEREPHTHALATE (PET) 1 PET	PET is typically used in the manufacture of bottles for many carbonated soft drinks, fruit juices and water. It is popular for packaging salad dressings, cooking oils and honey in squeezable bottles etc.	
HIGH DENSITY POLYETHYLENE (HDPE) 2 HDPE	Thicker, more rigid and more durable than PET, HDPE is used for packaging milk bottles, bleach, detergents, some food storage containers and some shampoo bottles.	
POLYVINYL CHLORIDE (PVC) 3 PVC	PVC is used for a range of food packaging applications, including bottles, clamshell punnets, trays for fresh fruit and some vegetables, blister packaging for medication, and cling film.	
LOW DENSITY POLYETHYLENE (LDPE) 4 LDPE	Given its flexible qualities, LDPE is commonly used in the manufacture of bin liners, carrier bags, frozen food packaging and squeezable bottles.	
POLYPROPYLENE (PP) 5 PP	PP is commonly used in packaging for margarine and butter tubs, yoghurt pots, ready-made microwavable meal trays and first-aid products.	
POLYSTYRENE (PS) 6 PS	PS is used for some food packaging such as egg cartons, yoghurts and disposable meat trays, hot drinks cups and takeaway meals.	

Figure 8 –   Names of polymers and applications for relevant plastic polymers identified with single-use plastics. Cronin et al. 2022, Table 4, p. 30.

Within this research, PET, r-PET, HDPE and PVC were the types of plastic polymers meant when referring to single-use plastics. Because the plastic members mobilised material-focused approaches, e.g., mechanical and chemical recycling, related to transforming

the aforementioned types of plastics into 'circular materials', these approaches emerged as predominant within the Plastic Project.

Finally, it is relevant to acknowledge the importance of the digital sites that composed the PPT research site. These are the PPT shared folder and the email platform, the plastic members' websites and their sustainability report downloadable in pdf format.

Through the shared folder and emails, it was possible to gain access and collect documents related to the development of the Plastic Project. The PPT's shared folder presented the relevant team workstreams in the shape of word documents, spreadsheets, pdf documents, PowerPoints and images. These documents contained significant information regarding the development of the PPT operations, relationships with plastic members and relevant external organisations (i.e., the EMF and related reports and digital publications around their CE philosophy), enactments of single-use plastics, CE ideas and understandings of the plastic crisis. Likewise, emails were relevant for tracking relationships between entities through virtual conversations and calendars (e.g., they showed meetings with members). Through the plastic members' website and their sustainability reports, it was possible to gather certain enactments of disciplined plastics, which CE agendas members invoked them, and their relationships with technologies and other organisations than the PPT and IASB.

Documents collected and related to the PPT activities represented most of the documentation gathered during fieldwork. For clarity and to help navigate the various documents and their purposes, they have been gathered in Table 5, which outlines which documents were gathered, who wrote them, and their significance within this research. Significance is determined by these documents showing a) the process of translation toward organising a CE for misbehaving plastics; b) how the PPT enrols and mobilises actors and actants; and c) which actors and actants get mobilised or disenrolled.

Document type	Author(s)	Significance		
Official and unofficial team reports	Marta	the process of translation toward organising a CE for misbehaving plastics	how the PPT enrols and mobilises actors and actants	which actors and actants get mobilised or disenrolled
Benchmark analyses	Marta with James' and Nicola's supervision	how the PPT enrols and mobilises actors and actants	which actors and actants are enrolled	
Meetings minutes	Marta	the process of translation toward organising a CE for misbehaving plastics	how the PPT enrols and mobilises actors and actants	which actors and actants get mobilised or disenrolled
List of relevant plastic members together with their sustainability reports and CE projects	Collected and commented by Nicola and Marta	how the PPT engages and mobilises actors and actants	which actors and actants are enrolled within the PPT network	
Drafts of the 'Plastic Project'	James and Nicola	the process of translation toward organising a CE for misbehaving plastics	which actors and actants get mobilised or disenrolled	
Email conversations	James, Nicola, and relevant plastic members	the process of translation toward organising a CE for misbehaving plastics	how the PPT enrols and mobilises actors and actants	which actors and actants get mobilised or disenrolled
Plastic members' Sustainability Reports	Relevant plastic members	the process of translation toward organising a CE for misbehaving plastics	how the PPT enrols and mobilises actors and actants	
The EMF's website and circular-economy-related digital publications	EMF team	the process of translation toward organising a CE for misbehaving plastics	how the PPT enrols and mobilises actors and actants	

Table 5 - *PPT research site - documents, authors and significance of those documents*

These documents were fundamental for my research for two reasons. First, they had a mapping function as I could follow the PPT process of translation toward organising a CE for recalcitrant plastics. Second, they represented a performative source of data that showed how the PPT enrolled and mobilised actors and actants and which entities got mobilised or disenrolled. According to this process of mobilisation (or disenrollment), it was possible to identify relevant material semiotic relationships toward understanding how the concepts of discipline and undiscipline were enacted within the PPT activities.

5.2.8 Research site D: the SOF

The SOF represented an important event for understanding the interrelations between organisations, plastics, CE ideas and conceptualisations of the plastic crisis. SOF was a three-day conference, held in the same European city every year and organised by the not-for-profit 'Green Organising'. It gathered diverse actors, such as practitioners, scientists, academia, government representative, NGOs and members from the informal sector to discuss a targeted issue related to sustainability and the natural environment. In 2019, the topics were plastic pollution and the CE. Activities developed to make participants collaborate and think across the wider picture were organised, with the aim to allow diverse sectors and organisations interrelate and evade 'working in silos', i.e., without considering possible collaborations and interactions with diverse enterprises active around the same topic. In an attempt to boost collaboration and problem-solving discussions, most of the Forum activities focused on organising solutions to the plastic crisis within simulated real-world scenarios.

Data collected on this research site related to observations annotated in the researcher's fieldnote diary, notes related to shadowing (Czarniawska, 2007) James, notes about relevant informal conversations, physical documents collected during the conference (e.g., handouts and activities material) and digital documents collected on the Green Organising's website.

Shadowing James meant following him, the CE ideas he invoked and the single-use plastics he performed with through participating in the same activities during SOF. Having a role as the notetaker (to write a report for the PPT about SOF) helped as I could observe James as part of my job. Furthermore, informal conversations happened around

topics of plastic pollution and circularity with relevant international attendees from academia, policy, business, NGOs and the informal sector (i.e., waste pickers).

A particular activity, the Roundtable Exercise, proved to be relevant for observing interrelations between James as the representative of the IASB, organisations attending the Forum, plastics, CE ideas and understandings of the plastic crisis.

SOF took place before the COVID-19 pandemic, and this exercise was run in one large room, hosting five roundtables that gathered up to ten people each. Approximately 45 people participated in this exercise, which happened in parallel with other activities scheduled on that day. This task lasted a couple of hours and aimed at developing strategies to make single-use plastics 'circular'.

Each table had a different, simulated real-life scenario designed by Green Organising. Because roundtables were composed of diverse actors with different agendas, the aim was to boost discussions toward finding common solutions to the plastic crisis. James participated in the group whose scenario was "a developing island country that relies on international aids, aquaculture, and tourism" (Fieldnotes diary, 2019, SOF, p. 39). See Table 6 for actors attending the Roundtable Exercise.

Attendee organisation name	Number of representatives
Waste Pickers Association	1
Environmental NGO 1	1
Policymaker	1
Environmental NGO 2	1
Recycling company 1 (RC 1)	1
Recycling company 2 (RC 2)	1
IASB/PPT	2
Plastic Producer company 1 − 2 − 3	3

Table 6 -   Roundtable Exercise attendees

The attendees at the Roundtable Exercise invoked specific ideas of the CE and interacted with the same types of single-use plastics as the PPT. Circularity ideas referred to the EMF's CE philosophy, the IASB's CE agenda (which only James invoked) and Break Free From Plastic's no-plastic agenda, which saw single-use plastics as pollutants and any chance for sustainability coming from banning any type of plastics. These ideas and types of single-use plastics represented significant actants within this site.

Informal conversations devolved around understandings of the plastic crisis, CE ideas and single-use plastic waste. These happened mostly during refreshments, dinners and walking from one venue to another.

The next paragraph explains how the collected data were analysed and considered the interrelations of materials and organisations within the IASB case.

Data analysis process

Once returned from the field, I found myself in front of a larger amount of digital (e.g., email conversations, reports and other documentation) and hand-written data (e.g., office notes) than I originally anticipated. No translation was necessary, as the research was conducted in English; the recorded semi-structured interviews were transcribed in word documents and hand-written fieldnotes as well as hard copies (e.g., flyers given during the SOF and IASB annual meetings) were digitalised in word documents and JPEGs. Data were collated and organised in chronological order, in folders and sub-folders accessible only to the researcher. See Appendix for an illustrative sample of data collation and analysis.

The data collected through this ANT ethnography gathered the interrelations between single-use plastics (actants), the IASB, the PPT, plastic members and SOF organisations (actors), the invoked CE ideas (object), and understandings of the plastic crisis (issue). Following up on the methodological framework adopted and mirroring the ANT element in it, the main goal of the data analysis was to map the material semiotic relationships that showed the enactment of discipline and undiscipline within the IASB case. Thus, the complex social and material dynamics that enacted the IASB as a research case led to it being considered as an actor–network. Actor–networks are a set of interrelations in which both human and non-human actors have agency in organising the social world

(Law and Callon, 1982; Law, 1994, 2009; Latour, 1987, 1988a, 1988b, 1991); moreover, single-use plastics, CE ideas and circular approaches (actants) perform with organisations (actors) toward enacting a CE for disciplined plastics.

To ease the analysis and clarify relevant interrelations, significant 'coherent' stories (Law, 2004) were outlined and used as analytical tools. As Law (1994, p. 43) mentions, an ethnography is a matter of ordering, "and the ordering involves interacting before, during and after the process of fieldwork". Therefore, these stories represented relevant moments of translation of the concepts of discipline and undiscipline and captured significant material semiotic relationships within the IASB actor–network.

After data collation, the data analysis process was developed in two steps.

Step One

Step one was about coding. The research question 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?' guided this first step of the analysis. The data collected, although ordered chronologically in folders and sub-folders, showed a certain lack of linearity and various degrees of 'messiness'. Drawing upon Law's (2003c, 2004; Law et al., 2010) idea of 'mess in the methods', I considered the lack of linearity within the data as a benefit; this allowed a certain freedom of movement across the four research sites and the content of fieldnotes, documents, semi-structured interviews, and informal conversations. Three codes were identified by tracking the associations and performances of relevant entities: 'CE ideas', 'moral positions', and 'material'.

- The 'CE ideas' code included all the interrelations between plastics, organisations and CE ideas. This code helped highlight the significant CE notions within this research and identify the relevant actors and actants performing such ideas.

- The 'moral positions' code was about mapping the movements of undisciplined ('bad', 'out of place' – Douglas, 1966) and disciplined ('good', 'in place') single-use plastics and actors interacting with these materials. From the collected documents, interviews and fieldnotes, it was possible to identify and track a specific chain of interrelations that enacted materials and organisations as undisciplined and disciplined.

- The 'material' code considered the relevant types of single-use plastics and how plastic members and the PPT interacted with these. This code overlapped with the other two codes toward identifying the most considered undisciplined and disciplined types of plastics within the IASB case.

These codes highlighted the process of translation of the concepts of discipline and undiscipline through detecting the significant entities enrolled and mobilised within specific research sites. Relevant actors (organisations) and actants (materials and ideas) and the reason for these to become significant were identified within the four research sites – with research site A (the annual meetings) charactering the beginning and end of this research fieldwork and highlighting significant enactments of single-use plastics, i.e., how these technologies were perceived when the PPT started (the Members Update meeting) and according to the team's Plastic Project (the Pro Members meeting). Research sites B (IASB headquarters), C (the PPT) and D (the SOF) became relevant by enlightening the relevant material semiotic relationships between significant actors and actants – dynamics that featured in topical moments of translation as described in the four 'coherent' stories (Law, 2004) in step two. The annual meetings site proved helpful for setting the scene of the IASB case but did not feature in the four stories.

Step Two
To illustrate the material semiotic relationships performed by the actors and actants identified in step one, four 'coherent stories' (Law, 2004) were found. These showed relevant moments of translation (Callon, 1986; Latour, 1987; Law, 2003b) in organising a CE for disciplined plastics within the IASB case, i.e., they showed the transformations in the enactment of disciplined single-use plastics, organisations, and the CE ideas invoked.

Story one, the 'IASB's CE agenda' story, looked at the materials semiotics within the IASB headquarters research site and the enactment of the IASB's CE agenda. This story was identified by following the interrelations between the IASB's senior management represented by Nadia (herein simply referred to as the IASB), single-use plastics (i.e., PET, r-PET, HDPE and PVC – herein referred to as 'single-use plastics'), the CEP represented by Berry, the EMF's CE ideas and certain members (i.e., Fly, Star, Blue and

Square). These material semiotic relationships performed the first significant moment of translation within the IASB case, i.e., the enactment of the IASB's CE agenda. Such an agenda is physically represented by the 'Organisations Guide to Circularity' publication.

Story two, the 'SOF' story, highlighted the interrelations between the IASB/PPT represented by James (herein simply referred to as the IASB/PPT), single-use plastics and the various organisations attending the Forum, and that participated in the 'Roundtable Exercise' group activity. This story was enacted by mapping the interrelations between the IASB/PPT, single-use plastics and relevant organisations (recyclers, manufacturers, retailers, NGOs, policymakers, academia, waste pickers association) at the SOF. This moment of translation outlined how the IASB's CE agenda interrelated with other CE ideas performing within the international sustainability business landscape, represented by the organisations attending the Forum. It also showed how diverse CE ideas invoked diverse concepts of discipline and undiscipline.

Story three, the 'Plastic Project' story, considered the material semiotic relationships within the PPT research site. It followed James' and Nicola's performances in designing and scoping an IASB CE plastic project, i.e., the Plastic Project. It included interrelations between the PPT, the IASB's CE agenda, single-use plastics, plastic members, and their interests within organising a CE for single-use plastics. This story was a fundamental moment of translation that showed how the IASB's CE agenda was translated within the PPT actor–network and how that informed the enactment of disciplined and undisciplined plastics and organisations.

Story four, the 'Walno story', looked at the PPT's attempt to mobilise a large retail organisation, Walno, within the Plastic Project and enveloped within the PPT research site. It outlined the interrelations between the PPT, IASB, single-use plastics, Walno and these actors' CE agendas. This is the final moment of translation and showed the last iterations of disciplined plastics, disciplined organisations, and the CE agenda within the PPT actor–network. This story ended with Walno getting disenrolled from the Plastic Project due to it mobilising a different idea of disciplined plastics (and, therefore, organisations) and circularity than the PPT.

These four stories show meaningful interrelations within the IASB, PPT and SOF research fields, following the material semiotic relationships across these sites and standing as dynamic frames of the IASB actor–network process of stabilisation toward organising a CE for disciplined plastics. They will feature in Chapters 6, 7, and 8 as analytical tools for discussing research findings.

The next section explains this research's limitations.

Limitations

Limitations to this research relate to methodological considerations, in terms of the type of data collected and the impact of the research agenda and fieldwork's length (shorter than traditional ethnographic studies) on the findings.

First, following the interrelation between single-use plastics and organisations was dependent on the IASB and their members' interests. Despite the large amount of data regarding CE ideas collected, this referred to this research participants' circular agendas that address specific interests within the organising of the Plastic Project. Data related to different agendas have not been pursued, enacting this research and its findings according to the IASB, its members and single-use plastics performance. However, it is worth mentioning that this was in line with the theoretical lens of ANT within this ANT ethnography, which considered following the interrelations between relevant actors and actants within a certain reality (e.g., Callon, 1986; Latour, 1988b; Law, 1994, 2009).

Following up from the previous point, relevant actors and actants and a significant interrelation between participants were in line with the research agenda (Callon, 1986; Latour 1987; Law, 2004). Specific interrelations were chosen in following the translation of the concepts of discipline and undiscipline. As Bloomfield and Vurdubakis (1999) discuss, potentially infinitive actors and networks could be included in a research piece. However, time and word limits of this thesis led me to make an analytical choice that directed me toward deciding which actors and actants to follow to answer the research question: 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?'.

Next, the fieldwork was conducted over a six-month period, which is shorter than the time typically considered for traditional ethnographic research (Geertz, 1988, 1992; Van Maanen, 1988; Atkinson et al., 2001; Faubion, 2001; Hammersley and Atkinson, 2019). Although the time spent at the IASB was enough to collect relevant data that addressed the research questions, staying longer could have helped follow significant material semiotic relationships further. However, it was not possible for me to spend more than six months in the field because of the PhD process and time constrains due to my doctoral scholarship.

Finally, this research presents possible limitations because of my dual role as the 'PPT intern' and the 'doctorate researcher'. My position within the IASB, i.e., my 'double hat', led to some complexities while doing fieldwork, such as constantly negotiating access and some degree of suspicion from my research participants, especially during the first two months.

Although these reflections could lead to a broader debate concerning the researcher's positionality, this work does not address that, as it falls outside the scope of this research and there is insufficient space to develop such reflections adequately within the word limit of this thesis. Another limitation related to my dual role concerned the data related to the documentation produced as the intern at the PPT (i.e., internal and official reports, benchmark and market analysis, email conversations) that informed the research findings. Furthermore, some information was not collected as data for this research because it related to my role of the intern and, due to a high level of confidentiality and commercial sensitivity, I could not use that in this study. Therefore, my position as the researcher influenced my work as the intern and how the mentioned documentation was produced; at the same time, my position as the intern impacted on the researcher role as certain data could not be collected.

Summary
This chapter outlined the IASB case according to the methodological framework of ANT ethnography and data analysis.

I began by introducing the organisation's governance and structure and outlining the research sites, identifying relevant participants, technologies, and types of data collected. Additionally, I described the process of negotiating access to the field.

Following this, I explained the data analysis process, identifying four 'coherent' stories as analytical tools to map the translation of disciplined and undisciplined entities. These stories were the 'IASB's CE agenda,' 'SOF,' 'Plastic Project,' and 'Walno story.' The chapter concluded by describing the limitations of this research. In the next chapter, I will explore the material semiotic relationships within these four 'coherent' stories.

Chapter 6 – Discipline and Undiscipline

In this chapter, I focus on, and problematise, the concept of 'discipline', a notion which Latour (1988a, 1991) utilises in passing in order to explain the notion of reliability. 'Reliability' is highlighted as a condition for delegations, suggesting that both humans and non-humans can be either reliable (disciplined, i.e. suitable delegates) or unreliable (undisciplined, not apt to delegation) actors within an actor–network. Latour does not invoke Foucault's (1991) work[15] – nor does he seem to elaborate the notion further. Here, I will discuss how the ideas of discipline and indiscipline were read into Latour's (1988a, 1991) work and the contributions drawn from other relevant research (e.g., Hodder, 2012) to understand these concepts. I will also outline why it is important to pay attention to disciplined and undisciplined entities by using illustrations from my research, the IASB case.

The chapter begins by problematising the concept of discipline that emerges from the ANT literature explored. I then reflect upon the concepts of disciplined and undisciplined plastics, enriched by connections with plastic technologies' material and social dimensions. Next, illustrations from the IASB case are proposed in the form of the four stories.

---

[15] Foucault's (1991) discussion of the concept of discipline is not addressed in this research due to space constraints in relation to the word limit for this thesis. However, I could not entirely omit reference to Foucault, as Latour's discussion implies the meaning of discipline according to the philosopher's genealogy. Law's (e.g., 1994) work offers a more comprehensive exploration of ANT's relationship with Foucault; however, this falls outside the scope of the current research.

I. The 'IASB's CE agenda' story looks at the materials semiotics that enact IASB's CE context and considers the interrelations within the publication 'Organisations Guide to Circularity';

II. The 'SOF' story highlights the interrelations between IASB/PPT, single-use plastics and the various organisations attending the Forum and that participated in the 'Roundtable Exercise';

III. The 'Plastic Project' story considers the material semiotic relationships (Law, 2008, 2009) within the PPT efforts to design and scope an IASB's CE for plastics initiatives, i.e., the Plastic Project;

IV. The 'Walno' story looks at the PPT's attempt to mobilise a large retail organisation, Walno, within the Plastic Project.

The chapter concludes with considerations on emerging elements around the process of invoking certain CE ideas and demonstrating the process of translation (Latour, 1987; Callon, 1986; Law, 2003b) of the CE agenda within the IASB case. The role of moral judgments within organising a CE for single-use plastics to tackle the plastic crisis is also discussed.

What are disciplined and undisciplined plastics?

Discipline and undiscipline are aspects of the of the theoretical ANT perspective I draw upon, although they are not normally elaborated as part of the ANT framework.

ANT emphasises networking as a key ingredient of all organisations, with networks involving delegations (Akrich and Latour, 1992) of allies (Latour, 1987). Allies can be both humans and things deemed reliable according to the actor–network's final goal toward stabilisation (Callon, 1986; Latour, 1987). Therefore, delegation "[…] draws on a seemingly obvious insight regarding the interchangeability of human and technical work […]" (Ribes et al., 2013, p. 2), i.e., the performance of organisational actors and technologies is interchangeable. Examples of such dynamics could be found in Latour's (1988a) case of the hotel door closer – which could either be a human (a groom) or a technological installation (automatic door closer). Both entities perform toward the same objective – opening and closing the door for hotel tenants.

In this regard, delegation presupposes the consideration of discipline. Latour (e.g. 1988a, 1991) in his work has stressed "how human/non-human translations and

delegations are frequently initiated via problematizations of discipline" (Ferri et al., *forthcoming*, p. 10). Enrolled allies, such as the door closer, are reliable, although they might prove to become unreliable at some point. In this case, former allies get disenrolled, i.e., enacted as undisciplined. When undiscipline occurs, new actors and actants are delegated, moving the process of translation along. Within this research, discipline is about delegating reliable actors and actants and disenrolling unreliable entities within a certain context.

Figure 9 - *Collage depicting a human groom and the machine version. Credits: Pinterest.*

Latour's (1988a) example of the hotel door closer is helpful to show the array of translations and delegations involving humans and technologies considered reliable within a particular actor–network. For instance, the hotel's tenants who failed to close the door were undisciplined and led the hotel managers to the choice either to discipline everyone

> […] or to substitute for the unreliable people another delegated human character [a groom] whose only function is to open and close the door […] The advantage is that you now have to discipline only one human and may safely leave the others to their erratic behavior (Latour; 1988a, p. 300).

Therefore, the human door closer (i.e., the groom) was delegated to open and close the door for hotel guests. However, we saw that the groom could become sick, or absent, or go on strike, becoming undisciplined according to the hotel managers' expectations.

Although there is now only one human to be disciplined instead of hundreds […] if this one lad is unreliable then the whole chain breaks down […] disciplining a groom is an enormous and costly task that only Hilton Hotels can tackle, and that for other reasons that have nothing to do with keeping the door properly closed (Latour; 1988a, p. 300).

Finally, the hotel managers were presented with a final choice, which was to either discipline all the groomers employed or "[…] to substitute for the unreliable humans a delegated nonhuman character" (Latour; 1988a, p. 301), an automatic door closer disciplined to open and close the door at the hotel. Seen as advantageous to rely on the machine, the human actors could be left to their erratic behavior. Thus, the automatic door closer was enacted as the most reliable, and therefore disciplined, option for the hotel's door to be safely closed at most times.

The presupposition of discipline and undiscipline that emerges from Latour's story stresses an important tension regarding the performance of actors and actants within an actor–network. As Ribes et al. (2013) observe, the performance related to 'technical' delegation (e.g., the automatic door closer) influences the process through the performative impact of technologies. The performance related to 'social' delegation, e.g., the groom, seems to guide the process of organising through actions that focus on human allies. However, it is relevant to point out that the distinction between 'technical' and 'social' is analytical and is not recognisable within complex interrelations such material semiotic relationships. For example, when the automatic door opener gets broken or does not work the way it is expected, the hotel staff refers to the machine as being "on strike" (Latour, 1988a, p. 303), projecting a human, and therefore social, behaviour onto a "cold technical object" (Ibid.). ANT scholars (e.g., Callon, 1986; Latour, 1988a, 1991; Law, 1994, 2009) have focused on following interrelations between actors and actants "[…] without stopping at artificial divides between what is purely technical and what is social" (Latour 1988a, p. 298). Therefore, according to the theoretical lens of ANT I draw upon, it does not matter if it is humans or technologies delegated to a task as long as they represent the most disciplined option available. As the case of the single-use plastic crisis has demonstrated, technologies can prove disobedient and "go on strike" as often as humans.

Hence, paying attention to technologies like plastics and the translations and delegations enacted to discipline these materials leads us to consider who and what can be effectively disciplined, how this is achieved, and who and what are better left to their erratic behaviour (Ferri et al., *forthcoming*). Because the challenges related to single-use plastic waste could be connected to these materials' physical characteristics misbehaving in respect to organisations' expectations (e.g., like pulper waste misbehaved according to the PWP members and did not confirm to EU recycling standards), plastic waste is an actant (Law and Callon, 1982; Callon, 1986; Latour, 1987; Law, 1994), a performative technology (Latour, 1987, 1988a, 1991). Therefore, plastics are unreliable and undisciplined if they are in the 'wrong' placement – stressing how the quest for discipline is about technologies (i.e., plastics' physical characteristic) and human (organisations) misbehaviour.

Being a complex and performative technology whose behaviour is linked to humans' (i.e., where plastics are placed and the meaning attributed to that), single-use plastics present material and social dimensions, in a sense that plastic waste are a set of materials as well as social relationships; it is culturally situated and has certain moral judgements attached to it (Douglas, 1966; Hardin, 1998; Hawkins, 2006, 2009; Liboiron, 2016). Thus, single-use plastics are 'bad', 'out of place' (Douglas, 1966), and undisciplined or 'good', 'in place', and disciplined depending on the actors, their agendas, the materials, the socio-cultural setting, and the related moral judgements. Therefore, the concepts of discipline and undiscipline relate to organisations and technologies behaving or misbehaving according to a certain context (Callon, 1986; Asdal, 2012). Disciplined and undisciplined single-use plastics present a material, social and moral dimension.

The material semiotic relationships of disciplined and undisciplined plastics
The material semiotic relationships of disciplined and undisciplined plastics in the IASB case are the interrelations (how) between relevant organisations (who) and their interests, single-use plastics (what), CE ideas and enactments of the plastic crisis (what). These interactions become clearer when considering the interchangeability of delegations across humans, i.e., individuals and organisations, and 'things', i.e., single-use plastics. Because the problematisation of plastics is an issue of human and material

behaviour, Hodder's (2012) four relational elements (Things depend on Humans – TH, Humans depend on Things – HT, Humans depend on Humans – HH, Things depend on Things – TT) can be used as an analytical tool to track the process of translation within an actor–network. According to this author, understanding how humans, both individually and collectively, become 'entrapped' in their relationships with materials leads to comprehending how these relationships function in practice. Hodder argues that these relationships involve a double bind, of dependence and dependency (e.g., the example of the air pump in Chapter 3). The plastic crisis could be seen as an example of how modern societies do not merely rely on plastic materials; they are addicted to them. These dependencies and addictions are not incidental but are actively sustained (Ferri et al., *forthcoming*); despite plastic pollution having been recognised as a global phenomenon that negatively impacts on natural ecosystems and human activities, societies still rely on the use of single-use plastics, e.g., food plastic packaging. With CE ideas being invoked to tackle challenges brought by the plastic crisis, e.g., the EMF's (2015) circularity philosophy, which inspired the IASB's CE agenda, these ideas are called to consider a radical reworking of these relationships of dependence and dependency (Ibid.).

In this respect, ANT provides us with the tool to analyse such reworkings, where one form of dependence is replaced by another through delegations. These delegations involve establishing interrelations (HH, HT, TH and TT) that can be interchangeable. However, the conditions that make such relations 'interchangeable' are often overlooked. Latour's (1988a) example of the hotel door closer is, again, helpful to show how ANT helps us consider this interchangeability. By exploring the array of delegations involving humans and technologies, it is possible to see how relations can be re-thought within a certain context. When the hotel's guests are deemed unreliable and the groom is enrolled to open and close the door, echoing Hodder (2012), one type of HH relationship is substituted with another one. Because the groom becomes unreliable, by being sick or going on strike, the automatic door closer was delegated. Therefore, the HH relationship (guests–groom) was translated into a TH relationship.

ANT provides us with another helpful tool that encourages us to consider interrelations between entities as dynamics, the material semiotic relationships. Such relations can be

tracked through the process of translation that performs toward stabilising the actor–network, i.e., reaching the purpose of the interrelations that is to discipline plastics. The concepts of discipline and undiscipline are enacted as a result of "materially and discursively heterogenous relationships" between entities (Law, 2009, p. 141).

Making sense of how the IASB attempts to discipline plastics (i.e., the process of translation – 'how') requires observing and following relevant material semiotic relationships of significant actors ('who'), materials and ideas ('what'). The process of translation enhances Hodder's (2012, 2016) understanding of interrelations between entities, who suggests that such interactions can be separated out to understand how that is happening. However, the process of translation looks at the relationships that make the notion of discipline within a specific context, which provides the framing (Callon, 1998; Cooper, 1986) for when plastics and organisations are understood as disciplined and undisciplined. This will be discussed more in detailed in the next chapter.

Like in Latour's (1988a) hotel door closer story, within the IASB case, it is possible to notice that the notions of discipline and undiscipline are presupposed. To simplify the mapping and observation of the relevant material semiotic relationships between plastics, the IASB and their members, and the CE ideas they invoked, the four stories (the 'IASB's CE agenda', 'SOF', 'Plastic Project', and 'Walno') are used to outline the process of translation of the notions of disciplined and undiscipline – and connected CE ideas.

Through the four stories, it is possible to observe how single-use plastics raised organisations' attention (TH) through the issues brought by the plastic crisis. Within this relationship, technologies were enacted as undisciplined due to them misbehaving toward organisations' agendas, i.e., they expected plastics to disappear after having disposed of them. Following the relationships between organisations and technologies (HT), organisations and other organisations (HH), and actants and other actants (TT) in the IASB study, it is possible to observe how these entities become disciplined. Table 7 summarises the relevant interrelations that track the enactment of the concept of discipline discussed in more detail in this research.

Single-use plastics (T) – IASB/CEP, PPT, plastic members, SOF organisations (H)
IASB/CEP/PPT (H) – single-use plastics (T)
SOF organisations (H) – single-use plastics (T)
Plastic members [including Walno] (H) – single-use plastics (T)
IASB (H) – the EMF's CE philosophy (T)
Plastic members [including Walno] (H) – the EMF's CE philosophy (T)
Plastic members [including Walno] (H) – the IASB's CE agenda (T)
PPT (H) – the IASB's CE agenda (T)
IASB/CEP (H) – PPT (H)
IASB/CEP (H) – plastic members [including Walno] (H)
PPT (H) – plastic members (H)
IASB/PPT (H) – SOF organisations (H)
The EMF's CE philosophy (T) – single-use plastics (T)
The IASB's CE agenda (T) – single-use plastics (T)

Table 7 -   Relevant actors and actants within the IASB case

Tables 26, 27, 28, and 29 in the Appendix show the interactions between this research's most crucial actors and actants that enact the four stories. Although material semiotic relationships are multiple, complex, and dynamic and mobilise (Callon, 1986; Callon and Law, 1982) diverse actors and actants simultaneously (Law, 1994, 2007), for analytical clarity, these interrelations are shown as a one-to-one performance. Significant extracts will be discussed in the next sections of this chapter.

How the IASB conceptualises the notions of discipline and undiscipline based upon their plastic members

Table 36 (Appendix VI) shows the material semiotic relationships that enacted the IASB's CE agenda in relation to single-use plastics, story one. It follows the interrelations (how) between the IASB, single-use plastics (what), the CEP, the EMF, and plastic members (who), i.e., recyclers, retailers, and producers represented by the companies Fly, Star, Blue and Square. Story one also illustrates the enactment of the IASB's CE context, which will be further discussed in Chapter 7.

The table below highlights and summarises the relevant interrelations.

Entities	Relationship
Single-use plastics (T) – IASB/CEP, plastic members (H)	Undisciplined plastics are an organisational challenge and issue in terms of finance and reputational capital
IASB (H) – single-use plastics (T)	
Plastic members (H) – single-use plastics (T)	
IASB (H) – plastic members (H)	The IASB supports plastic members to tackle issues brought by the plastic crisis
Plastic members (H) – the EMF's CE philosophy (T)	Plastic members invoked the EMF's CE philosophy
IASB/CEP (H) – the EMF's CE philosophy (T)	The IASB CE agenda was inspired by the EMF's CE philosophy (the IASB invoked it to discipline plastics because members invoked that)
The EMF's CE philosophy (T) – single-use plastics (T)	Plastics are undisciplined when leaking from official waste management systems and are not reused or recycled and disciplined when reused and recycled.
The IASB's CE agenda (T) – single-use plastics (T)	

Table 8 -   Relevant entities and interrelations in story one.

Because of the recalcitrant material composition of single-use plastics, these technologies were enacted as undisciplined, an organisational challenge, by IASB members (TH). Plastic members experienced various difficulties within their operations in relation to the types of single-use plastics they mobilised within the sectors in which they operated (HT), i.e., the loss of reputational capital by being addressed as the polluters by environmental NGOs, and financial losses due to poor waste management and a lack of standardisation of waste collection and recycling standards.

Plastic members that were plastic recyclers, retailers and producers performed with single-use plastics, and because of these technologies' physical characterises (e.g., difficult to recycle), they saw plastics as undisciplined. Recyclers addressed undisciplined plastics as materials they were unable to deal with either because plastic technologies were not sorted properly and/or not recyclable. Retailers wanted recyclable/reusable plastics to keep meeting their expectations as plastic packaging. However, plastics' recalcitrant physical characteristics did not allow that, as easy-to-recycle/reuse plastics

did not perform as expected in food and beverage preservation. Therefore, retailers kept using non-recyclable/reusable plastics, which often escaped waste management networks and leaked into and polluted the natural environment – enacting single-use plastics as undisciplined and building up a conversational reputational capital for themselves. To address the organisational challenges brought by single-use plastics as a representation of the plastic crisis, plastic producers who were members of the IASB attempted to manufacture recyclable and reusable plastics; however, they needed to meet customers' expectations (e.g., retailers' expectations of prolonging food and beverage shelf lives through packaging) that were often impossible to meet when plastics were recyclable/reusable.

It seems that for IASB plastic members, what made single-use plastics undisciplined was what happened after the technologies were thrown away after being used and becoming waste. To tackle the challenges around recyclability and the 'right' placement of plastic waste, plastic members mostly invoked circularity ideas related to the EMF's philosophy (HT), which saw the CE as an economic model that was

> restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption. (EMF, 2015, p. 2)

Despite the EMF's philosophy adopting design as an important element to develop their circular business model, plastic members invoking this CE agenda related differently to the design element. They either did not consider it or appealed to the idea of 'circularity by design' by mentioning design as a crucial element to reach circularity through reusing/recycling plastics (e.g., plastic member Star claimed the intent to reach "[…] circularity by design that includes reusing and recycling practices" to reorganise their plastic operations – Star Sustainability Report, 2018, p. 12). Plastic members seemed to invoke certain aspects of the EMF's circular philosophy related to material-focused practices, such as reusing/recycling practices, e.g., to

[…] Optimise resource yields by circulating products, components, and materials at the highest utility at all times in both technical and biological cycles. This means design for […] recycling to keep technical components and materials circulating in and contributing to the economy. […] inner loop […] to maximise the number of consecutive cycles […] by extending product life and optimising reuse. (EMF, 2015, p. 6)

Considering the design elements contained in the EMF's agenda (the CE is a business model "restorative and regenerative by design" and "designing for […] recycling […]" – EMF, 2015, p. 2; also, the third principle of the CE states to "foster system effectiveness by […] designing out negative externalities" – EMF, 2015, p. 6) as a mean to reach product recyclability or reusability, rather than an important feature to reach circularity per se, represented a dilution of the EMF's CE agenda. It also showed the first moment of translation of the idea of the CE invoked within the IASB case. The EMF's philosophy became used to justifying operations that aimed at keeping materials "at their highest utility and value at all times" (EMF, 2015, p. 2) through reusing/recycling, whilst designing became a go-to word used to emphasise the importance of reusing/recycling practices.

To achieve circularity by design is necessary to understand the existing recycling infrastructure […] and provide help to local entrepreneurs to build the infrastructure needed where there are gaps. (Star Sustainability Report, 2018, p. 13)

When interrelating with the EMF's CE philosophy, single-use plastics' physical characteristics (TT) made these technologies 'pollution to come', i.e., likely to escape attempts to keep their value high and become waste. EMF's CE ideas aimed at keeping materials 'at their highest utility and value at all times' (EMF, 2015, p. 2) through material-focused practices, i.e., reusing/recycling. Thus, plastic waste was undisciplined because it escaped attempts to keep its value high and became waste, e.g., by not being recyclable or reusable. To be enacted as disciplined, single-use plastics' material value was to be kept as valuable at all times – for example, by reusing/recycling plastics and reinforcing those networks.

Because it was inspired by the EMF's CE philosophy, the IASB's circularity context also saw single-use plastics (HT) as undisciplined when leaking from official waste management systems and not recycled or reused. Additionally, IASB plastic members that invoked the EMF's circularity philosophy saw plastics (HT) as undisciplined when not reusable or recyclable and when escaping official waste management systems. Hence, these technologies were seen as undisciplined because they were considered likely to leak into and pollute the natural environment. To become disciplined, plastics needed to be kept valuable at all times, for example, by being reusable and recyclable items. EMF ideas informed members' conceptualisation of undisciplined plastics, mostly related to the organisational challenges these actors had to face when interrelating with single-use plastic waste.

Because the IASB's mission was to support their members (not only from the plastic sector) (HH) to tackle issues impacting their operations, the IASB decided to design their CE agenda in a way to invoke similar circularity ideas to their members. For this task, the organisation set up the CEP (HH), delegating a team to design the organisations' CE agenda. The CEP took inspiration from the EMF's CE philosophy (HT) and organised a circularity agenda that saw the CE as

> […] a way to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability. (IASB's Organisations Guide to Circularity, 2019, p. 4)

This definition highlighted the re-organising of 'relationships' between natural resources, materials, technology, consumers, and the industry toward changing economic models. The IASB's CE aimed at re-organising economic activities to benefit members' finance, by promoting innovative business models, and civil society, by contributing to job creation, a safe environment, and clean cities. It seemed to be open to a holistic understanding of circularity by considering the interrelations between diverse actors and actants and the role of materials.

Furthermore, design featured as an important element, with a wider understanding of how plastic members referred to that in their sustainability reports. For example, in the Organisations Guide to Circularity, there is a reference to design as an integral part of

161

the "product-life extension" business model – "to design products in a way that they could be repaired and reused thus to phase-out from single-use production" (Organisations Guide to Circularity, 2019, p. 14). Design is also mentioned amongst the disruptive strategies to shift to a circular business model (Organisations Guide to Circularity, 2019, p. 21). However, when it comes to single-use plastics and organisations that dealt with these technologies, the Guide presented instances of circularity as a material-focused practice, i.e., reusing/recycling. The examples that plastic members contributed with to the Guide were about their attempts to re-organise their relationships with plastics (HT) by transforming these materials' physical characteristics.

> Fly has rethought their plastic strategy to procure high-quality PET flakes that have the same properties as virgin materials, and that can be used to produce flawless recycled r-PET plastic bottles […]. (Organisations Guide to Circularity, 2019, p. 6)

Or transforming their operations, i.e., the way to organise recalcitrant plastics.

> Star aims at changing their operations related to plastic packaging by building CE hot-spots, i.e., localised enterprises that sort, recycle and re-sell PET. Such initiatives will empower local communities by creating local recycling businesses. (Organisations Guide to Circularity, 2019, p. 10)

Despite a certain emphasis on the aim to bring societal benefits (e.g., the creation of jobs through creating localised recycling enterprises in Star's example) that could be related to the IASB's holistic CE agenda's 'circular society' discourses (Calisto Friant et al., 2022), the interrelations between Fly and Star and plastic waste seemed to show an internal translation of the enactment of the CE. The IASB's agenda, overall, adopted design as an important element to develop circular business models; however, plastic members' application of such ideas represented a diluted version, similar to how they diluted the EMF's CE philosophy – they did not consider the design element or appealed to the idea of 'design' as an element to boost the reusing/recycling of plastics (e.g., "[…] Fly established relevant partnerships with companies to improve PET bottles recyclability by design" – Organisations Guide to Circularity, 2019, p. 6). This dilution of the IASB's CE agenda actioned by the plastic members participating in the Guide

represented a second important moment of translation of the CE enactment within the IASB case.

Despite contributing to the organisation's CE platform, plastic members appeared to enact a specific CE for plastics within the IASB's broader and more holistic understanding of circularity. The members accomplished this by focusing on technocentric practices (Calisto Friant, 2022), i.e., reusing/recycling, rather than design elements. This approach could be interpreted as the members implying 'simpler' steps, i.e., activities that were easy for them to act upon because they did not require wide changes, before investigating other routes. Given the focus of this research on plastics and the CE, and the research question 'How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?', from now on, the IASB's CE agenda refers to the CE for plastics within this organisation's broader, holistic approach.

The examples brought by Fly and Star (p. 162) highlight how certain circularity ideas may appeal to plastics' material (e.g., in the Fly example, which focuses on plastics' physical characteristics) and social dimensions (e.g., in the Star example, which looked at the interrelations between organisations and materials by organising recalcitrant technologies).

Recyclers and single-use plastics performed and translated each other as disciplined when addressing recyclability and reusability, i.e., plastics are disciplined when recyclable and reusable, whilst recyclers are disciplined when able to deal with these technologies' material composition. The material semiotic relationships between retailers and single-use plastics changed when the former collaborated with producers toward redesigning plastics that were recyclable/reusable, thus meeting retailers' expectations. Hence, discipline was a matter of placement; disciplined plastics were those technologies included within collection, sorting and recycling networks, whilst retailers were disciplined when able to capture recyclable/reusable plastics. Regarding the interrelations between producers and single-use plastics, these would have transformed when a way to produce plastics that met customers' expectations and could be recycled/reused was identified. In this scenario, disciplined plastics were those that could be recycled/reused as waste; producers were disciplined when able to deal

with plastics' material composition and design plastics that met the standards of reusability/recyclability.

Overall, the interrelations that resulted in the IASB's CE context enacted plastics as disciplined when positioned within certain waste management systems and delegated either reusable or recyclable plastic technologies. Similarly, as per plastics' distributed agency, organisations were disciplined when they facilitated such a process.

Considering the interrelations between the IASB's plastic members and plastics led to thinking about how organisations interacted with one another (HH). Although organisations were aligning to the IASB's CE agenda, the material semiotic relationships between plastic members (producers, recyclers, and retailers) were complex.

On the one hand, retailers and producers implicitly interacted because they were connected by the way single-use plastics were manufactured and disposed of. Producers made plastics that were not recyclable/reusable to meet retailers' expectations, leading them to become undisciplined and addressed as the polluters due to them manufacturing single-use plastics that could pollute the natural environment. Retailers became undisciplined because their expectations were unfeasible for plastics to maintain the characteristics required and be recyclable/reusable, leading producers to manufacture something that made them undisciplined as well.

On the other hand, recyclers implicitly interacted with producers and retailers because they were linked by the fate of the single-use plastics producers manufactured and retailers disposed of and sent to recyclers. Thus, producers manufactured plastics that were not recyclable/reusable in order to meet retailers' expectations. Retailers were not able to sort these plastics correctly and created contaminated plastic waste streams that impacted recyclers, who could not recycle/reuse such plastics and ended up having to dispose of contaminated plastic waste streams. Hence, retailers and producers enacted each other as undisciplined because, paraphrasing the PPT manager Nicola's words, "retailers asked for something that could not be made otherwise, and producers provided retailers with plastics that made them the polluters" (Fieldnotes diary, 2019, week 23, p. 12). Similarly, recyclers, producers and retailers were undisciplined to each other because, still paragraphing Nicola's words, producers manufactured plastics that

were not recyclable/reusable to meet retailers' expectations. Retailers were not able to sort these plastics correctly and created contaminated plastic waste streams; recyclers could not recycle/reuse such plastics and/or contaminated plastic waste streams (Ibid.).

These interrelations show how considering plastics' material composition became relevant to discipline not only materials but also organisations as most of the issues between members came from plastics' materiality and how that was dealt with. To meet its mission to support their members, the IASB needed to translate their CE approach in a way that considered plastics' physical characteristics. This was the reason for the IASB's senior management to set up the PPT (HH), delegating a new team to show plastic members the IASB's efforts to support them:

> […] We have members that have representation across the plastic value chain, from petrochemical production through the end of life and recycling, and it becomes clear that plastic waste has become an epidemic. […] the creation of this team is to support our members' activities to build a positive role for them and ensure that plastic waste ends, but the use of plastic continues […] through a CE project for plastics led by the PPT. (Interview with the PPT Director James, 2019, p. 1)

Ideally, the PPT would demonstrate their value added to the IASB's senior management by scoping and developing a CE for plastics initiative. This initiative would create a collaborative platform for plastic members to become disciplined to each other ("to build a positive role for [plastic member] […]" – Interview with the PPT Director James, p. 1). The goal was to support producers to redesign single-use plastics to be made with recycled/recyclable materials and in a way that addressed retailers' standards for preserving food. So, retailers would have been able to capture such plastics within recycling networks managed by recyclers. Disciplined producers were the ones able to design single-use plastics up to recyclability standards; disciplined retailers were the ones who could capture such plastics within recycling networks; disciplined recyclers were those able to recycle newly designed recyclable plastics.

The PPT's mission was to find a mode of ordering materials and organisations – materials had to be recyclable single-use plastics, whilst organisations were disciplined when

165

supporting plastics to be recyclable and aligning to the IASB's CE agenda. Additionally, the IASB's plastic members needed to be disciplined to each other. Ideally, producers design plastics to standards that enable them to be recycled; retailers are able to capture such plastics within recycling networks; and recyclers can recycle newly designed recyclable/reusable plastics. This ideal outcome highlighted how organisations and technologies become disciplined alongside each other.

The IASB's CE agenda is tested externally

Table 37 (in Appendix VI) presents the material semiotic relationships that were used to test the IASB's CE agenda and understanding of discipline externally. The setting chosen was the SOF event, which gathered different organisations performing within the European Sustainability business-driven landscape. In story two, the 'SOF' story, I follow the process of translation of the notion of discipline through the material semiotic relationships (how) between single-use plastics (what), CE ideas (what), and attendees to the SOF and IASB (who), represented by James, the PPT Director. The table below summarises the relevant material semiotic relationships within this story.

Entities	Relationship
single-use plastics (T) – SOF organisations (H)	Plastics are undisciplined for diverse reasons depending on the organisation's CE agenda
SOF organisations (H) – single-use plastics (T)	
IASB/PPT (H) – single-use plastics (T)	Disciplined plastics are reusable and recyclable
SOF organisations (H) – CE ideas (T)	Various and different
IASB/PPT (H) – SOF organisations (H)	They are disciplined or undisciplined to one another depending on which CE agenda they invoke
SOF organisations (H) – SOF organisations (H)	Various and different. Undisciplined to one another depending on which CE agenda they invoke

Table 9 -   Relevant entities and interrelations in story two

The 'Roundtable Exercise', one of the numerous group and collaborative activities within the Forum, represents a meaningful example of how organisations, materials and ideas interrelated. Table 37 highlights the 'Roundtable Exercise' material semiotic relationships between single-use plastics, the IASB/PPT, industry (Recycling company 1 and 2, Plastic Producer companies 1, 2, and 3), advocacy (Waste Pickers Association,

Environmental NGO 1 and 2) and policymaking (Policymaker) organisations. The Roundtable Exercise was tasked:

> […] to save a country by finding a system that circulates materials. You have to focus on single-use plastics. Find a second life for these materials that do not end with landfilling. (Fieldnotes Diary, 2019, SOF, p. 39)

Each roundtable had a different, simulated real-life scenario; the one discussed here relates to the task of saving 'a developing island country' that relied on international aid, aquaculture, and tourism.

The briefing above stressed the disruptive role of single-use plastics on organisations' operations (TH) by highlighting the need to focus on these technologies, identified as a material issue as the brief indicated to 'find a second life for these materials that does not end with landfilling', highlighting plastics' material dimension. Single-use plastics are seen as 'pollution to come', where their prospective ontology (Rip, 2009) becomes more relevant than their present use, like Hawkins et al.'s (2015) bottle of water. Plastics' physical characteristics need to be addressed to 'save a country by finding a system that circulates materials', which leads to following the interrelations between Roundtable Exercise attendees and single-use plastics (HT), the IASB/PPT and attendees and CE ideas (HT), and the relations among IASB/PPT and within Roundtable attendees (HH).

Following the material semiotic relationships between organisations and technologies, a complex picture emerges, with various organisations and interests around plastics. Similarly to the IASB's plastic members, most of the organisations participating in this exercise had their agendas on plastics disrupted by these materials' misbehaviour; therefore, single-use plastics were enacted as undisciplined (HT). In this respect, organisations invoked various CE contexts (HT) to discipline single-use plastics.

Recycling companies 1 and 2, Plastic Producer companies 1, 2, and 3, Environmental NGO 2, and the Policymaker sitting at the table seemed to invoke ideas that could be identified as part of the EMF's CE philosophy and European Commission's CE agenda, such as the ones mentioned in the Action Plan for the CE (European Commission, 2015a). As seen before, the Action Plan was based on the EMF's circularity ideas, although

excluding incineration practices as a way to reuse/recycle waste materials. The data show how these organisations appealed to these CE ideas vaguely, avoiding specifying precise concepts and invoking reusing/recycling as circular practices. Fieldnotes reported how I made the conjecture between the organisations' circular solutions to plastics and the EMF's and European Commission's CE agenda.

> […] They [the Roundtable Exercise participants] refer to ideas of circularity such as recycling, proper waste management and reusing that are mentioned in the EC's [European Commission] agenda and the EMF refers to these practices in their technical cycle. (Fieldnotes Diary, 2019, SOF, p. 43)

James invoked the IASB's CE context, as one of the purposes of attending the SOF was to test the organisation's agenda within the European Sustainability landscape, which the organisations attending the Forum represented.

Waste Pickers Association and Environmental NGO 1 seemed to implicitly invoke Break Free From Plastic movement's ideas regarding plastic pollution and corporations' responsibility.

> Waste pickers and NGO 1 talk about how bad plastic is because of the pollution in the ocean and on land. It seems that they can't see any positive aspects of using plastics […] – […] BFFP [Break Free From Plastic?]. (Fieldnotes Diary, 2019, SOF, p. 43)

Although not a structured CE framework, this international environmental initiative, active since 2017, had specific and clear enactments of disciplined and undisciplined plastics. Simply, there were no 'good plastics' and all plastics were viewed as pollution, with plastic companies responsible for the global plastic crisis. It is relevant to specify that the Waste Pickers Association's narrative around undisciplined plastics emerged from the data. It is recognised that this is different from the usual narrative around waste pickers and (plastic) waste. For example, the Waste Pickers Association's view on plastics was interesting in consideration of the fact that their livelihood also depended on the presence and recyclability of waste (O'Brien, 2008) – "recyclability makes disposable like polystyrene 'in place'" (Liboiron, 2021, p. 35). By being recyclable, plastic

waste could be considered 'in place' because there are norms that make it behave – it is a useful resource for the waste pickers, who can extract materials to sell. However, within this research, waste pickers' views seemed to oppose that discussed by Liboiron (2015, 2016, 2021), i.e., that plastic waste is always 'in place' depending on the situation. Another noticeable element is that, during the Exercise, there was no mention of plastic pollution defined as an environmental and social injustice (e.g., Liboiron, 2021), another relevant argument usually supported by environmental charities and members of the informal waste management sector like Environmental NGO 1 and Waste Pickers Association participating in the Exercise. However, it can be assumed that these organisations adjusted the tone of their discourses according to the other Roundtable participants, who were mostly from the private sector.

While the different circularity ideas invoked by the Roundtable Exercise attendees led to diverse performances between actors and single-use plastics (HT – see the Actions column below), there was a certain degree of similarity that the actors showed when enacting plastics as undisciplined. This is shown in the Outcome 1 column in Table 10.

Entities		Relationships	Actions	Outcome 1
Waste Pickers Association	Single-use plastics	They act upon each other	Undisciplined: Waste pickers enacted plastics as undisciplined and aim to stop all plastics	Waste pickers see plastics as undisciplined and aim to stop all plastics
Environmental NGO 1			Undisciplined: 'Travel' plastics are undisciplined, and NGO 1 aims to stop imported plastics	'Travel' plastics are undisciplined, and NGO 1 aims to stop imported plastics
Policymaker		(implicit) Policymaker does not act directly on plastics	Undisciplined: Plastics that leak into the natural environment and pollute	Undisciplined: Plastics that leak into the natural environment and pollute
Environmental NGO 2		They act upon each other	Undisciplined: Plastics that leak into the natural environment and pollute	
Recycling company 1 (RC 1)			Undisciplined: Plastics that leak into the natural environment and pollute	
Recycling company 2 (RC 2)			Undisciplined: Plastics that leak into the natural environment and pollute	
IASB/PPT (James)			Undisciplined: Plastics that leak into the natural environment and pollute	
Plastic Producer company 1 – 2 – 3			Undisciplined: Plastics that leak into the natural environment and pollute; IASB/PPT unable to solve issues brought by plastics' recalcitrant materiality	

Table 10 - Extract I, Table 37

The extract above shows how most of the organisations at the roundtable invoked similar CE ideas that could be linked to the EMF's and European Commission's circularity notions. These were James (representing the IASB/PPT and invoking the IASB's CE context, whose circularity idea was inspired by the EMF's philosophy), Recycling companies 1 and 2, Plastic Producer companies 1, 2, and 3, Environmental NGO 2, and the Policymaker. However, two organisations, i.e., Waste Pickers Association (WPA) and Environmental NGO 1, implicitly invoked the Break Free From Plastic global initiative's ideas regarding plastic pollution and corporations' responsibility. So, there were two different enactments of undisciplined plastics, i.e., respectively, single-use plastics that leak into the natural environment and pollute are undisciplined, and any types of single-use plastics are undisciplined.

These enactments of disciplined and undisciplined plastics, although diverse, seem to highlight the focus on the future of single-use plastics, i.e., these materials being undisciplined because of their possible contribution to the issue of environmental degradation by becoming pollution. These technologies were considered 'bad actors' (Liboiron, 2016) according to what (often) happened when they became waste (i.e., they leak into the environment and pollute). Therefore, plastics were understood as undisciplined because of their material composition and the related prospective ontology (Rip, 2009). Thus, the Roundtable participants' attention moved from single-use plastics as technologies to the fate of plastic waste and how to stop future plastics from polluting the natural environment. This enactment led most of the organisations at the roundtable toward considering plastic waste as undisciplined, enactment that transformed if these technologies were included within the official waste management and materials were reusable/recyclable, as shown in Table 11.

Entities		Relationships	Translation	Outcome 2
Environmental NGO 2	Single-use plastics	They act upon each other	Artistic reuse/recycling	Disciplined: Reusable/recyclable plastics; NGO 2 able to deal with reusable/recyclable plastics
Recycling company 1 (RC 1)			Reuse/recycling	Disciplined: Reusable/recyclable plastics; RC 1 able to deal with reusable/recyclable plastics
Recycling company 2 (RC 2)			Recycling	Disciplined: Recyclable plastics; RC 2 able to deal with reusable/recyclable plastics
IASB/PPT			Recycling	Disciplined: Recyclable plastics; IASB/PPT to design a project to deal with recyclable plastics
Plastic Producer company 1 – 2 – 3			To create recycling markets for plastics	Disciplined: Recyclable plastics/recyclates; producers that invest in recyclable/reusable

Table 11 -   Extract II, Table 37

Such a conceptualisation of disciplined plastics was in line with specific ideas connected to the EMF's, IASB's and European Commission's circularity agendas, which invoked material-focused practices, i.e., reusing/recycling. To support this outcome, policymakers were asked to provide clear guidelines on waste regulations whilst educating the population. The stress on educating consumers tended to make consumers responsible for the future of plastics, an idea explored further in Chapter 7.

However, Waste Pickers Association and Environmental NGO 1 invoked circularity ideas that identified any type of plastics as undisciplined, implying that no plastics were disciplined. Tracking the interrelations between organisations (HH), it was possible to notice how, by invoking Break Free From Plastic global initiative's ideas on plastic

pollution, Waste Pickers Association and Environmental NGO 1 stopped the other participants from finishing the assignment. Therefore, they were undisciplined compared to all the other organisations participating in the Roundtable Exercise because they invoked a CE context that did not share similarities with the EMF's, IASB's and European Commission's agendas.

As an exemplar, it is worth showing how these two organisations and IASB/PPT from undisciplined became disciplined to one other. NGO 1 and Waste Pickers Association saw the IASB's plastic members as 'bad', i.e., polluters, because of their implications with polluting single-use plastics. To increase their allies (Latour, 1987), James convinced these organisations that the IASB and their members had a similar point of view on plastics to theirs. James managed to create new associations and mobilised NGO 1 and Waste Pickers Association by sharing the same goal around plastics, i.e., these technologies should not pollute.

The IASB/PPT and the other actors invoking similar CE ideas mobilised toward shifting attention from plastic things to plastic waste as the undisciplined entity. Thus, they also managed to change the Waste Pickers Association's and Environmental NGO 1's enactment of disciplined plastics. Strategies that made this shift happen included discourses around the possible value of plastic waste and their role in improving the island nation's economy.

> […] a lot of discourses around the value of plastics, even if already waste, e.g., recyclers think what can be done with those resources – so they see plastic waste like that. (Fieldnotes Diary, 2019, SOF, p. 39)

Furthermore, the assignment emphasised the emergency the developing island-nation was facing, i.e., "to save a country by finding a system that circulates materials […]" (Fieldnotes Diary, 2019, SOF, p. 39), creating a sense of urgency that strengthen the need to deal with the already generated plastic waste.

Thus, Waste Pickers Association and Environmental NGO 1 reconsidered and enacted undisciplined plastics as waste that leaks into the natural environment. This led to disciplined plastics being conceptualised as waste that does not pollute, in line with the

other representatives at the table. Therefore, disposed-of single-use plastics that remained within the official waste management systems were delegated as disciplined technologies.

The Roundtable Exercise showed how negotiating CE contexts led to enacting a certain idea of circularity, one focused on keeping the value of materials high at any time through reusing/recycling, and a particular enactment of disciplined single-use plastics, i.e., plastic waste that does not pollute the natural environment and can be reused/recycled. It is pertinent to note how the final enactment of disciplined plastics related to CE ideas close to the EMF's circularity philosophy, i.e., there is a distinct focus on materials and a technocentric approach (e.g., the one indicated by Calisto Friant's CE discourses – 2022) invoked by the organisations participating in the Exercise. Organisations got disciplined by supporting reusing/recycling initiatives in plastic operation. This enactment of the concept of discipline (referring to plastics and organisations) is the result of negotiations between diverse entities and demonstrates the importance of considering the social dimension of single-use plastics in understanding how the notions of discipline and undiscipline are enacted.

The concept of discipline transforms
Table 38 (Appendix VI) shows the material semiotic relationships (how) between single-use plastics (what), plastic members, the PPT (who) and the IASB's CE agenda (what). By tracking these interrelations, it is possible to follow the process of translation of the notion of discipline within the IASB case. Story three, the 'Plastic Project', helps us map the delegation of new allies and the understanding of discipline highlighted by a few topical interactions between organisations (HH), such as the PPT, IASB, and plastic members (e.g., Fly and Star). These organisations needed to show discipline to one another, as well as interrelations between these organisations, invoked CE ideas (i.e., the IASB's CE agenda and the EMF's circularity philosophy), and single-use plastics (HT).

First, being a newly set up team, the PPT needed to demonstrate that they were disciplined to the IASB (HH). The Plastic Project represented IASB efforts to support their plastic members and was designed to show the PPT alignment with the IASB's CE agenda. The IASB created the PPT to help the CEP solve the organisational issues that affected plastic members. Therefore, the PPT needed to align with the IASB's CE agenda

174

and demonstrate their discipline by feeding solutions to the CEP and IASB and designing the Plastic Project . This means that the PPT was disciplined to the IASB; the team's allegiance was demonstrated by invoking the IASB's CE context.

Secondly, the PPT had to recruit disciplined allies (HH). To make the recruitment process easier, the PPT designed the Plastic Project in a desirable way to attract plastic members – as there would be no Project without allies, as James put it in the following extract:

> […] the fact is that we need to recruit as many members as we can, and [to do so] we need to know what they are already doing in that space [plastics and the CE] thus we can propose something that aligns with their expectations. (Fieldnotes Diary, 2019, week 6, p. 9)

To make the Project as interesting for plastic members as possible, the PPT considered the examples presented in the Organisations Guide to Circularity by some of these organisations, e.g., the instances proposed by the recycler Fly (p. 162) and the retailer Star:

> […] circularity […] includes reusing and recycling practices. To achieve this goal is necessary to understand the existing recycling infrastructure […] and provide help to local entrepreneurs to build the infrastructure needed where there are gaps. (Star Sustainability Report, 2018, p. 13).

The Guide exposed the IASB's CE agenda; therefore, the PPT demonstrated allegiance to this organisation while considering specific examples of circularity brought by some of the plastic members. Therefore, the PPT interacted with these members' CE agenda (HT) – which happened to contribute to the IASB's one. Such models focused on material-focused practices, e.g., recycling, as shown in the extract above, and the PPT included these practices within the Plastic Project's goals:

> a) Develop business solutions to reach 100% recyclable single-use plastics, e.g., plastic packaging, b) create 'circular economies' for recycled materials, c) and promote actions toward tackling the plastic crisis. (Plastic Project document, 2019, p. 1)

Therefore, by proposing circular solutions to the plastic crisis that focused on recycling, the PPT diluted the IASB's CE agenda by leaving behind reusing practices that were mentioned in the Guide. Furthermore, the PPT did not include any reference to the IASB's holistic approach to circularity found in the 'IASB CE agenda' story, for example, the emphasis on contributing to local economies (e.g., Star's aim at building "localised enterprises that sort, recycle and re-sell PET to empower local communities by creating local recycling businesses" – Organisations Guide to Circularity, 2019, p. 10). With these transformations, the invoked CE ideas in story three present the third moment of translation of the notion of the CE within the IASB case.

Despite diluting the IASB's CE agenda into a version closer to plastic members' expectations, the PPT still aligned to the CEP and, therefore, the IASB, by considering ideas within the Guide and by linking the Plastic Project's objective A to the EMF's CE ideas (that inspired the IASB's circularity agenda). The team enacted a more specific understanding of disciplined plastics according to the translated CE notion and considered any plastics' physical characteristics that created organisational challenges to their members as undisciplined (HT).

Hence, the PPT attempted to discipline plastics through the Plastic Project based on particular criteria of the IASB's CE agenda (i.e., material-focused practices) to support plastic members in solving plastic-related organisational challenges. However, plastics' recalcitrant material composition made the PPT Project's objectives difficult to reach as not all single-use plastics were easy to recycle and, therefore, could be delegated. Hence, plastics that created organisational challenges to the plastic members, e.g., loss of finances and reputational capital, were undisciplined. At the same time, the PPT is undisciplined to plastics because it performs against plastics' physical characteristics that do not incline to recycling.

To translate plastics from 'pollution to come' to a disciplined material, the PPT considered members' examples of disciplined plastics within the Guide (e.g., Fly, which aims at recycling PET bottles), which can be summarised in the table excerpt below:

Entities		Outcome 2
Plastics member: recyclers	Single-use plastics	Disciplined: Recyclable/reusable plastics; recyclers able to deal with plastics' material composition
Plastics member: retailers		Disciplined: Plastics that are included within collection, sorting and recycling networks; retailers able to capture recyclable/reusable plastics
Plastics member: producers		Disciplined: plastics that can be recycled/reused as waste; producers are able to deal with plastics' material composition and design plastics to standards of recyclability/reusability

Table 12 -   Extract I, Table 38

By mobilising plastic members' understanding of disciplined plastic, the PPT translated this concept from reusable/recyclable plastics (as it was enacted within the IASB's CE context) to recyclable plastics within the PPT's Project. Translating the enactment of discipline was performed through negotiating diverse understandings of discipline and related moral judgements attached to such a concept, i.e., the PPT (discipline = recyclability is 'good' because it is desirable for plastic members and in line with the IASB's CE agenda), IASB (disciplined = reusability/recyclability is 'good' because it helps transition to a circular business model and is thus sustainable) and their members (discipline = recyclability is 'good' because it shows interest in sustainability and is in line with their business interests).

From being considered 'pollution to come', plastics were translated as disciplined when recyclable. Therefore, disciplined plastic members to the PPT's Project were those that dealt with single-use plastics, aligned to the IASB's CE agenda and supported recycling activities – a focus that did not come as a surprise as the PPT designed the Plastic Project according to IASB plastic members' interests regarding plastics. Hence, the PPT added a further particular criterion that the members needed to meet for delegation in the

Project: support recyclability. This meant that members that met IASB's CE ideas but did not meet the PPT criteria around recyclability were undisciplined.

Hence, although designing a project that targeted specific members' agendas, the PPT ended up translating specific requirements for organisations to join the Plastic Project, adding complexity to the process of disciplining; members had to align to the IASB's CE agenda as well as meeting the PPT's recyclability criteria to be enrolled and mobilised (Callon and Law, 1982) in the Plastic Project. Such a translation of the concept of discipline led to further negotiations between plastic members and to the PPT enacting disciplined single-use plastics and organisations. The next story brings an exemplar of such interrelations.

Negotiating concepts of discipline and undiscipline
The material semiotics within the 'Walno' story, story four, show the interrelations (how) between and single-use plastics (what), the PPT, the plastic member Walno (who), and the CE ideas they invoked (what). Walno was a large packaged goods retailer, while the invoked CE ideas corresponded to the PPT's CE context and the EMF's circularity philosophy. This story is presented in Table 39 in the Appendix VI.

Tracking the interactions between the PPT and Walno (HH) demonstrated how, at the beginning of their relationship, they were disciplined to one another by invoking similar CE ideas, i.e., the IASB's CE context, which drew inspiration from the EMF's circularity philosophy. The extract below summarises the relevant interrelations:

Entities		Relationships	Actions	Outcome 1
Walno	IASB	They act upon each other	Walno is one of the IASB's plastic members, and they align with the IASB's CE agenda. At the same time, Walno is large enough to create their own initiatives on plastics	Disciplined to each other
PPT	IASB/CEP	The IASB/CEP acts upon the PPT	The IASB created the PPT to help CEP solve the organisational issues that plastic members are affected by the plastic crisis. The PPT needs to align with the IASB's CE agenda. The PPT feeds solutions to the CEP and IASB by designing the Plastic Project	Disciplined: he PPT must align to the IASB's CE agenda to be enacted and disciplined. It does that, but it will be undisciplined when it stops aligning.
PPT	EMF	(implicit) EMF acts upon PPT	Because it aligns with the IASB's CE agenda, the PPT invokes particular ideas from the EMF's CE philosophy related to technocentric practices, e.g., recycling	Disciplined: the PPT is disciplined to EMF
Walno		EMF acts upon Walno	Like other IASB plastics members, because it aligns with the IASB's CE agenda, Walno invokes particular ideas from the EMF's CE philosophy related to technocentric practices, e.g., reusing and recycling	Disciplined: Walno is disciplined to EMF

Table 13 -   Extract I, Table 39

By invoking similar CE ideas, the PPT and Walno also performed with single-use plastics in a similar way (HT) and conceptualised these technologies similarly. The PPT enacted single-use plastics as undisciplined because their physical characteristic made the Plastic Project's objectives difficult to reach as not all single-use plastics are easy to recycle. Walno wanted recyclable/reusable plastics that would meet their expectations, e.g., as plastic packaging, to protect the product. However, plastics' recalcitrant physical

characteristics do not allow that, as recyclable/reusable plastics do not perform as expected. Therefore, Walno kept using non-recyclable/non-reusable plastics, which often escape waste management networks and leak into and pollute the natural environment.

Hence, undisciplined plastics were those materials that were not reusable/recyclable and escaped official waste management systems, leaking into and polluting the natural environment. This led to following the interactions between Walno, the PPT and single-use plastics and considering these technologies' material dimension – plastics' physical characteristics conflicted with both the PPT and Walno expectations. Reusable/recyclable single-use plastics, e.g., plastic packaging, rarely maintained the same characteristics as virgin materials in terms of product protection, a fundamental aspect for retailers like Walno. To stop relying on virgin plastics whilst still providing the desired service, Walno addressed this challenge in their Sustainability Report (2019, p. 2), which aimed at showing partners how their innovative approach to 'reduce plastic waste did not impact on the protection of goods' and brought examples, e.g., the following:

> Moving eggs from cardboard containers to reusable plastic containers decreased damage rates and, consequentially, the generation of food waste […]. (Walno's Sustainability Report, 2019, p. 2)

However, Walno's attempts to discipline plastics was insufficient to address the complex 'unruliness' of such materials, and the retailer looked for a global partner to create a large-scale project, hence the relationship with the PPT and IASB.

> […] Walno want to […] redesign plastic packaging that is 100% reusable/recyclable (designed for circularity). […] They are looking for a partner to convene leaders in the consumer packaging value chain to deliver […] [such] an objective. (James' email, Walno-PPT email correspondence, 2019, p. 1)

Although Walno and the PPT (HH) dialogued for some time and enacted the idea of undiscipline similarly, they displayed diverse interests toward disciplining technologies and, therefore, different enactments of disciplined plastics. Even if they initially

addressed both reusing/recycling initiatives, Walno ended up focusing mostly on reusing practices, as exemplified below:

Introduction of reusable/recycled plastic carrier bags sold in-store.

Reuse a certain percentage of clothing brand hangers.

Promote reusable coffee cup as an alternative to single-use cups across all shops.

(Walno Document, 2019, pp. 1–2)

On the other hand, the PPT's Plastic Project objectives specifically focused on recycling practices, i.e., "objective a) develop business solutions to reach 100% recyclable single-use plastics, e.g., plastic packaging" (Plastic Project Document, 2019, p. 1).

Hence, Walno and the PPT invoked diverse elements within the IASB's CE agenda (HT), i.e., reusing/recycling practices, that led to two diverse conceptualisations of disciplined single-use plastics.

Entities		Relationships	Translation	Outcome 2
PPT	Single-use plastics	They act upon each other	Focus on easy-to-recycle single-use plastics, e.g., plastic packaging	Disciplined: single-use plastics that are recyclable (e.g., plastic packaging); the PPT performs according to the mobilised plastics' material composition
Walno			Single-use plastics, e.g., plastic packaging, to become reusable through a project in collaboration with relevant partners	Disciplined: Single-use plastics, e.g., plastic packaging, that are reusable

Table 14 -   Extract II, Table 39

Walno and the PPT delegated two different types of plastics as disciplined; recyclable single-use plastics became undisciplined within the Walno network, while reusable single-use plastics became undisciplined within the PPT's Plastic Project. Hence, through plastics' distributed agency, the two organisations became undisciplined to each other.

181

This led to the disenrollment (Callon, 1986; Callon and Law, 1982) of Walno from the PPT's Plastic Project and the consequent enactment of Walno's 'plastic project', which focused on reusable plastics as disciplined materials, rather than on recyclable plastics:

> The [Walno's] Director explained they don't see the need for a project right now […]. Walno is scoping a multi-stakeholder' event to take place soon. […] This will be to support their stakeholders' understanding of Walno's goal of 100% reusable packaging by 2025 and to launch their new Project […]. (James' email, Walno-PPT email correspondence, 2019, p. 5)

The material semiotic relationships within story four have confirmed the PPT's CE context, which mobilised recycling practices as circularity and delegated recyclable plastics and organisations that promoted recyclability as disciplined. These enactments and the notion of discipline were presented by the PPT team during the Pro Members meeting in Autumn 2019, where the team launched the Plastic Project, the IASB's response to the plastic crisis.

To summarise, Table 15 shows the highlights of the process of translation of the concept of disciplined plastics and organisations and the CE agendas across the four stories.

Story	Disciplined plastic	Disciplined organisation	CE translation	CE agenda
1	Technologies that are included within waste management systems, do not leak, and pollute the natural environment and represent a resource for local economies by design	Supportive of practices that re-think relationships between businesses, materials, government and civil society, design materials to be a resource for local economies	Translation 1: Because most of their members seem to invoke the EMF's CE philosophy, the IASB gets inspired by the EMF's CE ideas and enacts their CE agenda as a holistic business model. The Organisations Guide to Circularity includes references to design and examples of reuse and recycle as CE practices. However, plastic members that invoked EMF circularity ideas often excluded design or mention that as a mean to recycling and reusing. This reflects on the IASB's CE agenda and leads to translation 2.	The EMF's CE philosophy: an economic model that was "restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption." (EMF, 2015, p. 2) The IASB's holistic approach; CE as a business model "[...] to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability." (IASB's Organisations Guide to Circularity, 2019, p. 4) Example of an IASB plastic member taking on the EMF's circularity ideas: "To achieve circularity by design is necessary to understand the existing recycling

			infrastructure […] and provide help to local entrepreneurs to build the infrastructure needed where there are gaps." (Star Sustainability Report, 2018, p. 13)
	Technologies that are included within waste management systems, do not leak into and pollute the natural environment, and are reusable/recyclable	Supportive of reusing and recycling operations	Translation 2: Plastic members seem to dilute the IASB's CE agenda when it comes to plastics. Whilst the IASB's CE holistic agenda considers design as an important element, along with reusing and recycling, plastic members bring examples that focus on material-focused practices, such as reusing and recycling, and design is only mentioned as a means to the reusing and recycling of plastics. Plastic members seem to enact a particular CE for plastics inside the IASB's CE agenda overall	Example of a plastic member's circular activity focused on recycling: "Star aims at changing their operations related to plastic packaging by building a circular economy hot-spots, i.e., localised enterprises that sort, recycle and re-sell PET. Such initiatives will empower local communities by creating local recycling businesses." (Organisations Guide to Circularity, 2019, p. 10)
2	Confirmation of the above enactment	Confirmation of the above enactment	/	Confirmation of the IASB's CE agenda for plastics

3	Recyclable plastics	Supportive of recycling operations	Translation 3: the PPT dilutes the IASB's CE agenda for plastics and considers only recyclability practices, leaving the emphasis on contributing to local economies and reusing practices behind	The PPT's CE agenda translated CE as a synonym of recycling (see bold); "a) develop business solutions to reach 100% recyclable single-use plastics, e.g., plastic packaging, b) create 'circular economies' for recycled materials, [...]" (Plastic Project document, 2019, p. 1)
4	Confirmation of the above enactment	Confirmation of the above enactment	/	Confirmation of the PPT's specific iteration of the IASB's CE agenda for plastics

Table 15 -   Highlights of the process of translation of the concept of discipline and the CE within the four stories

185

These four stories illustrated how negotiating enactments of discipline led to a certain conceptualisation of disciplined plastics and organisations, which were linked to the CE ideas invoked. These notions related to the performance between plastics' physical characteristics and organisations' interests, stressing how the material and social dimensions of single-use plastics helped enlighten dynamics of discipline and undiscipline.

Reflections

The four stories help us understand the process of translation of the notions of discipline and undiscipline within the IASB case by considering single-use plastics material and social dimensions. However, it is possible to notice that there are some elements that deserve further attention, i.e., how and why certain CE ideas are invoked and by whom, and what is the role of moral judgements in enacting disciplined plastics and organisations within the organising of CE project.

Stories one and two highlighted the relevance of paying attention to what and who have been delegated, their interests, how they interrelate, and the CE ideas invoked to understand how discipline and undiscipline are conceptualised within a certain setting. The interrelations between the single-use plastics, IASB and their plastic members, their CE agendas and understanding of the plastic issue helped raise awareness regarding considering the role of the context (Callon, 1986; Asdal, 2012) within the IASB case. As seen before, context is here understood according to the ANT perspective, i.e., rather than a fixed setting (e.g., Given, 2012), actors and their performance enact a certain reality that can be transformed through an ongoing process (Callon, 1986). By paying attention to the performative dimension of technologies and how they get disciplined, the role of context requires further exploration to problematise the delegation of entities throughout the process of disciplining. Plastics' performance brought disruptions in the plastic members' operations (financial and reputational issues) and IASB attempts to discipline these technologies referred to identify and detach something from the enactment of single-use plastics, an element that made these technologies undisciplined when interrelating with organisations. However, plastics were not inherently undisciplined but became so when interrelating with members and their interests, within a certain context. Therefore, the IASB went through a process of

186

translation toward recruiting and disenrolling entities in the attempt to discipline plastics and members. Hence, different contexts were enacted and invoked within this process, and this led to the consideration of contexts as an activity. As Asdal and Moser (2012) discuss, contexts are enacted by the relationships between diverse entities, their interests toward a particular object (e.g., the CE) and a certain issue being taken on (e.g., the plastic crisis). Contexts are always ongoing and translate along with the material semiotic relationships between actors and actants. By invoking a certain context, organisations also invoke a certain conceptualisation of discipline and undiscipline that goes along with the translation of the CE agenda within this research (i.e., the progressive dilution of that notion until becoming a synonym of recycling practices with the PPT's Plastic Project). Therefore, paying attention to the activity between contexts (defined as 'contexting' by Asdal and Moser – 2012) helps illuminate ways of organising a CE for disciplining plastics.

Stories three and four show how enacting plastics and organisations as disciplined and undisciplined implies moral judgements attached to plastic waste (Hardin, 1998; Hawkins, 2006, 2009; Liboiron, 2016). The interrelations gathered in these stories highlight how IASB, the PPT and plastic members negotiate such judgements and, consequentially, related to the enactment of disciplined and undisciplined technologies and IASB/PPT CE initiative in an attempt to detach such judgments from these technologies, i.e., discipline them. These attempts report various degrees of success, with entities being delegated but also disenrolled (e.g., Walno in story four) and left to their erratic behaviour, as they invoke diverse contexts around disciplining plastics. Considering the implications of the moral dimension of disciplined plastics contributes to enlightening new perspectives on ways of organising a CE for plastics, which will be discussed along with empirical examples in Chapter 8.

Conclusion

In this chapter, I have sought to show that assumptions about who and what can be disciplined and how, outlining the way the notion of discipline informs translations and delegations (Latour, 1988a) within the IASB case. This is relevant to problematise single-use plastic technologies and their performance with organisations within CE projects attempts, such as the one organised by the IASB. By paying attention to what types of

technologies (i.e., single-use plastics) and ideas (i.e., CE ideas), who (the IASB, their members, and the SOF organisations) invokes those ideas, and how these entities are delegated will help us understand the complex process of organising solutions to global challenges, e.g., the plastic crisis.

To do so, the material semiotic relationships performed through the four stories were used to follow the movements of disciplined plastics and organisations. These interrelations demonstrated how the notion of discipline emerged throughout the IASB's attempts to organise a CE for disciplining misbehaving single-use plastics, technologies that were disrupting a portion of their members. By progressively delegating (Akrich and Latour, 1992; Rubes et al., 2013) the most reliable entities, the notion of the CE changes, as does the idea of disciplined plastics. Other considerations emerged in relation to the process of disciplining within the IASB's actor–network. Stories one and two led to the role of contexts being considered (Asdal and Moser, 2012) to understand how the conceptualisation of discipline and undiscipline and the translation of the CE agenda within the IASB case happened. Stories three and four, i.e., the 'Plastic Project' and 'Walno' stories, emphasise a certain morality related to single-use plastics and the assumptions of discipline within the PPT organisation of a CE project for plastics. This led us to explorations of the moral dimension of disciplined plastics to understand how technologies and organisations get disciplined.

Chapter 7 – CE contexting

In this chapter, I discuss the context (Callon, 1986; Asdal, 2012) in which evaluations of reliability (discipline) and unreliability (undiscipline) are performed within the IASB case. Adopting the notions of framing (Cooper, 1986; Callon, 1998) and organisational boundaries (Cooper, 1986) as guidance, the process of capturing values of certain actors and actants within contexts is explained. Such evaluations are performed differently by means of contexts within the contexting (Asdal and Moser, 2012) activity.

Using the 'IASB's CE agenda' and 'SOF' stories as illustrations of the contexting activity, I follow the material semiotic relationships (how) between the IASB, CEP, PPT, their members, other relevant external organisations (who) such as the EMF and SOF attendees, single-use plastics (what), CE ideas (what), and understanding of the plastic crisis (what). Such dynamics highlight the movements of disciplined and undisciplined plastics and organisations and showcased the significance of considering who is involved, how and why certain CE ideas are invoked and translated, and what the consequences on organising a CE for plastics are.

The chapter concludes with discussing the implications related to IASB contexting activity, highlighting suggestions regarding a political dimension of disciplined plastics (Ferri et al., 2023).

Contexting and disciplined plastics

Framing as guidance to understand the contexting activity

To observe how single-use plastics, the IASB, their plastic members and other relevant organisations (e.g., the ones attending the SOF), circularity ideas and understandings of the plastic crisis interrelate toward organising a CE for disciplining plastics, it is relevant to consider how actors decide what is the 'right' and 'wrong' placements for plastics. The ANT notion of context (Callon, 1986; Asdal, 2012; Asdal and Moser, 2012) could be helpful for understanding how positions are enacted within the IASB actor–network. Tracking the activity between the contexts invoked by organisations, i.e., contexting (Asdal and Moser, 2012), helped understand how certain conceptualisations of

disciplined plastics and organisations became predominant, i.e., what is considered correctly placed and what is not.

To understand this contexting activity and its significance in translating the ontological status of things and organisations (i.e., from disciplined to undisciplined and vice versa), I consider the notions of 'frame' (Callon, 1998) and 'framing' (Cooper 1986). In this research, framing is considered as an operation, a deliberate activity to choose what material semiotic relationships to focus on and follow through the process of translation. According to Callon (1998, p.249), the 'frame' is the boundaries that "are drawn between the actors interacting with one another […] and the rest of the world". These boundaries are the brackets that shape how we see certain issues, e.g., the plastic crisis, and solutions, like the CE for single-use plastics. However, frames and brackets are hard to see (Bach, 2016). Bach (2016) compares a frame to photography: the photographer's attention is focused on the image to capture, not on what (and who) is outside the camera. Brackets, like the camera, serve to identify the picture in the frame, which is the object of our attention. The frame, in fact, serves to draw attention to elements depicted in the 'picture' – the interrelations that we decided to follow and the values they produce. A frame, thus, encapsulates how actors make sense of the world and what actants they delegate, making the frame a device to understand 'what is going on here' (Bateson, 2000). Hence, brackets mark what and who is, so to speak, inside and outside a certain context that is invoked by actors to make sense of a certain situation, to understand an issue and related solutions. Invoking a context (and the frame in it) leads to a certain way of organising responses to a challenge, e.g., the IASB's CE for plastics.

Cooper's (1986) discussion on framing helps us understand ways of organising and disorganising. Framing is the activity through which organisations interpret their process of organising. Such activity represents a dynamic process that enacts and connects different elements within an organisation, whilst producing and negotiating boundaries. This interpretation of framing could be used to understand the contexting activity and how the ideas of 'in' and 'out of place' (Douglas, 1966) come to be within a certain context. In this respect, the context is what is framed, as it is invoked by organisational actors to make sense of their world and do the organising, whilst the contexting activity

invokes a particular frame as it is produced by the performance between the contexts invoked.

According to Cooper (1986), framing helps organisations manage the constant tensions between order and disorder, where organisational boundaries are those that demark the difference between order and disorder. Similarly, Asdal and Moser (2012) discuss contexts as a set of shared values and interests (i.e., modes of ordering – Law, 1994, 2007, 2008). Contexts are invoked by organisations to support their agendas within the organising process; therefore, they could represent organisations' expectations of order and disorder. Cooper (1986) challenges the traditional Organisational Studies view that boundaries within organisations are fixed and rigidly demarcated, promoting the idea that they are fluid and dynamic, i.e., they transform according to internal and external interactions and become areas where meaning is continuously negotiated and renegotiated. In a similar fashion, Callon (1986) and Asdal and Moser (2012) see contexts as constantly ongoing and non-fixed, enacted by the changing dynamics between performing entities. Additionally, contexts relate, originating an ongoing contexting activity that negotiates a predominant context (Asdal and Moser, 2012) – i.e., a mode of ordering (Law, 1994, 2007, 2008). Both Cooper's notion of framing and Asdal and Moser's ideas of context and contexting reflect a fluid and transforming concept of organisations. Hence, Cooper's (1986) idea of boundaries helps us identify areas of tensions related to the dynamics within a context, as the performance of values and interests enact the notions of order (i.e., 'in place', discipline) and disorder (i.e., 'out of place', undiscipline) of a certain context. Cooper's notions of framing and boundaries serve as guidance to understand what and who is inside or outside the organisational boundaries and the process that delegated these entities (how). This also helps identify the 'right' and 'wrong' placement for entities according to particular contexts – bringing further analytical clarity to the contexting activity and how a certain context becomes predominant in this research.

Contexting

In this study, the contexting activity is about framing a particular actor–network, i.e., the IASB case. Therefore, contexting is a deliberate activity (how) to identify technologies

(what), CE ideas (what) and organisational actors that invoked those ideas (who) towards understanding a certain issue, e.g., the plastic crisis, and possible solutions, such as CE for plastics projects. I recognise that there are different ways of framing the plastic crisis and CE solutions; however, for the purpose of this research, the framing described in this chapter is identified.

As mentioned, single-use plastics are a complex technology with a social and material dimension. Furthermore, the quest for discipline enlightens the significance of organisations and materials behaviour – visible within a context's dynamics that involve values and organisational interests. Therefore, to follow the contexting activity within the IASB case, social and material values were identified. These values related to the material and social dimensions of single-use plastics technologies, which helped enlighten the interrelations that enacted the concepts of discipline and undiscipline.

Social values refer to organisations' interests around enacting responses to the plastic crisis, i.e., their CE agendas and ways of disciplining single-use plastics. Expectations toward single-use plastics and how these technologies are enacted as disciplined and undisciplined relate to organisational actors' social judgements – where is the 'right' placement for plastics to be considered 'in place'? Liboiron (2015, 2021) discusses that dirt is always 'in place' (and thus disciplined) depending on the socio-cultural setting and the related normative values that inform social judgments within a context. The organisational boundaries that enact the notion of discipline relate to specific social expectations pertinent to a particular context. The notion of being 'out of place' (i.e., undisciplined) is enacted according to materials' physical characteristics (Ibid., 2016) that refuse to behave according to the social values operating within a particular context. Hence, technologies perform outside the boundaries that organisations traced for them to be enacted as disciplined. For example, if "recyclability makes disposable like polystyrene 'in place'" (Liboiron, 2021, p. 35) but polystyrene escapes waste management and recyclability systems, this technology becomes 'out of place', undisciplined, because leaking into and accumulating in the natural environment is the 'wrong' placement. This leads to the consideration of another of Liboiron's (2016) arguments: the judgments on plastics are not enough, and it is fundamental to consider the physical characteristics of these materials to grasp the impact of plastic pollution.

Therefore, it is relevant to contemplate the interrelations between the social judgements, which reflect organisational actors' agenda (i.e., social values) and single-use plastics' physical characteristics, i.e., material values, within a certain context.

Material values relate to single-use plastics' physical characteristics that make these technologies supportive or disruptive of the IASB and their plastic members' CE responses to the plastic crisis. Materials' behaviour depends on how their material composition is expected to perform with organisations' agenda, i.e., if they are in 'right' placement, for example, they are within official recycling systems and do not leak in natural ecosystems and pollute (i.e., they are within the organisational boundaries). In this respect, because of their prospective ontology (Rip, 2009), future single-use plastics are often enacted as undisciplined because they are expected to become pollutants and feed the plastic crisis assemblage (Cooper, 1998; Bennett, 2010). Therefore, single-use plastics are assumed to perform outside the negotiated organisational boundaries, i.e., against organisations' attempts to put them 'in place', and, therefore, they are perceived as 'pollution to come' (Hawkins et al., 2015). Similarly, organisations dealing with undisciplined plastics are enacted as undisciplined, i.e., 'future polluters', as they perform with future plastic pollution. Technologies and organisations are disciplined when they perform toward a certain circularity ideal, e.g., recyclability within the IASB case.

The dynamics between social and material values show the tension between order and disorder visible by paying attention to organisational boundaries. What and who is inside the boundaries is 'in place' and, therefore, disciplined. What and who is outside these boundaries are 'out of place' and thus undisciplined. So, things got undisciplined or disciplined according to actors, their agendas and how they interrelate with one another and technologies' physical characteristics within a certain context. Because diverse contexts are invoked by organisations when attempting to organise undisciplined technologies, e.g., single-use plastics, organisational boundaries are constantly renegotiated within this contexting activity, along with the material and social values.

Following up on the discussion about Cooper's (1986) idea of framing and organisational boundaries and how that connects with Asdal and Moser's (2012) notion of contexting, the dynamics between social and material values are considered as a matter of context, the values that are framed and invoked alongside the context itself. Hence, by invoking a particular CE context, the IASB and their members mobilise particular social and material values and related understandings of the plastic issue and CE solutions.

Within the IASB case, the material semiotic relationships between the IASB, their plastic members and relevant external organisations (e.g., SOF organisations), single-use plastics, CE ideas and understandings of the plastic crisis enacted specific CE contexts that got invoked to support organisations' agendas toward backing up a certain notion of discipline that matched their interests around plastics. This means that organisations invoked a specific CE context to put technologies and other organisations 'in place'. Therefore, following relevant entities' performance through IASB contexting activity helped identify which contexts they invoked, and the related enactment of discipline and the CE agenda became prevalent within the IASB's network.

IASB CE contexting activity

The 'IASB's CE agenda' and 'SOF' stories are used to unfold IASB CE contexting activity and the dynamics between social and material values that make a certain circularity context and enactment of discipline predominant within this study. To navigate the process of translation that the invoked CE ideas went through (see Table 15), Calisto Friant et al.'s (2020) CE and circular society discourses are used.

CE discourses are 'sceptical' and 'optimistic' technocentric discourses. The first ones are focused on population controls and resource efficiency with no mention of wealth distribution and social justice. Positive discourses, instead, lean toward a technocentric approach and are based on the assumptions that "capitalism is compatible with sustainability and technological innovation can […] prevent ecological collapse" (ibid., p.11) while progressively eliminating waste. According to these discourses, circular solutions are material-focused, i.e., recycling, reusing, composting, and any practice that, while attempting to avoid the creation of waste by closing resource loops, maintains the economic value of materials. Such discourses are predominant among

business-driven organisations as they focus on technological innovation and business models (Ibid.).

'Circular society' discourses include approaches that "go beyond market-based solutions and economic considerations and see circularity as a holistic social transformation" (ibid., p. 8). Transformations are pursued through 'sceptical' and 'optimistic' attitudes; the first one by looking at ways to drastically transform society so to achieve sustainability through reconnecting markets, communities and resources and boosting slow and local economies (economy of sufficiency); the second one "propose[s] a mix of behavioural and technological change, leading to a […] sustainable future where scarcity and environmental overshoot has been dealt with by […] social, economic, industrial and environmental innovations" (ibid., p. 11).

This narrative represents a relevant tool to help make sense of the 'CE contexting activity' within the IASB case.

IASB circularity context

In this section, a focus on actors' social values, i.e., organisations' interests, and the performance of plastics material values, i.e., how these technologies' characteristics perform with organisations and their interests, will be discussed by using story one, the 'IASB's CE agenda' story.

In this story, the CEP had the mission to create a platform to support their members to create new practices and share experiences to transition toward a CE. The team developed a definition of the CE based on the EMF's vision (2015), which considered rethinking relationships between natural resources, materials, technology, consumers and the industry:

> By promoting circular solutions, IASB can help the global economy to be more resilient, support civic society […]. In our vision, the CE is a way to rethink the relationships between natural resources, materials, technology, consumers, and the industry to create a sustainable future where humans and the natural environment can thrive. (IASB's Organisations Guide to Circularity, 2019, p. 4)

Through encouraging different economic models that re-organised economic and financial activities, the IASB thought it possible to benefit businesses and civil society in terms of jobs creation, a safe environment, and clean cities. This understanding of the CE represented the IASB's overall method of putting entities 'in place' and seemed to align with Calisto Friant et al.'s (2020) circular society optimistic attitudes.

Although the Organisations Guide to Circularity, which contained the IASB's CE agenda, was written mostly for a business audience, considering the relationships between resources, materials, technology, consumers, and the industry, the actors mobilised to elaborate the IASB's CE agenda were varied. They included IASB members (manufacturers, retailers, waste management companies and recyclers), consumers and policymakers that could be identified as 'enablers' (Kirchherr et al., 2023) to transitioning to a CE inspired by the organisation's agenda. Furthermore, the IASB and their members seemed to mobilise materials and resources such as steel, aluminium, plastic, cement, glass, wood, primary crops and cattle as these specific materials referred to IASB members' business sectors and operations (i.e., retailing, chemical, technological, automotive, cosmetic, metallurgic, construction and agricultural–farming sectors). These eight materials were seen as 'responsible' for a consistent percentage of the global GHG emissions, water and land use.

> Steel, aluminium, plastic, cement, glass, wood, primary crops, and cattle are responsible for 20% of the global GHG emissions, 95% of water use and 88% of land use. Adopting a CE approach in these areas will tackle climate change and water and land use challenges. (IASB's Organisations Guide to Circularity, 2019, p. 9)

The IASB's CE agenda appeared to recognise that materials needed to be considered when discussing circular solutions. Because of the impact of these technologies on global challenges, e.g., climate change, the IASB had the opportunity to showcase what their members already did to tackle such challenges, demonstrating the role that organisations, under the IASB's guidance, could get in moving toward a CE.

The Guide did not call for actors to 'take responsibility'. However, it aimed to boost collaboration among businesses and consumers while considering the role of materials

in understanding possible barriers and benefits to transitioning to a CE ("[…] way to rethink the relationships between natural resources, materials, technology, consumers, and the industry to create a sustainable future […]" - IASB's Organisations Guide to Circularity, 2019, p. 4). Hence, the IASB invoked a CE context that aimed to go beyond a merely technocentric approach by including other actors than the industry, i.e., civil society, in the transition toward circularity. That could be defined as the IASB's holistic CE context.

IASB members were invited to display practical examples of circular solutions that supported the organisation's agenda. These instances aimed at demonstrating that the CE could meet the need of a growing world population by enhancing the global economy with fewer resources available. At the same time, the Guide showed policymakers the value of circular solutions:

> Shifting toward a CE model can aid members to meet policies and regulations. At the same time, members successfully adopting a CE model can represent a significant exemplar for policymakers toward designing and launching more sustainability policies […]. (Organisations Guide to Circularity, 2019, p. 12)

The role of the consumer was not explained in this documentation, implying that even if civil society was mentioned in the IASB's CE definition ("[…] way to rethink the relationships between natural resources, materials, technology, consumers, and the industry to create a sustainable future […]" - IASB's Organisations Guide to Circularity, 2019, p. 4), this circularity agenda encouraged the industry to lead the transition to a CE through practical examples of the benefits of circular solutions.

In the Guide, it was possible to identify a certain focus on plastics, recognised as one of the eight materials responsible for climate change. Plastics were conceptualised according to a positive judgment that saw this material as 'good' but that needed to get disciplined. Therefore, there was a general recognition that plastics were not 'out of place' per se, but more work was necessary to get them 'in place' according to the IASB's CE agenda. For example, Fly, a waste management company and IASB member, was mentioned in the Guide as 'good CE practice' and an instance of how to recycle toward circularity.

Fly has rethought their plastic strategy to procure high-quality PET flakes that have the same properties as virgin materials, and that can be used to produce flawless recycled r-PET plastic bottles. (Organisations Guide to Circularity, 2019, p. 6)

Recycling seemed to be the way to discipline thrown-away PET bottles. Furthermore, recycling PET into something that had the "same properties as virgin materials" and could make something "flawless" addressed the organisational interest to save raw materials and phase out plastic waste. However, the focus seemed not be on the plastic bottle, but on the future of that bottle. Fly's decision to focus on PET bottles, and recycle these, was in part given by this company's conceptualisation of undisciplined plastics. Because PET bottles could be found in photos showing the disruption brought by ocean plastics, Fly made sense of these technologies as possible 'future plastic pollution'. Undisciplined materials became symbols of disorganisation when they were 'out of place', i.e., when they were not placed correctly according to organisations' expectations and interests. As the figure below helps illustrate, a plastic bottle washed on a beach could be seen as pollution (it is in the 'wrong' placement' and, therefore, undisciplined), and vice versa for the 'right' placement; the correct waste management stream was a secondary material, i.e., it was recycled according to organisations' expectations.
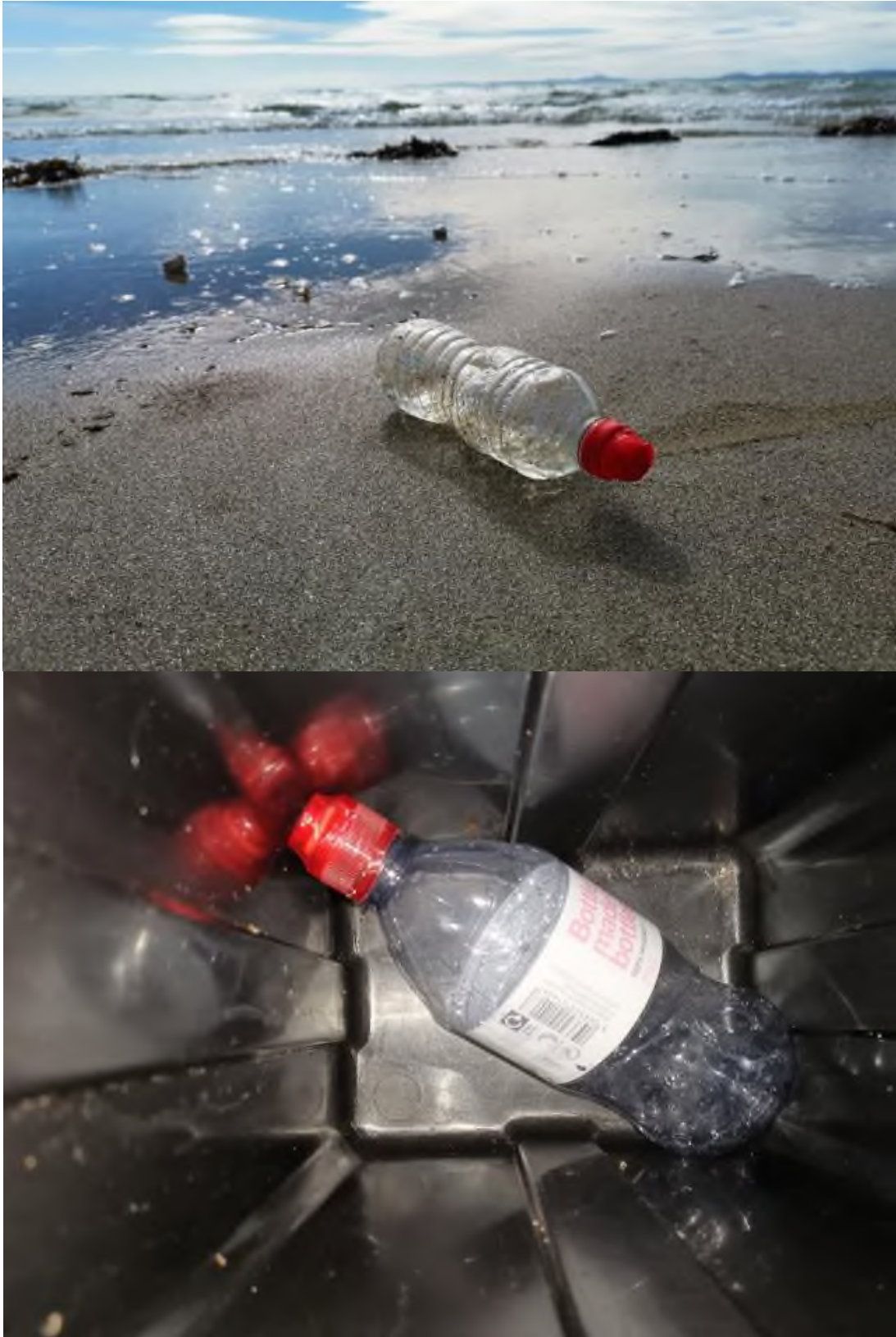
Figure 10 - Collage depicting a plastic bottle washed up on a beach vs. a plastic bottle correctly placed in the recycling bin. Credits: Marta Ferri, 2022.

The reason for emphasising recycling as a circular solution regarding single-use plastic materials was that the Guide and, therefore, IASB CE agenda, were written together with some of the IASB plastic members, i.e., producers, retailers, waste management and recycling companies that appeared to align with technocentric and material-focused views of circular solutions (Calisto Friant et al., 2020). The data from this study indicated that plastic members used their sustainability reports to stress how they were moving to circular practices, and this influenced the content of the Guide. For example, Square, a large international plastic manufacturer, emphasised how they contributed to the CE:

> […] with our Circular Chemical project, that aims at strengthening the already significant role of recycling by using chemically recycled plastic waste in manufacturing goods. (Square Sustainability Report, 2019, p. 105).

Retailers like Blue and Star, who heavily relied on and worked with single-use plastics, e.g., plastic packaging and distribution, respectively, referred to the CE as

> Redesigning products by…recycling and using post-consumer recycled materials in innovative ways. (Blue Sustainability Report, 2018, p. 30).

> […] circularity by design, that includes reusing and recycling practices. To achieve this goal is necessary to understand the existing recycling infrastructure…and provide help to local entrepreneurs to build the infrastructure needed where there are gaps. (Star Sustainability Report, 2018, p. 13).

Waste management and recycling companies, e.g., Fly, shared the same views on circular actions, seen as recycling practices that would permit to

> […] switch from a linear system to a circular loop approach. Industry and civil society will be able to contribute by encouraging waste recycling and recovery of secondary resources by participating in waste classification and collection. (Fly Sustainability Report, 2017, pp. 2, 6).

Plastic members' agenda focused on a view of the CE as a business model characterised by technocentric reusing/recycling practices. This impacted on how plastics were conceptualised as disciplined and undisciplined within the IASB CE agenda. Plastics were

disciplined when easy to reuse/recycle; additionally, organisations were considered disciplined when supporting these activities. This is an important moment of translation of the IASB's CE agenda for plastics and the related notion of discipline. It represents a dilution of the organisation's overall CE agenda that presented a wider and holistic view of circularity (i.e., IASB's holistic CE context) and focused on the technocentric approach promoted by plastic members. Hence, the data revealed that, although the IASB attempted to promote 'circular society' discourses (Calisto Friant et al., 2020) within their CE context, plastic members mobilised an agenda that appeared to consider material-focused circular practices, i.e., reusing/recycling (in line with Calisto Friant et al.'s CE discourses – 2020) that could be defined as the IASB's CE for plastics. The reason for the IASB to adopt plastic members' ideas that related to 'waste-free technical loops' (Corvellec et al., 2020a) as a starting point was to show other corporations how to begin with CE practices, and, possibly, inspire them to go further.

IASB's CE initiative for plastics
The IASB's CE for plastics context mobilised plastic members' interests regarding single-use plastics; it delegated non-reusable/-recyclable materials as undisciplined and plastic technologies situated within the correct waste stream as disciplined. This conceptualisation of discipline met members' understanding of how plastics should be 'in place'. It also showed in the publication Organisations Guide to Circularity that, although aspiring to cultivate circular society optimistic attitudes (Calisto Friant et al., 2020), it brought examples of technocentric practices such as reusing/recycling typical of optimistic CE discourses. These discourses characterised the CE for plastics that plastic members enacted within the wider, holistic IASB CE agenda.

After the conceptualisation of their circularity agenda, the IASB moved toward applying it. The organisation was facing significant challenges, especially supporting their plastic members, when it came to creating scalable and replicable circular responses to address the plastic crisis. These challenges included concerns related to the enactment of several plastic members as undisciplined, i.e., 'polluters'; for example, the international environmental charity Verde portrayed one of the IASB's members (a large single-use plastics producer) as outlined in the extract below:

[…] we need to stop its [plastic] production in the first place, and that's why we're going after [company name redacted]. As one of the largest consumer goods companies globally, […] [they have] a big role to play in curbing its plastic production. That's why Verde activists crashed their annual event to confront executives with the company's throwaway plastic found polluting the world's oceans. (Verde, 2019)

Enactments of plastic members like the one in the extract above led to the loss of reputational capital of these organisations.

Loss of revenue due to poor waste management, difficult operations between world regions given by different standards and waste management infrastructures, and organisations' level of commitment to the CE were other relevant challenges as expressed in the interview with the recycling company Happy:

That [recycling plastics coming from different world regions] is a big challenge. In fact, we don't have any recycling […] operations in Asia because [the region] is very fragmented and standards for post-consumption plastics are very different [from Europe]. […] infrastructures are bad, and the materials sold are low quality. […] there are not policies for waste collection, so companies look at the local market conditions. So, the international trade is not a real option. (Call with Happy, 2019, p. 2)

Similarly, the retailer Star, when outlining their CE strategy, mentioned the need to "provide help to local entrepreneurs to build the infrastructure needed where there are gaps" (Star Sustainability Report, 2018, p. 13), showing how common the problem with different waste management and recycling standards, infrastructures and commitment to a CE was.

Because of the challenges and barriers that plastic members were facing, the IASB's Senior Management Team saw the value of promoting an initiative to help them solve the issues brought by the plastic crisis – and they set up the PPT to address this task. The PPT aimed at scoping and designing an initiative that could support plastic members toward moving to circularity, i.e., the Plastic Project. In doing so, the team invoked the

IASB's CE for plastics context, rather than the overall, holistic organisation's CE agenda. The concept of discipline mobilised related to reusable and recyclable plastics and organisations were disciplined when they promoted reusing/recycling practices. Furthermore, the IASB, through the PPT performance with plastic members and the internal CE agenda for plastics they enacted, promoted circularity according to technocentric discourses close to Calisto Friant et al.'s (2020) description of the CE discourses.

Because most of the plastic members engaged with the business European Sustainability landscape, James, the PPT Director, thought that exploring what was already 'out there' regarding ideas of circularity within that setting was useful for designing the PPT's plastic initiative. Thus, the Plastic Project would have been integrated within a relevant framework for IASB plastic members. Furthermore, James could have tested the IASB's CE agenda for plastics and seen how it fitted that framework. The SOF, organised by the not-for-profit Green Organising, represented a significant opportunity to do so.

IASB's CE contexting at SOF
In this section, I look at how the IASB CE context interacts with other circular contexts at the SOF. The 'SOF' story represents a relevant example of the process of invoking contexts depending on the actors, technologies, objects and issues that interrelate; it shows which CE contexts were present, how and why these got invoked to put plastics and organisations 'in place'. The 'Roundtable Exercise', in particular, is used to show the contexting activity and understand who invokes certain circular solutions and how one of these solutions became predominant over the others.

As mentioned, at the roundtable sat representatives from plastic producer companies, two environmental NGOs, a waste pickers' association, recycler companies, a policymaker, and James. During the discussion, divergent CE contexts were invoked, and they mobilised opposite but competing ideas of disciplined plastics. These ideas saw plastics as 'bad' or 'good', and that they needed to be disciplined.

During the Exercise, the various participants at the table proposed eight solutions that presupposed a certain knowledge regarding the local community strengths, barriers and needs in that situation. Such solutions could be grouped into two themes: 'No plastics'

and 'New life to plastics'; the former gathered solutions with a negative judgment of single-use plastics, while the latter gathered solutions that had a positive view of these materials. Criteria to group these solutions in such categories were drawn according to the participants' moralisations of 'bad' (undisciplined) and 'good' (disciplined), which were collected while shadowing James during this exercise.

Conceptualisations of discipline and undiscipline, participants at the table (i.e., who is putting what solution forward), judgements toward plastics declared during the discussion of the exercise, and notions of responsibility related to these themes are summarised below in Table 16. The second column presents cherrypicked quotes from the fieldnotes diary; these extracts are the most relevant to representing actors' judgment on plastics.

Actors	Circular solutions (fieldnotes)	Theme	Judgement (plastics)	Notions of responsibility
Waste pickers Association	"Stop plastics by banning single-use plastics."	No plastics	Plastics are 'bad', stop to plastics	Plastic organisations and consumers need to stop using single-use plastics
Environmental NGO 1	"Tax for tourists bring plastics from abroad."	No plastics	Plastics are 'bad', stop to (additional) plastics	Consumers need to stop introducing plastics
Policymaker	"Education for local people (about sorting and recycling) to avoid leakages."	New life to plastics	Plastics are 'good', education to avoid pollution	Consumers need to be educated on how to recycle plastics
Environmental NGO 2	"Transformation of [disused] fishing nets into art."	New life to plastics	Plastics are 'good', artistic reuse/recycling	Consumers need to give a new life to plastic waste
Recycler company 1	"Deposit system"	New life to plastics	Plastics are 'good', reuse/recycling	Consumers need to place plastics correctly; recycling companies required to set up recycling markets
Recycler company 2	"Making fuel out of plastics."	New life to plastics	Plastics are 'good', recycling	Consumers need to place plastics correctly; recycling companies required to set up recycling markets
IASB/PPT (James)	"Collaboration between communities, government and the industry and set up recycling facilities."	New life to plastics	Plastics are 'good', recycling	Consumers need to place plastics correctly; policymakers and recycling companies required to set up recycling markets
Plastic Producer company 1 – 2 – 3	"Plastics become of value, e.g., PET, leads to a market, e.g., recycled PET"	New life to plastics	Plastics are 'good', recycling markets	Consumers and recycling companies need to place PET materials correctly

Table   Circular Solutions, Theme, judgement toward plastics and notions of   16 - responsibility in the Roundtable Exercise

As shown in the table, the 'No plastics' themed solutions promoted by waste pickers and environmental NGO 1 considered the presence of plastic things as 'bad', i.e.,

undisciplined. Social values, such as organisations' agendas, seemed to invoke circular ideas related to the reduction in and elimination of plastic waste through banning these materials. The 'No plastics' solutions were produced by the interrelations between these organisations' values, which would see single-use plastics as future pollution, with plastics material values, i.e., the material composition that made single-use plastics accumulate and litter the natural environment. It seems that these organisations always considered single-use plastics to be 'out of place', i.e., there was no context they would invoke to put them back 'in place'. Notions of responsibility invoked by these organisations saw both consumers and plastic producers accountable for the plastic crisis.

Policymakers, environmental NGO 2, recyclers, producers and James (representing the IASB) proposed the 'New life' themed solutions that went along with the idea that undisciplined single-use plastic waste (i.e., leaked into the natural environment and, therefore, 'out of place') was 'bad' and needed to be disciplined to be considered 'good', 'in place'. Thus, there was hope for these materials to be redeemed, and the way to do so was to invoke technocentric CE ideas that focused on material compositions, e.g., reusing/recycling. Reusable/recyclable single-use plastics were considered disciplined; additionally, organisations that supported these operations were considered disciplined. Thus, by being reusable/recyclable or not, the material composition of plastics (material values) interrelated with organisations' agenda (social values) by supporting or disrupting reusing/recycling practices. The 'New life' themed solutions invoked methods of putting entities 'in place' that produced a notion of responsibility that, on the one hand, called for industry and policymakers to create a situation where single-use plastics could be reused/recycled. On the other hand, it perceived consumers as being mostly responsible for the faith of plastics (i.e., the population needed to be educated to sort waste materials properly and be creative with waste) and accountable for the plastic crisis.

These two attitudes toward single-use plastics mobilised diverse circularity discourses; on the one hand, the mobilisation of CE optimistic discourses (Calisto Friant et al., 2020) in invoking 'New life to plastics' solutions that considered material-focused practices, i.e., reusing/recycling, as ways to progressively eliminate waste (e.g., "Making fuel out

of plastics [waste]" and "Deposit system" - Fieldnotes diary, 2019, SOF, p. 40). On the other hand, 'No plastics' solutions seemed to address Calisto Friant et al.'s (2020) circular society sceptical attitudes by focusing on promoting societal and market drastic changes (e.g., "stop plastics by banning single-use plastics" - Fieldnotes diary, 2019, SOF, p. 40).

Because the two themes gathered, respectively, similar ideas of circularity, they could be seen as CE contexts. The 'New life' context understood the CE as a way of disciplining single-use plastics through technocentric and material-focused practices, e.g., reusing/recycling. The 'No plastics' context saw the CE as a societal change and thus similar to Calisto Friant et al.'s (2020) 'societal change' and addressed single-use plastics as 'bad', materials that could not be disciplined. These two radical different conceptualisations of plastics tie in with the argument that the notions of putting something 'in place' and 'out of place' depend on the context invoked, i.e., there is no 'absolute' dirt, but the enactment of dirt is culturally and socially related (Douglas, 1966; Liboiron, 2015, 2016, 2021). The ideas of dirt and environmental pollution are brought together by social norms that reflect a certain moral judgment depending on a material's physical characteristics and placement (Liboiron, 2016). Within the European Sustainability business landscape represented by the 'New life' supporters, single-use plastics, by being recyclable, were seen as 'in place' because there were norms that disciplined these technologies, by making them useful to the recycling industry. At the same time, single-use plastics represented the source of environmental pollution for the 'No plastics' promoters, who saw plastics only as disruptive of natural ecosystems of the island-nation.

Throughout the two-hour discussion, actors who promoted the 'New life' solutions managed to shift the attention from plastic things to plastic waste as the undisciplined matter. Strategies that made this shift happen included discourses around the possible value of plastic waste and their role in improving the island nation's economy.

> [Plastic Producer company 2's representative]: Plastics have value and could lead to [the creation of] a market […] see that plant in Switzerland, for example, it used to be funded by the government as part of a government scheme to create

jobs, and it managed to become independent and thrive because rPET is requested by companies. […] PET is valuable and sustain a local economy. (Fieldnotes Diary, SOF, 2019, p. 40)

Participants representing policymaking enterprises, plastic recycling and producing companies and James (representing the IASB/PPT) kept bringing examples of reusing/recycling plastics that would have improved the local economy through job creation. For example, one of the recycling companies' representatives mentioned investigating the use of reused/recycled plastics in aquaculture enterprises (assuming that the island economy had that).

The policymaker sitting at the table stressed that because plastic waste had value, i.e., represented a resource for recycling business and created jobs, incineration was seen as the last resource, and only when relevant to stop leakages of plastic waste into the ocean. This contributed to making a significant connection for 'No plastics' supporters; plastic waste could be a resource to improve the local economy. Therefore, giving market and social (job creation) worth to these materials through reusing/recycling practices moved the focus to their placement rather than centring on the material composition. Discarded plastics, if placed in reusing/recycling networks through, e.g., "deposit schemes", "make fuel out of plastics", and "[…] set up recycling facilities" (Fieldnotes Diary, 2019, SOF, p. 40), would be kept away from the natural environment. This was passed as a possible solution to solve the plastic pollution problem in the short term.

Another aspect that worked in favour of the 'New life' supporters was the language of the scenario that already addressed plastic waste as the problem: "[…] You have to focus on single-use plastics. Find a second life for these materials that do not end with landfilling" (Fieldnotes Diary 2019, SOF, p. 39). In addition, although participants that proposed 'No plastics' solutions suggested a straightforward way to deal with the plastic crisis in that island nation, i.e., to reduce the consumption and disposal of these technologies within the national borders, this was discarded as 'not relevant' as a few of the 'New life' supporters noted how ocean pollution is spread through currents and tides, and the 'No plastics' actors could not find a counter-argument.

The performance of the 'New life' solutions supporters demonstrated the existence of a certain political strategy carried out by a positive judgement of plastics, one that saw recyclable/reusable plastic waste as disciplined. Delegating plastic waste as undisciplined, 'out of place', and arguing that ocean plastics were already in the water, they enacted imported single-use plastics as not being the immediate issue; these technologies were 'in place' until being thrown away and becoming pollution. So, participants all agreed to the final solution:

> [...] to aim to zero single-use plastics [waste], decreasing it over the years while implementing new initiatives such as reuse schemes, attracting artists and collaboration with other nations to develop recycling facilities. (Fieldnotes Diary 2019, SOF, p. 40)

The 'New life' coalition seemed to accomplish their political agenda by stressing that the pervasiveness of plastic waste as ocean (e.g., discarded fishing nets) and land (e.g., PET bottles) pollution was the reason why plastics were considered undisciplined. Plastic waste disrupted the island-nation economy by 'being there'; the problem was that these technologies did not degrade but accumulated in and littered the natural environment. The presence of unwanted plastic waste in the waters and on land was perceived as a problem to be solved as soon as possible, as the same scenario seemed to suggest that the country needed help: "to save a country by finding a system that circulates materials [...]" (Fieldnotes Diary, 2019, SOF, p. 39). The emphasis on 'saving' implied that the island nation was facing an emergency. This meant that solutions such as a deposit scheme, the creation of recycling infrastructures and 'trash art' were likely to be considered as they seemed to address the immediate problem.

By showing how plastic waste was dangerous, undisciplined, and 'out of place' (for example, leaking into and accumulating in the environment) and stressing the urgency of disciplining these materials through existing practices, 'New life' actors mobilised 'No plastics' organisations as allies (Latour, 1987), gaining the support of the 'New life' CE context and conceptualisation of discipline and undiscipline. So, the 'quickest' solutions to tackle the plastic emergency seemed to be through promoting 'business-as-usual' operations. The 'New life' CE context, as well as a notion of discipline related to

reusability/recyclability expectations for materials and organisations, became predominant within the Roundtable Exercise setting.

By becoming the predominant CE context within the Roundtable Exercise, the 'New Life' approach confirmed to James that the IASB's CE agenda for plastics represented the right circularity context to invoke to put undisciplined technologies back 'in place'.

It is worth noting that from the experience of the SOF's Roundtable Exercise, James came back with the PPT's CE for plastics context.

The emergence of a political dimension of disciplined single-use plastics

By following the material semiotic relationship (how) of the IASB (who), their plastic members (who), relevant external organisations (who – within the SOF story), single-use plastics (what), CE contexts (what) and understanding of the plastic crisis (what) within IASB contexting activity, it was possible to notice how disciplined single-use plastics show a political dimension (Ferri et al., 2023). Such a dimension is enacted through contexting, which performed the concepts of discipline and undiscipline according to social values (organisations' interests, i.e., how to put something 'in place') and material values (materials' performance toward the invoked understanding of putting 'in place') and enacted notions of responsibility that reiterated organisations' interests around plastics (Ibid.).

CE contexting as a political activity

The CE contexting activity in the 'IASB's CE agenda' and 'SOF' stories stresses two relevant points in understanding how a certain CE context and related notions of discipline and undiscipline become predominant.

First, the presence of different CE contexts challenges the application of circular solutions in real-life scenarios and reinforces the notion of the CE as a contested paradigm (Calisto Friant et al., 2020), 'umbrella concept' (Blomsma and Brennan, 2017) that could be adopted in different situations without an actual, unique, meaning: an 'empty signifier' (Corvellec et al., 2020a). Hence, business-driven organisations, performing as 'enablers' (Kirchherr et al., 2023) of the CE ideas they invoked (that matched their own agenda regarding circular plastics), ended up relying on invoking a CE identified with existing practices, business-as-usual operations that did not stop the

plastic crisis in the first instance, such as recycling (Ferri et al., 2023). This conclusion was supported by a later interview with James, who, while talking about the barriers of collaborating with plastic members, said:

> […] one of the key barriers is the reality that many of the members have a commercial interest – their agenda is not just around tackling the issues brought by plastic pollution but also around ensuring that the investment they are making today is increasing plastic production. At the same time, they aim to reduce and to eliminate plastic waste in the [natural] environment, and this is understood like…there are in many applications, alternatives to plastics that should be considered. However, if we consider the waste hierarchy, reduction is the best way to deliver environmental protection. This does not agree with several plastic members' agenda around plastics […]. (Interview with the PPT Director James, 2019, p. 3).

Therefore, paying attention to members' agenda around CE and plastics, i.e., the context they invoke to make something appear as 'in place', was significant within the PPT efforts to support members to tackle the issues brought by the plastic crisis.

Second, the contexting activity demonstrated how interrelations between the invoked CE contexts can be political because they are informed by actors' agendas (Ferri et al., 2023), i.e., organisations' understanding of 'right' and 'wrong' placement for plastics. Hence, it is important to consider how contexts are mobilised, e.g., who invokes them, how, and their agendas, and the related enactment of disciplined and undisciplined plastics and organisations. At the same time, organisations' social values are not enough to understand how a certain CE context has become prevalent, and there is a need to consider the interrelations with single-use plastics' material values. Therefore, CE contexting is a political activity that sees organisations invoking contexts to enact a certain notion of discipline according to their interests; however, this concept gets enacted not only by organisations' understanding of how things should be put 'in place' but also by technologies' ability to support or disrupt ways to be positioned in the 'right' placement. For example, in the 'IASB's CE agenda' story, any plastics that did not create organisational challenges to their plastic members and performed according to the

IASB's CE agenda were disciplined – these materials supported the IASB's attempts to help their members toward promoting circularity in their operations; therefore, they were in the 'right' place and got enacted as disciplined within the CE contexting. Likewise, in the 'SOF' story, plastics were considered disciplined when reusable/recyclable because they supported the Roundtable Exercise predominant CE context. Plastics, however, were undisciplined when hard to reuse/recycle, and possibly dangerous (i.e., the moral judgement attached to the conceptualisation of plastics as undisciplined) due to them disrupting organisations' attempts to save the island-nation economy by becoming pollution (i.e., leaking into and accumulating in the ocean represented the 'wrong' placement for these technologies).

Responsibility is political
If the activity between CE contexts is political, the related notions of responsibility could be seen as political as well (Ferri et al., 2023). However, as Hird (2015, p. 10) comments, "It is difficult to take responsibility for forgotten actions […]"; actors tend to invoke contexts that justify their actions and give responsibility to others. Furthermore, the notions of responsibility enacted by invoking CE contexts were driven by organisations' perspectives on single-use plastics (Ibid.). On the one hand, contexts invoked to portray plastics as undisciplined, e.g., the 'No plastics' supporters in the 'SOF' story, looked at plastic producers and recyclers as the 'polluters', 'waste creators'. Most of the responsibility was given to these actors, without considering the implications of eliminating single-use plastics overall and focusing on the figure of the 'guilty business' that produces plastic materials likely to leak into and pollute the environment, e.g., plastic bags and PET bottles. On the other hand, contexts that were invoked to enact single-use plastics as 'disciplinable', e.g., the 'New life' supporters, lay the responsibility on consumers.

The emphasis on reproducing a business-as-usual approach through promoting existing practices that are material-focused, e.g., recycling solutions, seems to stand on the creation of the figure of the 'guilty consumer', who uses a plastic bag (as the 'bad' supermarket costumers in Hawkins's 'Say No!' campaign example – 2009) or drinks from a PET bottle, things likely to leak when discarded and pollute the natural environment (Ferri et al., 2023). The political loading of the contexting operations creates a specific

strategy that organisations seemed to carry out to gain consensus, attract other possible allies and prevail on the other proposed solutions to the plastic crisis like the 'SOF' story has showed (Ibid.). The final CE solution produced in the Roundtable Exercise was based on the key figure of the 'guilty consumer' and the pervasiveness of plastic waste. Although including the role of businesses (creation of reuse/recycling networks) and the government (policies toward decreasing the generation of plastic waste through the years) as 'enablers' (Kirchherr et al., 2023) of CE ideas according to their plastic agenda, it saw civil society as responsible for sorting waste materials correctly (otherwise, they could not be recycled/reused), engaging in deposit schemes, and being creative with plastic waste.

The context that became predominant, and the related notion of responsibility, reflected the political process of the contexting activity that saw the predominant CE as the technocentric one (i.e., Calisto Friant et al.'s CE optimistic discourses - 2020) through supporting the organisations' single-use plastics agenda.

Within the IASB case, the contexting activity is political and suggests that enacting single-use plastics as disciplined and undisciplined is also a political action (Ferri et al., 2023). In this respect, it is possible to identify a political dimension of disciplined plastics that goes along with the social and material dimensions of single-use plastic technologies. These materials performed as disciplined and undisciplined depending on the contexts invoked to put plastics and organisation 'in place' and how these contexts interacted. Such interactions depended on the interrelations between organisations' interests (which are political because they support specific agendas) and plastics' physical characteristics behaving or misbehaving according to such interests. Paying attention to what technologies got delegated as disciplined, who invoked CE contexts, and how this led to considering the political dimension of the process of discipline, discipline got enacted according to a certain notion of responsibility that was the product of the invoked CE context (Ibid.).

Summary
In this chapter, I problematised the concepts of context and contexting (Asdal and Moser, 2012), using the notions of framing (Cooper, 1986; Callon, 1998) and

organisational boundaries (Cooper, 1986) as guidance to clarify the contexting activity within this study.

The contexting activity within the 'IASB's CE agenda' and 'SOF' stories helped follow the dynamics between relevant material (plastics' physical characteristics) and social (organisations' interests) values through the process of translation of the CE agenda and related the concept of discipline (and attached notions of responsibility) within the IASB actor–network. Furthermore, discipline is contextual and, for this reason, political, as it is about the 'right' and 'wrong' placement of materials according to actors' agendas. Hence, it was demonstrated how the CE contexting was a political activity, reflected in the enactment of disciplined single-use plastics that showed a political dimension (Ferri et al., 2023).

However, questions regarding the role of moral judgments attached to single-use plastics and how a moralisation of these materials affects the process of disciplining within the IASB case remain unanswered.

Chapter 8 – Evaluations of discipline

In this chapter, I discuss the judgements attached to organisational actors and technologies within the contexting (Asdal and Moser, 2012) activity in the IASB case. Moral evaluations related to the reliability (discipline) and unreliability (undiscipline) of entities are produced within the contexts invoked – with the contexting activity implying particular judgments. The 'Plastic Project' and 'Walno' stories are used as illustrations.

I examine how the contexting activity ('how') implies particular moral judgements of actors and technologies. By analysing the negotiations of the notions of discipline brought by the performance of various contexts, the moral load of single-use plastics (Hardin, 1998; Hawkins, 2006; Liboiron, 2016), i.e., 'what', and organisational actors that deal with these materials, e.g., the PPT and IASB plastic members ('who'), is examined. Hence, it is possible to observe how the moral judgments attached to these technologies and the notion of discipline address negotiations of moral positions.

Moral positions are here discussed as rules of membership (Sattlegger, 2021) within the process of disciplining, and both actors and actants are required to cover specific moral positions. Such positions reflect criteria for delegating (or disenrolling) entities within an actor–network and are invoked along specific CE contexts. Therefore, by invoking a certain context, plastic members and the PPT mobilise certain moral positions that plastics and organisations need to fit into to be enrolled within circular projects. The two stories 'Plastic Project' and 'Walno' are used to follow these negotiations that will lead to the moralisation of CE ideas and a moral dimension of disciplined plastics and organisations. This chapter concludes with reflections regarding how ANT aided our understanding of discipline and a summary of the research findings.

The moral dimension of single-use plastics

In this research, morality does not refer to attempts to articulate and discuss Moral Ethics (e.g., philosophers Aristotle's *Nicomachean Ethics*[16] and Immanuel Kant's

---

[16] Aristotle discusses the nature of practical reasoning and moral virtues, considered one of the foundations of the field of Moral and Ethics Philosophy (Hoffe, 2010).

Groundwork of the Metaphysics of Morals[17]). Morality is understood as evaluations of reliability, i.e., discipline, of entities within a certain invoked context (Asdal and Moser, 2012). Therefore, morality is about 'good' and 'bad' and how intuitive judgements of what is 'right' and 'wrong' are established within a context.

Evaluations of single-use plastics emerge from paying attention to the moral load of these materials and how actors interact with them. Within certain contexts, e.g., environmental NGOs and campaigns, e.g., Break Free From Plastic, plastic waste is seen as 'bad', 'out of place' (Douglas, 1966) because it is likely to leak into and pollute the natural environment, thus necessitating regulations and disciplinary actions. Hardin's (1998) and Hawkins' (2006) ideas help consider how a certain moral judgment is attached to waste materials and practices, and Liboiron's (2016) argument of single-use plastics identified as 'bad actors' connects the notions of moralised plastic waste and pollution.

Hardin (1998) posits that the call for garbage reduction implies moral expectations and possible public shame for actors that do not meet such expectations, and Hawkins (2006) suggests that the moral judgements attached to waste are normative, i.e., disciplinary codes and technical actions created by people to order waste in the 'correct' way. It seems that waste materials get moralised according to how people deal with them within a certain setting; the 'right' and 'wrong' placement of the materials, as well as the related performance of actors, impacts on the enactment of these technologies as 'in' and 'out of place' (Douglas, 1966). Similarly, Liboiron (2016) argues that the judgements attached to plastic waste depend on their 'polluting' behaviours linked to moral expectations of cleanness, e.g., plastics in the ocean have a negative moral connotation because environmental NGOs expect the ocean to be uncontaminated. Hence, single-use plastics become a moralised technology according to the 'right' placement those technologies are supposed to cover according to the invoked context. The interrelations between plastics' material dimension, i.e., their physical

---

[17] In this work, Kant aims to identify and corroborate the supreme principle of morality, the categorical imperative (Korsgaard, 2012).

characteristics that do not degrade and disappear in the ocean, and actors' expectations (social dimension, i.e., organisations' interests around plastics) of cleanliness and order within a particular setting (Douglas, 1966; Hardin, 1998; Hawkins, 2006; Liboiron, 2016) characterise the moral enactment of plastics.

It is important to notice that diverse types of single-use plastics are used in everyday life – why are only certain types considered 'bad actors'? It appears, once again, to be a matter of context (Callon, 1986; Asdal and Moser, 2012). It is worth considering two examples of commonly used single-use plastic items: single-use gloves and plastic straws. On the one hand, single-use plastic gloves used in hospitals are not considered intuitively 'bad'. In this context, plastic gloves are reliable because they keep the environment clean and safe for staff and patients by protecting from the diffusion of bacteria and other unsafe substances. Single-use plastic gloves are useful and essential within the hospital context and thus 'good'. On the other hand, single-use plastic straws served in drinks at a bar are intuitively considered 'bad', undisciplined, because of their prospective future as pollutants (Hawkins et al., 2015; Rip, 2009) and have been the object of policy regulations in several countries (e.g., the UK - Defra, 2024) and environmental charity campaigns (e.g., the Break Free From Plastic movement) toward reducing single-use plastics. The reason is that single-use plastic straws are not essential within the context of a bar or café – costumers do not rely on them for drinking or could use straws made of alternative materials that can be reused or recycled (e.g., paper).

Therefore, the context and its attached expectations regarding the 'right' and 'wrong' placement of technologies (wearing single-use gloves in a hospital is 'right'; having a plastic straw in your drink is 'wrong') matter to identify the moral dimension connected to the conceptualisation of disciplined ('good') and undisciplined ('bad') technologies and organisations. It is worth considering examples that feature plastics performing with diverse actors in different contexts. The two instances proposed by Hawkins' (2009) discussion around the moral values attached to plastic bags as well as the case of a German organic wholesaler that attempts to reduce plastic waste to meet expectations around environmental sustainability within their operations proposed by Sattlegger (2021) represent significant examples. Although Hawkins (2009) and Sattlegger (2021) do not specifically discuss the moral dimension of plastics or the idea of discipline – at

least not in the way these are discussed in this research – their examples help understand how moral evaluations of technologies and organisational actors are performed according to the invoked context. In fact, the authors bring illustrations of diverse settings with related material and social values and moral judgements attached to the placement of plastics.

It is pertinent to start with Hawkins' stories as they appeal to a broader understanding of what is considered 'good' and 'bad' in terms of plastics placement and the related organisational actors' behaviour within two different contexts.

In the 'Say No!' campaign example, Hawkins describes how movements to ban plastic bags have shaped consumers' behaviour and the perception of plastic bags. Being recognised as one of the most likely plastic items to pollute the natural environment (and, therefore, to end up in the 'wrong' place), plastic bags are seen as hazardous, and people advocate for banning them. According to a certain shared system of values that demonises plastic bags, shoppers must use reusable bags. The mobilisation of 'category-imperative' seems to enact a system of prohibitions that leads to judgements on plastic bags as morally 'bad', undisciplined; single-use plastics have become the moral intermediaries of the undiscipline of Global North consumers (they use plastic bags, a common polluting item) when they are not strictly relying on it for their shopping. The bags are not essential within that context as consumers have the choice to use reusable bags (e.g., canvas bags) for shopping. The context invoked by supermarket consumers seems to invite people and technologies to occupy specific roles to be considered 'good', disciplined. Consumers are required to demonstrate that they are 'ethical' and need no use of plastic bags to show their discipline. Plastic bags need not to be used as they are never 'good' and are always enacted as undisciplined in this context. Thus, these technologies represent the instrument in which the moral status of consumers can be enacted and displayed within the context invoked.

The Adidas advertisement example presents a distinct context. Hawkins looks at the performativity of plastic bags transformed into a football by a child who collects them from a road in a South American slum. Although the material composition of plastic bags has not changed, single-use plastics are enacted in a positive way – they are disciplined

218

within the context of a Global South child crafting themselves a toy to play with. Plastics become 'good' because they are used by an actor who relies on them for something morally positive or essential (e.g., a toy). The invoked context has changed, as have the actors interacting with single-use plastics – these technologies, so demonised in the 'Say No!' campaign example, become the moralised intermediaries of the concept of discipline in this example.

Figure 11 - Caption of the mentioned Adidas ad, available on YouTube: https://www.youtube.com/watch?v=4tyoaxiNHg8

Hawkins' (2009) examples highlight the significance of the context (and the contexting activity) in moralising single-use plastics and actors as disciplined and undisciplined. The 'right' position for actors and actants to cover according to each of these contexts is different; thus, the moral judgement of plastics and humans interacting with these technologies change. Thus, the same type of single-use plastic is enacted as 'bad' and 'good' depending on what, i.e., plastic technologies (material values), performs with who and their interests (social values) and how certain the context invoked, e.g., capitalistic consumerism in the Global North (first example) and underprivileged ingenuity in the Global South (second example). The moral load attached to actors in

Hawkins' instances contributes to enacting plastic bags as 'good' and 'bad'. On the one hand, Global North consumers who use avoidable plastic bags are undisciplined as they contribute to plastic pollution; thus, plastics are undisciplined because, through their prospective future (Rip. 2009), they contribute to pollution as well. On the other hand, a Global South child who crafts themselves a toy with plastic bags is 'good', as their desire to have a football and play presents a positive moral load. Thus, single-use plastics are used to make that toy become 'good', disciplined. These examples help demonstrate how the moral accountability of organisational actors and materials are interrelated and inherent to a specific context – i.e., the same plastic bags are 'bad' whilst interacting with undisciplined supermarket consumers in the Global North and 'good' whilst performing with a child in the Global South, a morally positive figure within the Adidas ad campaign invoked context.

Sattlegger's (2021) instance of the German wholesaler attempting to reduce single-use plastics is used to follow up on the moral significance of the context showcased in Hawkins' examples and demonstrate further how entities are judged according to the invoked context. In this case, similar plastic technologies are enacted as 'good' (disciplined) and 'bad' (undisciplined) differently within the same setting. Hence, this illustration invokes two levels of moral evaluation of entities: a broader one that invokes a conceptualisation of single-use plastics as disciplined depending on their ability to stay within official waste management systems (and avoid polluting the natural environment); and a more detailed evaluation, which depends on who performs with what type of plastics and the context they invoke. Thus, Sattlegger's example underlines the importance of paying attention to what and who perform, how they do so, and the specific context invoked.

In this case, Sattlegger problematises the process of translation of interests around the withdrawal of plastics (seen as a way to move toward a sustainable business model) and discusses the 'rules of membership' around the concepts of acceptable ('good', reliable, the 'right' placement) and non-acceptable ('bad', unreliable, the 'wrong' placement), which are linked to the ideas of discipline and undiscipline within the context invoked in his research. Because it is difficult to withdraw plastics altogether as they are highly embedded in business operations, the company opts for reducing the generation of

plastic waste by substituting non-reusable, non-recyclable plastic films with reusable plastic strips to package their goods. They do not implement something new, e.g., an alternative material to plastics (strips are still made of plastics) but renegotiate their attachment to this technology by mobilising a version of plastics that is acceptable according to their sustainability agenda, i.e., reusable plastic strips. Such a conceptualisation of discipline, however, encounters resistance from the warehouse workers that see their operations as changed. They enact a series of acts of resistance that moralise the reusable plastic strips as 'bad', undisciplined, in favour of the non-recyclable plastic films.

Sattlegger discusses the complexity of rules of membership in a network, i.e., what and who is delegated and what and who needs to be translated or disenrolled (therefore, left to their erratic behaviour – Latour, 1988a) according to the context invoked. However, it seems that two contexts are invoked at the same time: the company's sustainability agenda and the warehouse workers' resistance to change.

On the one hand, reusable plastic strips and the staff who support this solution are considered 'good', 'in place', disciplined (what and who is delegated). Accordingly, plastic strips become the moral intermediaries (to speak with Hawkins, 2009) of the concept of discipline within the context invoked by managers. Non-recyclable plastic films and the warehouse workers who prefer them to the new strips become 'bad', 'out of place' (Douglas, 1966), undisciplined (what and who needs translation or risk disenrollment). There are, therefore, specific moral positions that need to be covered by technologies and actors to be mobilised. In this respect, reusable plastics represent the ideal of discipline within the German organic wholesaler's sustainability agenda, and the company's staff is required to support this concept of 'good', 'in place' by using plastic strips to show their discipline. Because the warehouse workers resist the implementation of the reusable plastic strips (the new ideal of discipline), they need translation, i.e., to be disciplined. Thus, they would be able to fit the moral position required by actors within the sustainability context invoked by the organic wholesaler managers. On the other hand, managers and plastic strips are seen as 'bad', undisciplined, because they represent a change imposed from above, which several warehouse workers do not support and actively resist by continuing to use plastic films.

Plastic films are seen as disciplined and display the positive moral status of the workers (a moral intermediary). From the workers' perspective, it is managers and plastic strips that need disciplining.

The different enactments of discipline within Sattlegger's example aid our understanding of how moral evaluation is performed according to the invoked context – with organisational actors and technologies sharing moral accountability.

Abstract and Network moralities
Sattlegger's (2021) example and Hawkins' (2009) instances, although not focusing on the morality of plastics and the idea of discipline, show the need to consider the moral dimension of single-use plastics as a set of complex dynamics between social, material and moral values. Both authors, in describing the interrelations between organisational actors and plastic technologies, seem to imply the presence of criteria for actors and actants to meet to be mobilised within the network (i.e., to be enacted as 'good', disciplined) or otherwise disenrolled (seen as 'bad', undisciplined). Such criteria are broader, abstract types of 'good', (e.g., non-polluting plastics), and specific applications of such abstract ideals within a particular network (e.g., reusable plastic strips and managers who support the implementation of them at the organic warehouse or plastic bags used by a child to make a toy in a developing country). In this respect, it is possible to identify an abstract moral value attached to plastics and actors dealing with them, and a value that is the product of the interrelations between technologies, actors and ideas within a particular network.

Abstract moral values are mobilised by organisational actors when they invoke a context with attached a broader understanding of 'right' and 'wrong' placement. In Hawkins' (2009) 'Say No!' campaign example, the context invoked is the one related to environmental NGO campaigns against plastic pollution, which implies that single-use plastics (e.g., plastic bags), once they become waste, are pollutants (Hawkins et al., 2015); thus, they should not be used (e.g., the Break Free From Plastic global movement) considering their prospective future (Rip, 2009). These are (automatically) placed 'wrongly' once thrown away. In the Adidas ad instance, however, the context invoked relates to different broader, abstract ideals about the right for a child to play in spite of their difficult social and economic background (a South American slum). Thus, even

when invoking abstract moral values, the context matters as judgements of 'good' actors are enacted within a certain context.

In the first instance, supermarket customers in the Global North see plastic bags as undisciplined because they are a symbol of Western society's failure to withdraw plastic consumption – plastic bags are unessential technologies. Therefore, these technologies become moral intermediaries of the undiscipline of consumers, who opt for the 'easy' option and buy plastic bags rather than using a reusable alternative (e.g., canvas bags). However, within the context invoked by a child in the Global South, they become the moral intermediaries of the idea of discipline as they are materials the child relies upon to make a toy – with the child being a 'good' member of the network by attempting to do something considered morally acceptable like crafting a football for playing. These examples highlight the interconnectedness of the moral accountability of people and technologies.

Network moral values are the product of the negotiations of abstract moral values within a specific network; echoing Sattlegger (2021), these values represent the translation of abstract rules of membership into network ones (i.e., what does it take to be a 'good' member within a certain network?). The context invoked comes with abstract ideals of what is disciplined and undisciplined. Similar abstract moral values in Hawkin's (2009) 'Say No!' campaign example are mobilised by Sattlegger's (2021) German organic wholesaler, which considers unnecessary single-use plastics as 'bad'. In particular, a CE context commonly considered within the European sustainability business landscape that sees the generation of plastic waste as an issue solvable through material 'closed-loop' systems (Esposito et al., 2018; Calisto Friant et al., 2020; Corvellec et al., 2020a; Lacy et al., 2020) is invoked in this case. Furthermore, because of plastics' distributed agency (Latour, 1987, 1988a), organisations and consumers dealing with these materials become undisciplined (e.g., 'polluters') in consideration of their contribution to pollution by using such materials.

However, through the contexting (Asdal and Moser, 2012) activity, those ideals are translated into something specific to the predominant context enacted. In the German wholesaler case, two types of plastic packaging are enacted, respectively, as disciplined and undisciplined according to the contexts invoked by organisational actors (i.e.,

managers and warehouse workers) to support their agendas, i.e., the use they make of plastics. According to the managers, reusable plastics are evaluated as 'good' and get enacted as disciplined because they make the company look sustainable (despite avoiding the withdrawal of plastics). Therefore, managers and the company are able to occupy the moral position of 'sustainable business' (i.e., 'good') enacted by the context they invoked, whilst plastic films are single-use and non-recyclable, i.e., undisciplined, because they are likely to contribute to pollution. However, from the warehouse workers' perspective, plastic films are disciplined because the use of this material allows them to avoid changing their operations. Instead, reusable plastic strips are evaluated as 'bad' because they represent the transformation managers imposed on them. The context invoked by the warehouse workers, different from the one invoked by the managers, presents diverse moral positions to be occupied for entities to be considered 'good', disciplined members.

With the two diverse contexts invoked by managers and warehouse workers within the same actor–network, different moral positions are mobilised: thus, diverse network moral values are enacted. Through the contexting activity performed, one predominant context will emerge, and the final concepts of discipline and undiscipline will be enacted. Hence, the contexting activity shows a further degree of complexity when it comes to enacting network moral values.

Hawkin's (2009) and Sattlegger's (2021) examples help us pay attention to the negotiations of moral positions within the contexting activity. By following the performance of moral positions enacted within the contexts, it is possible to identify two levels of moral evaluations of actors and technologies – analytically distinguished but clearly connected. For example, in Sattlegger's case, abstract moral values related to the CE context commonly considered within the European sustainability business landscape were invoked and then negotiated according to the specific German wholesaler's actor–network requirements.

Thus, the level that looks at broader, abstract ideals of what is morally positive, (disciplined) and morally 'bad' (undisciplined) can be called abstract morality. The level that represents the application of abstract moral values within a particular network could be called the network morality. Because diverse contexts can be invoked and

224

different moral positions mobilised within the same actor–network (e.g., Sattlegger's organic wholesaler example), it is possible to say that there are various network moralities, as many as the translations of an abstract morality at a network level. Thus, there are several conceptualisations of discipline and undiscipline associated to network moralities.

IASB's moralities

Following up on Hawkins' (2009) and Sattlegger's (2021) examples of the moralisation of plastics and organisational actors and the role of contexting activity, the 'Plastic Project' and 'Walno' stories are used to show the dynamics that enact the IASB's abstract and network morality. Following up on the material semiotic analysis, these two anecdotes are considered to explore the negotiations of moral positions between the PPT and the plastic members, their interests, single-use plastics, CE ideas and understanding of the plastic crisis at an abstract and network level. The 'Plastic Project' story is used to outline the IASB's abstract and network morality and considers the IASB's CE contexting. The 'Walno' story shows the negotiations between two network moralities, the PPT's and Walno's, and how such performance might enact diverse ideas of discipline and undiscipline. These stories also show how the moralisations of discipline and undiscipline impacted on plastic members that, alongside single-use plastics, got enacted according to the IASB's morality.

IASB's abstract morality and network morality

The 'Plastic Project' story helps identify how abstract and network moralities related to the IASB's CE contexting activity and evaluation of 'good' (disciplined) and 'bad' (undisciplined) entities.

The 'IASB's CE agenda' story outlines what could be considered this organisation's abstract morality. Because of its proximity to CE ideals, the IASB's abstract morality could be called CE morality. By negotiating CE contexts in designing the organisation's circularity agenda, the IASB, their members and single-use plastics enacted two translations of the CE (Translations 1 and 2 in Table 15):

- Translation 1: CE as a business model "[…] to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability." (IASB's Organisations Guide to Circularity, 2019, p. 4)
- Translation 2: CE for plastics as enacted by IASB plastic members, focused on material management and technocentric practices, i.e., reusing/recycling.

Differently than Hawkins' (2009) and Sattlegger's (2021) examples, in which the abstract morality clearly referred to specific ideals of disciplined and 'good' plastics and organisational actors, the IASB case presents a certain degree of complexity due to the involvement of plastic members in designing the organisation's CE agenda. This generated two slightly different translations of circularity, with one related to a CE for plastics. To navigate such complex dynamics, it is possible to distinguish two types of IASB CE morality criteria: relationality and technocentric (Ferri, 2024).

Relationality criteria (Ibid.) addressed a general re-thinking of "the relationships between natural resources, materials, technology, consumers, and the industry to create a sustainable future […]" (IASB's Organisations Guide to Circularity, 2019, p. 4). The Organisations Guide to Circularity, inspired by circular society attitudes (Calisto Friant et al., 2020), aspired to a holistic approach by highlighting the need to re-organise relationships between material values, i.e., natural resources, materials, technology, and social values, i.e., consumers and business. Changing the dynamics between these entities and values would transform the global economy. Specifically, holistic criteria for enacting plastics as disciplined, as part of the eight undisciplined materials mentioned in the Guide (i.e., steel, aluminium, plastic, cement, glass, wood, primary crops and cattle), seemed to consider the ability of such materials to interrelate with natural resources, technology, consumers, and businesses in a circular way.

The Guide provided some examples, among which instances of how to discipline 'bad' single-use plastics, e.g., the recycler Fly' and retailer Star's circular initiatives (p. 162). As seen before, these two instances touched upon ideas such as saving natural resources (i.e., Fly's attempt to produce high-quality rPET, a way to save petroleum for producing virgin PET) and bringing social benefits by improving local economies in developing countries (i.e., Star building waste management and recycling infrastructure imply

creating jobs within a developing economy). These ideas addressed the IASB's 'circular society' aspirations by bringing attention to interrelations between industry (e.g., the companies Fly and Star), materials (plastic packaging), resources (petroleum to produce virgin PET), consumers (local community) and technology (waste management and recycling infrastructures). However, plastic members' initiatives seemed to refer to the IASB's circular society aspirations as an additional benefit related to their reusing/recycling operations (e.g., producing rPET in the Fly's example, and building waste recycling infrastructures in Star's one) – such aspirations did not seem to be the intended outcome, but rather a 'plus' to an existing practice (reusing/recycling).

Technocentric criteria referred to those material-focused and technical practices concerning the idea of making plastics circular within the Guide (Ferri, 2024). As seen before, by invoking a CE context that supported technocentric practices, plastic members seemed to distance themselves from the IASB's 'circular society' discourses, diluted the organisation's CE holistic agenda and enacted a particular CE for plastics inside the overall IASB's agenda. Therefore, regarding plastics, the Guide brought the plastic members' examples of creating 'closed cycles' where materials preserved their highest value and there was no waste generation. Fly and Star reported examples focused on recyclability, respectively, in recycling PET to produce high-quality rPET and enhance the quality of waste management and recycling infrastructure in developing economies. In this respect, technocentric criteria seemed to focus on the moral positions that re-evoke CE optimistic discourses (Calisto Friant et al., 2020) and privilege the physical characteristics of single-use plastics that allow reusing/recycling. This translation gave rise to the IASB's CE morality technocentric criteria.

The IASB's abstract ideals of the concepts of discipline and undiscipline, i.e., the rules of membership actors and actants are required to obey to be mobilised (Sattlegger, 2021), relate to single-use plastics evaluated as 'good' (disciplined) according to the relationality and technocratic criteria produced within the IASB's holistic CE context. These criteria are connected to the two CE translations that populate the IASB's circularity agenda; technologies are disciplined when included within waste management systems, do not leak into and pollute the natural environment, represent a resource for local economies by design (Translation 1) and are reusable/recyclable

(Translation 2). Given the distributed agency of plastics, organisations needed to support such criteria through their operations to be enacted as disciplined alongside materials. However, plastics were undisciplined when escaping waste management systems, polluting the natural environment and constituting an issue for local economies. Organisations were undisciplined when allowing plastics to leak into and pollute the natural environment and not supporting local economies through reusing/recycling activities to tackle the plastic issue.

Moving on to the IASB's network morality, this was represented by the PPT's Plastic Project as described in the 'Plastic Project' story. This story details James and Nicola's work toward designing and scoping an IASB CE plastic project, i.e., the Plastic Project. To do so, they reached out to IASB plastic members via email and setting up meetings and calls to understand their needs and interests around plastic circularity. They attempted to design the Plastic Project in a way that met members' interests around plastic circularity and IASB expectations related to the PPT value added within the organisation. James and Nicola's efforts could connect to Sattlegger's (2021) German organic wholesaler's managers, who attempted to apply their sustainability agenda to show their 'green' practices (e.g., reducing plastic waste) according to the European sustainability business landscape whilst continuing to deliver the service costumers expected from them.

To design the Plastic Project, James and Nicola seemed to invoke the IASB's CE for plastics context (i.e., the plastic members' translation of the organisations' circularity agenda) rather than the IASB's holistic CE context when they started to develop the Plastic Project. For example, the objectives stated in the 'Plastic Project' document, i.e., "a) develop business solutions to reach 100% recyclable single-use plastics, b) create 'circular economies' for recycled materials, c) and promote actions toward tackling the plastic crisis" (Plastic Project, 2019, p. 1), evoked Fly's and Star's examples, i.e., business solutions focused on recycling to tackle plastic issues. Leaving behind the relationality criteria that connected to IASB and the CEP holistic aspirations, James and Nicola's Plastic Project invoked only the technocentric criteria, as echoed in objectives A and B. Objective C, i.e., to promote actions toward tackling the plastic crisis, aimed to demonstrate the added value of the Plastic Project to IASB plastic members by showing

how the initiative's goal was to help them tackle the challenges brought by the plastic crisis (i.e., loss of reputational capital and financial challenges).

Although being inspired by the IASB's CE for plastics, the Plastic Project represented the third translation of the CE agenda within the IASB case (see Table 15, Translation 3). Abandoning the emphasis on contributing to local economies and reusing practices previously mentioned in the second translation, the 'Plastic Project' document did not provide instances of circular economies for recycled materials or how to reach 100% recyclable plastics, but it explained disciplined plastics as recyclable materials. Organisations needed to support such enterprises by facilitating plastic recyclability to be recognised as disciplined alongside technologies. Table 17 summarises the ideas around abstract and network moralities with examples from the 'Plastic Project' story.

Type	Definition	Examples	Criteria	Examples
Abstract morality	Judgements that define 'in' and 'out of place' in a specific context	The IASB's CE agenda for plastics	Relationality criteria: emphasise the interrelations between industry, materials, resources, consumers and technology	Fly and Star meant circularity as practices that connected resources, local communities, industry, materials and technology (pp. 178–181) Fly and Star emphasised recycling and building waste management infrastructures as circular practices (pp. 178–181)
			Technocentric criteria: material-focused and technical practices	
Network morality	The translation of abstract morality into particular instances	The Plastic Project	Particular criteria may vary	The Plastic Project stressed the focus on IASB CE morality negotiated technocentric criteria, e.g., recycling, and excluded relationality criteria

Table 17 –   Summary of the ideas around abstract and network moralities with examples from the 'Plastic Project' story

By mobilising negotiated technocentric criteria related to recycling practices and translating the CE agenda into the verbal equation 'CE = recyclability', the PPT seemed to enact a new, particular CE for the plastics context, different from the IASB's one (second translation, see Table 15) as it focused solely on recycling practices. Such a context could be defined as the PPT's CE for plastics context and was enacted by the performance between single-use plastics' material value and the PPT and plastic members' social values that focused on recyclability criteria more than reusability as demonstrated by the Fly and Star examples in the Organisations Guide to Circularity (2019, pp. 6, 10). By mobilising plastic members' understanding of disciplined plastic, the PPT translated the rules of membership from reusability/recyclability (as it was enacted within the IASB's CE for plastics context) to solely recyclability; therefore, within the PPT's CE for plastics context, disciplined technologies were recyclable, and organisations were delegated on the basis of their support to plastic recycling operations.

Negotiations of moral positions
Following the process of translation of the IASB's CE agenda for plastics and the moral dimension of disciplined technologies and organisations, the 'Walno' story can provide empirical insights regarding the contexting activity at the network morality level and how specific rules of membership (Sattlegger, 2012) were enacted when diverse CE contexts were invoked.

This story outlines the PPT attempts to enrol a large retailer, Walno, into the Plastic Project. Being an IASB member, Walno mobilised similar CE ideas to the PPT; therefore, they seemed to invoke a similar CE morality (abstract). When James and Nicola started collaborating with the company, Walno was already promoting internal circular initiatives regarding plastic packaging and wanted to design and scope a new global project that focused on either reusing or recycling practices. That goal re-echoed objective A of the Plastic Project "to develop business solutions to reach 100% recyclable single-use plastics" (Plastic Project, 2019, p. 1), which looked at recycling as a possible way to discipline plastics. It seemed that Walno, like the PPT, invoked the IASB's CE for plastics context and, therefore, the plastic members' dilution of the EMF's circularity

philosophy, i.e., a focus on waste material management practices, i.e., reusing/recycling. So, both organisations invoked similar technocentric criteria.

A second similarity regarded relationality criteria. Walno and the IASB (through the PPT) interrelated with single-use plastics understood as a performative technology (Latour, 2013; Beyes at al., 2022). Walno saw plastics as relational, i.e., these materials needed to be dealt with within the "consumer packaging value chain" (Walno-PPT email correspondence, 2019, p. 1), acknowledging that there were relationships (between technologies and organisations) to re-think to achieve circularity. Although the Plastic Project did not consider the IASB's relationality criteria, Walno shared this with the IASB's CE morality, which aimed to re-think "the relationships between natural resources, materials, technology, consumers, and the industry […]" (IASB's Organisations Guide to Circularity, 2019, p. 4). Despite invoking IASB relationality criteria, according to the data collected, it seemed that the retailer did not mention any form of support to local economies and saving natural resources as mentioned by the plastic members' in the IASB Guide. Therefore, Walno appeared to be in line with the PPT's network requirements as the organisation invoked a CE context that privileged material-focused and technocentric practices.

Although the above similarities and Walno seemed the perfect ally (Latour, 1987) for the PPT, after a few weeks, Walno's Sustainability Director explained how the retailer was not interested in pursuing a project with the IASB and that they decided to launch their own project, named 'Reusing Plastic Packaging', the goal of which was to reach "100% reusable packaging by 2025 […]" (Walno-PPT email correspondence, 2019, p. 5).

Similarly to the warehouse workers and managers at the German organic wholesaler (Sattlegger, 2021), Walno and the PPT translated two diverse ideas of disciplined plastics for the same type of plastics within the same network. In doing so, the organisations also translated diverse rules of membership within the network. Although still invoking a similar CE morality to the IASB, the member decided to translate those abstract criteria into a network morality focused on reusing rather than recycling, diverging from the technocentric criteria enacted by the PPT's Plastic Project. Although the PPT and Walno invoked the same CE context (the IASB's CE agenda for plastics) and similar enactments

of discipline (i.e., reusing/recycling), Walno's circularity agenda did not translate as disciplined within the PPT's network morality, which focused solely on recycling (i.e., the third translation of the CE agenda within the IASB case - see Table 15, translation 3). Therefore, reusable single-use plastics became undisciplined within the PPT's network morality, and, not obliging to the PPT rules of membership, Walno got disenrolled from the Plastic Project.

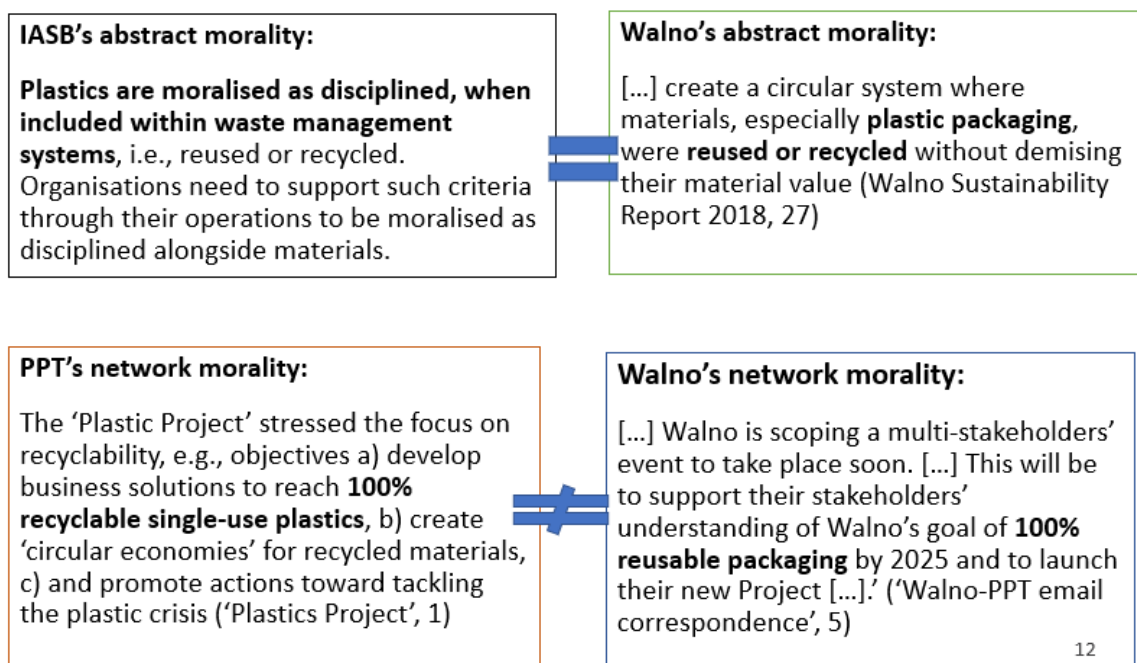A summary of the moral negotiations between the PPT/IASB and Walno is presented below.

IASB's abstract morality:

Plastics are moralised as disciplined, when included within waste management systems, i.e., reused or recycled. Organisations need to support such criteria through their operations to be moralised as disciplined alongside materials.

Walno's abstract morality:

[...] create a circular system where materials, especially **plastic packaging**, were **reused or recycled** without demising their material value (Walno Sustainability Report 2018, 27)

PPT's network morality:

The 'Plastic Project' stressed the focus on recyclability, e.g., objectives a) develop business solutions to reach **100% recyclable single-use plastics**, b) create 'circular economies' for recycled materials, c) and promote actions toward tackling the plastic crisis ('Plastics Project', 1)

Walno's network morality:

[...] Walno is scoping a multi-stakeholders' event to take place soon. [...] This will be to support their stakeholders' understanding of Walno's goal of **100% reusable packaging** by 2025 and to launch their new Project [...].' ('Walno-PPT email correspondence', 5)

12

Figure 12 -   Negotiating moral positions. The PPT/IASB and Walno. Credits: Marta Ferri

The moral dimension of disciplined single-use plastics and organisations

Within the IASB case, considering the material and social dimensions of single-use plastic waste helped enlighten the process of enacting disciplined and undisciplined technologies and actors. The political dimension of disciplined plastics showed how this process performed a certain agenda related to organisations' interests, i.e., social values. This political dimension, being based on organisations' social judgements on single-use plastics and their agendas toward these technologies, demonstrated a connection to moral positions that got invoked together with CE contexts and related enactments of the idea of discipline. Such moral positions referred to specific rules of

membership (Sattlegger, 2021) for organisational actors and materials to be delegated within a particular actor–network (e.g., the Plastic Project).

Furthermore, single-use plastics are moralised technologies (Hardin, 1998; Hawkins, 2006; Liboiron, 2016) according to their material value, i.e., the performance of their physical characteristics with actors' agendas in tackling the plastic crisis within the context invoked. Within the IASB case, technologies performed as moralised intermediaries (Hawkins, 2009) of the concepts of discipline and undiscipline enacted within IASB CE contexting activity.

The moral dimension of disciplined single-use plastics and organisations emerged by following the negotiations of moral positions associated with the CE contexts invoked – showing how the contexting activity can become 'morally charged', i.e., the moral evaluation of entities is performed within the context. The 'unruly' (Hodder, 2012) material composition of plastics demonstrated performativity when interrelating with organisational social values by disrupting or supporting the IASB, plastic members, external organisations (e.g., SOF attendees) and their interests concerning plastics. Paying attention to how single-use plastics and organisations got moralised, i.e., the negotiations of moral positions within the IASB's CE contexting, brought insights into complex organising processes such as the performing CE solutions to tackle the plastic crisis.

Whilst the IASB's CE agenda was the enactment of the IASB's abstract morality, the PPT's Plastic Project represented a particular translation of those abstract criteria into a network morality.

According to the IASB's CE morality, single-use plastics were judged as 'good' (disciplined) when reusable/recyclable. These technologies were the moralised intermediaries (Hawkins, 2009) of this abstract morality. Because of the context invoked, plastic members were invited to occupy the moral position of 'reusers/recyclers' to be seen as disciplined and mobilised within the IASB's CE for plastics. In other words, because of plastics' distributed agency (Latour, 1987, 1988a), plastic members, for being judged as disciplined, needed to facilitate plastics to be reusable/recyclable by including these technologies within waste management systems.

233

This happened when members aligned with the IASB's CE agenda and joined the Plastic Project, demonstrating how the moral accountabilities of technologies and organisations are interrelated when organising CE solutions.

For example, in the Organisations Guide to Circularity, Fly and Star were disciplined because they supported the IASB CE morality technocentric criteria "[…] procure high-quality recycled PET flakes that have the same properties as virgin materials, and that can be used to produce r-PET plastic bottles" (Fly, Organisations Guide to Circularity, 2019, p. 6) and relationality criteria "giving a second-life to plastic packaging through educating the civic society to sort plastics correctly and funding recycling centres in local communities in South America" (Star, Organisations Guide to Circularity, 2019, p. 10).

However, joining the Plastic Project for organisations and materials meant covering moral positions that referred to that specific network morality. Plastic members and single-use plastics were required to meet criteria showcased as objectives A and B in the 'Plastic Project' document, i.e., "a) develop business solutions to reach 100% recyclable single-use plastics, b) create 'circular economies' for recycled materials" (Plastic Project, 2019, p. 1). Plastics became the moralised intermediaries of the translated idea of discipline, i.e., they needed to be recyclable, whilst organisations had to facilitate that, e.g., through building new or enhancing present waste management infrastructures and designing 100% recyclable materials. Hence, if plastics needed to cover the moral position of 'recyclable technologies', plastic members had to occupy the one of 'recyclers'. In the eventuality that actors and actants did not meet such criteria, they needed to be disciplined or risked, like Walno, being excluded from the Project.

The 'Walno' story demonstrated how actors that invoked similar abstract moralities could enact different network moralities by mobilising diverse CE for plastics contexts. At an abstract level, Walno and the PPT invoked the IASB's CE morality (i.e., the IASB's CE for plastics context, the second translation of the IASB's CE agenda – Table 15), but their respective network moralities seemed to invoke slightly different rules of membership, diverse enough to exclude Walno from the Plastic Project. On the one hand, the PPT's network morality mobilised the team's CE for plastics context that focused on recyclability criteria. On the other hand, Walno considered reusing; thus, the

plastic member invoked a diverse CE for plastics context (although still in line with the IASB's one) and enacted a different network morality to the PPT. Consequently, Walno could not fit in the moral position the PPT's context invited the member to occupy (i.e., 'recycler'). Therefore, Walno disenrolled from the PPT's Plastic Project to work on their own CE plastic initiative.

The 'Walno' story also highlighted plastics' distributed agency. Once moralised as disciplined when reusable within Walno's network morality, this particular enactment of plastics became undisciplined, 'out of place' (Douglas, 1966), within the PPT's network morality, i.e., the Plastic Project. Like the technologies (i.e., reusable plastics), Walno became undisciplined within the Project, demonstrating how the moral accountabilities of materials and organisations were connected and shown through plastics' distributed agency.

Paying attention to the moral dimension of disciplined single-use plastics and organisations helped observe the complex dynamics of organising a CE for plastics. The interrelations between single-use plastics (what), the IASB, Walno and the other plastic members (who), the CE contexts invoked (what), and understandings of the plastic crisis (what) became a matter of morality, substantiated by single-use plastics that, as a technology, acted as a moralised intermediary of the notion of discipline.

IASB CE as a moral project
The moral dimension of disciplined single-use plastics and organisations enlightened the negotiations of moral positions at an 'abstract' and 'network' level within the IASB's CE contexting. These interrelations stressed moral connotations of the process of disciplining technologies and organisations through organising a CE for plastics – demonstrating how the contexting activity becomes 'morally charged' when performed in CE contexts. Following the translation of the definition of the CE within the IASB's contexting activity, this study showed the transformation from the IASB's CE morality (the second translation of the CE ideas within this study, i.e., the IASB's CE for plastics context) to the PPT's network morality (the final translation invoked within the PPT's CE for plastics context).

To navigate the process of translation and the diverse contexts invoked and their link to the IASB's moralities, I propose a summary of the connections between moments of translation of the CE agenda within the IASB's contexting activity, the CE contexts invoked, levels of morality and attached notions of discipline.

The process of translation of the CE ideas within the IASB case started from the EMF's circularity philosophy inspiring the IASB's holistic CE context (first translation) that mobilised a holistic business model and referred to design and examples of reuse and recycling as CE practices, whilst aspiring to circular society discourses (Calisto Friant et al., 2020). Through the contexting activity, it was translated by the plastic members into the IASB's CE for plastics context, which invoked more technocentric and material-focused practices in line with what Calisto Friant et al. (2020) discussed as CE discourses. Plastic members that focused on single-use plastics amongst the eight polluting materials mentioned in the Organisations Guide to Circularity (2019, p. 9) considered the idea of design only as a means to reusing/recycling practices, seen as the real goals of their CE for plastics agenda (second translation). The notion of the CE finally diluted further and transformed into the PPT's CE for plastics context that could be summarised as 'circularity = recyclability' with the Plastic Project and the PPT's attempts to increase their allies and delegate plastic members. This final translation of circularity and attached notion of discipline were presented at the Pro Members meeting in Autumn 2019, where the team launched the Plastic Project, the IASB's response to the plastic crisis.

In the first moment of translation, the IASB's holistic CE context (abstract morality) recognised circular solutions as a set of business models (Dzhengiz et al., 2023) able to 'transition' productivity and efficiency toward a sustainable approach to save our planet (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020).

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 1 - CE as a business model "[...] to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability." (IASB's Organisations Guide to Circularity, 2019, p. 4)	The IASB's holistic CE context	The IASB's CE morality [abstract] (relationality criteria)	Related to technologies being included within waste management systems that do not leak into and pollute the natural environment and represent a resource for local economies by design, with organisations supporting practices that re-think relationships between businesses, materials, government and civil society and design materials as a resource for local economies

Table 18   - Extract I, Table 40, Appendix VII

By mobilising relationality criteria, the organisation paid attention to the relationships between "natural resources, materials, technology, consumers and the industry" (IASB's Organisations Guide to Circularity, 2019, p. 4), acknowledging the role of diverse actors toward transitioning to circularity. The IASB's CE morality seemed to mobilise what Kirchherr et al. (2023) define as enablers, such as businesses (IASB members), governments (mentioned as 'policymakers' in the Organisations Guide to Circularity), and consumers. These enablers performed with single-use plastic technologies (i.e., the "materials" invoked in the IASB's definition of circularity) in an attempt to discipline the materials (plastics being part of the eight problematic materials mentioned in the Guide - 2019, p. 9).

The second moment of translation is still tied up in the enactment of the IASB's abstract morality, related to plastic members focusing on technocentric approaches, like reusing/recycling, attention that confirmed how these practices often represented the core principles of CE ideas invoked by businesses (Kirchherr et al., 2017, 2023). It also reiterated the notion of the CE as a 'closed-loop' (Dzhengiz et al., 2023) to keep "products and resources in use for as long as possible, and, at the end of use, cycling (or 'looping') [...] materials back into the system in a zero-waste value chain" (Lacy et al., 2020, p. 35).

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 2 – CE for plastics as enacted by IASB plastic members, focused on material management and technocentric practices, i.e., reusing/recycling	The IASB's CE for plastics context	The IASB's CE morality [abstract] (technocentric criteria)	Related to reusing/recycling practices, with organisations supporting this enactment through their operations

Table 19   - Extract II, Table 40

This approach stressed the focus on waste technologies and ways to make "waste disappear" (Corvellec et al., 2020a, p. 97), excluding the relational dimension from the IASB's enactment of the CE for plastics and concentrating on technologies' material dimension, which addressed circularity discourses as techno-fixes to waste (Calisto Friant et al., 2020). Because plastic members' technocentric examples of how to organise circular plastic technologies were mobilised as instances of circularity within the IASB's holistic CE context (they featured in the Organisations Guide to Circularity), it could be said that the IASB's CE morality mobilised plastic members' moralisation of discipline as related to reusing/recycling. Such an enactment of discipline became the technocentric criteria within the IASB's abstract morality and demonstrated a focus on the material dimension of plastics.

The third and final moment of translation of the IASB's CE agenda represented the PPT's CE for plastic context (i.e., the PPT's network morality) and was enacted by the material semiotic relationships that produced the Plastic Project. The team focused on single-use plastics' material dimension and recycling as a synonym of circularity.

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 3 – CE for plastics as enacted by the PPT developing the Plastic Project, focused on material management and technocentric practices invoked by plastic members, i.e., recycling	The PPT's CE for plastics context	The PPT's network morality (negotiated technocentric criteria, i.e., recyclability)	Related to recycling practices, with organisations supporting this enactment through their operations

Table 20   - Extract III, Table 40

Mobilising IASB CE technocentric criteria (whilst leaving behind relationality criteria) reiterated the idea that the CE focused on a transition based on reframing waste (Dzhengiz et al., 2023) through material-focused activities, e.g., recycling, "to extend the productive life of resources […] […] to delay or prevent landfilling or permanent disuse" (Blomsma and Brennan, 2017, pp. 603–608) of materials. This final translation represented an iteration of existing practices (i.e., recycling) that, although promoted as solutions to the plastic crisis, did not stop in the first instance. Thus, recycling practices could be defined as business-as-usual operations that matched plastic members' interests also in consideration of these organisations' attempts to recycle plastics – as demonstrated by the examples presented in the Organisations Guide to Circularity (2019, pp. 6, 10), their sustainability reports (Fly Sustainability Report, 2017, pp. 2, 6;

239

Blue Sustainability Report, 2018, p. 30; Star Sustainability Report, 2018, p. 13; Square Sustainability Report, 2019, p. 105) and data collected during the PPT meetings (e.g., Call with Happy, 2019, p. 2 – extract presented in Chapter 7).

The process of translation of the idea of the CE within IASB's contexting demonstrated how relationality and technocentric criteria were invoked to enact the notion of discipline. Each CE context invoked by the IASB, PPT and plastic members represented the product of negotiations between moral positions and mobilised relationality and/or technocentric criteria. Each negotiation ended with the inclusion or exclusion of particular requirements that either confirmed, disenrolled or re-enacted relationality and technocentric criteria at the network level – demonstrating how networks enacted certain values to assign to technologies and organisational actors and identify them as 'in' or 'out of place' (Douglas, 1966). For example, in the 'Walno' story, recycling was mobilised as a circular practice within the PPT's CE for plastics context but reusing was excluded, despite both practices featuring in the IASB's CE for plastics context, i.e., the IASB's CE morality technocentric criteria mobilised by the team. Included criteria and related notions of discipline (i.e., recycling) were considered moral, while the excluded criterion (i.e., reusability) was enacted as 'bad' and performed the idea of undiscipline.

Therefore, IASB CE contexting could be seen as a moral activity and the CE context that became dominant, i.e., the PPT's CE for plastics context, a moral imperative. Hence, in consideration of this final enactment of the IASB's CE agenda for plastics as strictly focused on recycling activities, it is possible to say that the IASB thought of existing practices, i.e., the recycling of single-use plastics, as a moral imperative and business as usual as moral. Hence, the IASB's initiative for plastics (the PPT's Plastic Project) launched during the Pro Members meeting in Autumn 2019 could be seen as a 'moral project'. This idea draws upon Gregson et al.'s (2015) discussion on the CE as a 'moral economy' within the European business landscape. Considering the European Commission's CE call for action that targeted businesses and governments to transition toward circularity business models, these authors recognised that there were 'right' and 'wrong' ways of keeping the materials circulating. For example, re-thinking waste as a resource through global recycling networks was increasingly considered a 'wrong' way

as it moved materials (resources) outside the European borders; local circularity, i.e., local recycling enterprises, was, instead, considered morally correct.

Because implying that there were 'right' and 'wrong' ways to make plastics circular – and, therefore, 'right' and 'wrong' placements for these technologies – the IASB's CE for plastics demonstrated a moral project to tackle issues related to that moralised technology. The 'right' way to discipline plastics, to make it circular, related to recyclability expectations both for technologies and organisations, e.g., Walno and other plastic members. As the Walno story showed, once materials and organisations became undisciplined, e.g., by invoking a different idea of discipline (i.e., reusability rather than recyclability), entities became undisciplined, immoral, and get disenrolled from the IASB moral project.

A controversial CE morality
There are considerations regarding the IASB's final enactment of the CE for plastics that relate to controversies linked to the definition of circularity focused on recycling practices. Drawing upon the critiques identified in regard to mainstream CE ideas invoked by businesses, limitations to the notions of circularity as recycling refer to a) the lack of attention to the social dimension of circularity (Murray et al., 2015; Schoggl et al., 2020; Böhm et al., 2023), b) the prevalent material-focused and business-led approach (Calisto Friant et al., 2020; Corvellec et al., 2020a), and c) the lack of consistency to transition toward a real change (Mah, 2021; Shamsuyeva and Endres, 2021).

The IASB's CE for plastics as enacted by the PPT's Plastic Project lacked consideration of the social dimension of circular solutions, which could be seen as a result of the dilution of the IASB's CE morality and exclusion of the relationality criteria in favour of technocentric ones. This echoes Murray et al.'s (2015) critique on CE approaches that overlooked the social dimension to focus on material management and demonstrates how the IASB (through the PPT) invoked circularity as a business model. Therefore, the IASB case seems to confirm the limitations of a technocentric CE agenda, where social aspects "form a periphery" (Schoggl et al., 2020, p. 1) and the focus on material management seems to exclude the attention on how the 'enablers' (Kirchherr et al.,

2023) mentioned in the IASB's holistic CE context (i.e., plastic members, consumers and policymakers) could promote the transition to circular plastics.

Another limitation of the IASB's enactment of the CE for plastics based on technocentric criteria (i.e., the PPT's CE network morality) is that such an agenda was material-focused and emphasised the business perspective (Corvellec et al., 2020a; Calisto Friant et al., 2020) of IASB plastic members. Being identified as an "empty signifier" (Corvellec et al., 2020a, p. 97), the notion of the CE seemed to allow for diverse interpretations and approaches within the IASB's CE contexting activity. Despite being enacted differently within the diverse CE contexts negotiating within the IASB contexting activity, this concept seemed to have eventually been hegemonised and diluted to ideas connected to 'waste-free technical loops' (Ibid.), e.g., recycling. This translation could be related to plastic members' role as 'enablers' (Kirchherr et al., 2023), who, rather than promoting the IASB's holistic CE agenda, advanced their own agendas regarding a material-focused CE for plastics. Hence, it could be said that the IASB's CE morality was based on a contested paradigm (Calisto Friant et al., 2020) that, invoked by organisational actors mobilising technocentric criteria (i.e., the plastic members and the PPT supporting their interests) and a moralisation of disciplined plastics as recyclable, got enacted as recycling activities.

By mobilising only technocentric criteria to discipline plastics and organisations and discarding the relationality criteria of the IASB's abstract morality, the final moment of translation of this organisation's CE agenda for plastics could be seen as supporting Calisto Friant et al.'s (2020) argument regarding this term being a 'go-to concept', easily discredited as greenwashing due to it failing to provide a holistic understanding of the implications of the CE, something that the IASB's CE morality attempted to do within their holistic CE context and in line with their mission.

Therefore, if we consider the IASB's mission to support their members to move toward sustainability (the CE was seen as a way to do so), a question arises: was circularity seen as recyclability and the enactment of disciplined technologies and organisations to support recyclability a way to move toward a sustainable business model in line with the IASB's mission?

To answer this question, it is relevant to consider Mah's (2021) critique of the CE for plastics as a paradox, suggesting that the most popular circularity strategies around plastics achieve no real change. The author argues that the CE for plastics focused on recycling practices represents a dominant corporate sustainability concept, which seems to promote innovation and solutions to move on from the linear economy's 'take–make–waste' system but effectively reproduces existing practices that do not "give up on unsustainable growth" (Mah, 2021, p. 121). Considering that recycling has been used as a way to manage plastic waste since the 1970s and did not prevent the plastic crisis in the first instance, it could be said that, for the IASB, the 'CE = recycling' enactment represented a controversial CE morality. As seen before, challenges related to recycling were the different types of design, uses, and additives (Brooks et al., 2018; Hahladakis et al., 2019) and the costs, being a "labour-intensive practice […] often concentrated where labour is cheap" (Hawkins, 2013, p. 64). Additionally, recycling was recognised as a practice that would not lead to a decrease in plastic waste; on the contrary, it would need these technologies to substantiate this business model. Therefore, it could be said that the final enactment of the IASB's CE morality (i.e., the PPT's CE network morality) reinforced the tensions with the material dimension of plastics and role in supporting the plastic crisis. Despite the IASB's CE morality for plastics being enacted in an attempt to tackle the plastic crisis, the lack of consistency across world regions in terms of infrastructures, regulations and material standards for recycled single-use plastics seemed to lead to the progressive failure (Shamsuyeva and Endres, 2021) of the PPT's CE for plastics due to it being based on recycling practices.

Furthermore, the IASB's abstract morality relationality criteria considered re-thinking "the relationships between natural resources, materials, technology, consumers and the industry toward sustainability" (IASB's Organisations Guide to Circularity, 2019, p. 4). The PPT's network morality, i.e., the final translation of the CE as recyclability, represented a business-as-usual approach and did not show any 're-thinking' of relationships between technologies and organisations toward promoting sustainability but supported existing practices. Although technocentric and material-focused practices, i.e., recycling, featured in the IASB's CE abstract morality, as shown by the inclusion of technocentric criteria (for example, the plastic members' instances

presented in the Organisations Guide to Circularity), these approaches were enrolled as a 'first step' to show businesses dealing with single-use plastics how to move toward circularity. Recycling and the other material-focused practices were not meant to represent the whole IASB CE agenda for plastics, but they became predominant due to their relevance to plastic members' interests, emphasising the political dynamics within the IASB's CE contexting. Therefore, the PPT's network morality seemed to enact something different from the original IASB's circularity intentions to promote sustainability through a holistic CE project.

This paradoxical result of the process of translation that the CE agenda and concept of discipline went through within the IASB case is not estranged to ANT studies (Law, 2003b). The final translation, the PPT's CE for plastics, stresses tight links with recycling practices, diluting the original IASB CE agenda. This final translation could be seen as what Law (2003b) defines as a *trahison* (French for 'betrayal'), stressing how things and ideas might have the same name (i.e., CE and disciplined plastics) but changing the way they work (synonym of recycling and recycled technologies). Therefore, the PPT's CE network morality and attached notion of discipline represented a 'betrayed' version of the original purpose promoted by the organisation's CE morality. Such a betrayal could lead to considerations around the reasons behind this moralisation of circularity and the political inclination of the process of disciplining technologies and organisations according to the mobilised network criteria.

Disciplining is a moral act with a political inclination

The discussion in this chapter was around the IASB's CE moral project and, specifically, the PPT's attempts to discipline misbehaving single-use plastics and plastic members through the Plastic Project. Disciplining could be seen as a moral act as it was enacted by negotiating moral positions related to material and social values regarding the judgement on technologies and organisations as 'good' and 'bad', i.e., 'circular' and 'not circular', disciplined and undisciplined. The moral dimension of disciplined single-use plastics and organisational actors helped observe ways of organising a CE and how this initiative might reproduce existing practices, e.g., recycling, by considering moral dynamics at an abstract and network level. Existing practices did not prevent the plastic

crisis in the first instance but remained the favourite methods of IASB plastic members according to their business-as-usual plastic agenda.

The IASB case showed how discipline is a matter of context and the contexting activity is political and enacts a certain understanding of responsibility, which is also political. By enacting circularity as a synonym of recyclability, the IASB's CE agenda for plastics, in the iteration of the PPT's network morality, invoked a certain notion of responsibility that saw consumers guilty because of purchasing single-use plastics and disposing of these materials. In other words, the context that plastic members invoked invited specific actors, such as consumers, to cover a specific moral position, e.g., of the 'ethical consumers' (as in Hawkins' 'Say No!' campaign example – 2009) to be considered 'good' members of that network. By being in charge of recycling, consumers became guilty of any outcome linked to the faith of single-use plastics – a similar result to the Roundtable Exercise in the SOF story.

The moral position related to this particular idea of responsibility enacted by plastic members performing as 'enablers' (Kirchherr et al., 2023) of the IASB's CE for plastics agenda (i.e., their own agenda) eluded the bigger picture that all actors interrelating with single-use plastics were guilty. It is worth noting how responsibility could be connected to the conceptualisation of waste as discarded materials seen as "a complex assemblage of actions" (Hawkins, 2006, p. 32) connected to obeying disciplinary codes that require actors' compliance and imply a sense of duty. Waste, and thus single-use plastic waste, had become a matter of responsibility for all actors involved. Thus, the moral load of actors (organisations and consumers) that deal with these technologies is significant, as waste materials are moralised according to their agendas, i.e., the use they make of these technologies, stressing the interconnectedness of actors' and actants' moral accountability shown in Hawkins' (2009) and Sattlegger's (2021) examples. The performance of certain actors, such as IASB plastic members, who wanted to evade the responsibility connected to the misbehaviour of plastics – despite manufacturing, consuming and recycling single-use plastics – demonstrates the political inclination within the process of disciplining. Thus, the creation of the figure of the 'guilty consumer' seemed to alleviate the responsibility of plastic members as they promoted solutions for recycling plastics and, therefore, got enacted as disciplined according to

the IASB's CE morality. Furthermore, the invention of the 'guilty consumer' figure seemed to have allowed member-based, business-driven organisations like the IASB to invoke CE contexts based on the reproduction of existing technocentric, material-focused practices that supported their (plastic) members' business-as-usual agenda regarding plastics.

Paying attention to the weight of plastic members' agendas while organising the IASB CE initiative led to disciplining being viewed as a moral act with a political inclination. Thus, the IASB's CE moral project could be identified as political by paying attention to the notions of responsibility attached to the concept of disciplined.

ANT ethnography and the concept of discipline

The approach developed in this research, the ANT ethnography, helped observe translations and delegations of entities within the IASB's contexting activities. I could observe how single-use plastic technologies and organisations got disciplined in the attempt to organise a CE to tackle the plastic crisis. It considered plastic technologies' distributed agency (Latour, 1987, 1988a) to explain how certain judgments attached to plastics also related to the organisations that interrelated with these materials. Hence, it was possible to observe how technologies and organisational actors got enacted as disciplined and undisciplined together. To explain how the notions of discipline and undiscipline got enacted, the approach adopted in this study showed the process of mobilisation of allies, i.e., how members and technologies were recruited in the IASB's CE project for plastics. For example, in the 'IASB's CE agenda' story, plastics were part of the eight polluting materials that needed intervention and plastic members were recruited to tackle organisational challenges related to plastics' misbehaviour.

The ANT ethnography also showed the process of disenrollment of entities, i.e., how entities became detached and excluded from the IASB's actor–network; for instance, the plastic member Walno and notion of disciplined plastics as reusable technologies became undisciplined and was disenrolled from the Plastic Project. Hence, following the materials' semiotic relationships helped establish how requirements for discipline were mobilised, whilst paying attention to which criteria were excluded helped enact the idea of undiscipline. On the one hand, in the 'IASB's CE agenda' story, plastic members

negotiated their understanding of circularity and disciplined plastics within the IASB's holistic CE context, enacting a specific understanding of disciplined plastics that translated as reusable/recyclable plastics. This enacted the second moment of translation of the idea of circularity within the IASB case and IASB's CE for plastics context. On the other hand, in the 'Walno' story, reusable plastics and the plastic member Walno got disenrolled from the PPT's Plastic Project (the final iteration of the IASB's CE for plastics, i.e., the PPT's CE for plastics context) because Walno adopted the notion of discipline related to reusing practices, rather than the PPT's idea of discipline as recycling.

Therefore, the process of mobilisation and disenrollment depended on the CE context (Callon, 1986; Asdal and Moser, 2012) invoked, as demonstrated by the IASB case. As was discussed, specific enactments of disciplined plastics were attached to translations of the CE that were a product of particular material semiotic relationships. Such enactments were invoked as contexts to support organisations' organising of a CE for plastics. Thus, technologies and organisations got disciplined according to the context invoked and, through the activity between these (contexting – Asdal and Moser, 2012), a certain notion of discipline became prevalent, along with the notion of responsibility related to that.

The ANT ethnography approach helped follow the significant passages of how contexts were invoked and negotiated and the related ideas of discipline mobilised within the IASB's CE contexting activity. In other terms, this approach helped follow the process of translation toward stabilising the IASB's actor–network (Callon, 1986; Latour, 1987), i.e., the organising a CE for single-use plastics that supported their plastic members.

This approach also helped understand the IASB's moralities by observing relevant material semiotic relationships that enacted the IASB's abstract and network morality. In this chapter, the IASB's CE contexting could be considered as a moral activity because it mobilised a moralised technology, i.e., single-use plastics. These technologies came with a negative moral judgement attached, enacted as polluting materials and, therefore, undisciplined. Because of plastics' distributed agency, plastic members were also moralised as polluters, leaving the IASB (and PPT) to figure out ways to detach those

negative judgements from plastic materials and, therefore, their members. This goal started the process of disciplining single-use plastics and plastic members. By considering plastics' moral dimension, i.e., how these technologies got moralised as disciplined and undisciplined through the contexting activity, it was possible to track the enactments of the IASB's abstract and network morality and their criteria. For example, in the 'Plastic Project' story, the PPT enacted a network morality based on technocentric criteria to discipline technologies and organisations, and disenrolled the relationality criteria invoked by the IASB's abstract morality because it was judged as irrelevant by plastic members – the allies the PPT was attempting to recruit to set up the Plastic Project. Another example could be found in the 'Walno' story; the plastic member Walno, once enrolled as an ally within the Plastic Project, was disenrolled as undisciplined because the retailer's network morality invoked more diverse criteria for disciplined plastics (reusability) than the PPT's criteria (recyclability).

The ANT ethnography aided our understanding of disciplined and undisciplined technologies and organisations by paying attention to how entities got delegated and eventually disenrolled through negotiations of moral positions within the IASB's CE contexting. This helped show the idea of context as an action with moral connotations, contributing to Asdal and Moser's (2012) idea of contexting.

Research findings

The IASB case showed how single-use plastics got enacted as disciplined and undisciplined and the role of ANT in understanding the process of disciplining. In this section, I summarise the research findings and how these filled the gap in the identified OS literature regarding the lack of studies on the role of other key dimensions of materiality than IT (Orlikowski and Scott, 2008) in organising. It is possible to identify three research findings.

First, disciplined single-use plastics were not passive materials within the process of organising as identified within the literature on the CE of plastics (Meys et al., 2020; Fellner and Brunner, 2021; Shamsuyeva and Endres, 2021) but a performative technology (Latour, 2013; Beyes at al., 2022) with a moral dimension. This was shown by following the movements of plastics (actants), organisations (actors), the CE contexts

invoked (the object) and understandings of the plastic crisis (the issue) throughout the IASB's CE contexting activity, highlighted by the IASB's four 'coherent' (Law, 2004) stories. Paying attention to disciplined plastics' moral dimension helped demonstrate these technologies' role within the IASB's organising of a CE. In this respect, plastics performed as a moralised intermediary (Hawkins, 2009) of the concept of discipline enacted within a context. This finding could be seen as filling the gap identified in the OS literature regarding the role of other key dimensions of materiality than IT in organising processes.

Second, the IASB case demonstrated that CE initiatives can be moral projects and the morality enacted can be controversial. By following relevant material semiotic relationships through the contexting activity and paying attention to the performance between material and social values at an abstract and network level, it was possible to identify criteria for disciplining technologies and organisational actors depending on the context invoked (as demonstrated in the 'Plastic Project' and 'Walno' stories). By invoking a CE context, a certain moralisation of discipline got mobilised. However, within the IASB case, moralisations of discipline seemed to support existing practices, i.e., recycling, and perpetuated plastic members' business-as-usual approach regarding organising single-use plastics. Therefore, a CE enacted as a synonym of recycling (the final translation of plastic circularity within the IASB case) became a moral project, where recycling was a moral imperative. This reflected a controversial morality related to single-use plastics and plastic organisations because attempting to recycle these technologies did not prevent the plastic crisis in the first instance.

Third, disciplining is a moral act with a political inclination and specific notions of responsibility attached. This was visible by following the negotiations of moral positions within the IASB's abstract morality and PPT's network morality. The notions of discipline mobilised by invoking certain CE contexts at an abstract and network level could be seen as political because reflecting plastic members' interests around plastics came with a particular idea of responsibility attached. For example, in the 'SOF' story, the final iteration of the CE and disciplined plastics produced within the Roundtable Exercise focused on reusing/recycling plastics and addressed consumers as responsible for the generation of undisciplined plastics; they purchased materials that leaked into and

polluted the natural environment. Similarly, in the 'Plastic Project' story, the PPT invoked a CE context that emphasised recycling as disciplined. The team enacted consumers as responsible for the discipline of plastics; they were guilty due to purchasing single-use plastics and disposing of these materials. This idea of responsibility eluded the bigger picture that all actors interrelating with single-use plastics were guilty and supported plastic members' business-as-usual agenda around these technologies. The final iteration of the IASB's CE was, therefore, a moral project that enacted plastic members' business-as-usual approach to plastics as disciplined.

Summary

In this chapter, I discussed the evaluation of the notion of discipline within the IASB contexting (Asdal and Moser, 2012) activity. Using the two stories 'Plastic Project' and 'Walno', how judgements of 'good' (disciplined) and 'bad' (undisciplined) entities were enacted within the invoked contexts was examined. Reflections regarding the moral dimension of disciplined single-use plastics and organisations led to contexts being considered as 'morally loaded', i.e., how moral evaluations are performed according to the context.

Two levels of moral evaluation were identified: the abstract morality and network morality. Paying attention to the performance of moralised single-use plastics and organisations within the IASB's abstract morality (CE morality) and the PPT's network morality contributed to understanding complex organisational dynamics, i.e., how the IASB's CE initiative was organised, and which CE ideas prevailed. The IASB's circularity enterprise was identified as a moral project (drawn from Gregson et al.'s idea of the CE as a 'moral economy' - 2015). Therefore, disciplining was enacted as a moral act with a political inclination noticeable by paying attention to the notions of responsibility attached to the concept of discipline.

This chapter concluded with reflections on the role of ANT in understanding how the concept of discipline got enacted and a summary of the research findings.

Chapter 9 – Conclusion

This qualitative research focused on single-use plastics and the CE. It followed IASB and its attempts to organise a CE to tackle the plastic crisis. Using illustrations from the IASB case, I investigated how the organising of a CE for plastics occurred, and explored the moral, political, and organisational dimensions of this process. I adopted an eclectic theoretical framework (Stinson, 2009), informed by the theoretical lens of ANT, which lent itself to an ANT-informed methodology, the ANT ethnography, designed to follow the movements of technologies and organisations in the organising of a CE. This approach helped attend to non-humans and it emerged not as a philosophical choice but a need that arose from the empirics. In both the PWP story and IASB study, the agency of single-use plastics, presented by their material, social and moral dimensions, imposed itself while interacting with organisations. This research answered the following questions:

1. How can understanding how organisations engage with the CE inform us about the role of materials (plastics)?
2. What are the consequences of organisations attempting to adopt CE to address the plastic crisis?

The IASB case demonstrated that by observing how organisations engage with CE ideas enlightened the role of materials, such a single-use plastic technologies, in the process of organising. To observe translations and delegations (Latour, 1988a, 1991) of disciplined and undisciplined entities, it was relevant to consider plastic waste social and material dimensions. By following the material semiotic relationships (Law, 2009) between organisations, CE ideas, single-use plastics and understandings of the plastic crisis through contexting (Asdal and More, 2012), the political dimension of disciplined single-use plastics emerged. This highlighted the consequences of IASB's attempts to adopt the CE to address the plastic crisis. Because CE contexts produced moral evaluations related to the reliability (discipline) and unreliability (undiscipline) of entities, moral negotiations were traced within the contexting activity, identifying an abstract morality and network morality within the IASB case. Therefore, disciplined single-use plastics presented a moral dimension.

Paying attention to these dimensions displayed the complexity of disciplined technologies and organisational actors (plastics' 'distributed agency' – Latour, 1987, 1988b) that were enacted as such within a particular context and materials performed as moral intermediaries (Hawkins, 2009) of a certain idea of 'discipline'.

In this chapter, I offer final reflections on this research and outline the theoretical and empirical contributions of my argument, concluding with ideas for future research.

CE and disciplining

This research journey started with business organisations attempting to respond to the organisational challenges posed by the plastic crisis by invoking CE frameworks. The PWP's attempts to organise a local CE to tackle the pulper waste crisis demonstrated how these technologies did not behave as organisations expected, i.e., by being easy to recycle, highlighting the emergence of the agency of undisciplined single-use plastics (i.e., the pulper waste). The PWP served to draw attention to plastics' material composition and their performance with organisations (i.e., the project members) within the organising of a CE initiative. The 'unruliness' (Hodder, 2012) of pulper waste coincided with the polluting (mis-)behaviour (Liboiron, 2016) of other types of single-use plastic waste that became of interest to the media (e.g., Brady, 2013; BBC One, 2017), environmental charities (e.g., the Break Free From Plastic movement), academia (e.g., Hawkins, 2009; Hawkins et al., 2015; Liboiron, 2016), policymakers and businesses (e.g., European Commission, 2018; Meys et al., 2020; Schoggl et al., 2020; Fellner and Brunner, 2021; Shamsuyeva and Endres, 2021). Because plastics refuse to disappear and resist organisations' attempts to hide them, the 'wrong' placement plastic technologies has negative consequences on human activities (e.g., organising a local CE for paper materials – see Chapter 1) and the natural environment (i.e., polluting ecosystems and disturbing marine life through leakages); pulper waste, as a representation of all single-use plastics, was thus moralised as 'bad', 'out of place' (Douglas, 1966), and undisciplined. Hence, the PWP story helped consider single-use plastics and social dimensions within the organising of a local CE initiative. It also highlighted how the CE ideas invoked by project members seemed to support their agendas. For example, Servo and Lux were interested in making the pulper waste disappear through recycling, while

Eco-pallets and All Plastics sought to diversify their operations and explore new revenue schemes, such as manufacturing 'pulper pallets'.

The PWP story presented a local attempt to organise a CE for disciplining plastics (pulper waste) seen as a 'closed-loop' that does not generate waste (Esposito et al., 2018; Calisto Friant et al., 2020; Corvellec et al., 2020a; Lacy et al., 2020). Such a CE model could be seen as an expression of circular agendas commonly invoked by business actors within the Global North that see circularity as a business model (Murray et al., 2015; Esposito et al., 2018; Lacy et al., 2020). To understand larger and global CE organisational attempts to tackle plastics' misbehaviour, this research focused on the IASB – a business-driven, member-based alliance – and their efforts to support members affected by undisciplined plastics at a larger scale.

Disciplining within the IASB case

Drawing upon the emergence of the material and social dimensions of single-use plastic waste and these technologies' performance within the PWP story, it was possible to notice how, within the IASB's organising of CE for plastics, the performance of these materials played an important role. Understanding how IASB engaged with the CE informed us about the disrupting role of plastics due to their distributed agency (Latour, 1987, 1988b). By tracking the material semiotic relationships (how) between the IASB and their plastic members (who), the PPT (who), SOF attendees (who), the invoked CE ideas (i.e., the IASB's CE agenda and the EMF's ideas on circularity (what)), single-use plastics (what), and understanding of the plastic crisis (what), it was possible to observe the process of disciplining through IASB CE contexting (Asdal and Moser, 2012) activity. The four 'coherent' (Law, 2004) stories (the 'IASB's CE agenda', 'SOF', 'Plastic Project', and 'Walno') exposed the process of translation of the IASB's CE agenda and related the concept of discipline within the contexting activity – from the IASB's holistic CE context to the PPT's CE for plastics context, the final translation of the CE as a synonym of recycling that enacted disciplined plastics as recyclable. Through the IASB's CE contexting activity, it was also possible to observe how delegations of entities led to the emergence of the political and moral dimensions of disciplined plastics.

Story one, the 'IASB's CE agenda', looked at understanding how IASB enacted its CE agenda through the contexting (Asdal and Moser, 2012) activity and addressed research question one in examining how that informed us about the role of plastics. The IASB's holistic CE context (first translation) and CE for plastics context (second translation) exposed the negotiations of moral positions that led the IASB's CE agenda to enact disciplined plastics as reusing/recycling practices. Moral negotiations referred to the performance of material (i.e., plastics' physical characteristics and behaviour) and social (organisations' agendas) values. These started with IASB plastic members enacting single-use plastics as undisciplined when disrupting their agendas, i.e., they leaked out of official waste management networks (escaping reusing/recycling) and polluted the natural environment. So, plastics were identified as 'pollution to come' (Hawkins et al., 2015). This stressed plastics' material dimension, i.e., these technologies' physical characteristics disrupted IASB plastic members' agendas by leaking into the natural environment and polluting. The material semiotic relationships between the IASB and their plastic members enacting single-use plastics as undisciplined according to their expectations around plastics as 'future pollution'; hence, these materials' prospective ontology (Rip, 2009) highlighted the social dimension of plastics. Organisations attempted to tackle the issues brought by these technologies' 'wrong placement' by invoking specific solutions, i.e., CE contexts mostly based on certain aspects of the EMF's circularity philosophy that met plastic members' interests, mostly related to technocentric and material-focused practices, i.e., reusing/recycling, that were in line with Calisto Friant's (2020) CE discourses.

On the one hand, these interactions illuminated the emergence of the political dimension of disciplined plastics because of members' agendas that enacted the notion of discipline as reusing/recycling practices. On the other hand, such interrelations contributed to the observation of the appearance of the moral dimension of disciplined plastics. Delegations in story one showed the enactment of the IASB's abstract morality, i.e., this organisation's CE morality, and the related relationality and technocentric criteria. Relationality criteria related to material and social values negotiated within the IASB's holistic CE context and the first translation of the CE in the IASB case. Technocentric criteria referred to material and social values negotiated within the IASB's

CE for plastics context and the second translation of the IASB's circularity agenda for plastics (see below). Within story one and following up on the second translation of the IASB' CE for plastics, materials and organisations that performed according to reusability/recyclability practices were regarded as disciplined while plastics that escaped official waste management and polluted the natural environment and organisations that did not prevent or act to solve this issue were enacted as undisciplined.

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 1 - CE as a business model "[...] to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability." (IASB's Organisations Guide to Circularity, 2019, p. 4)	The IASB's holistic CE context	The IASB's CE morality [abstract] (relationality criteria)	Related to technologies being included within waste management systems that do not leak into and pollute the natural environment and representing a resource for local economies by design. Also related to organisations supporting practices that re-think relationships between businesses, materials, government and civil society and designing materials to be a resource for local economies
Translation 2 – CE for plastics as enacted by IASB plastic members, focused on material management and technocentric practices, i.e., reusing/recycling.	The IASB's CE for plastics context	The IASB's CE morality [abstract] (technocentric criteria)	Related to reusing/recycling practices and organisations supporting this enactment through their operations

Table 21 - Extract IV, Table 40

Story two, 'SOF', showed IASB CE contexting activity within the SOF, an external event to the IASB that was attended by relevant organisations within the European sustainability industry landscape. Like in the previous story, the material dimension of single-use plastics was stressed by these technologies' material composition as 'pollution to come' and disrupted organisations' agendas to organise a circular initiative for disciplining plastics. The diverse Forum attendees invoked different CE contexts that supported their interests around single-use plastics. This story continued observing the emergence of the political dimension of disciplined single-use plastics by following the material semiotics that led a particular CE context (based on a technocentric, material-focused CE solution) to become predominant within the Roundtable Exercise. This story consolidated the second translation of the IASB's CE for plastics agenda and delegated reusable/recyclable plastics as disciplined technologies. It also showed how James, the PPT Director, invoked and tested the IASB's CE for plastics context within the SOF contexting activity and mobilised the IASB's CE morality technocentric criteria whilst negotiating with the other Roundtable attendees.

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 2 – CE for plastics as enacted by IASB plastic members, focused on material management and technocentric practices, i.e., reusing/recycling.	The IASB's CE for plastics context	The IASB's CE morality [abstract] (technocentric criteria)	Related to reusing/recycling practices and organisations supporting this enactment through their operations

Table 22   - Extract V, Table 40

The CE context enacted through the Roundtable Exercise had the consequence of reiterating existing practices as a CE solution, e.g., recycling that did not prevent the plastic crisis in the first instance. This addressed research question two. It also demonstrated how a certain notion of responsibility, the figure of 'guilty consumers',

was used to shift responsibility away from plastic organisations toward the misbehaviour of plastics. Such a notion was attached to the conceptualised idea of disciplined plastics based on reusability/recyclability expectations (like in story one) within the predominant context, emphasising the consequences of IASB's adoption of certain CE ideas and the emergent political dimension of disciplined plastics.

Story three, 'Plastic Project', displayed the third moment of translation of the IASB's CE for plastics and the related notion of discipline as recyclability, while it was also used to consider the emergence of the moral dimension of disciplined technologies. By following moral evaluations of technology and organisational actors within the IASB's CE contexting, the PPT attempted to translate plastics from a 'bad actor' (Liboiron, 2016) to disciplined technologies, with these materials becoming the moralised intermediary (Hawkins, 2009) of the concept of discipline. Hence, plastic members would have become 'good actors' as much as the technologies they interacted with (plastics' distributed agency). This attempt happened through the PPT translating the IASB's CE morality (abstract) into a network morality by organising the Plastic Project, which mobilised a negotiated version of the IASB's technocentric criteria that delegated recyclable plastics as disciplined (and excluded reusable technologies). Examining these dynamics helped understanding IASB's CE initiative further and highlighted the moral role of plastic materials within the process of organising, addressing research question one.

The PPT negotiated IASB technocentric criteria by invoking their revised iteration of the IASB's CE for plastics context, i.e., the PPT's CE for plastics context, which considered plastic members' agendas toward disciplining plastics, with a focus on recycling (the third translation of the CE agenda within the IASB case). The PPT enacted disciplined plastics when recyclable and members got disciplined by supporting recyclability operations. Because of recyclability becoming a moral imperative within the PPT's network morality, the CE initiative promoted through the Plastic Project seemed to become a moral project (from Gregson et al.'s idea of the CE as a 'moral economy' – 2015). As a consequence, the enactment of disciplined plastics as recyclable materials came with a certain notion of responsibility attached (i.e., the guilty consumers) that was performed according to plastic members' interests, seeming to promote their

business-as-usual approach toward plastics, addressing research question two. Therefore, it was possible to say that the IASB's CE for plastics project (i.e., the PPT's Plastic Project) was a moral project with a political inclination. By enacting the Plastic Project, the PPT added a layer of complexity to enrol allies, as organisations had to align with the IASB's CE morality relationality and technocentric criteria as well as the team's notions of discipline that related to the PPT's network morality technocentric criteria.

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 3 – CE for plastics as enacted by the PPT developing the Plastic Project, focused on material management and technocentric practices invoked by plastic members, i.e., recycling	The PPT's CE for plastics context	The PPT's network morality (negotiated technocentric criteria, i.e., recyclability)	Related to recycling practices and organisations supporting this enactment through their operations

Table 23   - Extract VI, Table 40

With the previous stories clarifying the link between the enactment of CE contexts and understanding the role of plastic materials within IASB's CE initiative (research question one), story four, 'Walno', highlighted the consequences of IASB adopting a particular CE context to address the plastic crisis (research question two). The story confirmed the enactment of circularity as enacted within the PPT's CE for plastics context (third translation) and saw the team mobilising the negotiated technocentric criteria related to the notion of discipline as recyclability expectations. The story stressed the moral dimension of disciplined single-use plastics by following the negotiations of moral positions between the PPT and the plastic member Walno at a network level. By invoking the IASB's CE morality (abstract) but translating those criteria into different network moralities, the PPT and Walno became undisciplined to each other. Walno's undiscipline emphasised single-use plastics' distributed agency; because the plastic member delated

reusable plastics as disciplined, rather than recyclable technologies according to the PPT's network morality, reusable technologies became undisciplined and so did Walno. This story reiterated that the IASB's CE project for plastics, i.e., the PPT's Plastic Project, was a moral project with political implications because based on recyclability, a moral imperative according to organisations' agenda. However, because the final translation of circularity and the notion of discipline seemed to reiterate plastic members' business-as-usual approach toward single-use plastics, it could be said that the IASB's CE morality was controversial and enacted a project that potentially did not promote real change (Mah, 2021).

Recyclability is not enough
Although the product of complex organisational dynamics between the relevant technologies, actors, their interests, CE ideas and a certain understanding of the plastic crisis, the enacted concept of discipline and the CE agenda did not bring innovation but seemed to perpetrate IASB's plastic members' existing practices in relation to single-use plastics.

Within the IASB case, the CE seemed to be invoked as a vague term ('umbrella term' – Blomsma and Brennan, 2017; 'contested paradigm' - Calisto Friant et al., 2020; 'empty signifier' - Corvellec et al., 2020a) and a given solution to plastic members' organisational challenges, reiterating the need to problematise the notion of the CE (Dzhengiz et al., 2023) within a certain context (Asdal and Moser, 2012). The PPT's Plastic Project got enacted as a means to meet plastic members' interests. Putting their agenda upfront IASB's holistic aspirations, i.e., invoking only IASB's CE morality technocentric criteria, ratified the Plastic Project's CE initiative as a possible reproduction of existing practices, i.e., recycling activities, that demonstrated a scarce potentiality in tackling the issues brought by the plastic pollution issue – having recycling failed to prevent the crisis in the first place. Recycling practices were previously developed (since the 1970s; Hardin, 1998; NUCIF, 2005) but failed to discipline plastics, which kept accumulating, with the result being the plastic crisis.

It could be argued that the reason why disciplined plastics were enacted as recycling technologies was that recyclable materials were easier to hide for organisational actors,

to put back 'in place' in the oblivion and satisfy organisations' interests toward forgetting about single-use plastic waste. Recycling also reinforced the notion of responsibility related to the figure of the 'guilty consumer', which shifted responsibility away from plastic organisations, e.g., IASB's members, otherwise addressed as 'polluters' by, e.g., the Break Free From Plastic campaign. Through the PPT performance, IASB's attention to meeting plastic members' agendas on single-use plastics and the CE led to this organisation's process of disciplining being considered as a controversial moral act with a political inclination.

Controversial, because moralising plastics as disciplined when recyclable had similar results as ignoring these technologies' physical characteristics and did not represent an actual mode of disciplining materials, but reiterated members' idea of discipline based on their current recycling practices. Hence, it could be argued that single-use plastics' material values may re-emerge in organisations attention, making them inevitable and impossible to refuse. Thus, the disciplined plastics of today, i.e., recyclable materials, could become the future undisciplined technologies of a not-so-distant tomorrow.

Contributions

This study's contribution was twofold. Analytically, this thesis focuses on the concept of discipline, a notion I argue has been implicit in ANT theorising, particularly in discussions of delegation (e.g., Akrich and Latour, 1992; Latour, 1988a, 1991). the ANT ethnography approach informed OS (Orlikowski and Scott, 2008) toward the need to pay attention to the performance of disciplined technologies, e.g., disciplined single-use plastics, within a complex process of organising, i.e., a CE to tackle the plastic crisis. Considering how organisations engaged with the CE highlighted the performance of disciplined and undisciplined single-use plastics within the process of organising CE initiatives; because of plastics' distributed agency (Latour, 1987, 1988b), their performance impacted on organisations' operations. This stressed the significance of paying attention to how CE contexts (Asdal and Moser, 2012) are enacted and the emergence of the political and moral dimensions of disciplined technologies as a consequence of how organisations adopt the CE. Empirically, this research proposed insights for international, business-driven, member-based organisations regarding organising CE initiatives. It was relevant to consider organisations' moral positions to understand the CE contexts they invoked.

Thus, it was possible to see if circular agendas led to the reproduction of existing practices and how alliances, such as the IASB, organised their members to promote innovations in this area.

Analytical contribution

The research findings outlined how the conceptualisation of discipline and undiscipline emerging from this study informed OS research and represented a mechanism that provided a means of paying attention to technologies and how they performed within organisations. These findings contributed to develop a new perspective by demonstrating the significance of the notion of discipline within the process of organising. So far, this notion has been implicit within ANT theorising and discussions of delegations (e.g., Akrich and Latour, 1992; Latour, 1988a, 1991). By placing the idea of discipline at the core of this analysis, I could demonstrate its significance within ANT discourse and how that informed OS.

Although some degree of attention was paid to the role of IT within the process of organising (Orlikowski and Scott, 2008), the theoretical lens of ANT helped broadening the meaning of technology beyond IT and considering other key dimensions of materiality by referring to non-human actants as technology (Latour, 1987, 1988a, 1988b, 1991), e.g., single-use plastics, and lead to further research horizons in OS. For example, identifying single-use plastics as a technology within the IASB case enlightened the role of these materials in organising and disorganising the world (Cooper, 1986) and informed the moral and political implications related to the process of disciplining within a particular context.

Through IASB CE contexting, it was possible to map the complexity of the moral negations (how) between the IASB, the PPT, plastic members, SOF organisations (who), their interests, invoked CE ideas (what), single-use plastics (what), and understandings of the plastic crisis (what). ANT helped understand who and what can be effectively 'disciplined' within the process of organising, how this can be achieved, and who and what are better left to their "erratic behavior" (Latour, 1988a, p. 300).

The IASB case highlighted the significance of considering the political and moral dimensions of disciplined single-use plastics within a CE project. Paying attention to these dimensions showed the importance of the following:

a) Considering actors' moral positions attached to the invoked CE contexts;

b) Materials as moralised intermediaries (Hawkins, 2009) of conceptualisations of discipline and undiscipline;

c) Notions of responsibility attached to conceptualisations of discipline and undiscipline to understand how complex organising processes happen and why they take a certain form, i.e., why a certain enactment of circularity and idea of discipline become predominant.

The ANT ethnography helped identify the abstract and network moralities within the IASB's attempts to organise a CE to discipline single-use plastics and contributed to making sense of the level of complexity of coordinating circular initiatives in a member-based organisation. Considering Chapter 7's discussion on how a particular CE context emerged as predominant through IASB contexting activity and observing the dynamics within abstract and network moralities (Chapter 8) enlightened how the IASB's actor–network was stabilising not by delegating allies but by disenrolling them. The process of translation of the IASB's CE agenda within the contexting activity showed such a process of exclusion toward stabilisation, i.e., the enactment of the IASB's CE initiative for disciplined plastics completed in the 'Plastic Project' story.

The PPT decided to scrap the IASB's abstract morality relationality criteria, negotiate the technocentric criteria (to include only recyclability as an expectation for disciplined technologies), and enact the PPT's CE for plastics context that addressed plastic members' recyclability expectations regarding plastics. This led to the enactment of the PPT's Plastic Project (the final translation of the IASB's CE agenda) as a moral project (Gregson et al., 2015) where recycling and recycled plastics became a moral imperative. It also emphasised the political dimension of disciplined single-use plastics and showed how interrelating with these technologies was easier; the performance of disciplined plastics could be discounted due to their compliance with organisations' expectations, i.e., agendas and interests toward single-use plastics. This resulted in the plastic

members that supported recycling activities getting disciplined alongside recyclable plastics and their business-as-usual approach becoming a moral imperative.

Furthermore, the 'Walno' story demonstrated the organisational consequences of adopting a certain CE context and enacting discipline through exclusion, showing how, despite invoking similar CE moralities, the PPT and Walno became undisciplined to each other by invoking diverse technocentric criteria at a network level. Considering the moral dimension of disciplined plastics exhibited how materials were 'in place' and thus judged as 'good' when meeting the technocentric criteria of the PPT's network morality. Hence, plastics disappeared through recyclables' waste streams and could be forgotten, i.e., technologies were considered as disciplined when they became invisible once again, in line with the IASB's plastic members' expectations.

Therefore, the ANT ethnography aided our understanding of how organisations engage with the CE and in which way that informs on the role of materials, e.g., disciplined single-use plastic technologies. By informing on complex organisational dynamics (i.e., the contexting activity and the negotiations of moral positions within it) that considered the performance of actors and technologies and the moral implications of these interrelations, the notion of disciplined technologies is problematised.

Empirical contributions
Following up on the analytical contributions, there are three practical lessons that could be learnt from the IASB's case that speak to business-driven, member-based organisations.

First, it is relevant to consider members' agendas and how these influence a member-based organisation's definition of the CE and conceptualisation of disciplined technologies, e.g., single-use plastics. As the IASB's CE for plastics context showed, business organisations tended to adopt a positive conceptualisation of plastics (e.g., in the Roundtable Exercise, story two) and saw these materials in the 'right' placement, 'in place', when reused/recycled. This reproduced existing practices that did not necessarily aim for innovative initiatives, e.g., the PPT's Plastic Project, which mobilised recycling practices as circular solutions perpetrating a business-as-usual approach. The recognition of the CE contexting (Asdal and Moser, 2012) activity would help alliances

to manage the influence of members on their initiatives as the IASB's contexting process showed how members mobilised CE agendas to preserve their existent approach to plastics. For example, within the 'IASB's CE agenda' story, plastic members invoked a material-focused and technocentric approach to discipline plastics and enacted the IASB's CE for plastics agenda and the related circularity context, which was then invoked by the PPT to organise the Plastic Project (story three). Paying attention to who and what (organisational actors and technologies), the object (what CE policy), and the issue (the plastic crisis) when designing circular solutions could lead business-driven alliances toward supporting members whilst helping them transition to an innovative understanding of the CE for plastics. Such a novel understanding would emphasise the relationships between materials (what), organisations (who), CE ideas (the object), and the plastic crisis (the issue).

Second, paying attention to the agency of technologies (Law and Callon, 1982; Callon, 1986; Latour, 1987, 1988a, 1988b, 1991, 2013; Law, 1994; Beyes at al., 2022), such as single-use plastics (Liboiron, 2016), could inform the ways CE projects are organised. Considering how single-use plastics' physical characteristics (material values) relate with members and their agenda (social values) leads to technologies' performance being paid attention to when organising a CE initiative. Looking at plastics' behaviour, how they support or disrupt the invoked CE ideas could help a member-based organisation to design circular solutions informed by the performance of technologies. Thus, CE projects could be customised according to the targeted type of plastic as well as the involved practices and members (depending on their agenda) to address certain material-related operational or organisational issues.

Third, it is possible to find contributions to the CE policy in the IASB case. In the 'Plastic Project' story, having considered IASB's holistic CE context and relationality criteria (alongside the technocentric ones) could have helped the PPT to design the project to avoid the reproduction of existing practices toward organising materials, i.e., recycling. In this respect, the IASB's final translation of the CE agenda would not have resulted in a controversial moral project, a 'betrayal' (Law, 2003b) of this organisation's holistic CE aspirations, and that reproduced a business-as-usual notion of disciplined plastics. Considering the IASB's CE morality relationality criteria could have led to a circular

initiative in line with their holistic agenda and toward significant change to practice. In this respect, CE policies could take into consideration social elements, e.g., social welfare (for example, job creation) and environmental recreation or conservation (for instance, the conservation of natural spaces), in targeting the management and organising of technologies and resources. Paying attention to more holistic conceptualisations of circularity could lead to a further comprehensive CE policy and innovation around organising circular materials. Suggestions include emphasising the social dimension of CE solutions (Murray et al., 2015; Schoggl et al., 2020; Böhm et al., 2023) toward shifting from the prevalent material-focused approach privileged by businesses (Calisto Friant et al., 2020; Corvellec et al., 2020a) in favour of an approach that considers a mix of societal and technological transformations, as mentioned by Calisto Friant et al.'s (2020) 'circular society' optimistic attitude. Focusing on a circular transition that highlights social benefits could also help address common critiques to the mainstream agendas often invoked by business-driven organisations regarding the lack of consistency of the term 'CE' and move toward giving clear indications of how to apply circularity toward a significant change to practice (Mah, 2021; Shamsuyeva and Endres, 2021).

Relevant transformations in the research background

It is worth considering that since this research was performed, there have been some changes in the European CE for the plastic business landscape, such as the increasing popularity of the EMF and United Nation Environment Program (UNEP)'s 'New Plastics Economy Global Commitment' (2018) and the advent of the COVID-19 pandemic.

In 2018, the EMF and the United Nation Environment Program (UNEP) jointly launched the 'New Plastics Economy Global Commitment' (2018), a new global initiative, open to different organisations. The New Plastics Economy vision was to 'unite […] businesses, governments, and other organizations from around the world behind a common vision of a CE for plastic, in which it never becomes waste or pollution' (UNEP, 2018). Mobilising businesses and policymakers representing about 20% of single-use plastics manufactured at a global level, this initiative aimed at promoting change regarding plastic production, use and reuse according to three principles (New Plastics Economy Global Commitment, 2018):

a) Eliminate unnecessary plastics;

b) Innovate toward designing reusable, recyclable and compostable plastics;

c) Circulate materials by maintaining their highest value at all times (EMF, 2015), as in line with the EMF's CE agenda.

The EMF and UNEP provided a space where organisations were given the opportunity to work together towards transforming how single-use plastics were designed, produced, used and reused: 'We cannot simply recycle or reduce our way out of the plastic pollution crisis' (EMF, 2018). The emphasis on abandoning existing material-focused practices, i.e., recycling, represents a considerable transformation in organising CE projects for plastics. Organisations such as the IASB, which significantly relied on the EMF's (2015) CE philosophy to enact their circularity agenda, might have considered a certain degree of transformation in their way of disciplining single-use plastics and organisations toward phasing out recycling practices, whilst maintaining their mission to support members' operations.

Furthermore, the European plastic business landscape has moved on as a result of the COVID-19 pandemic. During the pandemic, single-use plastics were in high demand due to concerns about personal health and safety (Prata et al., 2020; Kitz et al., 2021; Vanapalli et al., 2021), privileging human safety over environmental concerns (Grodzińska-Jurczak et al., 2020; Pipoli, 2020; Parashar and Hait, 2021). As Mah (2021, p. 14) pointed out, "Plastics were fantastic again", highlighting a shift in enacting these technologies from 'dirt' (Douglas, 1966) to 'wonder' (Gabrys et al., 2013), from undisciplined to disciplined.

As the amount of single-use plastic waste significantly increased (Silva et al., 2021; Winton et al., 2022) and waste management networks seemed to struggle to deal with the additional waste materials (Vanapalli et al., 2021), scholars and scientists called to recognise the significant policy progress in fighting single-use plastic pollution and avoid going backward (Prata et al., 2020; Silva et al., 2021; Winton et al., 2022), e.g., to revoke single-use plastic bans and several CE initiatives toward reducing/reusing/recycling these materials (Mah, 2021). The interrelations between organisations' agendas and these technologies changed in light of actors' expectations to stop the spread of the

coronavirus and, therefore, favouring single-use plastics to stop diffusing the virus (Winton et al., 2022). This has led to the reassessment of single-use plastics and CE policy as well as related research (Grodzińska-Jurczak et al., 2020; Kitz et al., 2021; Makki et al., 2021).

Paying attention to the transformations in the research background could help in considering future research ideas, as outlined in the next section.

Retrospective reflections on the research process and future research considerations

This thesis concludes with some relevant considerations regarding this research process and future research.

The research framework that led to the enactment of the IASB case, the ANT ethnography, helped track the material semiotic relationships that translated the notion of the CE within the IASB case and the related concepts of discipline and undiscipline. Despite representing a helpful approach because of its flexibility, able to catch the complex dynamics (Geertz, 1973; Czarniawska, 1998, 2004, 2007) and the messiness (Law, 2003b, 2004, 2009) of the PPT's attempts to affirm itself as a relevant team within the IASB (by demonstrating the value they added to the organisation) and performing toward organising a CE for single-use plastics, in retrospect, the ANT ethnography led to a lengthy research process. During the fieldwork and by following the interrelations of James and Nicola (this research's most relevant gatekeepers), several material semiotic relationships and entities that did not feature in this thesis were considered. This resulted in a large amount of data that required time to analyse and identify significant entities to follow to understand how the concepts of discipline and undiscipline got enacted. In retrospect, I should have chosen the data that was closest to the research questions from meetings, calls, documents, email conversations, interviews, and informal conversations during fieldwork to gather a more focused pool of data. Having fewer and more concise data might have led to a shorter period of analysis, simplifying the complexity of the interrelations during collection and easing the process of tracking pertinent interrelations and entities to answer the research questions.

Future Research
In terms of future research that could follow up from the IASB case, I present three ideas.

First, it would be significant to contribute to research on current CE organising in Europe by observing how the Plastic Project at the IASB has changed and what CE contexting the IASB is performing according to the transformations in the European business sustainability landscape, i.e., the launch of the EMF and UNEP's 'New Plastics Economy Global Commitment' (2018) and the COVID-19 pandemic (Pipoli, 2020; Mah, 2021). Following up on the New Plastics Economy Global Commitment's (2018) vision to move on from recycling practices and promote collaboration between businesses and policymakers, it would be interesting to see if the PPT has started mobilising the IASB's relationality CE criteria (i.e., a CE is about "re-organising 'relationships' between natural resources, materials, technology, consumers, and business" - IASB's Organisations Guide to Circularity, 2019, p. 4). Mobilising a more holistic understanding of circularity could effectively address the EMF's (2018) new approach to a CE for plastics while remaining aligned to the IASB's CE agenda. Such an enactment of the CE would consider social elements (e.g., social welfare, environmental conservation and restoration) together with technical criteria other than recycling, e.g., redesign and reuse (New Plastics Economy Global Commitment, 2018). Following the interrelations between organisational actors, technologies and CE criteria within the contexting (Asdal and Moser, 2012) activity could help highlight how including social interests could impact on mobilising certain members and moral positions as well as how these become prevalent within the organising of a CE for single-use plastics in the current European plastic business landscape. Furthermore, it would be useful to consider transformations prompted by the COVID-19 pandemic. It is likely that the PPT and plastic members have been addressing the increasing amounts of certain types of single-use plastics related to that extraordinary period, e.g., PPE. It would be pertinent to observe how the moralisation of disciplined technologies and organisations has moved on, as the recycling rate of single-use plastics has decreased and several CE initiatives related to material-focused and technocentric practices have been halted during the pandemic (Pipoli, 2020; Mah, 2021). Hence, by tracking the interrelations between materials, organisations, CE ideas and understandings of the plastic crisis and observing how the political and moral dimensions of disciplined single-use plastics have changed in post-

pandemic Europe, this research would contribute to understand CE organising in the 'new normal'.

Second, it would be significant to explore the political and moral dimensions of disciplined technologies further. By adopting the ANT ethnography, this research showed the emergence of such dimensions that contributed to the IASB's CE being enacted as a moral project (Gregson et al., 2015) with a political inclination, noticeable by paying attention to the notions of responsibility attached to the concepts of discipline and undiscipline. Being ANT an evolving perspective (e.g., Law and Hassard, 1999; Law, 2008), I argue that research that pays further attention to the moral and political dimensions of disciplined technologies requires what scholars (Law, 1999; Law and Hassard, 1999; Mol, 1999, 2002; Mol and Law, 2004) discussed as a 'post-ANT' approach. ANT prefers to focus on mapping the interrelations between actants and actors according to ideas of symmetry and toward stabilising a certain actor–network (Callon, 1986; Latour, 1987, 1988a, 1991) without paying further attention to the consequences of such interactions from a moral and political point. Recognising that the contexting (Asdal and Moser, 2012) activity toward such stabilisation is animated by specific interests and expectations linked to actants' performance leads to engagement with post-ANT ideas that consider the politics and morality of technologies within an actor–network. For example, Mol's (1999, 2002) and Mol and Law's (2004) discussion on notions of ontological politics and multiple ontologies could contribute to understand how the same entities, e.g., single-use plastics, is enacted and performs differently depending on the context invoked and actors' interests, without changing their ontology, their being single-use plastics. With single-use plastics enacted in diverse ways, for example, as 'good' because they preserve hygiene and keep people safe during the COVID-19 pandemic (e.g., Prata et al., 2020; Vanapalli et al., 2021) or as 'bad' when found in the natural environment and subjected to rethinking through global initiatives (e.g., New Plastics Economy Global Commitment – 2018), it is possible to talk about 'plastic multiple'. This idea informs an evolving understanding of material semiotic relationships in ANT discussions and links to Mol's (2002) concept of multiple ontologies. Because the ANT ethnography developed in this work does not present the grounds for supporting such an ongoing complex research subject, post-ANT ideas could help make

sense of the 'plastic multiple'. A post-ANT perspective points to the incoherence of the social world (Law and Singleton, 2014) and would help track the process of translation of how technologies and organisations get disciplined within complex organising, i.e., the relevant material semiotic relationships within the contexting activity. This perspective does that through a 'critical social inquiry' (Law and Singleton, 2014) that pays attention to the politics and moralities of discipline. Post-ANT ideas would enable the ability to conduct research that: a) tracks the incoherence and multiplicity in organisational processes, revealing how entities perform differently across contexts; b) explores further how the concepts of discipline and undiscipline frame technologies and organisational actors as moral actants and associations between these entities as moral projects. Such research would open possibilities for exploring further how responsibilities and moralities are assigned, contested, and enacted within networks, making visible political and moral values performed within organisations. It moves to critically interrogate the consequences of relevant material semiotic relationships and possibly supports organisations and policymakers to understand their practices and the consequences of their organising.

Third, it would be relevant to adopt a post-ANT perspective, enacted on the basis of the reflections mentioned above, to study how a CE for materials other than single-use plastics is organised, how different technologies are moralised as disciplined and undisciplined, and what the moral and political dimensions performing within that contexting activity are. A type of waste material that has been drawing attention in recent years is textile waste. The aftermath of the business-driven model known as 'fast fashion', which has made clothing faster and cheaper to produce, has attracted global attention through the media (e.g., McFall-Johnsen, 2019; Davis, 2020; Stallard, 2022; Shukla, 2022), the work of environmental charities (e.g., Fashion Revolution, Textile Exchange, Ellen MacArthur Foundation, Fashion Takes Action[18]) and academia (e.g.,

---

[18] Fashion Revolution https://www.fashionrevolution.org/about/; Textile Exchange https://textileexchange.org/; The Ellen MacArthur Foundation https://ellenmacarthurfoundation.org/circular-examples/keeping-clothing-in-use-to-

Brooks, 2019; Niinimaki et al., 2020). These actors are reminding the world of another 'hidden' (Brooks, 2019) and 'forgotten' (Hyrd, 2010) type of waste that, similarly to single-use plastics, is quickly accumulating, leaking into and polluting the natural environment, and challenging human activities (Brooks, 2019; Le, 2020; Cho, 2021; Stallard, 2022). The textile waste crisis has become a global challenge, partially connected to the plastic crisis since most of the discarded clothing is made of polyester and viscose, both plastic-based textile materials (e.g., Brooks, 2019; McFall-Johnsen, 2019; Davis, 2020; Shukla, 2022). Mapping and observing the interrelations between textile waste technologies and organisations within business-driven responses to this challenge would help understand a) how solutions are organised and what CE ideas are invoked, b) the role of textile technologies (a different key dimension of materiality than IT and single-use plastics) within the organising process, c) which actors and actants are mobilised and what moral positions they perform, d) what notions of discipline and undiscipline are moralised, and whether they avoid reproducing existing practices that did not help prevent the textile waste challenge in the first place.

Appendix I - A summary of theoretical ideas and their use in this research in order of appearance in Chapter 3

Table 24 - A summary of theoretical ideas and their use in this research in order of appearance in Chapter 3.

Author		Idea	Disciplinary Field(s)	Use in this research theoretical toolkit
Cooper (1998)		'assemblage'	Organisation Studies, STS	To problematise and make sense of the phenomenon of the plastic crisis
Bennett (2010)		'assemblage'	STS	To problematise and make sense of the phenomenon of the plastic crisis
Rittel and Weber (1973)		'wicked problem'	Social and Political Studies	To problematise and make sense of the phenomenon of the plastic crisis
Tarmeer et al. (2019)		'wicked problem'	Social and Political Studies	To problematise the idea of 'wicked problem' within different fields
Lonngren and van Poek (2021)		'wicked problem'	Environmental and Sustainability Education	To problematise the idea of 'wicked problem' within the literature on sustainability
Murray et al. (2015)		'CE'	Business Ethics	1. To contribute to and explain the origin of the term 'CE' 2. To contribute to and provide a definition of the CE from a business perspective

				3. To critique mainstream concepts of the CE in the business landscape (lack of a social dimension)
Calisto Friant et al. (2020)		'CE'	Political Theory	1. To contribute to and explain the origin of the term 'CE' 2. To contribute to and provide a definition of the CE from a business perspective 3. To problematise the idea of 'CE' within the business landscape 4. To critique mainstream concepts of the CE in the business landscape (material-focused and emphasise the business-driven perspective)
Blomsma and Brennan (2017)		'CE'	Organisation Studies	1. To contribute to and provide a definition of the CE from a business perspective 2. To problematise the idea of the 'CE' within the business landscape
Kirchherr et al. (2017, 2023)		'CE'	Environmental Engineering	1. To contribute to and provide a definition of the CE from a business perspective 2. To problematise the idea of the 'CE' within the business landscape

Dzhengiz et al. (2023)		'CE'	Business, Management and Organisation Studies	1. To problematise the idea of the 'CE' within the business landscape 2. To critique mainstream concepts of the CE in the business landscape (lack of critical approach in academia)
Esposito et al. (2018)		'CE'	Business, Management and Organisation Studies	To contribute to and provide a definition of the CE from a business perspective
Lacy et al. (2020)		'CE'	Business and Management Studies; Sustainability	To contribute to and provide a definition of the CE from a business perspective
Fellner and Brunner (2021)		'CE for plastics'	Waste Management	To problematise the idea of the 'CE for plastics' within the business landscape
Meys et al. (2020)		'CE for plastics'	Waste Management	To problematise the idea of the 'CE for plastics' within the business landscape
Schoggl et al. (2020)		'CE'	Business and Management Studies	To critique mainstream concepts of the CE in the business landscape (lack of a social dimension)

Böhm et al. (2023)		'CE'	Entrepreneurship and Business Studies	To critique mainstream concepts of the CE in the business landscape (lack of a social dimension)
Corvellec et al. (2020a)		'CE'	Organisation Studies; the fields of social science and humanities in Waste Studies	1. To contribute to and provide a definition of the CE from a business perspective (relevant to this research) 2. To problematise the idea of the 'CE' within the business landscape 3. To critique mainstream concepts of the CE in the business landscape (material-focused and emphasis on the business-driven perspective)
Shamsuyeva and Endres (2021)		'CE for plastics'	Material Engineering	1. To problematise the idea of the 'CE for plastics' within the business landscape 2. To critique mainstream concepts of the CE in the business landscape (material-focused and emphasise the business-driven perspective)
Mah (2021)		'CE for plastics'	Urban and Environmental Studies	1. To problematise the idea of 'CE for plastics' within the business landscape 2. To critique mainstream concepts of the CE in the business landscape (the notion is a paradox)

Gille and Lepawsky (2021)		'Waste Studies'	The fields of social science and humanities in Waste Studies	To provide a definition of 'Waste Studies' within the fields of social sciences and humanities
Scanlan (2005)		'waste'	The fields of social science and humanities in Waste Studies	To conceptualise the notion of 'waste'
O'Brien (2008)		'waste'	The fields of social science and humanities in Waste Studies	1. To conceptualise the notion of 'waste' 2. To problematise the concept of 'waste' (social dimension and culturally situated)
Stowell (2012)		'waste'	The fields of social science and humanities in Waste Studies; Organisation Studies	To conceptualise the notion of 'waste'
Douglas (1966)		1. 'waste' 2. 'discipline'	The fields of social science and	1. To conceptualise the notion of 'waste' 2. To problematise the concept of 'waste' (moral dimension)

			humanities in Waste Studies	3. To contribute to and provide a definition of 'discipline' within this research
Thompson (1979, 1998)		'waste'	The fields of social science and humanities in Waste Studies	1. To conceptualise the concept of 'waste' 2. To problematise the concept of 'waste' (social dimension and culturally situated)
Liboiron (2015, 2016, 2019, 2021)		'waste'	STS; the fields of social science and humanities in Waste Studies	To problematise the concept of 'waste' (social, moral and material dimensions) and draw attention to 'plastic waste' in particular
Hardin (1998)		'waste'	Ethics and Law; the field of social science and humanities in Waste Studies	To problematise the concept of 'waste' (moral dimension
Hawkins (2006, 2009)		1. 'waste' 2. 'discipline'	STS; the fields of social science and humanities in Waste Studies	1. To problematise the concept of 'waste' (social and moral dimensions) and draw attention to 'plastic waste' in particular 2. To contribute to and provide a definition of 'discipline' within this research

Beyes at al.'s (2022)		'technology'	STS	To problematise the concept of 'technology' and contribute to providing a definition of that within this research
Orlikowski and Scott (2008)		'technology'	Organisation Studies	1. To provide a theoretical background for discussing the role of 'technology' in studying organisations 2. To show the gap in Organisation Studies regarding the research on technology in organisations
Latour (1987, 1988a, 1988b, 1991, 2013)		1. 'technology' 2.'interrelations' 3. 'discipline'	STS	1. To contribute to and provide a definition of 'technology' in studying organisations 2. To problematise and conceptualise the idea of 'interrelations' within this research 3. To problematise and conceptualise the idea of 'discipline' within this research
Corvellec et al. (2020b)		'ANT'	STS	To contribute to and provide a definition of 'ANT'
Law (1994, 2003a, 2003b, 2007, 2008, 2009)		1.'interrelations' 2. ''mess in social science'	STS	1. To problematise and conceptualise the idea of 'interrelations' within this research 2. To explain how the theoretical framework of this research has been developed

Callon (1986)		1.'interrelations' 2. 'context'	STS	1. To problematise and conceptualise the idea of 'interrelations' within this research 2. To problematise the traditional concept of 'context' within social sciences and provide a critical definition of that
Asdal and Moser (2012)		'context' and 'contexting	STS	To problematise the traditional concept of 'context' within social sciences, provide a critical definition of it, and observe the activity between contexts (i.e., contexting)
Hodder (2012)		'discipline'	Historical and Cultural Anthropology	To problematise and conceptualise the idea of 'discipline' within this research
Stinson's (2009)		'theoretical eclecticism'	Philosophy of Education	To explain how the theoretical framework of this research has been developed

Appendix II – Interview Guidelines

The topics discussed may have commercial sensitivity; therefore, semi-structured interviews will be held at the IASB office, in the organisation's headquarters and/or other locations and during events related to the IASB (e.g., the Basic and Medium Members meeting). Semi-structured interviews will last up to 60 minutes, and consent for recording will be obtained at the beginning. The interviewee's affiliation and position within their organisation will be known in advance.

Interviews will include discussions on the following:

- The role of the organisation the interviewee represents within the CE Program (CEP)/No Plastic Waste Coalition;
- The interests of the organisation the interviewee represents within the CEP/No Plastic Waste Coalition;
- What kind of relationships the interviewee's organisation has with the other members/stakeholders, with an attempt to identify collaborations and/or barriers;
- The interviewee's personal interests in the CEP/No Plastic Waste Coalition;
- The IASB main goal and current actions and how the interviewee is involved (if applicable);
- The No Plastic Waste Coalition's main goal and current actions and how the interviewee's organisation is involved;
- Personal and professional understandings of the materiality of plastics;
- The origins and consequences of the "plastic crisis";
- Possible industrial and managerial solutions to the "plastic crisis";
- The origins and consequences of the CE;
- The application of circular practices in the interviewee's organisation;
- Other significant and pertinent topics that might arise during the interview.

Appendix III - Coding samples

This Appendix gathers illustrative samples of the data analysis process.

Examples of data collation and organisation, from the raw data organised chronologically during fieldwork to data organised in steps one and two.

Raw data organisation (chronological)	Collated data organisation	Step 1. Coding folders	Examples of coding files	Excerpts of colour coding
interviews MONTH 1 MONTH 2 MONTH 3 MONTH 4 MONTH 5 MONTH 6 MONTH 7 OFFICE ONEDRIVE - updating staff meeting	step 1 step 2	Circualr Economy Ideas Material Moral Positions	LANDSCAPE ANALYSIS 2016_11_04_____PackagingPolicy.pdf 2017_Impact_For_Growth_Progress_Repo... 2019 objectives ___ and teamfieldnotes.xlsx 13319-Global-Commitment-Definitions.... Appendix 2.docx bottle-bio-based-illustration.jpg Brochure2014_____i.pdf ___Guide_CE_DIGITAL_9-2018.pdf ___sustainbility brochure.pdf ___Presentation.pdf Definitions of Recyclability for Plastics.do... EMF KPIs.docx EMF requirements.docx ___Report-Final.pdf Global-Commitment-Signatories-June-2... Interview with Berry.docx Interview with James.docx Interview with Luciana.docx Interview with Nadia.docx Leaders in plastic value chain.docx leaflet___2017_engl_web.pdf List of possible members.docx Materials value chain.pdf packaging-and-the-circular-economy-p... ___2017_pwp_performance_metrics... plastic value chain - companies.xlsx ___Brochure-Sustainability-Report... ___ - flyer.pdf	See figure 1 for an example of colour coding in an office document (benchmark analysis document) See figure 2 for an example of colour coding in the fieldnotes See figure 3 for an example of colour coding in an interview transcript See figure 4 for an example of colour coding in an email

Figure 13 - Examples of data collation and organisation.

Examples of the manual coding within this research data analysis process. Colour coding was used to highlight interrelations between technologies, organisations and ideas that fell under the three identified codes:

1. Material = red
2. CE Ideas = yellow
3. Moral Positions = pink

Figure 14 - Example of colour coding in an office document (benchmark analysis document, used to identify allies for the PPT's Plastic Project amongst IASB plastic members).

Figure 15 - Benchmark analysis including members and relevant non-members.

Company	Value chain	iASB mb	Focus of the company re.	CE intiatives - external	CE intiatives - external2
	Converter	Yes	flexible packaging		address GRI index and SDGs:
	End-market user	Yes	rigid and flexible packaging	EMF New Plastic Economy;	
	End-market user	Yes	aerosol, rigid and flexible	EMF Circular Economy	2025 Plastic commitment (100
	End-market user	Yes	PET and fexlible packaging		2025 packaging commitment
	Converter	Yes	rigid and flexible packaging	EMF's CE100 member	
	Converter	Yes	plastics and bioplastic	EMF's CE100 member	
	End-market user	Yes	PET, flexible and rigid		5Rs (Renew, Recycle,
	End of life	Yes	recycler - waste to energy		
	Converter	Yes	rigid and flexible packaging		2025 Goal: Divert 90 percent
	Converter	Yes	rigid and flexible packaging		2025 packaging commitment
	Retailer	Yes	use of bio-packaging	EMF's CE100 member	reduction of plastic
	End-market user	Yes	PET and fexlible packaging		
	End-market user	Yes	rigid packaging (cosmetics)		
	End-market user	Yes	rigid and flexible plastics,		
	End-market user	Yes	flexible packaging		2025 packaging commitment
	End-market user	Yes	rigid packaging		address SDGs: 3, 5, 6, 8, 12,
	End-market user	Yes	rigid and flexible packaging,		2025 packaging commitment
	Converter	Yes	flexible packaging	EMF's CE100 member	
	Converter	Yes	rigid and flexible packaging	EMF Circular Economy	2025 packaging commitment
	End-market user	Yes	rigid and flexible packaging	EMF Circular Economy	to increase recycled plastics
	End-market user	Yes	rigid and flexible packaging		2025 packaging commitment
	End-market user	Yes	flexible packaging		
	End-market user	Yes	PET, rigid and flexible	EMF's CE100 member; Loop	2030 packaging commitment
	End-market user	Yes	PET and fexlible packaging		
	End-market user	Yes	rigid (smoking-free		address SDGs: 2, 3, 8, 12, 16;
	Converter	Yes	polyester		
	End-market user	Yes	flexible packaging	EMF Circular Economy	to increase recycled plastics
	Converter	Yes	flexible packaging		
	End of life	Yes	recycler - waste to energy	EMF's CE100 member	
	End-market user	Yes	rigid packaging (cosmetics)		adoption of SDGs (not
	End-market user	Yes	rigid and flexible packaging		
	End-market user	Yes	PET, flexible, rigid and	EMF Circular Economy	2025
	End of life	Yes	recycler - waste to resuurce	EMF Circular Economy	
	Retailer	Yes	PET, flexible and rigid		) – to
	End-market user	Yes	rigid and flexible packaging		2022 zero waste to landifll

Figure 16 - Benchmark analysis including members.
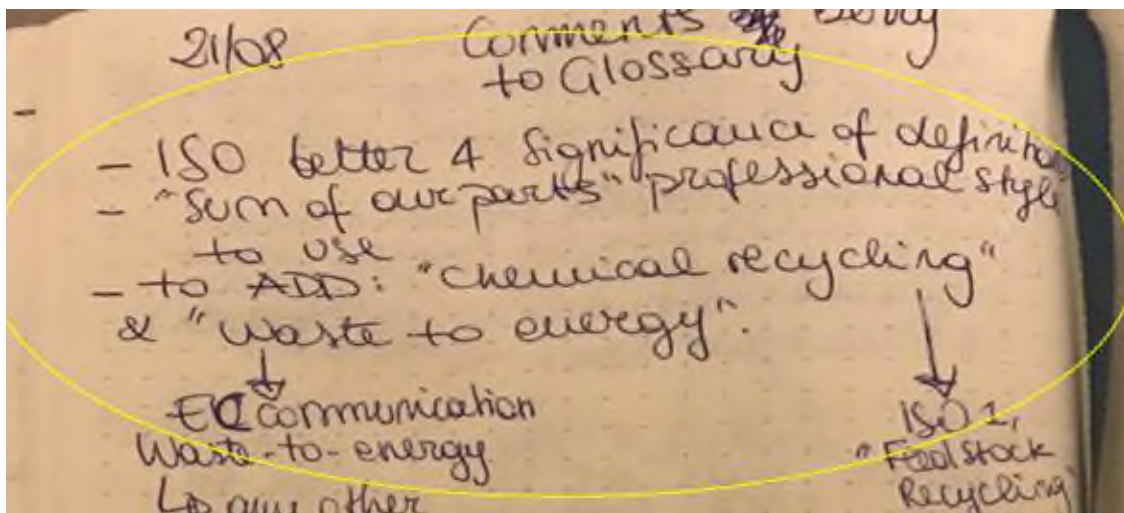
Figure 17 - Example of colour coding in the fieldnotes.

INTERVIEW WITH JAMES

At 11. 30 I have the interview with john, finally.

Find the audio in todays folder, this week folder.

Here my script:

QUESTIONS

- Interviewee's background

I joined IASB 1 April, background in consumer goods companies, Unilever, Colgate Palmolive, packaging company, engineer and then packaging role. Sustainability position in marketing.

Abb, Liaison delegate.

- The interviewee's role within the plastics team.

Main tasks: IASB is a membership-based organisation and 200 leadership multinational, accelerating sustainable development in society. We have members that have representations cross the plastic value chain, from petrochemical production through end of life and recycling, and it becomes clear that plastic waste has become an epidemic and the creation of this this team is to support our members' activities together with the members and to build a positive role for them and ensure that plastic waste ends, but the use of plastic continues. We are attempting to do so through a circular economy project for plastics led by the PPT.

- Opportunity to help and support members in other plastic circular economy projects with a plastic project scoped and led by myself.

- Is it possible to identify barriers created by members different background and/or relationships?

It is fair to be open that one of the key barriers is the reality that many of the members have a commercial interest – their agenda is not just around tackling the issues brought by plastic pollution but also around insuring that the investment their making today is increasing plastic production. At the same time, they aim to reduce and to eliminate plastic waste in the [natural] environment, and this is understood like…there are in many applications, alternatives to plastics that should be considered. However, if we consider the waste hierarchy, reduction is the best way to deliver environmental protection. This does not agree with several plastic members' agenda around plastics and, it is an issue across all membership. Even for waste management companies, they are volume businesses, and any initiatives that drive less value is something that create less revenue for them. So this is the necessary issue that has been addressed but the .org is taking its time to understand how much of that is should focus on another area. In terms of barriers of companies directly talking to each other. One of the reasons we are talking about large mature companies and sue to have professional precompetitive discussion and trading association within the sector.

- What kind of solutions are instead carried out or created by relationships within members?

No projects are helping in finding solutions. There is a strategy team that might start to address that. And I have to walk this type role between clarifying what power role IASB has in this area while keeping our members engaged and educating them as to the right strategy might be.

- What about external relationships? E.g. with local governments and NGOs?

A lot of organisations we need to have strong working relation either because they have geographic interest they have seen to have respected by stakeholders, they have access to either resources that we need or can provide reputational support to allow us to deliver our intention. A strong element of us is being able to use our resources around to invest in technology at the end of the day we need to apply those solutions in markets and we need the support of many partners to allow us to give us the right access to implement those solutions.

EMF, most critical is the UN in different departments. Representations rom nation states, a lot of waste management is an issue that needs to be decide controlled and managed at a state level. If we start looking at the role of consumer brands putting product onto the market how that is being shaped by the plastic waste agenda, e.g., the one of the emf. We need working to develop a partnership with them. WWF is another org that is collaboration and has an environmental mission and we want to make sure that we are working constructively with them and provide resources and strategy to help manage plastic waste and no environment.

1

2

Figure 18 - Examples of colour coding in an interview transcript from an interview with James, the PPT Director.

Dear [World representative],

Plastic waste and the future of plastic packaging is high on the business and government agendas. Society and governments are pressing companies to move away of single use plastics. Many companies have taken commitments to address plastic waste (for instance by signing the New Plastics Economy Global Commitment).

As part of our IASB program on Circular Economy, we are looking at scoping a project to:

- accelerate actions to achieve 100% recyclable packaging and the creation of tangible, working "circular economies";
- help drive pre-competitive demand and solutions for renewable packaging materials;
- create collaboration across the value chain to accelerate the transition of packaging to a circular economy.

This project would complement with the other CEP initiatives and would focus on upstream solutions to reduce, replace and design for recyclability.

I would appreciate to get your perspectives on these topics. Would you have time dates to discuss the potential interest you may have in this scoping project?

We are also planning a session during the IASB Pro Members Meeting on […] and I would be happy to discuss your involvement in this session.

Looking forward to hearing from you,

Thanks,

Best regards,

James and Nicola

Figure 19 - Example of colour coding in an email.

Appendix IV- Complete list of semi-structured interviews and informal conversations

During this ethnographic research, a total of 46 semi-structured interviews and informal conversations were collected. Some of these interviews and conversations happened with more than one participant at a time. Only a few of these became relevant through the data analysis and for the purpose of answering the research questions. Such interviews produced information regarding the process of disciplining plastics and organisations and supported such evidence according to the three codes identified (CE ideas, moral positions, and material) in step one of the data analysis. The others excluded reported information about the No Plastic Waste Coalition, which does not feature in this research, and other sustainability themes the IASB worked on at that time and did not help in enacting the IASB case.

The 18 semi-structured interviews saw the participation of 19 informants (10 males and 9 females). Participants were provided the Participant Information Sheet in advance, which summarised the research topics and goals, and the Consent Form, which outlined what they consented to in participating to the research. Most of the interviewees agreed to be recorded. Recordings, the notes taken during the interviews and interview transcripts are stored in an encrypted and password-protected external drive. These, together with the rest of the raw data collected, will be deleted within the time frame suggested by Lancaster University Ethics Guidance.

Table 25 shows the complete list of interviewees, roles, and details. They are grouped per team and listed from the most to the least senior within that team.

Table 25 - Overall list of interviews, roles, details and teams

Interviewee	Role	Details	Team	Research site
James	Director	Male	PPT	PPT
Nicola	Manager	Female	PPT	PPT
Gerry	Manager	Male	PPT	PPT
Ayushi	Manager	Female	PPT – Asia Office	PPT
Cody	Associate	Male	PPT	PPT
Nadia	Managing Director	Female	CEP, IASB senior management	IASB

Berry	Director	Male	CEP	IASB
Rika	Manager	Female	CEP	IASB
Luciana	Associate	Female	CEP	IASB
Brian	Director	Male	PPT – Asia Office	PPT
Lola	Consultant	Male	Working with the PPT	PPT
Simon	Consultant	Female	Working with the PPT	PPT
Lavinia	Director	Female	Automotive Project team	IASB
Tom	Manager	Male	Automotive Project team	IASB
Martin	Associate	Male	Sustainability Reports team	IASB
Finn	Intern	Male	Sustainability Reports team	IASB
Laura	Intern	Female	Sustainability Reports team	IASB
Paula	Intern	Female	Sustainability Reports team	IASB
Tito	Director	Male	DD Chemicals	SOF

As Table 25 outlines, three interviewees were IASB interns (two females, one male); three were IASB associates (two males, one female); seven were IASB managers (four females, three males)[19]; five were IASB directors and managing directors (three males, two females); and one was a director of a significant plastics member company (male).

The 31 informal conversations occurred without planning and following a specific set of themes and questions with relevant participants. Some occurred at the IASB headquarters, usually during breaks. Some other informal conversations happened before or after staff meetings, the PPT weekly meetings and calls with relevant plastic members, in the relative privacy of the meeting pods in the office. These were sound-

---

[19] This number also includes the two consultants as they were formally part of the PPT and IASB's employees. Their distinct grouping in the previous sections is related to their understanding of their role and involvement with the PPT and because they were still employed at their respective consultancy agencies.

proof, glass-walled, bookable spaces positioned in different locations in the IASB office; privacy was relative as the glass walls made it possible to see who was inside. In total, 27 (18 females, 9 males) participants were involved in these informal conversations, of which three were intern-level participants (2 females, 1 male); three were associate-level participants (2 females, 1 male); 7 were manager-level[20] participants (5 females, 2 males); and 14 were executive-level[21] participants (7 females, 4 males). Table 26 outlines each participants' name, details and team as well as the number of conversations per participant.

---

[20] This number includes participants in the 'consultant' position.

[21] This number includes participants in the 'director', 'founder' and 'co-founder', and 'senior management' position.

Table 26 - List of informal conversations.

Participant	Role	Details	Team/ organisation	Research site(s)	Number of conversation(s)	Topic
James	Director	Male	PPT	PPT	1	Regarding the position of the PPT within the IASB
Nicola	Manager	Female	PPT		4	How to scope the Plastic Project, sharing information on the significant plastic members and commenting on how the plastic members related to each other
Cody	Associate	Male	PPT	Delegate Meeting, PPT	2	Regarding the PPT's (representing the IASB) connections with external initiatives on plastic CEs
Berry	Director	Male	CEP	Delegate Meeting	1	Regarding the IASB's CE agenda and the next steps for CEP toward including more of the Alliance's members to join
Rika	Manager	Female				
Paula	Intern	Female	Sustainability Reports team	IASB	1	Regarding the meaning of sustainability within the IASB and the role of the Alliance's CE agenda
Laura	Intern	Female	Sustainability Reports team			
Finn	Intern	Male	Sustainability Reports team			
Apollo	Manager	Male	Sustainable Fashion company	SOF	1	Regarding environmental, financial, and organisational issues about plastics, and the CE as a solution
Arnold	Founder	Male	Waste Rebels NGO			

Cassiopea	Director	Female	Academic Centre for Microplastic Studies			
Estia	Director	Female	Sustainable Plastics Company			
Fritz	Manager	Male	Chemical Recycling Company 2			
Hellen	Founder	Female	Yellow Circle startup company			
July	Co-founder	Female	Vulcanic startup company			
Lauren	Associate	Female	EsseQ Consultants			
Lila	Consultant	Female	South Consultants			
Michelle	Director	Female	Marine Plastics Governmental Enterprise			
Molly	Manager	Female	Waste Pickers Association			
Morgana	Director	Female	Plastic in the Ocean NGO			

Naomi	Director	Female	Chemical Recycling Company 1			
Rita	Senior Manager	Female	Triller company			
Roxy	Associate	Female	Academic Centre for environmental policymaking			
Samantha	Senior Manager	Female	Orma company			
Skylar	Senior Manager	Female	FinWay startup company			
Tito	Director	Male	DD Chemicals			
Thomas	Manager	Male	World plastics company			

Appendix V – Relevant Tables for Chapter 5

Table 27 - List of actors per event as described in Chapter 5

Actors	Event
James (PPT Director)	Pro Members meeting and Members Update meeting
Gerry (PPT Manager)	Members Update meeting
Cody (PPT Associate)	Members Update meeting
Nadia (CEP Managing Director)	Members Update meeting
Berry (CEP Director)	Members Update meeting
Rika (CEP Manager)	Members Update meeting
Luciana (CEP Associate)	Members Update meeting
Nicola (PPT Manager)	Pro Members meeting
IASB plastic members	Pro Members meeting

Table 28 - List of actants per event as described in Chapter 5

Actants	Event
Single-use plastics	Members Update meeting
The IASB's CE agenda	Members Update meeting
PPT translation of the IASB's CE agenda	Pro Members meeting
Organisational Circularity Documents	Pro Members meeting and Members Update meeting

Table 29 - The PPT members in hierarchical order (senior to junior), as described in Chapter 5

Participant name	Title	Office
James	Director	Headquarters
Brian	Director	Asia Office
Nicola	Manager	Headquarters
Gerry	Manager	Headquarters
Ayushi	Manager	Asia Office
Lola	Consultant	Asia Office

Simon	Consultant	Headquarters
Cody	Associate	Headquarters
Marta (myself)	Intern	Headquarters

Table 30 - Plastic members enrolled within the Plastic Project in chronological order, as described in Chapter 5

Member name	Number of representatives	Details
Fly	From Organisations Guide to Circularity and sustainability reports	Recycler
Star		Retailer
Blue		Consumer goods company
Square		Producer–recycler
Walno	1	Retailer
Alpha	2	Consultancy agency
Woods	1	Retailer
Music	1	Retailer
Cabbage	1	Consumer goods company

Sugar	3	Consumer goods company
Middle	1	Consumer goods company
Mauritius	1	Producer
Gamma	1	Producer
Worlds	2	Producer–recycler
Happy	1	Producer–recycler
Yellow	1	Recycler

Table 31 - PPT research site: actant details, as described in Chapter 5

Actant	Details
Single-use plastics	PET, PP, HDPE, rPET, PVC
The IASB's CE agenda	Definition of CE aimed at a holistic approach and mobilised material-focused approaches such as recycling. The Organisations Guide to Circularity published by CEP presented such an agenda
The EMF's CE agenda	Definition of CE based on recycling and materials management (the loop)

Mechanical and chemical recycling	Recycling approaches that process plastic packaging in a mechanical and chemical way

Table 32 - List of informal conversation during SOF, as described in Chapter 5

Participant	Role	Organisation(s)	Topic
Apollo	Manager	Sustainable Fashion company	Regarding environmental, financial and organisational issues about plastics, and the CE as a solution
Arnold	Founder	Waste Rebels NGO	
Cassiopea	Director	Academic Centre for Microplastic Studies	
Estia	Director	Sustainable Plastics Company	
Fritz	Manager	Chemical Recycling Company 2	
Hellen	Founder	Yellow Circle startup company	
July	Co-founder	Vulcanic startup company	
Lauren	Associate	EsseQ Consultants	
Lila	Consultant	South Consultants	

Michelle	Director	Marine Plastics Governmental Enterprise	
Molly	Manager	Waste Pickers Association	
Morgana	Director	Plastic in the Ocean NGO	
Naomi	Director	Chemical Recycling Company 1	
Rita	Senior Manager	Triller company	
Roxy	Associate	Academic Centre for environmental policymaking	
Samantha	Senior Manager	Orma company	
Skylar	Senior Manager	FinWay startup company	
Tito	Director	DD Chemicals	
Thomas	Manager	World plastics company	
Zeus	Director	Circular World waste management company	

Table 33 - Relevant actors and actants within the IASB research site, as described in Chapter 5

Actors	Significance	Actants	Significance
Nadia, CEP Managing director	The interviews captured meaningful performances to understand IASB organising	Single-use plastics	Their misbehaviour challenges IASB members
Berry, CEP Director	The interview and the informal conversation helped understand the IASB's CE agenda	The EMF's CE ideas	Inspiration for designing the IASB's CE agenda
IASB plastic member Fly, recycler	They contributed to designing the IASB's CE agenda regarding single-use plastics	The IASB's CE ideas	Designed to support members to transition toward a circular business model coordinated by the IASB
IASB plastic member Star, retailer		Recycling approaches	Invoked by IASB members and considered within the IASB's CE agenda

IASB plastic member Blue, consumer goods company			
IASB plastic member Square, producer–recycler			
IASB plastic member Happy, recycler	Although not contributing to the IASB's CE agenda, Happy's experience with single-use plastics informed the IASB regarding the challenges faced by recyclers		

Table 34 - Relevant actors and actants within the PPT research site, as described in Chapter 5

Actors	Significance	Actants	Significance
James, PPT Director	Significant insights regarding their perspective on developing a circular initiative targeting plastics within the IASB, their broader understanding of a CE, single-use plastics waste and the plastic crisis and the role of the IASB in tackling these issues	Single-use plastics (PET, r-PET, HDPE and PVC)	Their misbehaviour challenges plastic members
Nicola, PPT Manager		The EMF's CE ideas	Plastic members invoked these ideas + inspiration for designing the IASB's CE agenda
The IASB plastic members	They contributed to organising the Plastic Project with their understanding of a CE (i.e.,	The IASB's CE ideas	Designed to support members to transition toward a circular business model coordinated by the IASB

	material-focused and related to recycling approaches) and views on single-use plastics' behaviour	Recycling approaches (chemical and mechanical)	Invoked by plastic members and considered aligned with the IASB's CE agenda

Table 35 - Relevant actors and actants within the SOF research site, as described in Chapter 5

Actors	Significance	Actants	Significance
James	It represents the IASB and PPT	The IASB's CE agenda	Invoked by James and tested against the international business sustainability landscape
Roundtable Exercise attendees	They represent the international business sustainability landscape IASB/PPT aims to perform within	The EMF's CE agenda	Invoked by most of Roundtable Exercise organisations
		Break Free From Plastic's no-plastic agenda	It represents a disruptive solution to the plastic crisis by advocating for eliminating plastics and goes against the IASB and the rest of the Roundtable Exercise organisations CE responses
		Single-use plastics (PET, r-PET, HDPE and PVC)	Their misbehaviour challenges IASB and SOF organisations

Appendix VI – Material Semiotic Relationships in the Four Stories

The tables presented in this appendix depict the material semiotic relationships (Law, 1994, 2009) and the process of translation within the four 'coherent' (Law, 2004) stories that underpin the IASB case, as described in Chapter 6.

Table 36 - Story one – 'the IASB's CE agenda'

Entities		Relationship	Actions	Outcome 1	Translation	Outcome 2
IASB	Single-use plastics	(implicit) They act on each other	Whilst the IASB attempts to moralise undisciplined plastics as disciplined through their CE agenda to support their members in solving the organisational challenges plastics brought, plastics' recalcitrant materiality makes the IASB's circularity ideas difficult to work	Undisciplined: Any plastic waste that creates organisational challenges to their plastic members, e.g., loss of finances and reputational capita. The IASB is undisciplined because it cannot perform with plastics in a disciplined way, i.e., avoid plastics to bring issues to their members	Plastics' materiality and the IASB's agenda collaborate to create solutions	Disciplined: Any plastics that do not create any organisational challenge to their plastic members and perform according to the IASB's CE agenda
IASB	CEP	They act upon each other	The CEP feeds the IASB with ideas and members to develop a CE agenda; the IASB gives resources to the CEP to continue with their purpose	Disciplined to each other	/	/

IASB	EMF	The EMF acts upon the IASB	The IASB bases their CE agenda on the EMF's CE ideas	Disciplined to each other	/	/
IASB	Plastic members (recyclers, retailers, producers)	They act upon each other	The IASB included their plastic members in designing the IASB CE agenda; whilst the IASB attempted to make members invoke the IASB's circularity ideas, at the same time, members influenced the IASB's CE agenda	Disciplined to each other	/	/
Plastics member: recyclers	Single-use plastics	They act upon each other	Plastics are not sorted properly and/or are not recyclable. They leak into the natural environment and pollute as recyclers do not have a solution for non-recyclable plastics	Undisciplined: plastics bring organisational challenges, e.g., financial loss and controversial reputational capital for recyclers. Recyclers are not able to deal with plastics' material composition	Plastics' material composition collaborates with the IASB and their members' solutions	Disciplined: Recyclable and reusable plastics; recyclers able to deal with plastics' material composition
Plastics member: retailers	Single-use plastics	They act upon each other	Retailers want recyclable/reusable plastics that keep meeting	Undisciplined: plastics that bring organisational	Retailers collaborate with producers to	Disciplined: Plastics that are included within

304

			their expectations as plastic packaging. However, plastics' recalcitrant physical characteristics do not allow that, as recyclable/reusable plastics do not perform as expected to preserve goods. Therefore, retailers keep using non-recyclable/reusable plastics, which often escape waste management networks and leak into and pollute the natural environment	challenges, e.g., financial loss and controversial reputational capital. Retailers cannot stop using plastics but are unable to deal with non-recyclable/reusable plastics' material composition	redesign plastics that are recyclable/reusable and meet retailers' expectations	collection, sorting and recycling networks; retailers able to capture recyclable/reusable plastics
Plastics member: producers	Single-use plastics	They act upon each other	Producers attempt to manufacture recyclable and reusable plastics; however, they need to meet customers' expectations (e.g., retailers' expectations of prolonging life shelf through packaging), which	Undisciplined: plastics waste, i.e., once thrown away after serving their purpose of preserving goods. Producers are not able to make plastics that are recyclable/reusable	Identify a way to produce plastics that meet customers' expectations and can be recycled/reused	Disciplined: plastics that can be recycled/reused as waste; producers are able to deal with plastics' material composition and

			often cannot be met with recycled/reusable plastics	that meet customers' expectations.		design plastics to the standards of reusability/recyclability
Plastics member: retailers	Plastic members: producers	(implicit) They act on each other	Producers manufacture plastics that are not recyclable/reusable in order to meet retailers' expectations. Retailers' expectations are unfeasible for plastics to maintain the characteristics required and be recyclable/reusable	Undisciplined: they enacted each other as undisciplined because retailers ask for something that cannot be made otherwise; producers provide retailers with plastics that make them the 'polluters'	Redesign single-use plastics to be made with recycled/recyclable/reusable materials	Disciplined: producers that design up to standards reusable/recyclable plastics; retailers able to capture such plastics within recycling networks
Plastics member: recyclers	Plastic members: producers and retailers	(implicit) They act on each other	Producers manufacture plastics that are not recyclable/reusable in order to meet retailers' expectations. Retailers are not able to sort these plastics correctly and create contaminated plastic waste streams; recyclers cannot recycle/reuse such plastics	Undisciplined to each other	Producers to redesign single-use plastics to be made with recyclable/reusable materials; retailers able to capture such plastics within recycling networks;	Disciplined: producers that design plastics to the standards of reusability/recyclability; retailers able to capture such plastics within recycling networks; recyclers able to

					recyclers to provide recycling networks	recycle newly designed recyclable/reusable plastics
EMF	Plastic members	EMF acts upon plastic members	Several IASB plastic members are involved in EMF's initiatives around circularity; therefore, they bring the EMF's CE ideas when performing with the IASB's efforts to enact a CE agenda	Disciplined: IASB plastic members are disinclined because mobilising EMF's CE ideas	/	/
EMF	Single-use plastics	(implicit) EMF attempts to act upon plastics	The EMF's CE ideas aim at keeping materials "at their highest utility and value at all times" (EMF, 2015, p. 2) through material-focused practices, e.g., recycling and reusing	Undisciplined: plastics are undisciplined because they escape attempts to keep their value high and become waste, e.g., by not being recyclable	Plastics to be kept as valuable at all times, e.g., recycling and reusing practices, e.g., by designing recyclable or reusable plastics and reinforce recycling and reusing networks	Disciplined: recyclable and reusing plastics are disciplined

Table 37 - Story two – 'Sustainable Organisations Forum'

Entities		Relationships	Actions	Outcome 1	Translation	Outcome 2
Waste Pickers Association	Single-use plastics	They act upon each other	Waste pickers collect plastic waste from the urban and natural environment; however, plastic waste is not recyclable and keeps leaking into the natural environment and polluting, giving more work for waste pickers	Undisciplined: Waste pickers enacted plastics as undisciplined and aim to stop all plastics	The problem is not plastics' material composition but plastic waste position	Disciplined: plastic waste that does not pollute the natural environment is disciplined
Environmental NGO 1	Single-use plastics	They act upon each other	Travelling is the primary reason for plastic pollution because plastics are likely to be disposed of improperly, leaking into and polluting the natural environment	Undisciplined: 'Travel' plastics are undisciplined, and NGO 1 aims to stop imported plastics	The problem is not plastics' material composition but plastic waste position	Disciplined: plastic waste that does not pollute the natural environment is disciplined
Policymaker	Single-use plastics	(implicit) Policymaker does not act directly on plastics	Plastics are undisciplined because consumers litter and make mistakes in sorting plastic waste	Undisciplined: Plastics that leak into the natural environment and pollute	Education to avoid pollution	Disciplined: Plastic waste within official waste management systems

Environmental NGO 2	Single-use plastics	They act upon each other	Plastics are not collected and recycled; they leak into the natural environment and pollute; NGO 2 cannot deal with plastics' recalcitrant material composition	Undisciplined: Plastics that leak into the natural environment and pollute	Artistic reuse/recycling	Disciplined: Reusable/recyclable plastics; NGO 2 able to deal with reusable/recyclable plastics
Recycling company 1 (RC 1)	Single-use plastics	They act upon each other	Plastics are not sorted properly and/or not recyclable. They leak into the natural environment and pollute; RC 1 does not have a solution for non-recyclable plastics	Undisciplined: Plastics that leak into the natural environment and pollute	Reuse/recycling	Disciplined: Reusable/recyclable plastics; RC 1 able to deal with reusable/recyclable plastics
Recycling company 2 (RC 2)	Single-use plastics	They act upon each other	Plastics are not sorted properly and/or not recyclable. They leak into the natural environment and pollute; RC 2 does not have a solution for non-recyclable plastics	Undisciplined: Plastics that leak into the natural environment and pollute	Recycling	Disciplined: Recyclable plastics; RC 2 able to deal with reusable/recyclable plastics
IASB/PPT (James)	Single-use plastics	(implicit) They act upon each other	Plastics represent a 'wicked' organisational challenge for IASB/PPT members as they keep leaking into the natural environment and	Undisciplined: Plastics that leak into the natural environment and pollute; IASB/PPT	Recycling	Disciplined: Recyclable plastics; IASB/PPT to design a project to deal with recyclable plastics

			polluting; The IASB/PPT is not able to deal with plastics' recalcitrant material composition	unable to solve issues brought by plastics' recalcitrant materiality		
Plastic Producer company 1 – 2 – 3	Single-use plastics	They act upon each other	Because of customers' expectations, plastics must be manufactured in certain ways. However, they are not often recyclable, and there is no incentive for producers to spend time/money to develop a recyclable alternative because there is not a large market for plastic recyclates	Undisciplined: Plastics that leak into the natural environment and pollute; producers that do not invest in recyclable/reusable plastics	To create recycling markets for plastics	Disciplined: Recyclable plastics/recyclates; producers that invest in recyclable/reusable
Recycling companies 1 and 2, Plastic Producer companies 1 – 2 – 3, Environmental NGO 2, Policymaker	The EMF's CE agenda and European Commission's CE agenda	(Implicit) Organisations act upon EMF's and European Commission's CE agendas	Organisations invoked CE ideas that could be linked to EMF's and European Commission's circularity agendas to support their agenda on plastics	Disciplined: Organisations invoked only partial ideas from the EMF's and European Commission's CE agenda that fit with their interests on plastics	/	/

IASB/PPT (James)	The IASB's CE agenda	They act upon each other	The IASB/PPT invoked the IASB's CE agenda	Disciplined to one another	/	/
Waste Pickers Association and Environmental NGO 1	Break Free From Plastic's ideas on plastic pollution and corporations' responsibility	(Implicit) Organisations act upon Break Free From Plastic 's ideas	Organisations invoked Break Free From Plastic 's ideas on plastic pollution and corporations' responsibility as CE ideas to support their agenda on plastics	Disciplined to one another	/	/
IASB/PPT (James)	Environmental NGO 1	IASB/PPT acts upon NGO 1	NGO 1 enacted the IASB's plastic members as 'bad', i.e., polluters. Hence, the PPT wants to make NGO 1 see the IASB and their members' point of view on plastics, thus ceasing the attacks on plastic members	Undisciplined to each other	Collaborate on a project	Disciplined: organisations that share the same aim are disciplined
IASB/PPT (James)	Waste Pickers Association (WPA)	IASB/PPT acts upon WPA	The WPA moralises the IASB's plastic members as 'bad', i.e., polluters. Hence, the PPT wants to make NGO 1 see the IASB and their members' point of view on plastics, thus ceasing the attacks on plastic	Undisciplined to each other	Collaborate on a project	Disciplined: organisations that share the same aim are disciplined

IASB/PPT (James)	Environmental NGO 2	They act on each other	Both organisations think that plastics are 'good' but need to be disciplined. Therefore, they collaborate toward the same goal.	Disciplined to each other	/	/
IASB/PPT (James)	Policymaker	They act on each other	Both organisations think that plastics are 'good' but need to be disciplined. Therefore, they collaborate toward the same goal.	Disciplined to each other	/	/
IASB/PPT (James)	Recycling company 1 (RC 1) & (RC 2) 2	They act on each other	Both organisations think that plastics are 'good' but need to be disciplined. Therefore, they collaborate toward the same goal.	Disciplined to each other	/	/
IASB/PPT (James)	Environmental NGO 1	They act on each other	Both organisations think that plastics are 'good' but need to be disciplined. Therefore, they collaborate toward the same goal.	Disciplined to each other	/	/

Table 38 - Story three – 'Plastic Project'

Entities		Relationships	Actions	Outcome 1	Translation	Outcome 2
PPT	Single-use plastics	They act upon each other	The PPT attempts to discipline plastics through the Plastic Project based on particular criteria of the IASB's CE agenda (i.e., material-focused practices) to support plastics members in solving plastic-related organisational challenges. Plastics' recalcitrant material composition makes the PPT Project's objectives difficult to achieve, e.g., not all single-use plastics are easy to recycle	Undisciplined: Plastics that create organisational challenges to their plastic members, e.g., loss of finances and reputational capital, are undisciplined. Undisciplined: The PPT is undisciplined to plastics because it performs against plastics' recalcitrant physical characteristics	Focus on easy-to-recycle single-use plastics, e.g., plastic packaging	Disciplined: single-use plastics that are recyclable (e.g., plastic packaging); the PPT performs according to the mobilised plastics' material composition

Plastic members	Single-use plastics	See table 36				
PPT	The IASB's CE agenda	See table 37				
PPT	The IASB/CEP	The IASB/CEP acts upon PPT	The IASB created the PPT to help the CEP solve the organisational issues that affected plastic members. The PPT needs to align with the IASB's CE agenda. The PPT fed solutions to the CEP and IASB by designing the Plastic Project	Undisciplined: the PPT must align with the IASB's CE agenda to be considered as disciplined. It does that, but it will become undisciplined as soon as it stops aligning	/	/
PPT	Plastic members	They act upon each other	The PPT's Plastic Project needs members to work; however, plastic members need to be aligned with the IASB's CE agenda and the PPT idea of	Disciplined: members that are aligned to the IASB's CE agenda are considered disciplined.	Plastic members to align to the IASB's CE agenda and PPT translation of the concepts of disciplined within the Plastic	Disciplined: member companies to collaborate and support the IASB's CE agenda and PPT's Project objectives

			disciplined plastics to be recruited within the Project	Undisciplined: however, the Plastic Project has further particular criteria that the members need to meet to be part of the Project. Therefore, members that meet the IASB's CE agenda but do not meet the PPT criteria are undisciplined	Project (related to recyclability)	
PPT	EMF	(implicit) EMF acts upon PPT	As it aligns with the IASB's CE agenda, the PPT invokes particular ideas from the EMF's CE philosophy related to material-focused practices, e.g., recycling	Disciplined: the PPT is disciplined to the EMF	/	/

Table 39 - Story four – 'Walno'

Entities		Relationships	Actions	Outcome 1	Translation	Outcome 2
PPT	Single-use plastics	See table 38				
Walno	Single-use plastics	They act on each other	Like other IASB plastics member retailers, Walno wants recyclable/reusable plastics that keep meeting their expectations, e.g., as plastic packaging, to protect the product. However, plastics' recalcitrant physical characteristics do not allow that, as recyclable/reusable plastics do not perform as expected. Therefore, Walno keeps using non-recyclable/non-reusable plastics, which often escape waste	Undisciplined: plastic packaging that leaks into the natural environment pollute and brings organisational challenges, e.g., financial loss and controversial reputational capital; Walno is not able to avoid leakages and pollution because it cannot deal with non-recyclable/non-reusable plastics' materiality	Single-use plastics, e.g., plastic packaging, to become reusable through a project in collaboration with relevant partners	Disciplined: Single-use plastics, e.g., plastic packaging, that are reusable

			management networks and leak into and pollute the natural environment			
EMF	Single-use plastics	See table 36				
PPT	The IASB's CE agenda	See table 37				
Walno	IASB	They act upon each other	Walno is one of the IASB's plastic members, and they align with the IASB's CE agenda. At the same time, Walno is large enough to create their own initiatives on plastics	Disciplined to each other	/	/
PPT	IASB/CEP	See table 38				
PPT	Walno	They act on each other	The PPT engages Walno to join the Plastic Project as they both invoke the IASB's CE agenda	Disciplined: they seem to be disciplined to each other as they invoke the same CE agenda (IASB CE agenda)	They negotiate CE ideas; however, they enact different specific criteria for plastics to be moralised as disciplined	Undisciplined: they are undisciplined to each other and will remain like that as Walno moves toward organising their own Project to discipline plastics

PPT	EMF	See table 38				
Walno	EMF	EMF acts upon Walno	Like other IASB plastics members, because aligning with the IASB's CE agenda, Walno invokes specific ideas from the EMF's CE philosophy related to technocentric practices, e.g., reusing and recycling	Disciplined: Walno is disciplined to EMF	/	/

Appendix VII - Summary of the connections between moments of translation of the CE agenda, the CE contexts, levels of morality and notions of discipline as discussed in Chapter 8

Table 40 - Summary of the connections between moments of translation of the CE agenda, the CE contexts, levels of morality and notions of discipline as discussed in Chapter 8.

CE translation and definition	CE context	Level of morality	Notion of discipline
Translation 1 - CE as a business model "[...] to rethink the relationships between natural resources, materials, technology, consumers and the industry toward sustainability." (IASB's Organisations Guide to Circularity, 2019, p. 4)	The IASB's holistic CE context	The IASB's CE morality [abstract] (relationality criteria)	Related to technologies being included within waste management systems that do not leak into and pollute the natural environment and represent a resource for local economies by design, with organisations supporting practices that re-think relationships between businesses, materials, government and civil society and design materials as a resource for local economies
Translation 2 – CE for plastics as enacted by IASB plastic members, focused on material management and technocentric practices, i.e., reusing/recycling.	The IASB's CE for plastics context	The IASB's CE morality [abstract] (technocentric criteria)	Related to reusing/recycling practices with organisations supporting this enactment through their operations
Translation 3 – CE for plastics as enacted by the PPT developing the Plastic Project, focused on material management and technocentric practices invoked by plastic members, i.e., recycling.	PPT's CE for plastics context	The PPT's network morality (negotiated technocentric criteria, i.e., recyclability)	Related to recycling practices with organisations supporting this enactment through their operations

References

Akrich, M., and Latour, B. (1992) 'A summary of a convenient vocabulary for the semiotics of human and nonhuman assemblies', W. E. Bijker, and J. Law (eds.) *Shaping technology/building society: Studies in socio-technical change*. Cambridge, Massachusetts: MIT Press.

Almroth, C. B. and Eggert, H. (2019) 'Marine Plastic Pollution: Sources, Impacts, and Policy Issues', *Review of Environmental Economics and Policy,* 13(2), pp. 317–326. Available at: https://www.journals.uchicago.edu/doi/10.1093/reep/rez012.

Aminoff, A. and Pihlajamaa, M. (2020) 'Business experimentation for a CE-Learning in the front end of innovation', *Journal of Cleaner Production*, 275, 124051. Available at: https://doi.org/10.1016/j.jclepro.2020.124051.

Amit, V. (2000) *Constructing the Field: Ethnographic Fieldwork in the Contemporary World*. London & New York: Routledge.

Appadurai, A. (1986) *The Social Life of Things. Commodities in Cultural Perspective*. Cambridge: Cambridge University Press.

Arksey, H. and Knight, P. T. (1999) *Interviewing for social scientists: An introductory resource with examples*. London: Sage Publications.

Asdal, K., and Moser, I. (2012) 'Experiments in Context and Contexting', *Science, Technology & Human Values*, 37(4), pp. 291–306. Available at: https://doi.org/10.1177/0162243912449749.

Atkinson, P., Delamont, S., Coffey, A., Lofland, J. and Lofland, L. (2001) *Handbook of Ethnography*. London: Sage Publications.

Ayres, R. U. and Simonis, U. E. (1994) *Industrial Metabolism: Restructuring for Sustainable Development*. Tokyo: United Nations University Press.

Bach, D. (2016) 'Frame or Get Framed', *Yale Insights*. Available at: https://insights.som.yale.edu/insights/frame-or-get-framed (Accessed: 25 June 2024).

Barad, K. (2007) *Meeting the University Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Massachusetts: Duke University Press.

Bateson, G. (2000) *Steps to an Ecology of Mind*. Chicago: The University of Chicago Press.

BBC One. (2017) *The dangers of plastics in our Ocean,* Blue Planet II. Available at: https://www.bbc.co.uk/Programs/p05q49hq (Accessed: 20 April 2020).

Beard, L., Scarles, C. and Tribe, J. (2016) 'Mess and method: Using ANT in tourism research', *Annals of tourism research*, 60, pp. 97-110. Available at: https://doi.org/10.1016/j.annals.2016.06.005.

Beaumont, N. J., Aanesen, M., Austen, M., Börger, T., Clark, J. R., Cole, M., Hooper, T., Lindeque, P., Pascoe, C. and Wyles, K. J. (2019) 'Global ecological, social and economic impacts of marine plastic', *Marine Pollution Bulletin*, 142, pp. 189-195. Available at: https://doi.org/10.1016/j.marpolbul.2019.03.022.

Benjamin, A. (2015) *Towards a Relational Ontology: Philosophy's Other Possibility*. Albany: Suny Press.

Bennett, J. (2010) *Vibrant matter: a political ecology of things*. Cambridge, Massachusetts: Duke University Press.

Beyes, T., Chun, W. H. K., Clarke, J., Flyverbom, M. and & Holt, R. (2022) 'Ten Theses on Technology and Organization: Introduction to the Special Issue', *Organization Studies*, 43(7), pp. 1001-1018. Available at: https://doi.org/10.1177/01708406221100028.

Blaxter, L., Hughes, C. and Tight, M. (2006) *How to Research*. New York: Open University Press.

Blomsma, F. (2018) 'Collective 'action recipes' in a CE. On waste and resource management frameworks and their role in collective change', *Journal of Cleaner Production*, 199, pp. 969-982. Available at: https://doi.org/10.1016/j.jclepro.2018.07.145.

Blomsma, F., and Brennan G. (2017) 'The Emergence of CE. A New Framing Around Prolonging Resource Productivity', *Journal of Industrial Ecology*, 21(3), pp. 603–614. Available at: https://doi.org/10.1111/jiec.12603.

Bloomfield, B. P., and Vurdubakis, T. (1999) 'The Outer Limits: Monsters, Actor Networks and the Writing of Displacement', *Organization*, 6(4), pp. 625 – 647. Available at: https://doi.org/10.1177/13505084996400.

***Blue[22] (2018) *Sustainability Report.* Available at: http://www.bluesustainabilityreport.com (Accessed: 2 March 2023).

Böhm, S., Ho, C-H., Holmes, H., Manolchev, C., Rödl, M. and Spekkink, W. (2023) 'Circular society activism: prefigurative communities in everyday CE action', A. Alexander, S. Pascucci and F. Charnley (eds.) *Handbook of the CE*. Berlin: De Gruyter, pp. 241–259.

Bowen, G. A. (2009) 'Document Analysis as a Qualitative Research Method', *Qualitative Research Journal*, 9(2), pp, 27-40. Available at: https://doi.org/10.3316/QRJ0902027.

Break Free From Plastic (no date) *The global movement envisioning a future free from plastic pollution*. Available at: https://www.breakfreefromplastic.org/ (Accessed: 23 April 2019).

Brooks, A. (2019) *Clothing Poverty. The Hidden World of Fast Fashion and Second-Hand Clothes*. London: Zed Books.

Brooks, A. L., Wang, S. and Jambeck, J. R. (2018) 'The Chinese import ban and its impact on global plastic waste trade', *Science Advances*, 4, pp. 1 –7. Available at: https://www.science.org/doi/10.1126/sciadv.aat0131.

Calisto Friant, M., Vermeulen, W. J. V. and Salomone, R. (2020) 'A typology of CE discourses: Navigating the diverse visions of a contested paradigm', *Resources, Conservation & Recycling*, 161, 104917. Available at: https://doi.org/10.1016/j.resconrec.2020.104917.

---

[22] For confidentiality purposes, pseudonyms are used for websites, the names of organisations and the titles of the reports and publications that mention IASB and their members. These resources are marked with ***. If required, I can provide the references.

Callon, M. (1986) 'Some elements of a sociology of translation: Domestication of the scallops and the fisherman of St Brieuc Bay', in J. Law (ed.) *Power, action, and belief: A new sociology of knowledge*. London: Routledge, pp. 196–223.

Callon, M. (1998) 'An essay on framing and overflowing: Economic externalities revisited by sociology', in M. Callon (ed.) *The laws of the markets.* Oxford: Blackwell Publishing, pp. 244–269.

Callon, M. and Law, J. (1982) 'On Interests and Their Transformation: Enrolment and Counter-Enrolment', *Social Studies of Science*, 12(4), pp. 615–25. Available at: https://www.jstor.org/stable/284830 (Accessed: 20 January 2021).

Charter, M., and Keiller, S. (2014) *Grassroots innovation and the CE. A Global Survey of Repair Cafés and Hackerspaces*. The Centre for Sustainable Design®, University for the Creative Arts. Available at: https://cfsd.org.uk/site-pdfs/circular-economy-and-grassroots-innovation/Survey-of-Repair-Cafes-and-Hackerspaces.pdf (Accessed 2 July 2023).

Chen, Y., Cui, Z., Cui, X., Liu, W., Wang, X., Li, X. and Li, S. (2019) 'Life cycle assessment of end-of-life treatments of waste plastics in China', *Journal of Resources, Conservation and Recycling*, 146, pp. 348–357. Available at: https://doi.org/10.1016/j.resconrec.2019.03.011.

Chertow, M. R. (2000) 'Industrial symbiosis: literature and taxonomy', *Annual Review of Energy and the Environment*, 25, pp. 313–337. Available at: https://www.annualreviews.org/doi/10.1146/annurev.energy.25.1.313.

Cho., R. (2021) 'Why Fashion Needs to Be More Sustainable', *Columbia Climate School – State of the Planet,* 10 June. Available at: https://news.climate.columbia.edu/2021/06/10/why-fashion-needs-to-be-more-sustainable/ (Accessed 10 October 2022).

Clifford, J. (1992) 'Traveling Cultures', in L. Grossberg, C. Nelson and P. A. Treichler (eds.) *Cultural Studies.* London: Routledge.

Coffey, A. (1999) *The Ethnographic Self. Fieldwork and the Representation of Identity.* London: Sage Publications.

Cooper, R. (1986) 'Organization/Disorganization'. *Social Science Information*, 25(2), pp. 299-35. Available at: https://doi.org/10.1177/053901886025002.

Cooper, R. (1998) 'Assemblage Notes', in R. Chia (ed.) *Organised Worlds: Explorations in Technology and Organization with Robert Cooper*. London: Routledge, pp. 100-119.

Cooren, F. (2018) 'Materializing Communication: Making the Case for a Relational Ontology', *Journal of Communication*, 68(2), pp. 278–288. Available at: https://doi.org/10.1093/joc/jqx014.

Corvellec, H., Bohm, S., Stowell, A. and Valenzuela, F. (2020a) 'Introduction to the special issue on the contested realities of the CE', *Culture and Organization*, 26(2), pp. 97–102. Available at: https://doi.org/10.1080/14759551.2020.1717733.

Corvellec, H., Babri, M. and Stål, H. I. (2020b) 'Putting circular ambitions into action: the case of Accus, a small Swedish sign company' in M. Brandao, D. Lazarevic and G. Finnveden (eds.) *Handbook of the CE*. Cheltenham: Edward Elgar Publishing, pp. 266-277.

Corvellec, H., Stowell, A. F. and Johansson, N. (2021) 'Critiques of the CE', *Journal of Industrial Ecology*, 26(2), pp. 421-432. Available at: https://doi.org/10.1111/jiec.13187.

Czarniawska, B. (1998) *A Narrative Approach to Organization Studies*. Thousand Oaks: Sage Publications.

Czarniawska, B. (2004) 'On time, Space and Action Net', *Organization*, 11(6), pp. 773-791. Available at: https://doi.org/10.1177/135050840404725.

Czarniawska, B. (2007) *Shadowing: And Other Techniques for Doing Fieldwork in Modern Societies*. Copenhagen: Copenhagen Business School Press.

Davis, H. (2015) *Life & Death in the Anthropocene a Short history of plastics*. Available at: https://heathermdavis.com/wp-content/uploads/2014/08/Life-and-Death-in-the-Anthropocene.pdf (Accessed 14 March 2022).

Davis, N. (2020) 'Fast fashion speeding toward environmental disaster, report warns', *The Guardian*, 7 April. Available at:

https://www.theguardian.com/fashion/2020/apr/07/fast-fashion-speeding-toward-environmental-disaster-report-warns (Accessed 10 October 2022).

Decreto Legislativo 5 febbraio 1998, agg. 2006 (2006) 'Individuazione dei rifiuti non pericolosi sottoposti alle procedure semplificate di recupero ai sensi degli articoli 31 e 33 del decreto legislativo 5 febbraio 1997, n. 22 (versione coordinata con il DM 5 aprile 2006)', *Albo Nazionale Gestori Ambientali*. Available at: https://www.albonazionalegestoriambientali.it/Download/it/NormativaNazionale/004-DM_05.02.98.pdf [Accessed 1 November 2022].

Decreto Legislativo 3 aprile 2006, n. 152 (2006) 'Norme in materia ambientale', *Gazzetta Ufficiale n. 88 - Supplemento Ordinario n. 96*. Available at: https://www.gazzettaufficiale.it/dettaglio/codici/materiaAmbientale (Accessed: 1 November 2022).

Decreto Legislativo 3 dicembre 2010, n. 205 (2010) 'Disposizioni di attuazione della direttiva 2008/98/CE del Parlamento europeo e del Consiglio del 19 novembre 2008 relativa ai rifiuti e che abroga alcune direttive', *Gazzetta Ufficiale*. Available at: https://www.gazzettaufficiale.it/eli/id/2010/12/10/010G0235/sg (Accessed: 3 November 2022).

Department of Environment and Rural Affairs (2011) *Guidance on applying the Waste Hierarchy*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf (Accessed: 15 November 2022).

DeVault, M., L. (1990) 'Novel Readings: The Social Organization of Interpretation', *American Journal of Sociology*, 95(4), pp. 887–921. Available at: https://www.jstor.org/stable/2780645 (Accessed: 10 March 2020).

Douglas, M. (1966) *Purity and Danger: an analysis of concepts of pollutions and taboo*. London: Routledge.

Ellen MacArthur Foundation [EMF] (2013) *Towards the CE. Economic and business rationale for an accelerated transition*. Available at:

https://emf.thirdlight.com/link/x8ay372a3r11-k6775n/@/preview/1?o (Accessed 16 September 2021).

Ellen MacArthur Foundation [EMF] (2015) *Towards the CE: business rationale for an accelerated transition*. Available at: www.ellenmacarthurfoundation.org (Accessed 21 July 2021).

Ellen MacArthur Foundation [EMF] (2016) *Plastic Pacts*. Available at: https://www.ellenmacarthurfoundation.org/our-work/activities/new-plastics-economy/plastics-pact (Accessed 2 June 2019).

Ellen MacArthur Foundation [EMF] (2018) *New Plastic Economy Global Commitment*. Available at: https://www.newplasticseconomy.org/projects/global-commitment (Accessed 2 June 2019).

Ellen MacArthur Foundation [EMF] (2019) *Looking for the New Plastics Economy?*. Available at: https://www.newplasticseconomy.org/assets/doc/GC-Report-June19.pdf (Accessed 2 July 2019).

Ellen MacArthur Foundation [EMF] (2021) *Keeping clothing in use to reduce waste: ThredUP*. Available at: https://ellenmacarthurfoundation.org/circular-examples/keeping-clothing-in-use-to-save-us-money-and-reduce-waste-thredup (Accessed 23 September 2022).

Emerson, R. M., Fretz, R. I. and Shaw, L. L. (2001) 'Participant Observation and Fieldnotes', in P. Atkinson, S. Delamont, A. Coffey, J. Lofland and L. Lofland (eds.) *Handbook of Ethnography.* London: Sage Publications, pp. 352-368.

Eschner K. (2017) 'How the 1970s Created Recycling As We Know It. People recycled before then, but for different reasons', *Smithsonian Magazine*, 15 November. Available at: https://www.smithsonianmag.com/smart-news/how-1970s-created-recycling-we-know-it-180967179/ (Accessed: 17 November 2020).

Esposito, M., Tse, T. and Soufani, K. (2018) 'Introducing a CE: New thinking with new managerial and policy implications', *California Management Review*, 60(3), pp. 5-19. Available at: https://doi.org/10.1177/0008125618764691.

European Commission (2015a) *Closing the loop - An EU action plan for the CE*. Luxembourg: Office for Official Publications of the European Communities. Available at http://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF (Accessed: 30 March 2020).

European Commission (2015b) Directive (EU) 2015/720 of the European Parliament and of the Council of 29 April 2015 Amending Directive 94/62/EC on Packaging and Packaging Waste to Reduce Non-Consumption of Lightweight Carrier Bags. Luxembourg: Office for Official Publications of the European Communities. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L0720 (Accessed: 4 May 2021).

European Commission (2018) *A European Strategy for Plastics in a CE*. Luxembourg: Office for Official Publications of the European Communities. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF (Accessed: 17 October 2021).

European Union (1997) Risoluzione del Consiglio del 24 febbraio 1997 sulla strategia comunitaria per la gestione dei Rifiuti. *Gazzetta Ufficiale*. Available at: https://eur-lex.europa.eu/legal-content/IT/TXT/?uri=OJ%3AC%3A1997%3A076%3ATOC (Accessed: 3 November 2022).

European Pallet Association (no date) *EPAL Euro Pallet (EPAL 1).* Available at: https://www.epal-pallets.org/eu-en/load-carriers/epal-euro-pallet (Accessed: 1 November 2022).

European Union (2008) *Direttiva 2008/98/CE del Parlamento europeo e del Consiglio, del 19 novembre 2008 , relativa ai rifiuti e che abroga alcune direttive (Testo rilevante ai fini del SEE)*. Available at: https://eur-lex.europa.eu/legal-content/IT/TXT/?uri=celex%3A32008L0098 (Accessed: 3 November 2022).

Fashion Revolution (no date) *Fashion Revolution.* Available at: https://www.fashionrevolution.org/about/ (Accessed: 23 September 2022).

Fashion Takes Action (no date) *Circular Fashion. Fashion's Waste Problem.* Available at: https://fashiontakesaction.com/circular-fashion/ (Accessed: 23 November 2023).

Faubion, J., D. (2001) 'Currents of Cultural Fieldwork', in P. Atkinson, S. Delamont, A. Coffey, J. Lofland and L. Lofland (eds.) *Handbook of Ethnography.* London: Sage Publications, pp. 39 – 59.

Fellner, J., Brunner, P., H. (2022) 'Plastic waste management: is CE really the best solution?', *Journal of Material Cycles and Waste Management,* 24, pp. 1–3. Available at: https://doi.org/10.1007/s10163-021-01340-2.

Ferri, M. (2024) 'Morality and Discipline of single-use plastics' in Waste Perspectives from social sciences and humanities. Cambridge Scholar Publishing, pp. 191 - 210.

Ferri, M., Hill, C., Stowell, A. and Vurdubakis, T. (*forthcoming)* 'Taming the Monster: 'Disciplined Plastics' and the Meta-Organization of Circularity'. In progress.

Ferri, M., Stowell, A. and Whiteman, G. (2023) 'Plastic futures: Mobilising CE contexts to address the plastic crisis', in A. Alexander, S. Pascucci and F. Charnley (eds.) *Handbook of the CE*. Berlin: De Gruyter, pp. 307-331.

Foucault, M. (1991) *Discipline and punish: the birth of the prison*. London: Penguin.

Fisher, T. (2013) 'A World of Colour and Bright Shining Surfaces: Experiences of Plastics after the Second World War', *Journal of Design History*, 26(3), pp. 285-303. Available at: https://doi.org/10.1093/jdh/ept012.

***Fly (2017) *Sustainability Report.* Available at: http://www.flysustainabilityreport.com (Accessed: 2 March 2023).

Frosch, R. A., Gallopoulos, N. E. (1989) 'Strategies for manufacturing', *Scientific American*, 261, pp. 144–152. Available at: https://www.jstor.org/stable/24987406 (Accessed: 23 January 2021).

Gabrys, J., Hawkins, G. and Michael, M. (2013) *Accumulation: The Material Politics of Plastic*. London: Routledge.

Geertz, C. (1973) *The interpretation of cultures*. New York: Basic Books.

Geertz, C. (1988) *Works and Lives: The Anthropologist As Author*. Stanford: Stanford University Press.

Geyer, R., Jambeck, J. and Law, K.L. (2017) 'Production, use, and fate of all plastics ever made. *Science Advances,* 3(7), 1700782. Available at: https://www.science.org/doi/10.1126/sciadv.1700782.

Gille, Z. and Lepawsky, J. (2021) *The Routledge Handbook of Waste Studies*. Oxon: Routledge.

Given, L. (2012) 'Social Context', in L. Given (ed.) *The SAGE Encyclopedia of Qualitative Research Methods*. Thousand Oaks: Sage Publications.

GOV.UK (2024) *Guidance. Single-use plastics bans and restrictions*. Available at: https://www.gov.uk/guidance/single-use-plastics-bans-and-restrictions.

Gregson, N., Crang, M., Fuller, S. and Holmes, H. (2015) 'Interrogating the CE: The Moral Economy of Resource Recovery in the EU', *Economy and Society*, 44(2), pp. 218–243. Available at: https://doi.org/10.1080/03085147.2015.1013353.

Grodzińska-Jurczak, M., Krawczyk, A., Jurczak A., Strzelecka M., Rechciński, M. and Boćkowski, M. (2020) 'Environmental choices vs COVID-19 pandemic fear – Plastic Governance Re-assessment', *Society Register*, 4, pp. 49-66. Available at: https://doi.org/10.14746/sr.2020.4.2.04.

Gupta, A. and Ferguson, J. (1997) 'Discipline and Practice: 'The Field' as Site, Method, and Location in Anthropology', in A. Gupta and J. Ferguson (eds.) *Anthropological Locations. Boundaries and Grounds of a Field Science.* Berkely: University of California Press, pp. 1– 46.

Gutberlet, J., Carenzo, S., Kain, J. H. and de Azevedo A. M. M. (2017) 'Waste Picker Organizations and Their Contribution to the CE: Two Case Studies from a Global South Perspective', *Resources,* 6(52). Available at: https://doi.org/10.3390/resources6040052.

Hahladakis, J. N., Velis C. A., Weber R., Iacovidou E. and Purnell, P. (2018) 'An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling', *Journal of Hazardous Materials,* 344, pp. 179–199. Available at: https://doi.org/10.1016/j.jhazmat.2017.10.014*.*

Hammersley, M. and Atkinson, P. (2019) *Ethnography: Principles in Practice*. London: Routledge.

Hannerz, U. (1992) *Cultural Complexity: studies in the social organization of meaning.* New York: Columbia University Press.

Hardin, G. (1968) 'The Tragedy of the Commons: The population problem has no technical solution; it requires a fundamental extension in morality', *Science,* 162, pp. 1243–1248. Available at: *https://www.science.org/doi/10.1126/science.162.3859.1243*.

Hardin, R. (1998) 'Garbage Out, Garbage In', *Social Research, 65(1),* pp. 9-30. Available at: *https://www-jstor-org.ezproxy.lancs.ac.uk/stable/40971249* (Accessed: 23 January 2023).

Hastrup, K. and Hervik, P. (1994) *Social Experience and Anthropological Knowledge*. London: Routledge.

Hawkins, G. (2006) *The Ethics of Waste: How we relate to Rubbish*. Lanham: Rowman and Littlefield.

Hawkins, G. (2009) 'More-than-Human Politics: The Case of Plastic Bags', *Australian Humanities Review,* 46, pp. 43-55. Available at: https://australianhumanitiesreview.org/2009/05/01/more-than-human-politics-the-case-of-plastic-bags/ (Accessed: 23 January 2020).

Hawkins, G. (2013) 'Made to Be Wasted: PET and the Topologies of Disposability', in J. Gabrys, G. Hawkins and M. Michael (eds.) *Accumulation: The Material Politics of Plastic*. London: Routledge, pp. 49-67.

Hawkins, G. (2017) 'Ethical Blindness: Plastics, Disposability and the Art of Not Caring', in V. Kinnunen and A. Valtonen (eds.) *Living Ethics in a More-Than-Human World.* Rovaniemi: University of Lapland Press, pp. 15–28.

Hawkins G., Potter, E. and Kane, R. (2015) *Plastic Water: The Social and Material Life of Bottled Water*. Massachusetts: MIT Press.

Hetherington, K. (2004) 'Secondhandedness: consumption, disposal, and absent presence', *Environment and Planning D: Society and Space*, 22, pp. 157–173. Available at: https://doi.org/10.1068/d315t.

Hird, M. J. (2015) 'Waste, Environmental Politics and Dis/Engaged Publics', *Theory, Culture and Society,* 34(2-3), pp. 187-209. Available at: https://doi.org/10.1177/0263276414565717.

Hisano, A. (2017) 'Cellophane, the New Visuality, and the Creation of Self-Service Food Retailing', *Harvard Business School General Management Unit Working Paper No. 17–106*. Available at: http://dx.doi.org/10.2139/ssrn.2973544.

Hodder, I. (2012) *Entangled: An Archaeology of the Relationships between Humans and Things*. Chichester: Wiley-Blackwell.

Hodder, I. (2016) *Studies in Human-Thing Entanglement*. United States: Self Publishing Online. Available at: https://hodder.squarespace.com/books/studies-human-thing-entanglement (Accessed: 27 November 2023).

Höffe, O. (2010) *Aristotle's Nicomachean ethics.* Boston: Brill.

Institute for European Environmental Policy [IEEP] (2014) *Manual of European Environmental Policy.* Available at: *http://minisites.ieep.eu/understanding-the-eu/manual-of-european-environmental-policy/* (Accessed: 1 November 2022).

*****International Alliance for Sustainable Business [IASB] (2018) *Organisations Guide to Circularity.* Available at: http://www.iasborganisationguidetocircularity.com (Accessed: 2 March 2023).

***International Alliance for Sustainable Business [IASB] (2019) *Mission and Vision.* Available at: http://www.iasbmissionandvision.com (Accessed: 2 March 2023).

International Union for Conservation of Nature [IUCN] (2022) *The plastic pollution crisis*. Available at: https://www.iucn.org/story/202207/plastic-pollution-crisis (Accessed: 27 October 2022).

Jóhannesson, G. T. (2005) 'Tourism translations: Actor-Network Theory and tourism research', *Tourist Studies*, 5(2), pp. 133-150. Available at: https://doi.org/10.1177/1468797605066924.

Kakadellis, S. and Harris, Z. M. (2020) 'Don't scrap the waste: The need for broader system boundaries in bioplastic food packaging life-cycle assessment. A critical review', *Journal of Cleaner Production*, 274, 122831. Available at: https://doi.org/10.1016/j.jclepro.2020.122831.

Kazlauskas, A. and Hasan, H. (2009) 'Web 2.0 solutions to wicked climate change problems', *Australasian Journal of Information System*, 16(2), pp. 23–36. Available at: https://doi.org/10.3127/ajis.v16i2.587.

Keane, W. (2003) 'Semiotics and the social analysis of material things', *Language and Communication*, 23, pp. 409-25. Available at: https://doi.org/10.1016/S0271-5309(03)00010-7.

Kirchherr, J., Reike, D., Hekkert, M. (2017) 'Conceptualizing the CE: An analysis of 114 definitions', *Resources, Conservation & Recycling*, 127, pp. 221–232. Available at: https://doi.org/10.1016/j.resconrec.2023.107001.

Kirchherr, J., Yang, N-H N., Schulze-Spüntrup, F., Heerink, M. J. and Hartley, K. (2023) 'Conceptualizing the CE (Revisited): An Analysis of 221 Definitions', *Resources, Conservation & Recycling*, 194, 107001. Available at: https://doi.org/10.1016/j.resconrec.2023.107001.

Kitz, R., Walker, T., Charlebois, S. and Music, J. (2022) 'Food packaging during the COVID-19 pandemic: Consumer perceptions', *International Journal of Consumer Studies*, 46, pp. 434–448. Available at: https://doi.org/10.1111/ijcs.12691.

Konietzko, J., Bocken, N. and Hultink, E. J. (2020) 'Circular ecosystem innovation: An initial set of principles', *Journal of Cleaner Production*, 253, 119942. Available at: https://doi.org/10.1016/j.jclepro.2019.119942.

Korsgaard, C. M. (2012) *Kant: Groundwork of the Metaphysics of Morals*. (M. Gregor & J. Timmermann, Trans.) (2nd ed.). Cambridge: Cambridge University Press.

Lacy, P., Long, J. and Spindler, W. (2020) *The CE Handbook: Realising the Circular Advantage*. London: Palgrave Macmillan.

Latouche, S. (2009) *Farewell to Growth*. Cambridge: Polity Press.

Latour, B. (1987) *Science in Action: How to Follow Scientists and Engineers Through Society*. Milton Keynes: Open University Press.

Latour, B. (1988a) 'Mixing humans and non-humans together. The sociology of a door-closer', *Social Problems*, 35 (3), pp. 298–310.

Latour, B. (1988b) *The Pasteurization of France*. Translated from French by A. Sheridan and J. Law. London: Harvard University Press.

Latour, B. (1991) 'Technology is society made durable', in J. Law (ed.) *A Sociology of Monsters: Essays on Power*, *Technology and Domination.* London: Routledge, pp. 103–131.

Latour, B. (2013) *An inquiry into modes of existence: An anthropology of the moderns*. Translated from French by C. Porter. Cambridge, MA: Harvard University Press.

Law, J. (1994) *Organizing Modernity*. Oxford: Blackwell Publishing.

Law J. (1999) 'After ANT: Complexity, Naming and Topology', in J. Law and J. Hassard (eds.) *Actor Network Theory and After*. Boston: Blackwell Publishing, pp. 10-18.

Law, J. (2003a) 'Ordering and Obduracy', *Centre for Science Studies*, Lancaster University. Available at: http://www.com:lancs.ac.uk/sociology/papers/LawOrdering-and-Obduracy.pdf (Accessed 28 February 2023).

Law, J. (2003b) 'Traduction/Trahison: Notes on ANT', *Centre for Science Studies*, Lancaster University. Available at: http://www.com:lancs.ac.uk/sociology/papers/Law-Traduction-Trahison.pdf (Accessed 28 February 2023).

Law, J. (2003c) 'Making a Mess with Method', *Centre for Science Studies*, Lancaster University. Available at: http://www.com:lancs.ac.uk/sociology/papers/Law-Making-a-Mess-with-Method.pdf (Accessed 20 March 2020).

Law, J. (2004) *After Method. Mess in Social Science Research*, London: Routledge.

Law, J. (2008) 'On sociology and STS', *The Sociological Review*, 56 (4), pp. 623-649. Available at: https://doi.org/10.1111/j.1467-954X.2008.00808.

Law J. (2009) 'Actor-Network Theory and Material Semiotics', in B.S. Turner (ed.) *The New Blackwell Companion to Social Theory*. Chichester: John Wiley & Sons, pp. 141–158.

Law, J. and Hassard, J. (1999) *Actor Network Theory and After*. Oxford and Cambridge: Blackwell Publishing.

Law, J., Ruppert, E. and Savage, M. (2010) 'The Double Social Life of Methods', *Sixth Annual CRESC conference on the Social Life of Methods*. Conference at Oxford (UK), 31 August – 3 September. Working paper 95. Available at: http://heterogeneities.net/publications/Law2010DoubleSocialLifeofMethod5.pdf (Accessed 20 September 2022).

Law J. and Singleton, V. (2014) 'ANT, multiplicity and policy', *Critical Policy Studies*, 8(4), pp. 379-396. Available at: https://doi.org/10.1080/19460171.2014.957056.

Le, N. (2020) 'The impact of fast fashion on the environment', *Princeton Student Climate Initiative*, 20 July. Available at: https://psci.princeton.edu/tips/2020/7/20/the-impact-of-fast-fashion-on-the-environment (Accessed 10 October 2022).

Liboiron, M. (2013) 'Plasticizers: A Twenty-first-century Miasma', in J. Gabrys, G. Hawkins and M. Michael (eds.) *Accumulation: The Material Politics of Plastic*. London: Routledge, pp. 134-149.

Liboiron, M. (2016) 'Redefining pollution and action: The matter of plastics', *Journal of Material Culture*, 21(1), pp. 87–110. Available at: https://doi.org/10.1177/1359183515622966.

Liboiron, M. (2019) 'Waste is not 'matter out of place'', *Discard Studies*, 9 September. Available at: https://discardstudies.com/2019/09/09/waste-is-not-matter-out-of-place/ (Accessed: 23 February 2022).

Liboiron, M. (2021) *Pollution is Colonialism*. London: Duke University Press.

Liboiron, M. and Lepawsky, J. (2022) *Discard Studies. Wasting, Systems, and Power*. Massachusetts: MIT Press.

Liu, Q., Li, H.-M., Zuo, X.-L., Zhang, F. F. and Wang, L. (2009) 'A survey and analysis on public awareness and performance for promoting CE in China: A case study from Tianjin', *Journal of Cleaner Production*, 17, pp. 265-270. Available at: https://doi.org/10.1016/j.jclepro.2008.06.003.

Lönngren, J. and van Poeck, K. (2021) 'Wicked problems: a mapping review of the literature', *International Journal of Sustainable Development & World Ecology*, 28(6), pp. 481-502. Available at: https://doi.org/10.1080/13504509.2020.1859415.

Lord, H. L., Pfannkoch, E. A. (2012) 'Sample Preparation Automation for GC Injection', *Comprehensive Sampling and Sample Preparation*, 2, pp. 597-612. Available at: https://doi.org/10.1016/B978-0-12-381373-2.00061-2.

Mah, A. (2021) 'Future-Proofing Capitalism: The Paradox of the CE for Plastics', *Global Environmental Politics*, 21(2), pp. 121–142. Available at: https://doi.org/10.1162/glep_a_00594.

Mak, A. (2018) 'Why Does Half of the World's Used Plastic End Up in China? To be reused', *Slate*, 21 June. Available at: https://slate.com/technology/2018/06/why-china-import-half-world-used-plastic.html (Accessed: 16 February 2023).

Makki, F., Lamb, A. and Moukaddem, R. (2021) 'Plastics and the coronavirus pandemic: a behavioral science perspective', *Mind and Society*, 20, pp. 209–213. Available at: https://link.springer.com/article/10.1007/s11299-020-00258-w.

Mason, J. (2018) *Qualitative Researching*. London: Sage.

McCool, B. (2020) 'The History of Plastic: The Invention of Throwaway Living', *Dieline*, 3 October. Available at: https://thedieline.com/blog/2020/3/10/the-history-of-plastic-the-invention-of-throwaway-living (Accessed: 16 May 2022).

McDonough, W. and Braungart, M. (2002) *Cradle to Cradle: Remaking the Way We Make Things*. New York: North Point Press.

McFall-Johnsen, M. (2019) 'The fashion industry emits more carbon than international flights and maritime shipping combined. Here are the biggest ways it impacts the planet', *Business Insider*, 21 October. Available at:

https://www.businessinsider.com/fast-fashion-environmental-impact-pollution-emissions-waste-water-2019-10?r=US&IR=T (Accessed 10 October 2022).

McNaught, A. D. and Wilkinson, A. (2019) Chemistry Compendium of Chemical Terminology. Oxford: Blackwell Scientific Publications. Available at: https://goldbook.iupac.org/terms/view/P04961 (Accessed: 1 November 2022).

Mead, M. (1953) *Coming of age in Samoa: a psychological study of primitive youth for Western civilization*. New York: Random House.

Meadows, D. L., Meadows, D. H., Behrens, W. and Randers, J. (1972) *The Limits to growth: a Report For the Club of Rome's project On the Predicament of Mankind*. New York: Universe Books.

Meys, R., Fricka F., Westhuesb, S., Sternberga, A., Klankermayerb, J. and Bardow, A. (2020) 'Towards a CE for plastic packaging wastes – the environmental potential of chemical recycling', *Resources, Conservation & Recycling*, 162, 105010. Available at: https://journals.sagepub.com/doi/pdf/10.1177/1357034X04042932.

Mol, A. (1999) 'Ontological Politics: A Word and Some Questions', in J. Law and J. Hassard (eds.) *Actor Network Theory and After.* Cambridge: Blackwell Publishing, pp. 74-89.

Mol., A. (2002) *The Body Multiple: Ontology in Medical Practice*. London: Duke University Press.

Mol, A. and Law, J. (2004) 'Embodied Action, Enacted Bodies. The Example of Hypoglycaemia', *Body & Society*, 10(2-3), pp. 43-62. Available at: https://journals.sagepub.com/doi/pdf/10.1177/1357034X04042932 (Accessed: 1 November 2023).

Mulder, K. F. (1998) 'Sustainable Consumption and Production of Plastics?', *Technological forecasting & social change*, 58(1), pp. 105-124. Available at: https://doi.org/10.1016/S0040-1625(97)00129-7.

Murphy, E. and Dingwall, R. (2001) 'The Ethics of Ethnography', in P. Atkinson, S. Delamont, A. Coffey, J. Lofland and L. Lofland (eds.) *Handbook of Ethnography.* London: Sage Publications, pp. 339–351.

Murray, A., Skene, K. and Haynes, K. (2017) 'The CE: An Interdisciplinary Exploration of the Concept and Application in a Global Context', *Journal of Business Ethics,* 140, pp. 369–380. Available at: https://doi.org/10.1007/s10551-015-2693-2.

Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T. and Gwilt, G. (2020) 'The environmental price of fast fashion', *Nature Reviews Earth and Environment Journal*, 1, pp. 189–200. Available at: https://doi.org/10.1038/s43017-020-0039-9.

NUCIF (2005) *The story behind the strategy of EU waste policy – Report*. European Commission Publications. Available at: https://nucif.net/wp-content/uploads/2020/02/The_Story_of_EU_Waste_Policy.pdf (Accessed: 2 June 2019).

Nye, D. E. (2006) *Technology matters: Questions to live with*. Cambridge, MA: MIT Press.

O'Brien, M. (2008) *A Crisis of Waste? Understanding the Rubbish Society.* Oxford: Routledge.

Okely, J. (1992) 'Anthropology and Autobiography: Participatory Experience and Embodied Knowledge', in J. Okely and H. Callaway (eds.) *Anthropology and Autobiography.* London: Routledge, pp. 1– 28.

O'Reilly, K. (2012) *Ethnographic methods*. New York: Routledge.

Orlikowski, W. J. (2007) 'Sociomaterial Practices: Exploring Technology at Work', *Organization Studies*, 28(9), pp. 1435-1448. Available at: https://doi.org/10.1177/0170840607081138.

Orlikowski, W. J. and Scott, S. V. (2008) 'Sociomateriality: Challenging the Separation of Technology, Work and Organization', *The Academy of Management Annals,* 2, pp. 433-474. Available at: http://dx.doi.org/10.1080/19416520802211644.

Parashar, N. and Hait, S. (2021) 'Plastics in the time of COVID-19 pandemic: Protector or polluter?', *Science of The Total Environment*, 759, 144274. Available at: https://doi.org/10.1016/j.scitotenv.2020.144274.

Parker, L. (2018a) 'We made plastics. We depend on it. Now we are drowning on it', *National Geographic*, (1-30 June). Available at: https://www.nationalgeographic.com/magazine/2018/06/plastic-planet-waste-pollution-trash-crisis/ (Accessed: 2 June 2019).

Parker, L. (2018b) 'China's ban on trash imports shifts waste crisis to Southeast Asia', *National Geographic*, (16 November). Available at: https://www.nationalgeographic.com/environment/2018/11/china-ban-plastic-trash-imports-shifts-waste-crisis-southeast-asia-malaysia/ (Accessed: 2 June 2019).

Parker, L., Elliott, K. (2018) 'Plastic Recycling Is Broken. Here's How to Fix It', *National Geographic*, (20 June). Available at: https://www.nationalgeographic.com/news/2018/06/china-plastic-recycling-ban-solutions-science-environment/ (Accessed: 2 June 2019).

Parker, L. (2019) 'The world's plastic pollution crisis explained', *National Geographic*, (7 June). Available at: https://www.nationalgeographic.com/environment/article/plastic-pollution (Accessed: 17 November 2021).

Pauli, G. A. (2010) *The Blue economy: 10 years, 100 Innovations, 100 Million Jobs*. New Mexico: Paradigm Publications.

Pearce, D. W. and Turner, R. K. (1989) *Economics of Natural Resources and the Environment*. Baltimore: Johns Hopkins University Press.

Pernecky, T. (2023) 'Mobilizing relational ontology: meeting the pluriversal challenge in tourism studies', *Current Issues in Tourism*, 27(22), pp. 3623–3635. Available at: https://doi.org/10.1080/13683500.2023.2281599.

Pipoli, R. (2020) 'Covid-19 Seen Slowing Efforts to Reduce Single-Use Plastics and Recycling', *Petrochemical Update*, 12 May. Available at:

https://www.reutersevents.com/downstream/process-safety-ehs/covid-19-seen-slowing-efforts-reduce-single-use-plastics-and-recycling (Accessed: 1 February 2023).

Plastics Europe (2019) *Plastics – The Facts 2019*. Available at: https://www.plasticseurope.org/en/resources/publications/1804-plastics-facts-2019 (Accessed: 2 June 2019).

Prata, J. C., Silva, A. L., Walker, T. R., Duarte, A. C. and Rocha-Santos, T. (2020) 'COVID-19 pandemic repercussions on the use and management of plastics', *Environmental Science & Technology*, 54(13), pp. 7760– 7765. Available at: https://doi.org/10.1021/acs.est.0c02178.

***Pulper Waste Project. (2019) *Final Report*. Available at: http://www.pwpfinalreport.com (Accessed: 2 March 2023).

Ribes, D., Jackson, S., Geiger, S., Burton M. and Finholt, M. (2013) 'Artifacts that organize: Delegation in the distributed organization'*, Information and Organization*, 23, pp. 1–14.

Rifkin, J. (2013) *The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World.* New York: Palgrave Macmillan.

Rip, A. (2009) 'Technology as prospective ontology', *Synthese*, 168, pp. 405–422. Available at: https://www.jstor.org/stable/40271255 (Accessed: 27 January 2020).

Rittel, H. and Webber, M. (1973) 'Dilemmas in a general theory of planning', *Policy Sciences*, 4, pp. 155-169. Available at: https://www.jstor.org/stable/4531523 (Accessed: 2 November 2019).

Salotti, R. (2018) 'Dalle infrastrutture ai costi di smaltimento del pulper, grido d'allarme delle cartiere al Miac', *Serchio in Diretta,* 10 October. Available at: www.serchioindiretta.it (Accessed: 3 November 2022).

Sanjek, R. (1990) *Fieldnotes. The Making of Anthropology.* London: Cornell University Press.

Scanlan, J. (2015) *On Garbage.* London: Reaktion Books.

Schoggl, J. P., Stumpf L. and Baumgartner, R. J. (2020) 'The narrative of sustainability and CE - A longitudinal review of two decades of research', *Resources, Conservation & Recycling*, 163, 105073. Available at: https://doi.org/10.1016/j.resconrec.2020.105073.

Schröder, P., Anantharaman, M., Anggraeni, K., Foxon, T. J. and Barber, J. (2019) 'Introduction: sustainable lifestyles, livelihoods and the CE', in P. Schröder M. Anantharaman, K. Anggraeni, T. J. Foxon, J. Barber (eds.) *The CE and the Global South*. London: Routledge, pp. 3-22.

Shamuyeva, M. and Enders, H. J. (2021) 'Plastics in the context of the CE and sustainable plastics recycling: Comprehensive review on research development, standardization and market', *Composites Part C: Open Access*, 6, 100168. Available at: https://doi.org/10.1016/j.jcomc.2021.100168.

Sherman Heyl, B. (2001) 'Ethnographic Interviewing' in P. Atkinson, S. Delamont, A. Coffey, J. Lofland and L. Lofland (eds.) *Handbook of Ethnography.* London: Sage Publications, pp. 369 – 383.

Shukla, N. (2022) 'Fast Fashion Pollution and Climate Change', Erath.org, 21 February. Available at: https://earth.org/fast-fashion-pollution-and-climate-change/#:~:text=Fashion%20and%20its%20supply%20chain,and%20the%20aviation%20industry%20combined (Accessed 10 October 2022).

Sidorkin, A. M. (2002) 'Chapter 7. Ontology, Anthropology, and Epistemology of Relation', *Counterpoints*, 173, pp. 91–102. Available at: http://www.jstor.org/stable/42977063.

Silva, A. L. P., Prata J. C., Walker T. R., Duarte A. C., Ouyang W., Barcelò D. and Rocha-Santos T. (2021) 'Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations', *Chemical Engineering Journal*, 405, 126683. Available at: https://doi.org/10.1016/j.cej.2020.126683.

Spradley, J. (1979) *The ethnographic interview*. New York: Holt, Rinehart and Winston.

***Square. (2019) *Sustainability Report.* Available at: http://www.squaresustainabilityreport.com (Accessed: 2 March 2023).

Stahel, W. (2010) *The Performance Economy*. London: Palgrave Macmillan.

Stallard, E. (2022) 'Fast fashion: How clothes are linked to climate change', BBC News, 29 July. Available at: https://www.bbc.co.uk/news/science-environment-60382624 (Accessed: 22 November 2023).

***Star. (2018). *Sustainability Report.* Available at: http://www.starsustainabilityreport.com (Accessed: 2 March 2023).

Stauffer, E., Dolan, J. A., Newman, R. (2008) 'Chemistry and Physics of Fire and Liquid Fuels', in E. Stauffer, J. A. Dolan and R. Newman (eds.) *Fire Debris Analysis.* Academic Press, pp. 85-129. Available at: https://doi.org/10.1016/B978-012663971-1.50008-7.

Stiegler, B. (1994) *Technics and time, 1: The fault of Epimetheus*. Translated from French by R. Beardsworth and G. Collins. Stanford, CA: Stanford University Press.

Stinson, D. W. (2009) 'The Proliferation of Theoretical Paradigms Quandary: How One Novice Researcher Used Eclecticism as a Solution', *The Qualitative Report*, 14(3), pp. 498-523. Available at: https://doi.org/10.46743/2160-3715/2009.1408.

Stowell, A. F. (2012) *Organising e-waste*. Unpublished PhD thesis. Lancaster University.

Stowell, A. F. and Brigham M. P. (2018) 'Extractivism, Value and Waste: Organizational Mining of e-Waste in the United Kingdom', *Etnografia e Ricerca Qualitativa,* 1, pp. 75–95. Available at: https://doi.org/10.3240/89695.

Stowell, A. and Brown, C. (2022) 'Management of Sustainability, or How should we manage Planet Earth?', in D. Knights and H. Willmott (eds) *Introducing Organizational Behaviour and Management*. Boston: Cengage Learning, pp. 500-546.

Strauss, S. (2000) 'Locating yoga Ethnography and transnational practice' in V. Amit (ed.) *Constructing the Field: Ethnographic Fieldwork in the Contemporary World*. London and New York: Routledge, pp. 162–194.

Termeer, C. J., Dewulf, A. and Biesbroek, R. (2019) 'A critical assessment of the wicked problem concept: relevance and usefulness for policy science and practice', *Policy and Society*, 38(2), pp. 167-179. Available at: https://doi.org/10.1080/14494035.2019.1617971.

Textile Exchange (no date) *Climate action starts at the source of the materials we choose*. Available at: https://textileexchange.org/ (Accessed 23 September 2022).

Thompson, M. (1979) *Rubbish Theory: the creation and destruction of value.* Oxford: Oxford University Press.

Thompson, M. (1998) 'Waste and Fairness', *Social Research*, 65(1), pp. 55-73. Available at: http://www.jstor.org/stable/40971251 (Accessed: 10 January 2021).

United Nation Environment Programme [UNEP] (2018) *Putting the Environment at the Hearth of People's Lives*. Available at: https://www.unep.org/resources/un-environment-2018-annual-report (Accessed: 27 November 2023).

Van Maanen, J. (1988) *Tales of the field: on writing ethnography*. Chicago: University of Chicago Press.

Vanapalli, R. G., Sharma, H. B., Ranjan, V. P, Samal, B., Bhattacharya, J., Dubey, B. K. and Goel, S. (2021) 'Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic', *Science of The Total Environment*, 750, 141514. Available at: https://doi.org/10.1016/j.scitotenv.2020.141514.

Velis, C. (2014) *Global recycling markets: plastic waste. A story for one player – China*. ISWA Globalisation and Waste Management Task Force, International Solid Waste Association. Available at: https://www.researchgate.net/publication/281865813_Global_recycling_markets_plastic_waste_A_story_for_one_player_-_China_ISWA_Globalisation_and_Waste_Management_Task_Force (Accessed: 16 February 2023).

***Verde (2019) 'We're going after plastic polluters'. Available at: https://www.verde.org (Accessed: 17 August 2021).

***Walno (2018) *Sustainability Report.* Available at: http://www.walnosustainabilityreport.com (Accessed: 2 March 2023).

Wang, C., Zhao, L., Lim, M. K., Chen, W. and Sutherland, J. W. (2020) 'Structure of the global plastic waste trade network and the impact of China's import Ban', *Resources,*

Conservation & Recycling Journal, 153, 104591. Available at: https://doi.org/10.1016/j.resconrec.2019.104591.

Wen, Z., Xie, Y, Chen, M. and Dinga, C. D. (2021) 'China's plastic import ban increases prospects of environmental impact mitigation of plastic waste trade flow worldwide', in *Nature Communications*, 12, 425. Available at: https://doi.org/10.1038/s41467-020-20741-9.

Wildman, W. J. (2006) *An Introduction to Relational Ontology,* working paper. Boston University. Available at: https://people.bu.edu/wwildman/media/docs/Wildman_2009_Relational_Ontology.pdf.

Winton, D., Marazzi, L. and Loiselle, L. (2022) 'Drivers of public plastic (mis)use — New insights from changes in single-use plastic usage during the Covid-19 pandemic', *Science of The Total Environment,* 849, 157672. Available at: https://doi.org/10.1016/j.scitotenv.2022.157672.

WWF Australia (2021) *The lifecycle of plastics*. Available at: https://www.wwf.org.au/news/blogs/the-lifecycle-of-plastics#:~:text=Plastic%20bottles%20%E2%80%93%20450%20years (Accessed: 18 October 2022).

YouTube (2012) *Adidas – Plastic Bag Soccer Ball – TV commercial'*. Available at: https://www.youtube.com/watch?v=4tyoaxiNHg8 (Accessed: 24 June 2024).

Zhang, W., Li, H. and An, X. (2011) 'Ecological Civilization Construction is the Fundamental Way to Develop Low-Carbon economy', *Energy Procedia*, 5, pp. 839–843. Available at: https://doi.org/10.1016/j.egypro.2011.03.148.