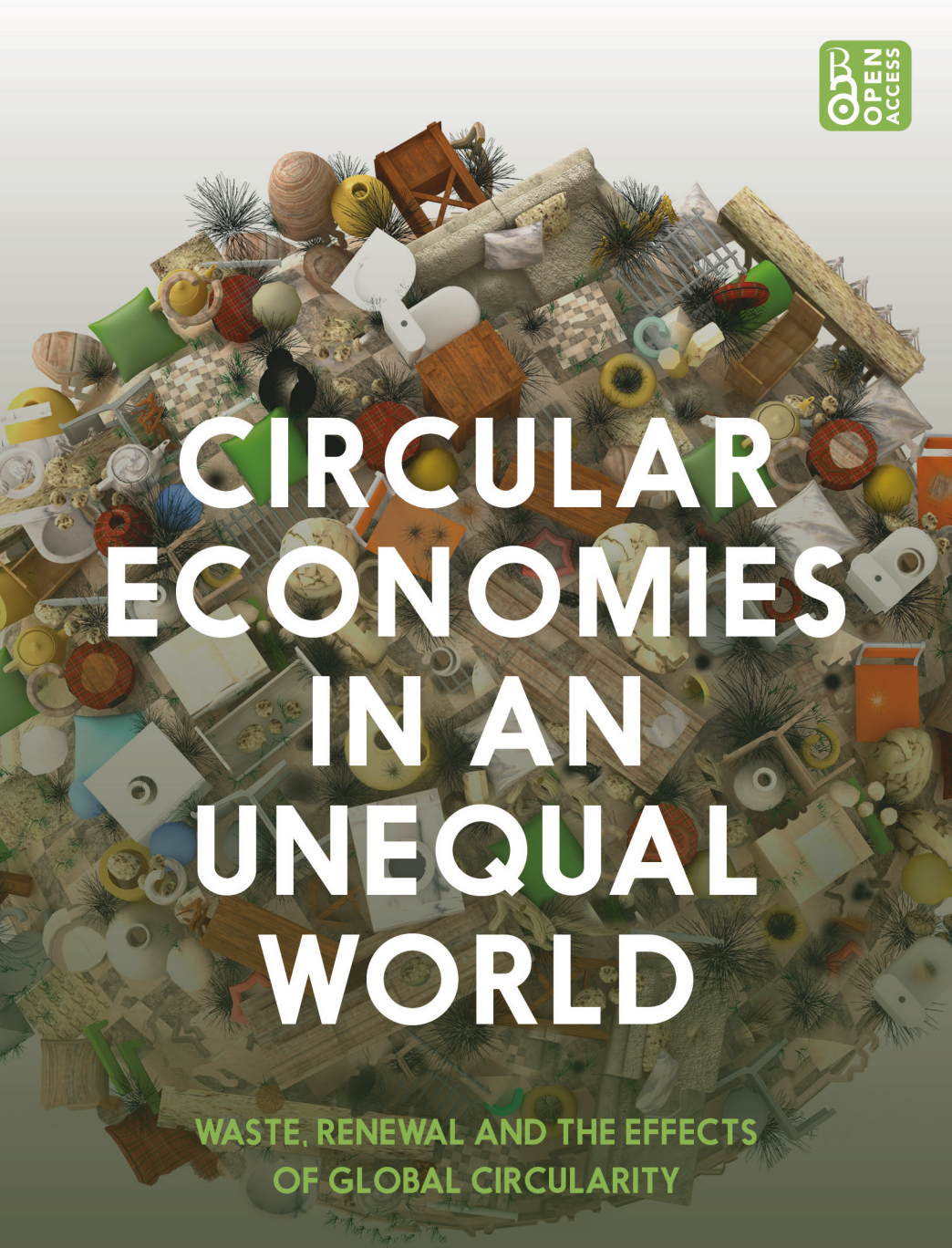

CIRCULAR ECONOMIES IN AN UNEQUAL WORLD

WASTE, RENEWAL AND THE EFFECTS OF GLOBAL CIRCULARITY

Edited by Patrick O'Hare
and Dagna Rams

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Introduction – Circular economies

Between the promise of renewal and unequal global circulation

Patrick O'Hare and Dagna Rams

It is no news to the reader that waste is a worrisome perversity of our times. It is distinct from previous waste-related crises such as sanitary problems that beguiled the early rise of cities. The distinctiveness stems partly from new types of materials such as plastics that outlast their original use and linger in the environment[1] and partly from the economic arrangements such as global economies of scale that give rise to waste at an express speed and enormous volume.[2] A plethora of frameworks has been created in the attempt to address such a contemporaneous manifestation of waste – among them, the circular economy has been one of the most recognizable.

A key challenge of this volume has been defining the 'circular economy' amid the term's historical elaborations and travels far and wide. Its definitions often invoke what it is not, namely it is not the 'linear economy' in which natural resources become consumer goods and then eventually get discarded as waste. Broadly, circular schemes are concerned with the prevention of waste rather than waste's management or utilization, which are otherwise the objectives of waste infrastructure and recycling. When it comes to the details of what circular economy stands for, we see more debate with respect to the proposed scale, scope and focus of circular changes.

1. There are numerous studies in social science that have tracked this new type of waste and its profusion. Rachel Carson's (2002 [1962]) *Silent Spring* was one such initial investigation. More recent efforts cover different types of waste and their global scales, notably Lepawsky (2018).

2. Various social scientists have probed this relationship between global capitalist economic system and its tendency to produce waste, notably Liboiron (2021), MacBride (2013) and O'Neill (2019).

The term 'circular economy' was coined in architectural, engineering and economic circles in North America and Western Europe in the 1970s and has gone mainstream more recently. The range of disciplinary backgrounds – from hard to social sciences – involved in the economy's elaboration signals that it has been treated as both a technical and social challenge. The technical challenge involves developing new materials to increase durability and facilitate recycling. The social challenge meanwhile is to reshape economic systems so as to move them away from patterns of production and consumption that promote waste (e.g. fast fashion). This means that a range of schemes including those that facilitate connections between discarding and production, those that seek to change materials used for production to extend product life, and those that alter how people consume goods so that they discard less can all be referred to as 'circular'.

Additionally, the uneven regional scale and distribution of design, production, consumption and waste can determine the nature of circular schemes. Many of the transnational companies that have been seen as polluting at a global scale tend to take decisions in their headquarters in North America or Europe while the consequences of these decisions might be experienced elsewhere in the contexts of resource exploitation and production. Likewise, some waste infrastructures around the world are better prepared to tap into waste and transform it into a resource than others. To take the example of fashion, the possibility of making it circular might be quite different in countries like the UK, where many fast fashion brands find their biggest consumer markets (c.f. Thomas 2019), compared to the West African country of Togo, where second-hand clothes from the Global North exist side by side a vibrant economy of tailors and textiles that might be more responsive to circular schemes but finds itself under pressure from global markets in used and cheap clothes (c.f. Sylvanus 2016).

Yet 'circular economy' as a blanket term has seen a recent mainstreaming across geographies, with the EU adopting an ambitious 'circular economy action plan' and China enshrining the circular economy (*xunhuan jingji*) in law since 2008. These schemes often involve large sums of money. In the EU for instance, funds from the European Structural and Investment Fund, Horizon 2020 and the LIFE programme have all been made available for enabling a transition to the circular economy at nation state levels, in addition to finance and advice provided through the European Investment Bank. The private sector has been similarly responsive to the circular economy. There are

new streams of funding and investment, with BlackRock's CE fund now worth over US$2 billion.

What is the circular economy? Who gets to define it and propose solutions to advance it? Does it matter when all sorts of actors – from multinational companies to smaller community initiatives – refer to the term to explain their various activities? What in the circular economy is symbolic and promissory and what is truly reformatory? How should we deal with the diversity of waste-reducing practices and ideologies that do not use the term yet could enter a productive dialogue with it? How to deal with emerging hegemonies backed up by powerful institutions that might be narrowing such diversity of ideologies and practices? How are possibilities of a circular economy regionally circumscribed based on the uneven spatialization of design, production, consumption and waste generation?

Anthropological theorizing and practice allow for a situated exploration of these questions through the observation of circular economy interventions but also of economic traditions that could converse with recognizable circular economic schemes, thus critiquing, ameliorating or contextualizing them. On the one hand, such an engagement addresses the currently limited anthropological theorizing about the circular economy per se. Anthropologists have been interested in policies and cultures of reuse and recycling (see Alexander and Reno 2012; O'Hare 2019), but as mentioned such schemes differ from the circular economy in that they address waste as the effect of production or consumption rather than seek to remake economic systems and industrial design so as to prevent waste.

On the other hand, the anthropological archive can inform a broader inquiry into practices and ideologies of circulation beyond explicit circular economic schemes. An argument can certainly be made that the Kula Ring – the circulation of arm shells and shell strings between tribes of different Melanesian islands – as written about by Bronislaw Malinowski (1920) could be interpreted in relation to the principles of the circular economy. The Kula involved continual circulation of ceremonial items between inhabitants of spread-out islands and their transitory possession where multiple people would access certain symbolic goods for limited periods of time until having to pass them on to others. The Kula objects were imbued with spiritual and sentimental value linked to previous owners and bestowed social status upon trade participants. Paul Sillitoe cites the Kula Ring as an example of a sphere of exchange of durable wealth, where 'transactable objects belong to the society as a whole and are not inalienable possessions associated with

certain persons' (2006: 15). The Kula tacitly shows that maintenance of objects in circulation could require developing new relationships with them that go beyond fixation on their utility or lack thereof, with Malinowski mentioning that visible damages to ceremonial objects would be treated as 'marks of distinction' (Malinowski 2005 [1920]: 383). Other examples of such practices and ideologies include studies on building from sustainable materials (Cassiman 2006; Vellinga 2005) and labour regimes built around maintenance rather than production (Denis and Pontille 2014).

To expand on these potential avenues for anthropological theorizing and practice, this introduction first seeks to explain further how the term 'circular economy' has been used over the years and how we could distinguish it from other kindred terms to enable a productive dialogue about economic systems in relation to waste. The introduction also first outlines and then elaborates three tangible ways in which anthropologists might usefully contribute to studies of the circular economy.

The first potential contribution of anthropology is to treat circular thinking and practice as socially embedded. This is especially productive as recent manifestations of circular economy focus on material design and technical challenges, making assumptions about how far social contexts can be disciplined to follow the proposed solutions. Likewise, social embeddedness means that there is a potential gap between the circular economy as a proposition and as an actual policy implementation. We can point to nascent anthropological studies of explicit circular economy schemes, such as those rolled out by the European Union and other states (see Angelidou and Pateraki in this volume). They can help situate conceptual understandings of the circular economy at a grassroots level, aiding to distinguish between the circular economy in theory and in practice, especially when such practice is coloured by local realities that are distinct to universalizing ideologies.

The second possible contribution is to analyse existing circular economic interventions with the aim of understanding how they represent the economic arrangements that they seek to improve and how in turn the proposed improvements either struggle to upend the status quo or perpetuate it under new guises. As such, the contribution would be to analyse both the conditions of possibility of the circular economy that might be economically or geographically circumscribed and the specific new paradigms that circular economic interventions install. For example, as many contributions to this volume show, circular economic

schemes win popularity with corporations and governments because they promise aligning considerations about the environment with those about economic growth and provision of consumer goods. Yet in making such promises, they redefine sustainability to privilege economic interests. In consequence, the circular economy garners symbolic value and political influence that call for a critical acumen in response.

Finally, in relation to anthropology's value as a discipline that interrogates a variety of social institutions across geographies, anthropologists can draw attention to social practices that seek to prevent waste without invoking the circular economy – be it because that term is not known outside specific geographic and expertise contexts or not used for various reasons. It is fitting to mention that some of the foundational circular economic thinkers would frequently refer to cultural beliefs and practices outside Europe and North America, taking inspiration from their perceived concern for the environment. This means that although the circular economy was first conceptualized in Europe and North America and then travelled through publications and promotion to other places around the world, it has also been explicitly energized by a critique of Western capitalism and examples of economic practices that are seen to be outside it.

Relatedly, applied anthropology may shape circular economic schemes. Anthropologists have long been arguing that wastefulness and inefficiency are not straightforward categories (O'Hare 2019). Such thinking may help to find solutions that go beyond social dogmas but may also help to reframe and redefine problems (e.g. Appelgren and Bohlin 2020). Where so desired, applied anthropology can contribute to thinking about ways to promote the circular economy in order to overcome the social attachment to individual ownership and consumption, markets' attachment to business as usual and states' attachment to economic growth. Given that there has been limited applied anthropology conducted in relation to the circular economy to date, this introduction will primarily focus on the cultural imaginaries behind circular economy theory, and ethnographies of processes and projects that implicitly or explicitly engage the principles of the circular economy.

Defining the circular economy

The circular economy concept emerges out of the ecological economy tradition whose proponents believe that economics ought to be

normative; that is to say, it should involve value judgements and ideas of fairness. This was a radical proposition vis-à-vis the far more influential group of environmental economists who simply sought to represent environmental considerations as a monetary value that can be factored into cost-benefit analysis. The environmental economists argued that nature can be quantified, reduced to its utility for economic designs and environmental externalities permitted if balanced out by benefits (see Livingston 2019: 34). Ecological economists in turn argue that economists ought to promote nature as an explicit and non-negotiable value, with key texts being E. F. Schumacher's (1973) *Small Is Beautiful – A Study of Economics as if People Mattered* and Kenneth Boulding's (1966) *The Economies of the Coming Spaceship Earth*. These manifestos were imaginative exercises that searched for inspiration far and wide – referring to Buddhist traditions, imagining the world as a spaceship and using metaphors to open the economic discourse to the qualities of nature and not solely quantities of cost and benefit.

Boulding's text is often seen as the first building block of circular economy theory. While the term itself never appears in its pages, Boulding advocates a shift towards a 'closed system' that is likened to a spaceship in which 'all outputs from consumption would constantly be recycled to become inputs for production' (1966: 7). This is counterposed to what the author believes to be the existent hegemony of 'cowboy economics', which imagines a limitless plain 'associated with reckless, exploitative, romantic, and violent behaviour' (1966: 9). The language already suggests that the transition to the closed system is not only a technical issue but one of remaking men (humans) from cowboys into spacemen, something that includes instilling new virtues, attitudes, and practices. Although Boulding does not speak of circles, he does discuss spheres, linking the exhaustion of new earthly frontiers for escape or exploitation with the discovery of the spherical earth, which, although widely accepted since the navigations of the fifteenth century, would only become available in photographic form with the famous 'blue marble' photograph taken by NASA in 1972.

A similarly holistic view of the circular economy appears in the works of its key theoretician, Walter Stahel, who from the 1970s onwards has introduced new vocabularies, theories and case studies. He began with a review co-authored with Geneviève Reday-Mulvey (1981) for the European Commission entitled *Jobs for Tomorrow: The Potential for Substituting Manpower for Energy*, which proposes a 'closed loop economy'. As Stahel (2016) later explained, the report was inspired by his experience as an architect in the 1970s, as Europe was beset by

the oil crisis, which saw rising energy prices and high unemployment. The extension of life of buildings and products could be seen as a win–win situation, since it involves an increased use of labour in the context of unemployment and a decreased use of energy and materials in the context of high prices and scarcity. After the success of his report on closed-loop economies, in 1982 Stahel founded the Product Life Institute in Geneva, whose publications introduced and championed other concepts associated with the circular economy, including the performance economy (which suggests a need to shift from the sale of goods to that of goods' performance) and cradle-to-cradle (product design thinking that aims to prevent waste and create regenerative systems). Stahel's writings pitch the circular economy as a solution to resource management but also labour, which he argues should be reallocated from production to maintenance. Stahel's institutional acumen and conceptual proliferation have made him increasingly influential with governments and businesses.

The current consolidation of circular economic thinking and its diffusion is due in no small part to the work of the Ellen MacArthur Foundation (EMF), established in 2010. For the EMF, the circular economy is guided by three broad principles: designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. The Foundation's principal activities involve lobbying, the commissioning of reports, and strategic partnerships with companies, cities and nation states with the aim of strengthening aspects of the transition. The Foundation's influence means that the EMF propositions about the circular economy have become synonymous with the circular economy itself. For example, the European Investment Bank's Circular Economy Guide (2020) and other international organizations reproduce the Foundation's definitions and visualizations in their own reports.

In its attempt to define the circular economy, the EMF institutes key binaries that are worth setting out for exploration. The first is that between a linear and a circular economy. Another is between biological and technical cycles: these are two cycles that function according to different principles and together constitute the circular economy in a butterfly model. Biological cycles are those that are designed to mimic natural systems and function according to the 'waste is food' principle (Kopnina and Blewitt 2015), whereby biodegradable materials can be harnessed to reinvigorate natural systems, through processes such as composting. Technical cycles, meanwhile, involve man-made synthetic materials that cannot be so easily reintegrated into nature: for these,

the modus operandi is the recovery and restoration of products, components and materials through strategies such as reuse, repair, remanufacture or (in the last resort) recycling (EMF 2013: 7). These binaries can be treated as something to translate into tangible business models (a task that the EMF often sets itself).

Unlike the early theorists such as Boulding, who offered manifesto-like suggestions, the EMF is intent on elaborating tangible, pragmatic solutions and securing capital to ensure implementation. Its primary focus has been on material design of commodities and development of new services. Some examples of circular economic cases heralded by the Foundation are food packaging from biodegradable seaweed as a replacement for plastic or corporate commitments to in-store collection of used consumer goods with the aim of recycling them into new products. As these goods and services are designed to make profit, they are aligned with key tenets of capitalism and economic growth.

Unsurprisingly thus, the Foundation partners with multinational corporations and states. Recent proof of this is a statement by the Foundation co-signed by some of the biggest multinationals such as Nestlé, Unilever, Pepsico and IKEA. According to the statement, the circular economy will 'create vital opportunities for economic growth that also restore the environment, create jobs, and benefit society'.[3] Given the list of powerful signatories, the promise of economic growth and the underpinning belief in business models as drivers for social change, such an expression of the circular economy has understandably been critiqued for appropriating the CE for the purpose of markets as usual.

A more radical interpretation of the circular economy meanwhile is rather englobed by kindred terms and propositions such as de-growth (Latouche 2010) and doughnut economics (Rawforth 2017). Serge Latouche's (2010) vision of de-growth argues for a sweeping re-direction of human energies away from profit-making towards the promotion of such intangible values as neighbourliness and conviviality, as well as new polities, currencies and social orders. Doughnut economics, meanwhile, is a concept that seeks to define planetary limits and social boundaries as entwined: the framework encourages a double-pronged reflection on the extent to which the economy meets the needs of people without impinging on the needs of the environment to survive.

3. Ellen MacArthur Foundation Joint Statement (2021).

The circular economy can thus variously be viewed as an open-ended exploration of economic systems with the aim of eliminating waste, as a guidebook for business solutions, or as a technical challenge for material and industrial design. The current hegemonic version of the circular economy, propped up by its most recent powerful proponents, is, however, design focused, and tangible, though it often struggles to scale up innovative pilots and institute systemic change.

Putting the social and political into the circular economy

Both early texts and current theorists posit the circular economy as an economic, social and political intervention that reshapes consumption, labour, markets and economic metrics. At a most basic level, one finds in them frequent references to 'culture' and 'society', but unlike the concept of sustainable development, which has long factored social change and at least the possibility of radical economic propositions into its agenda, it can be argued that framings of the circular economy have thus far remained oblivious to wider social concerns. Conceptualizations of sustainable development are often cognisant of global and regional inequality and equity issues and envision social change, with even the widely used Brundtland report definition ('development that meets the needs of the present without compromising the ability of future generations to meet their own needs') involving the idea of intergenerational equity. From that, it is not a huge leap to argue that satisfying the needs of a minority in the present should not be achieved at the expense of their global contemporaries. More pointedly, the Sustainable Development Goals (SDGs) approved by the UN General Assembly in 2015 involve a plethora of social aims, including the eradication of hunger and poverty and the importance of widespread access to quality education and healthcare.

None of the three central planks of the EMF definition of CE – designing out waste, keeping materials and objects in use and regenerating natural systems – say very much about the uneven global relations of power and capital. As Schroder et al. (2019) remark, 'for an inclusive transformation to a CE on the planetary scale, we cannot overlook . . . systemic issues of unequal power relations entrenched in global value chains' (12). The value chains as noted earlier follow specific geographic patterns in which design, production, consumption and waste have different scales and characteristics, and are backed by

uneven economic and political regimes. For example, while design and innovation are definitely not circumscribed to the Global North (e.g. Grace 2021; Mavhunga 2014), these geographies of design nonetheless have an outsized influence on the rest of the world that is difficult to counteract. As social scientists, we need to analyse both how these global economic contexts affect the possibility of a circular economy and how the latter in turn might perpetuate its underlying structures.

One of the specific ways in which the dominant definitions of the circular economy might disregard economic geographies is in their perception of recycling as an option of the last resort. Gregson et al. remark that both industrial symbiosis and extended product life versions of the circular economy are 'notable for a key absence: both write out global recovery and recycling, the primary means by which wastes are recovered and materials keep circulating through economies' (2015: 221). For the authors, this omission highlights that circular economies are also moral economies, that 'there are right and wrong ways of constituting the economic circulation of materials and, within the EU, the revalorization of wastes through global recycling networks increasingly counts as the wrong way to do this' (221).

The structure of socio-economic relations is crucial meanwhile for such parameters as the economy's inclusivity, distribution of profits, risks and hazards, and regulatory allocation of privileges, obligations and sanctions. In this sense, we can point to the work of Sebastián Carenzo, a contributor to this volume who, together with Jutta Gutberlet (2020), has argued for the need to place waste pickers 'at the heart of the circular economy' (see also Barford and Ahmad 2021), thus counteracting the tendency in Latin America to try to sideline waste picker collectives in favour of companies. In part, they do this by highlighting the potential overlaps and fruitful synergy between the circular economy, the ecological economy (EE) and the social and solidarity economy (SSE). The latter in particular involves the incorporation of historically excluded actors (e.g. waste pickers) into economic decision-making and value creation, as well as a move away from profit-driven growth towards collective and community ownership centred on the common good. As Gutberlet and Carenzo note, waste picker involvement in recycling processes can bring benefits with regard to the circular economy and particularly its principle of keeping materials in use, since in purely market-driven waste management systems it is often better business to charge for the transport of materials and their disposal in landfill rather than seek innovative recycling or repurposing solutions for materials that lack a viable market. The latter activities, Gutberlet

and Carenzo note, are much more likely, in the Global South, to be carried out by subaltern actors like waste pickers, in line with the proverb that necessity is the mother of invention. In some instances, such as the Uruguayan CE awards discussed by O'Hare in this volume, there have been belated moves towards recognizing subaltern actors' contribution to the circular economy, with a women's waste picker cooperative scooping an accolade in 2021.

The waste that the circular economy seeks to eliminate is itself a deeply social, relational and shifting category, with discard studies scholars emphasizing that perceptions of waste and wastefulness can be coloured by class, race and economic interests (Liboiron and Lepawsky 2022). Ascriptions of wastefulness, or conversely thrift (Alexander and Sosna 2022), are often associated with some actors more than others, regardless of the evidence for such claims, while some forms of wastefulness are highlighted over others. Offering appropriate solutions to wastefulness and inefficiency thus requires a profound cultural understanding of the processes by which certain practices and actors become categorized as both waste and wasteful (Alexander and O'Hare 2020) and as forming part of the circular economy or not. Isenhour and Reno (2019) strike a note of caution in this regard, raising two overlapping concerns. The first is that the discourse of closing loops may remain unimplemented, while obfuscating existing forms of excess. The second is that 'the embodied carework of tinkering, repairing and tending to materials, upon which the formal politics of economic circularity depend, is only alluded to, at best, in contemporary formations of circular economy' (2019: 1–2). This is a theme O'Hare (2021) has also taken up elsewhere, arguing for the existence of an 'actually existing circularity' of popular reuse and repurposing practices that might in fact be threatened by corporate circular economy schemes that seek to restrict the circles in which materials and commodities move. Of course, the idea of 'actually existing circularity' may also be embraced by corporate actors who have long been minimizing waste in their internal production processes.

The amenability of the circular economy to different economic interests means that without sufficient critical imagination, it can be used to greenwash social inequalities and constitute a new frontier for capitalist 'eco-accumulation' (Savini 2019). One of the functions of a nascent anthropology of the circular economy might then be that of pointing to the way that CE schemes can entrench, exacerbate or indeed create new patterns of inequality. This is a scenario indicated by Berry, Bonnet and Isenhour (2019) in their exploration of the existing and long-established cultures and economies of reuse in the United States.

Taking the circular economy to involve, at least in part, increased financialization and commodification of existing objects and their circulation as second-hand goods, the authors worry that the embrace of discarded things as a new commodity frontier might channel goods away from provincial towns towards US urban centres and overseas, limiting 'opportunities for locals who have long seen the value of discarded goods, and relied upon them to make a living' (2019: 8). Thus, from waste pickers to market traders, anthropological attention to social justice and inequality can highlight those that are recruited into and those that are left out of the economic circles of new circular economies and how.

The circle of life

The circular economy is often represented by actors such as the EMF as both a set of principles and a series of illustrative case studies of tangible changes to business models. This means that the line between the aspirational and the factual, the ideal and the real is often blurred. Nowhere is this more evident than in the model of the circle used by CE proponents. The circle is meant to represent the economy's aspiration to keep materials in circulation through regeneration, reuse and recycling. However, the extent to which a perfect circularity of all materials is achievable is debatable. Gregson et al. argue that within the circular economy bubble, 'the idea of a perfect circle comes to be taken for a reality', whereas it is at best 'an endlessly deferred, but attainable future' (2015: 224). Even a brief inspection of the EMF's database of circular economic projects from around the world shows that not all efforts are easily mappable onto a circle. For example, a virtual clothing line which allows customers to photoshop their portraits into unique virtual clothes seems like an interesting proposition to shift the desire for new fashion away from the material world but its circularity is not straightforwardly clear. The same goes for the featured companies that list their circular economic policies as a commitment to better sourcing of materials, which is neither novel nor straightforwardly 'circular'.

If complex real-world supply chains only rarely map onto circular diagrams, we perhaps need to look beyond the carved-out economic realm to understand why circularity is given such prominence and has so much purchase as an aspirational model for economic change. Effectively, an appeal to the circle and to regeneration relies on wider social valence of such symbols. Anthropology can point not only to

different cultural approaches to regeneration (and death) as in Bloch and Parry's influential (1982) edited volume but also to the strong tendency within Western thought to value the bios to the detriment of death. On the one hand, the death and decay of persons and things can clearly be generative of new life, whether these literally provide nutrients for the soil or pave the way for new generations and the transfer of social roles. Numerous cultural, political and religious orders, argue Bloch and Parry, have sought to 'overcome the spectre of a tyrannous biology' by converting death into rebirth (1982: 23). Yet at the same time, as Marilyn Strathern has recently noted, the social role and importance of death, rupture and discontinuity has perhaps been too quickly overlooked in anthropology and elsewhere, influenced by a Christian bias towards ideals of everlasting life. Re-evaluating ethnographic data from Papa New Guinea, she highlights the way that, for the Dobu, yams come to form part of a lineage, 'planted in gardens just as persons are buried in the village mound', livings tubers that will 'in giving rise to the shoot(s) that it generates, itself fall back into decay'. Her point is that people and plants are necessarily dying as well as living entities, and the eventuality of death is as important as the experience of life. Yet, she argues, 'the positive valorisation of life in anthropological knowledge is but a symptom of a pervasive inclination to see life in everything that is (positively) valued'.[4]

Like Strathern, literary scholar Robert Pogue Harrison (2003) points to the tendency within Western thought to flee from death, 'to emancipate ourselves, by any means necessary, from our millennial bondage to the land and our servitude to the dead' (32). In this context, Heather Davis argues that 'the use of plastic to stave off decay and decomposition – think of cling wrap and other mechanisms for preserving food – contributes in part to the imagined belief that we could, if not escape death, then at least postpone it' (2021: 49). Two of the chapters in this volume discuss the ways in which expanded polystyrene (EPS), used in food packaging, might be considered as forming part of a circular plastics economy. One of the defences of this problematic material is that during its short life span it helps to prevent food waste. Yet beyond the question of who actually profits from these technologies, one can also ask whether life extension outweighs collateral contamination, as EPS that has absorbed food cannot easily be recycled, and organic matter that has been contaminated with plastic cannot easily return to

4. Unpublished workshop paper, 'Life without its antithesis'.

the earth as compost. Plastic, the synthetic material par excellence, is located by circular economy scholars within a 'technical cycle' and food crops within a biological one. Yet it must be remembered that food crops are cultural as much as natural artefacts, and that plastic, through its combination with organic matter, helps both to preserve life and to prevent its regeneration. In Heather Davis's terms, plastics are 'impressed with an attempt to violently cleave the world in two, while also exposing how nature and culture can never be separated' (2021: 10).

The technical/biological divide is only one of the foundations of the circular economy that anthropology might challenge. David Graeber (2012), in a short but influential afterword, analyses circular and cyclical economic imaginaries and is highly critical of the idea that our economies, or indeed our lives, might be considered cycles at all. First, he suggests that the 'life cycle' of a product, the original cycle onto which 'recycling' is grafted, is presumably based on the human life cycle. Neither, he adds, are particularly cyclical, with the human life more closely resembling a 'long ascending arc with a final crash' (Graeber 2012: 279). The product cycle, he argues, is tied to market trade, because it is the idea of the cycle that enables us to imagine a 'steady state' object that circulates through time and space while itself largely remaining unchanged: a thing to which property rights can be ascribed. In fact, Graeber suggests, both things and people can be more accurately described as interlocking processes. Recycling then, for Graeber, simply represents the 'latest in a series of attempts to impose a circular, equilibrium model on a system that is, at least in energy terms, as far from an equilibrium as anything could possibly be' (Graeber 2012: 279).

We might take issue with Graeber's assertion that a Western industrial cosmology imagines the life of a commodity to be cyclical at all. Graeber himself notes the similarity between the death of humans and of things: each of these stages is to some extent hidden away, bodies in graveyards and rubbish shunted out of sight to peripheral landfills (see Reno 2016). The move to a cyclical imagining of the economy can thus be seen as characterizing not a hegemonic (linear) industrial cosmology but an emergent (circular) one, with new characteristics with regard to maintenance, repair and processing. Yet it is one that is ultimately inspired by models of natural equilibrium and biological cycles whose foundations Graeber critiques.

Debates about natural cycles and the role of humans within them are complex and polemical, particularly in the context of climate

change. As Doreen Massey (2006) has discussed, the idea of nature as being characterized by a state of original balance or harmony has been much questioned in the academy, in part because of the nostalgia that it promotes and its lack of recognition of the human role in creating such supposedly pristine landscapes as the Amazon rainforest (see Descola 2013). The circular economy also assumes that mimicking nature is always positive, while anthropological studies show that to think of nature as being cooperative and amenable to human designs fails to credit it with a wide spectrum of agency (see Williams 1973; Callon 1984). Yet, as Massey asks, if nature is presumed to always have been unstable, fluid and mobile, how can we establish meaningful ethical criteria for human intervention (2006: 39)? This is not a moot point, since those defending anything resembling a harmonious understanding of nature have long been pilloried by those seeking to defend anthropogenic planetary change, as when Rachel Carson was denigrated as a 'fanatical defender of the cult of the balance of nature' by the president of Monsanto for her work researching the impact of the insecticide DDT upon bird species (in Mann 2021: 11). Writing about plastic, Davis perhaps points us in the right direction for while she argues that 'there is no homeostasis or equilibrium from which plastic comes or might return . . . only variable ecological assemblages', she also argues that situating plastic in deep time and an unstable world should increase rather than diminish practices of awareness, care and responsibility (2021: 43).

Despite multifaceted critique from the social sciences, the circular economy at its best can be a radical concept that encourages a wholesale rethinking and redesign of our established economic systems (Corvellec et al. 2020: 98). This volume seeks to critically engage with the concept rather than simply dismiss it out of hand. Its contributions point to the power dynamics and differentials involved in deciding who and what are recognized as forming part of an emergent circular economy. They also explore the existing chains and flows in which materials – plastic, metals, textiles – are currently enmeshed. Far from coasting along linear routes, these often travel along complex pathways for which the ethnographic methods that many of our contributors employ are particularly suited. It is our firm conviction that the growing importance of the CE means that a grounded bottom–up analysis of both its multiple meanings and the contemporary production and consumption models that it seeks to reorder is imperative. This volume makes a modest contribution to this broader project.

Summary of the volume

While the concept of the circular economy is often mobilized in corporate and policy circles, many of the contributions to this volume are interested in how practices taken as constitutive of a circular economy form part of an 'actually existing circularity' (O'Hare 2021) or innovations from below that often go unrecognized and unnoticed. Like Hart's (2017) 'human economy' or Graeber's (2011) 'everyday communism', these contributions demonstrate the myriad ways in which the circular economy can be seen to exist in everyday life, in the cracks and crevices of our consumption-driven capitalist economy, in frugal or 'informal' traditions and in emergent forms of reparative re-use, waste prevention, or sharing. The volume also follows corporate and state circular economy plans, which, while appealing to virtue and sustainability, often revive economic growth dogmas and lay the ground for new forms of dispossession, or struggle to take hold as positive business models in a wider economy that is assessed by reference to production and consumption levels. The fear that circular designs reflect narrow corporate and state interests always looms in the background. Hegemonic framings of the circular economy usually incorporate appeals to transparency and accountability to prove commitment to sustainability but also make distinctions with informal practices. The circular economy can thus be seen as a key battleground for the future shape of our economy, an idea that fluctuates between a greenwashed version of the status quo and a more radical vision that builds on existing and emergent instances of green, democratic economic practices.

Circular models of production push producers to diminish their reliance on raw materials, leading to the emergence of new geographies of trade and brokerage. Closing the loop – that is, feeding waste or by-products back into production – is an effort that leads to the emergence of economic niches and new forms of regulation. In the first chapter of this volume, Dagna Rams shows how circular economic interventions heralded by development actors create new developmental politics and supply chains of metals between urban mining in Africa and industries in Europe. The chapter highlights some of the challenges and considerations of creating ethical supply chains of recycled (as opposed to raw) metals. Policies also give producers new responsibilities, with extended producer responsibility (EPR) principles requiring them to pick up some of the costs of managing the end of life of products. Julia Perczel's contribution focuses on a new breed of enterprise in India – a Producer's Responsibility Organisation

(PRO) – to which corporate and state actors outsource the end-of-life management of their goods. Perczel's chapter shines a light on some of the new bureaucracies and challenges that are created in the process of closing the loop. She focuses on the experience of one PRO as it tried to achieve sustainable outcomes amid a complicated economic ecosystem. Patrick O'Hare's chapter, meanwhile, looks at the system of prizes, funding and audits that aim to incentivize a transition towards a circular economy of plastic in Uruguay. In particular, he looks at two very distinct plastic materials/products – plastic board and expanded polystyrene trays – asking how both could have received circular economy recognition despite ostensibly constituting cases of down-cycling and virgin plastic production.

Another key tenet of circular economic models is reimagining the role of consumers. The consumption of objects prior to their wasting is central to a linear economic model. Circular models, in contrast, often involve the consumption not of objects but of services, while aiming to invest consumers with new responsibilities that seek to prevent wastage. Aliki Angelidou and Mimina Pateraki's chapter focuses on 'servitization' – a relationship between consumers and producers encouraged by EU-funded workshops in Greece. Consumers are trained to become new citizens who demonstrate their ecological commitment through developing novel and continuous relationships with producers, who maintain ownership over goods and service them, thus prolonging their useful life but in constrained ways. Yet workshop participants remained sceptical in the context of suspicion towards the EU and fears that long-held notionsof progress and modernity might be at risk.

Circular economy approaches also explicitly recast the role of discards in our economy – no longer a waste to be landfilled but a resource to keep in circulation through reuse, recycling and repurposing. Sebastián Carenzo and Lucas Becerra, and Laura Neville's chapters look at the role of waste pickers, who have historically carried out the lion's share of waste recovery and classification in the Global South, within the circular economy. Carenzo and Becerra follow Argentine waste pickers/informal recyclers to show how their everyday practices of social and technological innovation represent a 'circular economy from below'. They compare two innovative processes involving expanded polystyrene (EPS), one developed by a private company that employs former informal sector waste pickers and the other by a wastepicker cooperative itself. They show that although it is the former that has garnered circular economy accolades, the latter offers greater potential for a socially inclusive and disruptive

circular economy in the Global South. Laura Neville, meanwhile, shows that the utopian rhetoric of Columbia's circular economy policies has re-energized formalization efforts that create barriers to the integration of *recicladores* into official circular economy schemes. Despite the anti-landfill sentiment at the heart of circular economy discourse, landfills will likely continue to be used for waste disposal in many parts of the world for the foreseeable future. Indeed, as Daniel Sosna demonstrates in his chapter, these spaces have their own circular and cyclical practices and imaginaries, from the recirculation of discards by landfill workers to the natural water cycles that inspire vernacular solutions for the treatment of leachate. These practices in turn shine light on the difficulty of imagining circular practice without connecting it to the interrupting qualities of natural cycles.

Most chapters in this volume reference the friction between new circular economy policies and existing circular practices. Our final two substantive contributions, from Benjamin Steuer and Heike Derwanz, focus on policy in relation to how such practices are incorporated or disregarded. In her chapter, Derwanz traces a century-long history of German state intervention in the textile sector to show that ideas about thrift, circularity and reuse, far from a novel premise, have long transitioned between practice and legislation. Steuer examines China's experiments with circular economy as a 'Westernization' project that privileges Western solutions and technologies over embedded, popular and often informal practices. In consequence, the circular economy is seen in this instance as an economic intervention that privileges specific forms of globalization and worlding. Finally, in his afterword, Andrew Sanchez asks why it is that the idea of the circular economy appears so seductive, and how it is, and is not, rather like alchemy.

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Chapter 1

The circular economy of metals and the challenges of its globalization in Ghana

Dagna Rams

In 2015, German Economic Cooperation and Development Minister Gerd Müller visited Accra during the Ebola outbreak in West Africa. As German newspapers reported, while on the plane to the city, Müller read one of the many media reports that had been referring to Ghana as a destination for electronic waste dumping. These reports focused on the scrapyard of Agbogbloshie located in the country's capital. Agbogbloshie was run by scrap dealers who used it as a location for collection and dismantling of waste into metals for resale. This created a landscape of work processes such as cable burning that were visibly polluting and discarded by-products that lined the soils and jutted out into the surrounding lagoon. Agbogbloshie has been framed in international media, reports and interventions as a space that represents the externalities of electronics consumption and disposal. Its allegoric qualities – achieved through the aesthetics of photojournalism and the repetition of the same narrative across numerous media publications – meant that the site has been central to the discourse on international dumping of electronic waste and the way the problem is viewed. Provoked by the images, Gerd Müller decided to visit the scrapyard. Soon, as one journal reported, he 'strode through Agbogbloshie's glistening pools of car oil and was horrified' (Szent-Ivanyi 2016). He emphasized that 'most electrical appliances discarded illegally and legally in Europe end up here – including those from Germany' (Szent-Ivanyi 2016) – as such it was the responsibility of his country to intervene in order to repair the damage. When later speaking in the Bundestag (German Federal Parliament), Müller referenced his visit to Agbogbloshie and the unease that he felt at seeing child labour that went into recycling 'German

microwaves and freezers'[1] and pointed to his intervention as a 'circular economic project' to ameliorate the situation.

This initial spark translated into a German development aid project on e-waste in 2016 that ran until 2023 and was renewed for another three years until 2026. The project was divided into activities headed by the German Agency for International Cooperation (GIZ) and those headed by the German development bank (KfW). The GIZ's aim was a social transformation of Agbogbloshie through community building and education; it lasted until the end of 2022. The KfW established a handover centre that would buy specific types of e-waste but only provided that they are dismantled safely beforehand (e.g. cables are not burnt). As of writing in 2023, the latter project is ongoing and is currently handled by Ghanaian NGO Green Ad. The projects were to work together to recast Agbogbloshie as part of an emergent global circular economy of electronic waste. In that sense, the intervention emphasized the workers' role as collectors of electronic waste who dismantle and channel it to metal recycling industries but do so in ways that require improvement. It is difficult to reflect on the effects of the initial aim as Agbogbloshie was violently evicted in July 2021 by order of municipal authorities, leaving buildings sponsored by the German aid and a patchwork of recalcitrant informal dismantling activities on its edges as some of the few remnants of the scrapyard's past. The development project met the brute reality of municipal politics that had long cast the scrapyard as scheduled for an eviction. The fact that the eviction had not taken place in the first twenty-five years or so of Agbogbloshie's life suggested that there would not be a problem for the German development to intervene. Agbogbloshie is treated in this chapter as a site from which to study a circular economic project from its ideological scaffolding through to its initial attempts at implementation. The intervention was also a recent instantiation of attempts at creating a global circular economy of electronic waste since the early 2000s.

The intervention in Agbogbloshie was meant to represent what European applied scientists have been calling in policy papers a 'circular

1. Trans. "Ich sehe deutsche Mikrowellen, deutsche Gefrierschränke. Deutscher Elektronikschrott landet dort und wird von Kindern unter unsäglichen Zuständen auseinandergenommen (…) Ich habe dort ein Projekt gestartet, um eine Kreislaufwirtschaft, eine nachhaltige Schrottverwertung aufzubauen und so den Kindern und Jugendlichen zu helfen", Bundestag (2019).

economy' and a 'best of 2 worlds model' in which scrap collectors in poorer countries organize collection of e-waste which they then channel inter alia to metal refineries in Western Europe. Such visions aim to increase standardization of labour and its practices in a context that is already connected to all sorts of metal refineries around the world as scrap dealers in Agbogbloshie would sell their metals to national industries or for export. The industrial capacity to recycle different metals is dispersed for some metals and concentrated for others. More specifically, technologies for recycling iron scrap at an industrial level are spread around the world and are available in West Africa, including in Ghana, which alone has five such smelters;[2] copper, aluminium and lead scrap collected in West Africa is usually heading to industries in Asia or Europe (Lepawsky 2018); and finally precious metal recycling technologies are concentrated in a handful of multinationals located mostly in Europe, North America and East Asia. In this context, the European interest in 'best of 2 worlds' stems from the strategic interests of its own industrial sector and the goal of increasing recycled metals in European supply and demand, thus lowering dependence on natural resource extraction and regions in which they are located.

Given the profusion of electronic waste, the stakes of the German development programme were not only linked to the future of Agbogbloshie but rather the latter would have been the most recent testing ground for the rearrangement of the relationships between electronic waste sites and the metallurgic industries. The intervention aimed to discipline scrap dealers to ensure that their work is more environmentally friendly and their dismantling practices favourable to the industries' needs. In 2015, during Müller's visit, Agbogbloshie was already channelling its collected electronic waste to global industries. This happened through all sorts of domestic and international brokers negotiating low prices, cherry-picking metals, and leaving cumbersome and hazardous remains in Ghanaian dumpsites. This was a late capitalist supply chain as described by Anna Tsing (2015: 62) where 'amassing wealth is possible without rationalising labour and raw materials'. As a result, Agbogbloshie existed at the intersection of electronic waste dumping and convoluted scrap metal supply chains. Reimagining

2. It is important to point out that this statistic has been fairly dynamic over the course of the last twenty years due to the ebbs and flows in demand. I am referring to the number as of June 2022. It is likely that the number has grown since due to recent boom in construction.

Agbogbloshie's economy without endangering livelihoods of scrap dealers in Ghana was a potent task for a development organization in the twenty-first century: one that intervenes at the level of trade, appeals to sustainability, seeks solutions that reference communal empowerment, and trials a blueprint for a waste stream that is unlikely to decrease in size or reach.

In the following pages, I focus on the challenges presented by the recent implementation of the model in Ghana. I show how it entered into competition with existing forms of global connection between Ghanaian scrapyards and international metal markets. I point to the problems of scaling the circular economy as a specific claim about sustainable use of resources onto a global scale with the aim of imposing universal standards of sustainability. The circular economy is here an 'ameliorative discipline' (Welker 2014) that seeks to rearrange how existing economic actors work and relate to each other. My ethnographic work in Agbogbloshie between 2015 and 2019 and archival reading of German developmental reports are the basis for the discussion. My personal experience of working as a consultant for the German Development Aid's (GIZ) branch in Ghana in 2019 and 2020 delivering research on ways to improve GIZ's stakeholder dialogue in Agbogbloshie sensitized me to some of the issues raised in this chapter. I refer to this work engagement in three instances – when mentioning some of the social programs that the GIZ ran in Agbogbloshie, when accounting for the prevalent wish of the programme's workers to preserve the scrapyard livelihoods, and when referring to one of the workshops run by the organization following the scrapyard's eviction. In addition, thanks to the consultancy, I was able to partake in the World Resources Fora organized in Geneva in 2019 and 2021 where the subject was the future management of global resources through circular economy. Taken together, the experience has given me an insight into the conceptualizations of present and future challenges.

A circular economy of metals

There are two forms of developmental discourse in donor countries that imagine restorative solutions for sites like Agbogbloshie. In this case, as in others, the developmental discourse is a combination of a perceived need for intervention and donors' assumption of responsibility to define the course of action to be taken (Escobar 1992). One approach focuses on dumping and advocates for policies to prevent it. The other focuses

on the potential that resides in waste and argues for policies to realize it. These two solutions are viewed as complementary by donors such as the already mentioned German aid and its various project partners.

The dumping of electronic waste is often explained through reference to the porosity of borders, high costs of disposing electronic waste within rich countries and consequent exportations of the waste to countries with lax environmental regulations. According to Josh Lepawsky (2018), the controversy came to the forefront following *Exporting Harm: The High-Tech Trashing of Asia*, published by the American non-governmental organization Basel Action Network (BAN) in 2002. The report was followed by another, *The Digital Dump: Exporting Re-use and Abuse to Africa*, in 2005. The former publication focuses on China, India and Pakistan as destinations of dumping, while the latter focuses on Nigeria. It was eventually the global campaigning group Greenpeace that put Ghana on the map of international electronic dumping sites in 2008 with a report about chemical contamination at two electronic waste sites in Ghana, one of them being Agbogbloshie (Brigden et al. 2008). In the same year, *National Geographic* wrote the first international media report on Agbogbloshie, entitled 'High Tech Trash: Will Your Discarded TV End up in a Ditch in Ghana?,' which ushered in a wave of reporting including in *The New York Times*, *The Guardian* and *Wired*, as well as in national media in Germany and beyond. Among the many whose attention was drawn to this issue was Gerd Müller.

The recurrent solution to dumping has been to strengthen borders both ways against the migration of waste. The Basel Convention, an international treaty since 1992 with an objective of preventing or reducing the movement of hazardous waste between nations, specifically from rich to poorer countries, provides the regulatory framework for enacting such a solution. Ghana has adopted its own e-waste legislation modelled on the Convention to prohibit the importation of such waste (see Oteng-Abagio, van der Velden and Taylor 2020). Alongside the regulation, the personnel at Ghana's Customs Excise, which acts as the inspector of imports, have been trained to police incoming containers for waste. They have worked in conjunction with the international police, Interpol, under the auspices of ominously named projects Eden and Enigma, each of which aimed to make sure Ghana's badge as an 'e-waste dump' is reversed.

However, the firming up of the borders – in itself a process that meets multiple challenges[3] – does not prevent electronic waste. This is

3. The challenges have been explored in research (e.g. Lepawsky 2018).

because Ghanaians themselves consume electronics, mostly second-hand and coming from various countries in the Global North, and these too eventually become waste. To address the issue of waste regardless of its provenance, a parallel group of institutions and engineers reflected on recycling solutions within 'emerging economies' such as Ghana, thus treating the e-waste as an inevitable outcome of global consumption and at best a potential to realize. The key donors in the field have been the aforementioned GIZ and Swiss Economic Cooperation and Development (Seco), which in turn have been aided by two research institutions: the German Oeko-Institute (Institute for Applied Ecology) and Empa (Swiss Federal Laboratories for Material Science and Technology). Over the years, the institutions collectively have proposed research methodologies and models that seek to manage electronic waste in countries in Asia and Africa, including Ghana.

The models for global electronic waste management have had different nuances over the years. Their names changed and included denominations such as: 'the Clean e-Waste Channel' (CeWC), the 'Best of 2 Worlds' (Bo2W), 'Circular Economy of Electronic Waste' and also 'the Circular Economy of Strategic Metals'. They invoke concepts such as 'circular economy' and regional difference (i.e. 'two worlds'). The aforementioned German and Swiss institutions first started putting the 'philosophy' into action in early 2000s in India. The interventions over the years tend to be made up of three steps that would be tailored to specific contexts: working with governments to create electronic waste legislation, supporting registered companies earmarked as sustainable due to their possession of recycling technologies and establishing pilot projects aimed at informal recyclers. The 'informal' sector of electronic waste is a byword in these models for a sector that is organized communally rather than corporately, usually using unregulated land for work, and relying on manual labour that can expose workers to hazards associated with recycling.

The Bo2W model is predicated on a geographic specialization of the recycling chain, which is divided into three stages: collection, pre-processing and end-processing. Much of that geographic specialization has changed in recent years as recycling industries are opening in Asia, upsetting some of the distinction between 'developed' (often signifying Europe) and 'developing' regions that existed in the early elaborations of the Bo2W. In these elaborations, the workforce in the so-called 'developing countries' is lauded for extensive collection and minute pre-processing that are seen as an effect of economic deprivation: the context pushes people to collect more waste despite low-profit margins

and their lack of technologies leads to reliance on manual dismantling, which is better than 'purely mechanical treatment options, as typically applied in western countries with high labour costs' characterized by 'major losses of precious metals in dust and ferrous fractions' (Schluep et al. 2013: 48). The end-processing meanwhile entails the refining of metals from electronic waste. This, in turn, is the specialization of the 'developed countries' which have the appropriate technologies. For example, a refining of gold though leaching in a workshop context has a low recovery rate and is hazardous compared to smelters in Europe where the recovery of precious metals is almost complete and the hazards are contained (Schluep et al. 2013: 48). The Bo2W model is labour intensive when it comes to the processes that are to be kept in the 'emerging economies', and it is technology plus capital intensive when it comes to the processes that are to be performed in industrial contexts in Europe. The scrap workers get recast in these models as collectors who are to perform collection and dismantling, while leaving other processes to the recycling industries to which they are to sell their finds.

For the Bo2W models to become economically independent from the initial injection of development funds, the volumes of electronic waste need to be extensive enough to generate profit margins that provide capital for upgrading recycling processes within the country and cover intercontinental transport to industries outside. This is why the Bo2W's implementation begins with e-waste country assessments to provide information about volumes of electronic waste. This is 'the most important piece of information on which tailored and sustainable solutions can be built' (Schluep et al. 2013: 45–6). Recycling is an economy of scale, which means that ascertaining quantities is integral to predicting the economy's viability and levels of public investment. At the same time, informal sector activities and porousness of borders in developing countries mean that the existing data is patchy and approximate at best. It is against this background that the specific policies advocated by the Bo2W – formalization, legislation, control of material flows through borders and pilot studies – auger the promise of more reliable data about the volumes of electronic waste.

The need to collect data about e-waste highlights one of the fundamental hurdles of the circular economy: for secondary resources (obtained from waste) to compete with primary resources (obtained from exploitation of natural worlds), their supply needs to be rendered predictable (see Gregson, Watkins and Calestani 2013). Much of the unpredictability in target countries such as Ghana, meanwhile, is presently handled by scrap dealers, who cope with two separate dynamics: the unpredictability of waste generation and its content and

the changing prices in global metal markets. In response, they devise various strategies such as combining scrap work with other economic pursuits to substitute incomes, engaging in communal ventures that pull money together and performing economic activities, such as refurbishing or recycling that go beyond the mere collection and dismantling of waste.

Some previous scholarly works have examined Bo2W models critically (Reddy 2015, 2016; Lepawsky et al. 2017; Millington and Lawhon 2019), arguing that they reinforce divisions between 'developed' and 'developing' counties through making the latter into collectors of metals for the former. The authors also critiqued such schemes for undermining livelihoods of non-corporate, freelance scrap workers such as the ones in Agbogbloshie. Rajyashree N. Reddy (2016) wrote about the first Bo2W intervention in India from the perspective of informal workers, arguing that the model sought to strip such workers of their current economic activities, reducing them to collectors while also failing to address the problem of hazardous fractions in India. In addition, such interventions advocate for an increased role of formal companies in the e-waste sector, whereas scrap workers might prefer to organize into loose collectives premised on communal rather than corporate work arrangements.

It is within this longer legacy of Bo2W that development agencies set their eyes on Africa as a new frontier for the model's implementation. Ghana's badge as an e-waste dumping ground which had already led to some research on electronic waste flows, and the country's longer history of development cooperation with Germany, made it a suitable target. The German Oeko-Institute prepared a series of reports on the country including a feasibility study to determine Ghana's suitability, which concluded that 'there are significant untapped economic, environmental and social improvement potentials' (Prakash and Manhart 2010: 5).

The study focused on three waste types to ascertain their suitability as the first subjects of the intervention: desktop computers, cathode-ray tube televisions (the back heavy televisions that preceded flat or LCD screens), and refrigerators and freezers. Desktop computers – central in reporting about electronic waste in the media reports – were seen as the most straightforwardly appropriate for the intervention as they would require 'only' two interventions in the value chains: elimination of cable burning otherwise used to retrieve metals from under cable coating and ensuring controlled incineration or regulated landfilling

of the remaining plastic. In contrast, the CRT-televisions and fridges represented a quagmire of various hazards and unclear economic profits. The two latter waste types generate hazardous waste such as phosphorous dust, glass cullets, oil and polystyrene that struggles to find productive uses compared to the computers. To ensure safe management of these fractions, the report suggests the need for domestic solutions for the disposal of hazardous waste including dedicated disposal sites and controlled incineration. It argues that 'although the net material value of some e-waste types can contribute to cover the costs for sound management of low value and hazardous fractions, the example of CRT-devices shows that it will be difficult to achieve environmentally sound end-of-life without additional financing mechanisms' (Prakash and Manhart 2010: 86). The report suggests that such financing could come from taxes on electronic imports. Similar to what Reddy (2016) observed for India, here too the suggested destination for hazardous fractions is within Ghana. Importantly, the report refers to these fractions as 'domestically generated', thus subtly decreasing the level of perceived developmental responsibility for them.

This early report was followed over the next five years by the establishment of the 'Best of Two Worlds' consortium hosted by the Institute and uniting powerful industry members such as the Belgian recycling giant Umicore that specializes in e-waste metals recycling, the German company Vacuumschmelze that produces metallic devices for cars, and Johnson Control, an American company domiciled in Ireland that focuses on batteries for vehicles and lead smelting. In addition, the consortium included two regional corporate partners in Ghana and Egypt. These industries' role was to provide specialized knowledge on best dismantling practices and create novel recycling partnerships with scrap dealers in Ghana.

There was also an occasional subtle shift in the language that surrounded the consortium's work, with 'Bo2W' being mentioned in the same place as a 'global circular economy of strategic metals' (Manhart, Schleicher and Degreif 2014). The backdrop for the latter moniker is the European Commission's creation of a list of critical raw materials that has gone through four updates since 2010. The fuel for the list has been the growing demand for metals amid metal-heavy decarbonization and digitalization and attempts to lower EU dependence on specific supply chains – currently, Russia is the region's primary source for palladium, while China is the biggest producer of many others as well as an almost exclusive source for rare earth metals. It is in this context that the recycling of precious metals and the search

for new supply chains acquire an added importance and inspire policy innovation. The Oeko Institute recast scrapyards in Ghana as having 'strategic' importance and linked the intervention in Ghana to policies at the level of the EU. The reference to the 'strategic' nature of the metals adds a sense of urgency and suggests a temporal horizon within which the importance of a global circular economy of electronics will grow even if the report shows that recovery of such metals in Ghana might be small in the present moment.[4] It also explains why the industries have an interest in the training of their global partners in various dismantling and handling procedures, as this would in turn lower the industries' own costs of processing.

To enable the cooperation between industries in Europe and informal workers in Ghana, the reports drafted by the GIZ and the Oeko Institute are thus full of references to 'optimal dismantling depths' (i.e. how best to dismantle electronic components to ensure their recyclability), as well as composition details for specific wastes and predicted profits from the dismantling and resale of their components (e.g. Manhart et al. 2015). The optimal dismantling depths are meant to alert Ghanaian workers to industrial expectations – for example, about ways to dismantle computer hard disks to remove magnets that contain rare earth metals and information about how to package lead acid batteries for bulk transport. Meanwhile, the analysis of material components in electronic waste is an exercise with an expiry date due to the breathtaking speed of technological transformation which translates into changing material composition of electronics and their miniaturisation.

The financial and research energies over the years that went into the writing of these reports reveal the enormous burden that the 'informal' workers in places like Ghana have been encumbered with henceforth: while companies that assemble such electronics have capital for

4. Two of the metals that are identified in the study on Ghana's 'e-waste potential' – cobalt and palladium – are considered 'strategic' or 'critical' by the European Union. The scrap that can be found in Ghana's scrapyards also contains other examples of strategic metals that are currently being recycled or earmarked for further research into recycling efforts. One of the reports published by the Oeko-Institute predicts that the cumulative content of palladium that can be found in Ghana's notebook e-waste is 0.16 tonnes in 2020. This is but a drop in the ocean of European demand that averaged around 56 tonnes per annum in the 2010s.

research and development and hire scientists, scrapyards around the world that dissemble these technologies are playing catch-up in discovering what hides inside and how much profit can be made from recovery. It also shows the disciplining and rationalizing effort needed to wield control over post-consumer goods so as to enlist them into circular economies.

After the sheer quantity of reports and considered options, the developmental aid finally started dispensing its key funding to upgrade Agbogbloshie into the sustainable recycling park. One of its foci was setting up a handover centre, which would buy electronic waste with the aim of transferring it first to the agency's partners in the formal sector in Ghana and then to the industries abroad. In the spirit of the reports, the centre was to generate data about e-waste volumes and compositions in Ghana, incentivize efficient and sustainable handling of waste, and build direct business partnerships between the scrapyard and earmarked industries acting as a conduit. In addition, the developmental aid also aspired to intervene in the social realm, by building a health clinic, a football field and a training centre for all sorts of communal empowerment activities. This was such an immense effort that it required the cooperation of a range of donor agencies that divided specific functions between them and included the German Development Agency (GIZ), the Oeko Institute and the German Development Bank (KfW), as well as Ghanaian NGOs that were outsourced related roles. The intervention aimed to integrate the social worlds of Agbogbloshie with the hope of gaining trust and social legitimacy. The GIZ in particular worked with local theatre groups to spread its messages, organized workshops for female food traders in Agbogbloshie to improve their livelihoods and add new economic activities, and supported youth to play sports, in addition to offering training aimed at scrap dealers. There were 'visioning processes' (i.e. focus groups to imagine together with the donors the best future for the scrapyard), stakeholder meetings, celebratory events, frequent visits by the GIZ executives to scrapyard associational representatives, the emergence of rapport between GIZ staff and the workers, all underpinned in the numerous conversations by the stated belief in wanting to preserve Agbogbloshie's livelihoods. While these broader interventions aimed to transform Agbogbloshie into a safe work environment, the establishment of a handover centre handled by the KfW was a testing ground for the sustainable and circular value chains.

The handover centre

The idea for the handover centre was born in the first feasibility assessment conducted by the Oeko-Institute (Prakash and Manhart 2010). The report considered two models for the relationship between scrapyards in places like Ghana and the global refineries. The first was one of indirect relationships that installs intermediaries to buy the fractions in Ghana and later export them to their destination markets. The authors at this point expressed fears that the model would lead to the cherry-picking of the best fractions while leaving worthless remains such as plastics in unauthorized dumpsites. The second model would create direct cooperation between the collectors and the refineries through the establishment of an authorized centre that buys goods that meet specific standards such as unburnt cables and aims to buy all fractions. This would cut the risks associated with intermediaries and the cherry-picking (Manhart and Prakash 2010).

The handover centre, according to the goals of the project, was initially to buy up 'at least 200 tonnes of cables and 2,000 tonnes of plastic casing and bring these to regulated recycling centres' (KfW 2017).[5] The key innovation of the centre was to offer subsidized prices to incentivize scrap workers to bring their material unburnt. The centre would then transfer thus acquired scrap to a formal company located in Ghana and co-headed by a German CEO which in turn traded with industries in Europe. The centre was located in a container on the edge of Agbogbloshie. It was easily reachable compared to other metal buying enterprises that were located a motorcycle ride away from Agbogbloshie.

Importantly, the project was not about putting a supply chain in place where there was none but rather sought to change how scrap dealers in Ghana went about their work and who they chose as buyers for their goods. Ghana's scrapyards had already been abuzz with international connections through Asian, European and Middle Eastern metal brokers. However, unlike the German development organisations, those brokers did not profess care for the environment or working standards as values in their own right. Their interaction with scrap

5. 'Scrap Recycling done right: Innovative solution for disposing of harmful electrical waste in Ghana', KfW Development Bank, 08.03.2017, https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/News/News-Details_402752.html (accessed 12 January 2022).

dealers was strictly limited to trading and an occasional extension of credit to secure goods vis-à-vis competition. This latter feature of the relationship meant that even if scrap dealers had wanted to trade with the German centre, their cables might have already been the property of the international brokers. True to the notion of 'flexible mining' introduced by Freyja Knapp (2016) to emphasize scrap metal chains' spatial and temporal flexibility as compared to mining networks, these international metal brokers were hopping between geographic locations, buying based on the ups and downs of the metal prices and competing with each other to get the most metals for the least money. As such, the brokers were routinely unloading financial risk onto their Ghanaian partners in the informal economy, forging a sense that scrap dealing was akin to gambling or a 'try and luck business' in the local parlance (Rams 2021). The brokers also occasionally offered prices that were suspiciously high, suggesting that they are not only interested in scrap as a specific commodity but also as an exchangeable commodity with which they can launder money or expatriate capital.[6]

For its first years of operation, the handover centre decided not to intervene too broadly in the economy but rather to focus narrowly on cables (see Manhart et al. 2020), thus dropping the idea of collecting desktops that had been flagged earlier. The outcomes of the early focus on cables were meant to act as a blueprint for developing practices for other more complicated waste types. However, such a scaling of the centre's work has not taken place between the inception and my last inquiry into the centre's work in August 2022. What made the project 'circular' was thus not the fact of transitioning waste into a resource, as this was a generalized practice, but rather ensuring recycling did not make recourse to practices such as burning and incorporated actors meeting the standards of the German development aid to which the handover centre resold what it bought from around Agbogbloshie. In effect, this circular proposition only affected a subsection of economic exchanges taking place in the area.

The focus on cables correlated with a broadly established perception that open-air cable burning is the key ground for intervention in the context of African electronic waste economies (see WHO 2021). In trying to understand the persistence of burning, the Oeko Institute's

6. Such reasons for high prices in metal markets are suggested by Levin Sources (2017) in their handbook for the investigation of sustainability of artisanal mining and its markets.

experts (Manhart, Schleicher and Degreif 2014) referred to economic rationality: burning cables does not require much manpower, it is fast and cheap, and it does not affect the weight of the final metallic product. Burning cables releases toxins which when inhaled damage people's bodies and ambient environments (e.g. see Cesaro et al. 2019). These dangers cannot be underestimated and they are the subject of scrap dealers' own worries about their health and that of their neighbours. As I learnt through fieldwork and interviews in Agbogbloshie and other scrapyards in Ghana, burning was a complex social and economic process which related to the distribution of labour roles in the scrapyards, strategies of negotiating with metal brokers and the management of bodily energies. Contrary to the development agencies perception about its limited use of manpower, burning was seen a legitimate livelihood for those specialized in the practice and thus calls to eliminate it were viewed by many as tantamount to dispossession without offering much in exchange. The activity was thus part and parcel of fragile attempts to make ends meet and a shared understanding that urban sacrifices are required to transmit money to families back home outside the country's capital (Rams 2021). Burning was also an occasional response to the exhaustion of personal energies in the busy life of Agbogbloshie. Sometimes workers lacked the physical energy to perform the more meticulous work of dividing metals from plastic after a full day of collecting and dismantling scrap or withstanding numerous stressors associated with life in a congested marketplace.

In setting up the problem, the German development organization argued that most electronic waste generated in the country ends up in the informal sector like Agbogbloshie. According to these experts, this is because such operations offer cash for waste and externalize environmental impacts, thus avoiding additional costs that sustainability would demand (Manhart et al. 2020). In comparison, 'formal and soundly operating, recyclers [. . .] use large parts of their revenues to responsibly manage e-waste fractions and avoid pollution' (Manhart et al. 2020). The project recognized that the simple banning of certain activities is not effective, and as such there is a need for an incentive-based rather than regulatory approach. Over the first ten months of its operation, the centre collected almost thirty tonnes of cables which reduced at least some burning activity.

The key problem vis-à-vis the durability of the intervention was how to keep the centre and its incentives alive when the direct development investment ends at some point in the future. Some of the possible options that were discussed included making the association of scrap

dealers in Agbogbloshie responsible for the collection of funds to keep the incentive in place, thus collectivizing the costs of sustainability that were previously externalized to the environment or using the money from electronic import levies charged at the ports (as enabled by Ghana's Hazardous and Electronic Waste Control and Management Act 2016). Both turned out to be difficult. To keep an incentive in a competitive market with other opportunities that did not require additional financial tools was a hard sell. Second, the handover centre struggled to monopolize the market, which is why burning activities were still taking place as scrap dealers burned cables to sell to the metal brokers. In other words, the burning continued, while the limited purchasing offer of the centre meant that the workers recycled other types of electronic and scrap waste as before.

Even though the choice of the cables was meant to be the least complicated, there was a need to run trial studies to learn what one 'gets' from the scrapyard. Initially, the project indiscriminately bought kilograms of jumbled-up and small-diameter cables, which are the most commonly burnt, to analyse content: the amount of metals and their type, the amount of dirt mixed in with the cables, the amount of plastic and insulation. They cooperated with the partner company City Waste Group, which previously received a cable granulator from the German development. Sorting out the cables into types, cleaning them, removing additional plastic components such as plugs – all required significant labour from the partner company (Manhart et al. 2020: 21). The project realized that it was walking a fine line: should the centre demand scrap dealers to perform additional labour, the scrap dealers might take their goods to the competition; if in turn cables were accepted indiscriminately, the project would end up buying waste materials such as dirt or fibre-optic cables determined during the trial to have no material value for the recyclers (Manhart et al. 2020: 21). In the end, the project decided to use a graded scale for different cables and pay the incentives according to their grade.

After the time taken to study the details, the handover centre was set up and continues to run despite Agbogbloshie's eviction and the end of other development activities. In the time of its initial operation, the centre saw some increase in the amount of cables that it received from one week to the next. It also managed to attract scrap dealers to the project. The purchased cables were initially processed by the centre and divided into metal and non-metal components. The metals were sold to recycling industries; some of the granulated insulation was exported to Germany for incineration, while plugs, plastic, fibre-optic and steel

cables headed to a landfill in Ghana (Manhart et al. 2020: 21). Thereafter, the next batches of cables were instead meant to be tendered to local companies with the aim of selling them a critical mass of cables that would justify acquiring pricey machines for their processing, fostering recycling capacity within the country. There was thus some dynamism when it comes to the details of the project as different options were emerging as more or less economically profitable and viable in the long term.

The now-and-then scenarios

We have seen that the German development agency initially took an expansive view of electronic waste and eventually settled on a specific type of cables. This itemization reveals one of the crucial challenges of a sound and global electronic waste economy: while those who assemble electronics have control over the different materials that combine to make electronics, the work of dismantling is a process of discovery and exploration. Meanwhile, what lurks in the background is an uneven regionalization of the processes of electronics' design, production, consumption and regulated versus unregulated disposal. The complexity is compounded by the fact that Ghanaian electronic markets are destinations for different flows of new and second-hand goods: from Asia, Europe and North America which once they become waste present their specific challenges – for example, some products (such as Apple or Hewlett-Packard) are increasingly created to make unauthorized repair impossible, while low-cost mobile phones contain so much plastic that dismantling them only makes sense when scrap dealers get them in big quantities. In consequence, scrapyards become sites of experimentation to make collection, dismantling and recycling economically viable. The difficulty of achieving economic viability was revealed by the fact that the Oeko-Instiute study that preceded the setting up of the handover centre in Agbogbloshie and which had for its aim the calculation of the required development funds was almost as long as the trial itself.

A circular economy would demand that all the different material components of electronics be accounted for and fed back into production as much as possible. To do so efficiently requires mastery of different domains: estimating the difference between the material value of components versus their hazardousness, knowledge of dismantling techniques to – on the one hand – limit health and environmental

footprint and – on the other – ensure the greatest material recovery, and ability to negotiate with buyers of different components to obtain a price that would justify all the effort in the first place. Instead, what is currently happening in scrapyards as well as in the handover centre's accounting is a focus on metal prices as benchmarks for calculating the profitability of the recycling of different waste types. This shows that a complete circular economy of all component parts is difficult to achieve as it represents a technical, accounting and material flows challenge. There is a tendency to use the term 'circular economy' together with the commodity (as in 'circular economy of strategic metals' or 'circular economy of electronic waste') to focus on those materials that can transition from waste to resource, thus subtly pushing concerns about complete circularity into the background.

Immediately following Agbogbloshie's eviction, the GIZ has focused its work on empowering scrap dealers in Accra to improve their business practices overall, promoting business formalization with the aim of recasting scrap work as a space of obligations vis-à-vis recycling standards. As Agbogbloshie's scrap dealers were dispersed around Accra and its suburban areas, in 2022, the programme functioned through mobile trainings that met people in their new places of work. GIZ-trained teachers coordinated by one of the organization's local partners would stage demonstration events, showing how specific electronics are to be dismantled to diminish toxic exposure and increase the recovery rate.

The GIZ has also worked on reaching scrap dealers across the country, thus focusing on scrap as an economic sector beyond the specific place of Agbogbloshie. In July 2022, for example, they invited scrap dealer representatives from across the country for two days of training in Accra. The meeting was meant to instil GIZ's key messages about scrap dealers' obligations – for example, that scrap collectors should sell their collected goods to 'licensed dealers', that is dealers who have gone through business registration and environmental permitting. The scrap dealers were introduced to an electronic waste toolbox that the GIZ has been developing as a repository of required knowledge for 'responsible' actors in the sector. The toolbox included: *permitting*, that is, information on receiving permits from the Environmental Protection Agency; *partnership*, that is, how to build business partnerships with metal buying companies and other actors in the sector; *location*, that is, how to organise a scrapyard in an environmentally friendly way; and *material flows*, that is, how to calculate waste coming in and out. The scrap dealers were invited to discuss the toolbox, and their questions

raised familiar problems already forecast by the Oeko-Institute reports recounted earlier. For example, they asked, 'who will take the hazardous waste?' and 'where do we put it?', which elicited aspirational and future-oriented answers in response. In the meantime, however, the workers pressed: 'What do we say to the Environmental Protection Agency if they come and ask about hazardous waste [as they would if we want to go through the environmental permitting system advocated by the GIZ for all the actors in the scrap and e-waste sector]?'. The discussion concluded with a recommendation from the GIZ instructors to 'push the EPA to do something'. These back-and-forth exchanges show the difficulties of assuming responsibility for hazardous waste and bearing costs for its proper disposal or recycling. Each of the parties was right to some extent: the Ghanaian legislation on electronic waste advocated by the development agencies *gives power* to push exporters and importers to contribute their profits to public funds via levies that could be used to develop a hazardous waste handling centre, the EPA *is* the responsible agency to ensure the protection of the environment in the country, and the scrap dealers also *should* ensure environmental standards as circular economic schemes (and increasingly scrap dealers' associations themselves) recast their work as not only profit-driven but environmentally necessary. Yet, what is clear here are multiple problems of bringing that future about, including the temporal lapse between the future utilization of levies and the current pressing problem of hazardous waste. Towards the end of the meeting, the EPA representative present in the room told the scrap dealers' associations that it was incumbent upon them to obtain appropriate environmental permits in order to cause a chain reaction that will eventually lead to the establishment of hazardous waste disposal sites in the country.

The overarching theme of this meeting and other trainings was thus that scrap dealers should bear more responsibilities: for the proper handling of scrap, for the land on which they work and for pushing the government to invest in hazardous waste disposal. This was also a conclusion that some of the scrap dealers present in the room were reaching themselves given the eviction of Agbogbloshie, carried out without consideration for scrap dealers' possessions or livelihoods (Akese, Beisel and Chasant 2022) and mistreatment from international metal brokers over the years. The voices grew in favour of a stronger scrap dealers' association that takes responsibility for hazards but also demands in exchange a dignified treatment from the state and corporate actors that has been lacking so far. In 2021, following the eviction, some 830 scrap dealers of Agbogbloshie and elsewhere in Accra raised as

much as 1.6 million GHS[7] towards buying land to establish a scrapyard that would not be threatened with eviction and could constitute a generational wealth in the city. Following this, a newly established scrap dealers association (Gbewaa Scrap Dealers Association) bought a piece of land on behalf of those who partook in the effort. It remains to be seen whether the new initiative will yield intended outcomes, as so far the Association had to respond to land claim conflicts and struggled to convince scrap dealers to settle the new location, which is further from the city centre.

The transformation of the developmental project – from the rhetorical assumption of large-scale responsibility for the waste to the focus on the empowerment and responsibilization of scrap dealers – is reminiscent of other examples of development projects in the decades following structural adjustment characterized by an appeal to such qualities as community empowerment and perceived responsiveness of markets to change (Elyachar 2005; Mosse 2013). There are multiple reasons for such a narrowing of the project's ambitions when it comes to the scope of the circular intervention in the scrapyard. One among them is the sheer complexity of ensuring that the economy meets the goals of both sustainability and economic rationality. The other is the complexity of technology and its changing material composition.

Conclusion

The current circular economic models for electronic waste seek to forge an economy in which discards are funnelled back into production. The ability to channel one into the other is a context referred to by the term 'closing the loop'. Some technology companies have increased their capacity to close the loop by changing the role of customers from those who consume products to those who use a service. When I attended the World Resource Forum in 2019 in Geneva, a science-based platform for sharing knowledge about the economic, political, social and environmental implications of global resource use, the question of re-channelling waste into production was high on the agenda. There were numerous presentations about the problems

7. Ghanaian cedi (GHS) has been experiencing a fast decrease vis-à-vis dollar in recent months. At the time when the money was collected in 2021, it was the equivalent of around 260,000 USD.

of accessing household electronic waste in developed countries in particular. Meanwhile, current circular efforts in those countries have been specifically effective when it comes to complex machinery that can be used in limited settings such as medical or factory equipment. Consumer electronics are more recalcitrant to collection efforts. Presenters such as ETH-based researcher Antoinette van der Merwe reported that around 70 per cent of households in Switzerland keep their electronics at home even though they know they can take them to dedicated collection centres. It is in this context that the collection rates of electronic waste achieved by scrap dealers in emerging economies such as Ghana sounded impressive.

The fact that Asia, the Americas and Europe are primary markets for electronics explains the recent corporate interest in creating ways to compel customers to bring back their wastes through circular economic schemes. These include monetary incentives, discounts on new editions or the impossibility of repairing the products by unauthorised repairers. Such approaches are in tune with the vision of circular economies of electronics painted by the Ellen MacArthur Foundation and build on notions such as Walter Stahel's performance economy. Some of the most techno-optimist companies of the Global North such as Apple and Tesla are already championing shifts in product design that would eliminate unauthorized reassembly or repair. Their products are packed with propriety parts that cannot be used in other products or repaired without expert knowledge. The schemes also can have the power to push scrap dealers in Ghana and beyond into the ranks of 'invisible users' (Burrell 2012), a term originally coined by Jenna Burrell to describe the experience of marginality of youth who inhabited Accra's internet cafes as the computer software that they were making use of was not designed with them and their needs in mind. Their invisibility followed from their 'non-centrality' for those in power – technology designers.

The existence of second-hand consumers and their reliance on a repair and scrap sector to recuperate value from second-hand technologies is marginal to new designs or circular economic strategies, or falls outside such schemes outright. The second-hand consumers are effectively 'invisible' to producers and many take-back and re-channelling schemes.

The German incentive-based approach in Ghana is a recent addition to the reservoir of options already explored by similar developmental aid organisations, such as the formalization of informal labourers

(Reddy 2016), technology transfer of specific recycling technologies such as wire strippers (Akese and Little 2018) and encouragement of legal frameworks to impose standards. These earlier instantiations were recognized as offering limited opportunities for workers by critics.. The handover centre still focused on establishing a circular economy around waste materials that can be transitioned into a resource comparatively easily. As for other wastes, the implementation is pending, thus showing the enormity of the task of creating a circular economy where diversity of waste and environmental costs are taken into account.

The length of time, the amount of money and research expertise that went into realizing a project for take-back of one waste type – cables – shows the weight of the challenge. The project revealed some of the levers of what a global sustainable circular economy of electronics would require: a continuous analysis of waste types to understand their changing compositions and appropriate ways of handling, an ability to train an informal labour force around the world about the suitable depth of dismantling and segregation to ensure both material recovery and preservation of health and environments, availability of safe disposal of hazardous waste, and the accounting tools for calculating financial gain vis-à-vis sustainability costs that are suitable for a workforce running on small profit margins. The enormity of the task shows why the critique of these schemes is enduring and repeats familiar tropes between publications. It also adds a further fuel to the long raised arguments about the responsibility of producers, in this case the responsibility of producers to consider second-hand consumers and the repair and scrap sector that services them – be it through design that is repairable or redistribution of profits.

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Chapter 2

MAKING E-WASTE CIRCULAR

Countering vicious circles and materializing honesty

Julia Perczel

It was the day of Manish's monthly visit to the head office of Sahih Kaam.[1] On other days, Manish divided his time between the company's warehouse and doing the rounds at an informal e-waste market located in the north-eastern periphery of Delhi. His employer, Sahih Kaam, is a producer responsibility organization (PRO), which means it buys e-waste from the informal market to channel it into authorized recycling plants. It thus provides extended producer responsibility (EPR) services on behalf of electronics producers and importers who are mandated by law to make sure that their goods do not end up as waste in the informal sector, long seen in India as a polluter. EPR is the policy tool that was first introduced in India in 2011 to force producers to take responsibility for the future e-waste resulting from their current sales. The updated E-waste (Management) Rules of 2016 define producer responsibility in terms of collection targets, that is, quantities of e-waste to be collected based on previous years' sales and planned obsolescence rates. The rules also allow producers to contract PROs to fulfil the legally mandated targets on their behalf. The rules are widely interpreted as the key to establishing better waste management, which in turn is seen as crucial for the transition to the circular economy (Toxics Link 2019;

1. Through 2019, I did fieldwork with a Delhi-based for-profit company that I call Sahih Kaam. The pseudonym means 'right work' or 'good work' in Hindi, indicating my commitment to recognize the company's values detailed in this chapter. To ensure the company's anonymity, I use pseudonyms to refer to it and its competitors (Global Recycling Solutions), clients (Big Electronics) and partners in the informal sector (Kabadabad market).

Chaturvedi, Gaurav and Gupta 2019). In this sense, in terms of e-waste in India, the circular economy means 'closing material loops' by creating systems for channelling waste back into production through recycling.

The PROs in India confront the absence of formal e-waste collection systems. As a result, they need to develop relationships with informal waste collectors and markets rather than formal municipal infrastructures, as is the case for similar ventures in Europe. To fulfil targets, Sahih Kaam bought e-waste from the informal sector and maintained warehouses in every state in India. Manish was the PRO's representative for managing the exchange with *kabadiwallas* (scrap dealers) in the e-waste market referred to here as the Kabadabad market.[2] On his monthly visits to the head office, Manish carried the documents certifying the exchanges between the company and the market traders. The company treated the paper trail as a form of 'formalisation of e-waste recycling'. The documents testified to Sahih Kaam's efforts to re-channel e-waste from the informal to the formal sectors. Besides fulfilling the legally determined EPR, Sahih Kaam's documentation of e-waste recycling was hoped to 'disrupt the status quo' and 'close material loops' in pursuit of establishing a circular economy of e-waste in India. As my ethnography shows, Sahih Kaam's business model and some of the issues encountered along the way are indicative of what it means to enact a transparent and standardized circular economy on the ground. This ethnographic account is an important addition to the critique that focuses on the limitations of the circular economy with regard to material and technological solutions without considering the multiple political and social challenges of transitioning to such an economy (Chaturvedi, Gaurav and Gupta 2019). This chapter shows how one practitioner in the formal e-waste sector struggled to ensure that its work met the commitment to the environment in a multistakeholder

2. I anonymize the market's name because of the traders' fear that media or academic reports about their activities will lead to 'sealing drives'. Such drives are often the result of court-based environmental advocacy and target those carrying out polluting activities in areas designated as residential by Delhi's zoning laws (Baviskar 2020). The police regularly crack down on scrap shops in such areas and extract fines. If the owners lacked funds or the order came from the Supreme Court, the police seals the shop and its wares, pushing the scrap dealers to find new locations for their work. 'Sealing drives' is a common euphemism for such a form of police harassment.

sector that has long been organized around the pursuit of profit and cost-cutting.

During his monthly visits to the headquarters, Manish reported the news of the goings in the Kabadabad market. On the day in question, he gave an account that elicited outraged grunts from the company employees. He told others: 'Global Recycling Solutions (GRS) [Sahih Kaam's most important competitor] loads a car with rubbish, they place a couple of LCD screens and TVs at the back, take a photo, make it go around the market and then come back to the same warehouse to unload.' The audience found the story shocking, because electronic items only count towards EPR if they contain all parts with the exception of batteries. Manish was claiming that the staged photos would likely serve as proof of evidence (PoE) of having channelled e-waste to an authorized recycling plant. The truck meanwhile circled around the market before ending up in the warehouse again. To Manish and his colleagues, it was yet another suggestion of the widespread 'cheating' in the sector. The competitors, while compliant with the law, did not live up to the law's environmental ethics as they failed to match collection targets with actual waste flows reaching registered recyclers that producer companies otherwise paid to guarantee. In comparison, when Sahih Kaam picked up a load in the Kabadabad market and took pictures as the PoE, they made sure to follow up with pictures of the same load at their own warehouse and eventually at the registered and vetted recycling plant.

The employees at the head office listened to Manish's story in horror as well with some self-satisfaction because the supposed practice was a confirmation of the widely held belief that the law was not improving recycling practices in India. The common suspicion was that only very little recycling went on in the formal sector. The authorized recyclers were believed to leave their machines idle, preferring to resell the goods back to the informal sector like the Kabadabad market. The story highlighted the fragility of the system based on pictures and other documentation to prove compliance with the law. Meanwhile, Sahih Kaam painstakingly developed its own documentation to comply with the law. Unlike what the company suspected about its competitors, its own documentation strived to reflect the actual material flows which meant that the company's operational costs were higher than those of the competition, which was, in turn, reflected in the higher price that the company demanded from its clients. Since the competitors such as GRS did not actually buy e-waste or pay for its transportation, processing labour, storage and internal auditing, their operational costs were kept to a minimum. As a result, GRS was able to provide EPR compliance services at a fraction of Sahih Kaam's price. In this context, Sahih Kaam prided itself on being the sole company in

India that operated actual channels between the informal collectors and the few authorized recyclers that did the recycling work and as such held onto environmental ethics beyond rhetoric. Manish's story provided a counterpoint to Sahih Kaam's definition of what it meant to be 'doing the right kind of work' – that is, instituting the circular economy in the pursuit of environmental responsibility.

As the concept of the circular economy increasingly gains ground, it is important to examine what it entails in practice. This chapter provides an account of the specific struggles to implement the circular economy in India in the absence of rigorous legal enforcement, amid rudimentary infrastructural arrangements and persistent socio-economic inequalities. The chapter explores the contradictions of the need for documentation to implement the circular economy and the documentation's potential to undermine that same effort. The challenge of closing material loops lies in establishing transparent and auditable secondary resource recovery channels, which at the same time enable 'paper trading' – meaning trading in documentary evidence without having to trade in the actual e-waste material. I explore the challenge posed by unregulated material loops that represent an already existing circularity. I show that what the circular economy confronts is not only the linear economy of 'take-make-waste' but rather a vast world of extant but often hazardous processes of dismantling, recycling and resource recovery. The Indian context shows that circularity in itself is not an environmentally responsible practice, rather its implementation requires circular economy actors to be committed to environmental values and transparent material flows.

Transparency, audits and circular economy in India

Manish's visit to the headquarters took place amid an office crisis. That day, the compliance team of Big Electronics (BE), a major global electronics producer and a client of Sahih Kaam, had just announced their intention to visit the Delhi warehouse and the informal market. Sahih Kaam's environmental ethics – their need to prove that they did actual work, paid for labour, transportation and storage – rested on opening themselves up to such audits. The BE team was considered to be the most demanding of all the company's clients, and their intention to visit occasioned a frantic search for a person who could show them around. Sahih Kaam had recently lost trusted colleagues, who moved on to other jobs. They would have known how to handle such demanding

visitors. Meanwhile, the newly hired employees had not yet even been to the Kabadabad market, let alone had any experience guiding clients around.

When Anjali, the head of communications, heard the makeup of the visiting team, she spun around on her heels, looked over her team and settled her eyes on me. 'You'll have to handle them!', she said, pointing in my direction: 'the person who is coming is crazy'. 'They are also working with our competitor GRS they cannot be made a fool of.' It was in the face of this anxiety and the threat of the competition that Manish recounted the faked load. Manish's story reiterated the company's common reproach that no one else in the market 'did any work'. I asked Anjali why BE would work with GRS if everyone knew that they were 'not doing a good job', a phrase that signified the various circumventions of laws and environmental responsibility. She answered, 'The BE producer team want to be taken for a fool by them.'

Her response illuminated the multiple standards that operated in EPR compliance. There was one standard for GRS, which did not claim to do anything other than provide compliance on paper at a base rate, and one for Sahih Kaam, which promised to deliver better services at a higher price. The risk was not so much being found out for 'not doing a good job' but failing to meet the environmental standards that the company set for itself above the legal requirements. The self-imposed environmental ethics were in stark contrast to the absence of government-enforced standards, which permitted other companies to 'leak' waste to the informal sector and commit other malpractices, of which Manish's story was one example.

The concern with monitoring, transparency and auditable channels in e-waste recycling dates to the early 2000s, when e-waste emerged as an issue in environmental campaigns for the first time. This was spurred by influential reports written by the US-based Basel Action Network (BAN) and other regional advocacy groups including Delhi-based Toxics Link. The reports focused on illegal transboundary shipments of e-waste from OECD to non-OECD countries (BAN 2002; Toxics Link 2003). They criticized governments and electronics producers in OECD countries for not processing consumer discards in the countries of discarding allowing them to be shipped instead to low-income countries with lax labour and environmental laws (Pellow 2006). International activism in the wake of the damning evidence focused on tightening the borders in the Global North to prevent such exports. Meanwhile, e-waste hotspots in countries like China and India became infamous for toxic sites characterized by burning plastics, acid baths and lack of labour protection.

Yet, the control of e-waste flows did not prove practicable. There has been a shift in global e-waste flows that no longer easily map onto the Global North–South divide and corresponding environmental injustices (Lepawsky 2018; Lepawsky and Billah 2011). Consumption rates have grown the world over, making local e-waste generation a concern. Correspondingly, more recent reports have been framing the problem less in terms of transboundary shipments and more in terms of e-waste quantities that remain undocumented and end up in the informal sector (Baldé et al. 2017; Forti et al. 2020). Recent official estimates in 2019 claimed that out of 44.3 MT of global e-waste produced that year, 84 per cent remained unaccounted for (Forti et al. 2020). India's estimated e-waste production remains below the global average per capita generation, yet in sheer numbers it is the world's third- or fourth-largest producer of waste (depending on the year), with 90 per cent of the waste being unaccounted for (Forti et al. 2020).

In India, a civil society coalition headed by Toxics Link has been particularly influential in campaigning with the government for a legal framework to regulate who has the right to recycle e-waste and under what conditions. This campaign resulted in the 2011 Rules mentioned in the beginning of the chapter and then their updated version in 2016. The fact that much of the world's discards are not documented as discarded has been understood both on local and global levels as evidence of illegal dumping and informal sector activities. Yet, as Manish's story shows, even documented e-waste might not be recycled in an environmentally responsible manner.

Environmental advocacy groups and international organizations see the failures of India's e-waste laws as the result of the informal sector's persistence. The sector is often mentioned in relation to a lack of concern for workers' safety and open burning of plastics to recover metals, leading to the release of toxicants into the environment. The concern is that the informal sector, by not investing in worker safety and pollution mitigation, can keep its costs well under the formal sector recycling rates. Yet, Sahih Kaam's work vis-à-vis that of its competition shows that in the context of lacking oversight, the implementation of environmentally responsible e-waste recycling is undermined by fabricated documentary compliance without corresponding material flows. The failure of the documentation to impact circular change is emphasized further when one considers the extensive reuse and repair practices in the informal sector, which lead to the actual recovery of secondary resources but without the required documentation (Gidwani and Corwin 2017; Corwin 2018). The informal sector's secondary resource recovery lacks transparency and auditability

but can create veritable material flows, while the formal sector malpractices like the one recounted in the opening of this chapter produce documentation but without a corresponding material recovery. The economy is already circular in many ways. However, what the legislation seeks to impose is the distinction between 'right' and 'wrong' circular flows.

An already circular e-waste in India

E-waste legislation and the vicious cycle

In 2019, Toxics Link, after two decades of environmental advocacy and campaigning, published a report examining the effects of the 2016 E-waste Rules which they helped draft. The new report argues that the situation on the ground looked much the same as in 2003, when their first report was published. The report states that 'post E-waste (Management) Rules 2016, it was expected that e-waste flowing towards informal markets would reduce and the clean channel or the formal ecosystem will take over' (Toxics Link 2019: 23). The report recognizes the informal sector's continuing importance to the circular economy by keeping 'tonnes of toxic waste out of landfill' and providing 'livelihood to millions of people' yet emphasizes its dire environmental impact (Toxics Link 2019).

The report also offers a curious turn of phrase which illuminates the particular difficulty of transforming an economy characterized by multiple circular material flows organized by different actors and set according to different standards. The report features a flow chart showing how e-waste 'moves from the formal sector to the informal trading and processing units' and how 'the recovered materials and repaired/dismantled functional parts are sold to the formal market again' (Toxics Link 2019: 24). The caption identifies this as 'a vicious cycle', preventing effective waste treatment (Toxics Link 2019: 24). This perhaps little-considered remark spoke to what I found significant during my ethnographic research, namely that Sahih Kaam's issues were not so much due to the linearity of the take-make-waste model as due to the fact that the economy was already circular in ways that made their interpretation of the circular economy difficult to put into action.

The flow chart starts with the easily definable and legally regulated actors listed under 'source' such as producers, bulk consumers, consumers and waste importers. These are all actors that generate e-waste. The complication begins under the label 'trading', which lists

actors that buy e-waste from the 'source'. The actors listed here are not only the formal dealers as required by law but also 'scrap dealers,' 'kabadi shops' (scrap shops) and 'kabariwallas' (scrap dealers). Based on the caption one would think that as waste is transferred to various waste traders, it moves out of the formal sector and thus out of the reach of government regulations. The Hindi vernacular terms 'kabadi shops' and 'kabadiwallas' imply informality, and yet such outfits are often registered with the Central Pollution Control Board (CPCB). Nonetheless, their activities would be termed informal based on an aesthetic judgement consolidated in advocacy and media representations of e-waste as an environmental problem (Pathak 2020). The chart demonstrates the impossibility of telling formal and informal apart, making this conceptual duality of dubious utility (Taskar 2021). While the notion of formality implies certainty, among e-waste dealers and dismantlers there is a high degree of fluidity when it comes to registration and the exact mode of operation (Gandolfo 2013). As Manish's allegations against GRS show, even actors considered formal, with international links and reputations, could potentially come under scrutiny for their informal practices, undermining the rationale of the conceptual duality (Ojani 2022). Yet, despite such conceptual problems, the informal-versus-formal divide continues to be useful for Sahih Kaam and other formal actors in the e-waste ecosystem, not least because it allows them to win contracts with electronics' producers.

Sahih Kaam's value chain

When Sahih Kaam started its operations in 2017, they were a new type of a company, a PRO, but with an existing competition. The e-waste sector was densely populated by scrap dealers, refurbishers, dismantlers, recycling units, and local and international advocacy groups. The possibility for the company's operations was provided by the space opened up in the wake of Toxics Link and other actors lobbying of the government to intervene in the field of relations already existing in the market. Sahih Kaam's operations connect two worlds that are seen as separate: the formal sector of companies and the informal one of the scrap dealers and refurbishers. The PRO was expected to manage the risks associated with informality: toxic effluents, undocumented loads, untraceable recovery.

When I asked about circular economy, the employees of Sahih Kaam, many of them graduates of European environmental studies

programmes, would reference the Ellen MacArthur Foundation's definition. The Foundation's website in 2019 had a roll-down multimedia info-sheet full of videos explaining 'the take-make-waste model' of the linear economy. They talked about the contrast between this unethical way of using resources and the circular economy, which intends to harness the endless possibilities for growth provided by infinite regeneration of resources undergirded by the three principles of 'designing out waste and pollution', 'keeping products and materials in use' and 'regenerating natural systems' (Ellen MacArthur Foundation, n.d.).

Sahih Kaam, as one of the first PROs to be registered with the Central Pollution Control Board (CPCB), was seen in the eyes of its employees as a crucial building block in creating a financially viable circular economy. The key to environmental compliance was in establishing a 'compliance bureaucracy' to borrow Sarah Babb's term (2020). Such bureaucracy means that non-state actors are tasked with 'interpret[ing], apply[ing] and oversee[ing] adherence to government rules' (Babb 2020).[3] As part of that pursuit, the company built a business model in which they would buy up waste from *kabadiwallas*, who, kitted out with bank accounts and GST (Goods and Services Tax) registration, were recast as 'aggregators'. The bank transactions recording payments of GST then were proof of regularization and the photographic evidence (PoE) of electronic waste loads became a proof of channelling e-waste away from the informal sector. If the law's original intention was to prevent e-waste from flowing to the informal sector, Sahih Kaam's business model can be seen as a creative interpretation of that law which gained acceptance from the government. In contrast, environmental advocacy group Toxics Link could initially see the company's approach as a failure of the rules, since the company accepted the role of the informal sector as an aggregator. At the same time, however, Toxics Link, together with other actors in the e-waste sector, has been insisting on the need to include the informal sector in the implementation of the rules and to avoid criminalizing it (Chaturvedi, Gaurav and Gupta 2019). Thus, Sahih Kaam understood the flow of waste to have been formalized

3. Also similar to the workings of corporate social responsibility (CSR), which has an extensive anthropological literature (Dolan and Rajak 2016; Cross 2016). India has a separate set of rules that mandate the return of a particular section of profits for CSR, which cannot be used to fund EPR.

when it started in the informal waste market and ended in regularized, vetted and audited recycling units.

The effectiveness of such an interpretation of the rules has been marred by the lack of rigorous oversight of recycling operations, which Sahih Kaam employees interpreted as a result of complicity between government officials and recyclers. The government meanwhile seemed interested in enforcing some parts of the e-waste rules, which were ineffective in terms of establishing the circular economy but required extra work for Sahih Kaam employees. For example, the government at one point stopped the electronics import of the PRO's most important producer clients, causing a loss of significant revenues. This was because official audits found that several e-bins run by the producer were not well-maintained. The obligations of maintaining collection points were part of the producer responsibility defined by the e-waste rules, yet, in fact, contributed next to nothing to overall collection rates, which were still mostly due to the activities of the so-called informal sector.

Sahih Kaam also organizes awareness sessions, designed to spread knowledge about the dangers of inappropriate recycling in the hope of sensitizing the consumers of electronics to proper disposal. These awareness sessions are also conducted in the hope of increasing, direct collection rates from consumers and offices, thus intercepting them before they reach scrap dealers, and repair and refurbishing circuits. However, awareness programmes only led to piecemeal, heterogeneous collection rates that contributed little to the collection targets set by the law. Due to small quantities in individual households and the mixed electronics discards originating in bulk consumer offices, the loop cannot be closed and 'leakage' to the informal sector continues unabated. Given the high cost of logistics, the informal sector is more successful at producing the desired quantities of sorted e-waste, which can be converted into legally defined categories required for EPR compliance. The informal sector remains an important force in the economy not because people prefer to pollute but because it provides all sorts of services – including door-to-door collection and a skilful sorting of e-waste – at lower costs that other actors struggle to compete with.

Kagaz ka kaam – *Circulating documents*

GRS's practice of loading and unloading a truck for a photo-op was not a one-off incident. It was confirmed by Sahih Kaam's trusted aggregators

in the market: 'We had been approached before to do *kaagaz ka kaam* [work of paper or paper trading].' While the temptation was great, since selling on paper would have meant being able to sell the waste twice, some of the informal aggregators educated by Sahih Kaam said that they recognized the dubious ethics of the deal and refused to enter such arrangements.

The employees of Sahih Kaam particularly begrudged the legally compliant but unethical practices of 'not doing proper work' as competitors could offer lower prices in the absence of labour or transportation costs. Since the unique selling point of Sahih Kaam was to stop such dubious dealing in the sector, all parts of work life in the company were peppered with second-guessing the integrity of other companies. The company would regularly audit the government-authorized recycling plants to which it sold the goods. The employees would occasionally return dejected, recounting how the tables with suction machines to dissemble CRT monitors looked entirely unused and untarnished by lead dust which would have been perceptible if recycling was taking place. Everything looked too clean to signify that some of the plants were doing the recycling that they were contracted to do.

On my first 'field visit' to one of the company's warehouses with an office employee, we saw a scrap dealer being grilled by Manish and Kartik. The pair oversaw the sourcing, unloading, quality checking, re-bagging and loading of waste from Sahih Kaam's central warehouse to the recycling companies. Daanish, the aggregator under scrutiny, had delivered a truckload of waste in the same bags that Sahih Kaam had sold it to a recycling plant earlier. The bags were identifiable by a barcode. This effectively proved that at least one of the recycling plants to which Sahih Kaam was selling was reselling the goods back to the informal sector. This was happening despite the fact that the recycling plant had been frequently audited by the company. Since Sahih Kaam struggled to extend power and control over the recycling company, what it could do instead was blacklist Daanish, the scrap dealer.

Such practices created a highly charged atmosphere of mistrust. The Central Pollution Control Board (CPCB) publishes a list of EPR-compliant electronics producers, the amounts they pledge to EPR compliance and the recycling plants that they work with. Rumours abounded that the recycling plant which held the highest number of recycling contracts was in cahoots with the CPCB chief. The chief and the recycling plant owner, the rumour went, happened to live across the street from each other in the same neighbourhood. In another

anecdote, another well-known recycler secured contracts from producers by theatrically placing a knife on the negotiating table. Whatever the truth of these claims, evidence pointed to considerable dividends from running recycling plants, as owners were seen changing their cars regularly, progressing up the ladder of consumer brand hierarchy – from Royal Enfield motorbikes through Mini Cooper to Mercedes.

Despite their bad reputation, recycling plants continue to be awarded contracts and gain business, as they are an essential part of the government-sanctioned e-waste recycling value chain. Sahih Kaam's aim to fill a role in the 'compliance bureaucracy' and build its infrastructure through the creation of documented, transparent and accountable channels in a field of previously unregulated practices in e-waste recycling was undermined by other formal actors. Leading to what was termed as a lack of 'level playing field' in the industry, companies would provide paper accounting and documentation for waste to prove it had been sold through official channels. Yet, having provided the documentary requirements, the recycling companies would then leak material back to unofficial downstream vendors who continued to practice substandard dismantling practices that had brought international attention to unregulated e-waste recycling in India in the first place. Worse still, the notion that the material might be circulating in a closed loop between recyclers and informal workers via Sahih Kaam was more than just a possibility. The e-waste recycling economy was already circular, but in all the 'wrong' ways in terms of Sahih Kaam's ethical commitments to proper recycling.

Material arrangements of honesty

Operating in the swampy terrain of a well-established informal sector and the highly dubious 'paper trading' going on in the formal sector, Sahih Kaam's employees felt compelled to create a trustworthy brand. Besides 'doing things right' and 'working honestly', they also tried to effect a change at a sectoral level by developing practices that prove the material correspondence between paperwork and e-waste flows. Sahih Kaam implemented their own processes, most of which were not required by law, but that they hoped would be adopted by the government as industry standards. I argue that these represent material arrangements of honesty because they are meant to not only signal honesty but also

effect a change in the material world through establishing elements of the circular economy and countervailing widespread malpractices.

Material arrangements of honesty can be understood as similar to the work that goes into resource extraction establishing 'resource materialities' (Richardson and Weszkalnys 2014; Onneweer 2014). Richardson and Weszkalnys (2014) argue that resources come into being through 'an entanglement of processes and practices of abstraction, homogenisation, and standardisation aimed at inscribing the boundaries between nature and culture' (21). Making e-waste circular is an attempt to produce secondary resources that would replace the demand for virgin resources.

To bracket off toxic substances and standardize quality, the materiality of secondary resources would require intense documentation. As Gregson, Watkins and Calestani (2013) write about the economisation and marketisation of recycling, secondary materials become commodities by the affixing of the adjective 'recycled' as their defining characteristic. The authors demonstrate how this works through the example of recycled paper products, which link to 'the conduct of an ethical self, while positioning the product in a wider network of products whose materiality is expressive of a duty of wider (planetary) care' (Gregson, Watkins and Calestani 2013: 8). They also add that 'for markets in secondary materials to expand and deepen, requires the widespread substitution of secondary materials for virgin materials in a range of manufacturing processes' (Gregson, Watkins and Calestani 2013: 8). Such substitution requires the recognition of the recycling process, its documentation as well as the bracketing of the risks associated with secondary materials (e.g. low quality and toxicity). Given e-waste's complicated materiality, the contrasting coexistence of the logic of hazard and the logic of resource (Kama 2015), extraction requires reframing these opposing values to conceive of the conditions for the replacement of virgin materials with secondary resources (Kockelman 2016). Rather than re-inscribing the boundaries of nature and culture, as in the case of virgin resource extraction, 'processes and practices of abstraction, homogenisation, and standardisation', (Richardson and Weszkalnys 2014) are aimed at bracketing out toxicity, while reframing 'value regimes' (Gille 2007) to enable the recovery of secondary resources.

In contrast to most recycling units and other PROs which kept their doors shut to external visitors, Sahih Kaam opened up their value chain to outsiders to prove the honesty of their arrangements. Many high-profile partners of the company took advantage of the invitation

to survey the company's premises. From employees of development organizations to electronics producer teams, everyone wanted to see the warehouse where the magic of formalization happened. After visiting the warehouse, visitors were ferried across the rugged terrain of periurban Delhi to meet trusted scrap dealers to demonstrate long-standing relations and prove the origin of scrap. Such visits were high stakes. The volumes of waste in the warehouse demonstrated the honesty of Sahih Kaam, while meetings with scrap dealers in the market provided the opportunity to demonstrate the impact of regulation. The messiness of the place and piles of municipal solid waste on the street contributed to the perception of the e-waste market's toxicity and provided a great contrast to Sahih Kaam's well-organized warehouse. The visitors left with the conviction of the importance of a continued patronage.

After BE's visit on the fateful day, Amit, a veteran Sahih Kaam employee who ended up leading the producer team around, recounted the visiting team's reaction to an informal business which sold keyboards in bulk to Sahih Kaam. 'Producer team was very smart', he wrote in a text message to me. They started questioning why Shaheed, one of the oldest Sahih Kaam aggregators, continued to break CD-ROM players manually, which was an illegal practice for a registered e-waste dealer in India, with only formal dismantlers legally allowed to break e-waste. The breaking of electronics in the shop called into question Shaheed's position as a regularized scrap dealer and offered a possible point of probing for the shrewd producer team. Amit was equal to the task, responding that the producer team insisted on seeing an 'informal dismantler,' so he was showing them one. To the question of Sahih Kaam's impact on his life, Shaheed said he used to dismantle everything, but now he sold some of his goods intact saving himself many hours of labour. Amit insisted their long-term goal was to make scrap dealers like Shaheed sell only to the company, but the market could not be transformed overnight and the complete shift would take years. The producer team, in Amit's words, 'was very impressed *ki main sab kuch dikha raha hum* [that I am showing them everything].' Thus, the combination of showing visitors around the warehouse, demonstrating the formalization process as well as some illegitimate practices with the right explanation cemented Sahih Kaam's reputation as an honest PRO.

The encounter in Shaheed's warehouse also highlights a significant contradiction at the heart of the circular economy concept. Shaheed broke CD-ROM players for a living, while selling keyboards to Sahih

Kaam on the side – occupying an ambiguous position in terms of the informal and formal dichotomy – which fulfilled a key role in the establishment of the circular economy. Shaheed sourced the CD-ROM players from the trucks of itinerant e-waste sellers, while his brother Samir squatted on the floor spending his days hammering away at unending streams of CD-ROM players over a heavy thirty-centimetre diameter cast iron nut. They separated plastic from steel, copper from reader lens and motors. The little motors were picked up, I was told, most often around religious holidays, particularly Diwali, because they would be remade into cheap plastic toys. Traders picked up the plastic and steel to resell them as material for plastic pellets or steel. On the one hand, such trading may represent a strong, bottom-up example of a circular economy in which waste sites were connecting to production. On the other hand, the copper-containing reader lenses and printed circuit boards were sold to those parts of the informal e-waste recovery that became infamous in environmental reports. While Shaheed's work does not directly release significant amounts of harmful materials, Shaheed fed materials to undocumented resource recovery loops which may do so.

Anas Malik, a sixteen-year-old scrap dealer, reclaimed transformers from flat-screen TVs and used to resell them to a middleman. One day Anas followed the middleman all the way to West Delhi, and since then he has been selling directly to the flat-screen TV manufacturer. As the transformers are directly repurposable, such practices represent industrial-level closure of loops without additional energy inputs. There is also little toxicity released during the dismantling process. Yet there is no conscious adherence to the circular economy principles nor any documentation of it by Anas. While some of Sahih Kaam's employees marvelled at the ingenuity of the scrap dealer and other examples of such a proto-circular economy, these practices were not condoned in the company's operations. The law regulates refurbishers, and thus specifies the conditions of resale and repair, but Anas's process was squarely outside the government recognition. This highlights how the implementation of a circular economy might struggle to recognize such practices when they grow organically without the paperwork performed by organisations like Sahih Kaam.

There is also a contradiction between a widespread secondary resource recovery, a requirement of the circular economy, and the bottom-up reuse trade in old parts that are used to produce new commodities. Whereas the former may produce documentation but no responsibly recovered secondary resources, the latter produces

secondary resources on a large scale without documentation. Meanwhile, to allow for secondary resources to be marketed as 'recycled' commodities and for widespread replacement of virgin material – to limit environmental harm and control resource recovery – documentation may be essential.

Sahih Kaam's employees also complained about buying 'cannibalized' items. For example, laptops and mobile phones would always come without batteries. The real trouble was when central processing units (CPUs), which is what we understand in common parlance as the body of PCs, came as empty steel chassis, whereas laptops came without motherboards and smart and feature phones without printed circuit boards (PCBs). This significantly reduced the value of the waste aggregated. The parts removed were not only the most valuable parts of such items but also the most hazardous ones. The company thus often received items that on the outside looked like electronics but their valuable insides were gone. Recycling plants then would often refuse such items for their low value – often terming them *kacchra* (rubbish). This gave rise to the practice, whereby some aggregators, instead of breaking the waste into parts, would reassemble already separated items. They would buy hard disks, motherboards and power supply units to make CPUs that are EPR-compliant and attractive to the recycler. If not flattened in the process of dismantling, the recycler could resell the metal chassis to scrap dealers again without scruples. The aggregators would then rebuild it into EPR-compliant e-waste again – more evidence that Sahih Kaam could just be perpetuating another pre-existing loop. To respond to the problem, the PRO started asking for pictures as proof of destruction of flattened CPU steel casings to avoid their continued circulation.

The requirement for proofs of flattened chassis is just one example of Sahih Kaam's material arrangements, which they required for working honestly. The whole process looked something like this: whenever Sahih Kaam wanted a category of products in which the legally defined targets needed to be filled (e.g. laptops, keyboards and CPUs), Manish would get on his scooter and do a round at the market and talk to the informal aggregators. The aggregators could then start making arrangements to source the required items. The loading and unloading of goods (*maal*) required intense documentation, some of which was required by the state and some by the producers. Documentation included billing from aggregators, *dharam kantha* or weighing bridge slips, an e-way bill proving the

payment of GST[4] (goods and services tax) and what was known as 'Form 6' containing e-waste transportation details . Sahih Kaam developed a mobile phone application to upload digital copies of all documentation. Pictures of the lorry being loaded at the aggregator's premises and the same lorry being unloaded at the warehouse had to be uploaded with photo scans of the paper trail.

In addition to the intense documentation and paper trail required by the government, Sahih Kaam also installed a barcoding system in its twenty-seven warehouses across the country, which proved to be a multifaceted improvement. On a practical level, it meant the printing of barcodes at the time of re-bagging and quality checking when the material arrived in the warehouse. The scannable barcode revealed details of each consignment the particular bag belonged to, including invoice numbers, seller's name and the type and weight of the items inside. I was presented this practice as a method to counteract leakage from the recycling plant to the company.

On closer inspection, however, barcoding formed part of what was called the 'automatization' of the warehouse, linking the 'inward' with the 'outward'. Barcodes attached to bags and CPU casings allowed for better tracing between acquisition from aggregators and sale to recyclers. It became easier to keep track of stock within company processes and make it visible to producers through the app. When the barcode was scanned, the information about the consignment's status was uploaded to the app, where producers could check the status of goods assigned to them. This included logging the consignments sent off to recyclers which contributed to fulfilling their targets. Since recyclers do not link up to the system – they do not use the same barcodes – traceability ended with delivery to the recyclers. The hope in Sahih Kaam's logistics department was, however, that the CPCB could be pushed to adopt barcoding and, through this, the tracing of materials as a legal requirement.

One of the most important nodes in the effort to close the loop and create the perfect circle in the eyes of e-waste industry practitioners, including Sahih Kaam management, are the recycling

4. A recently introduced and much discussed tax that unifies taxation of goods and services in the separate states of India. Toxics Link's representatives highlight the fact that even informal scrap traders need to show these bills while transporting scrap across state borders, an added reason to question the concept of informality.

units. In the struggle against their secretive operations, another one of Sahih Kaam's ideas for material arrangements of honesty was to encourage one of their aggregators to set up a dismantling plant that provides 24/7 CCTV footage. The young businessman-turned-lawyer originally from a kabadiwalla family who operates the dismantling plant offered his thoughts on the ethics of the e-waste business:

> You know what happened, from the laptops that came recently, 3-4 labourers found a few laptops that still work and got adapters from the market and started using them. The other workers who didn't get a share came and told me, 'either give us some laptops, or take it away from them too, 'cause it is not fair.' I took their laptops and made them break them in front of me. If you look at this from an environmental perspective, it is not good practice, [he said at my prompting] but this is honest recycling, meaning honouring the terms of agreement. If the producers pay for the destruction of items, then I can't have workers keep phones and laptops even if they are in working condition.

Although in recent communications the plant owner reflected that he may have been wrong in forcing his workers to destroy working order computers, this story highlights a key contradiction in the EPR rules. The enforcement of rules interpreted as honesty may lead to increased transparency and accountability which in turn may contribute to the establishment of the circular economy, but it does not necessarily mean environmentally sound practice. While involving big business and making producers responsible for their products' obsolescence is a welcome change from putting the sole responsibility for recycling on consumers, it requires constant translation of policies to the language of gain for the companies and operational transparency. Producers are keen to make sure that the terms of recycling include the destruction of even working order items, since that reduces the amount of obsolete items that defy planned obsolescence, making space for new items on the shelves (Giles 2021). Ensuring product destruction then is part of the terms of engagement with which producers hand over the fulfilment of their legally mandated responsibility towards the afterlife of their products.

Wholesale scrapping of electronics, regardless of their condition, is not as widespread a practice as it is in Europe. Many recycling plants have sister companies that refurbish electronics, which is not against the law (Corwin 2020). Not surprisingly, however, it is the PRO's

agreements with the producer companies that require all equipment to be shredded, irrespective of whether it is in working order or not.

In effect, by material arrangements of honesty, I mean the socio-technical relations and understandings of order which ideally work together to provide a proof of transparency, accountability and, by extension, honesty. Through such arrangements, Sahih Kaam goes beyond the legal requirements of fulfilling targets in large numbers and battles e-waste's socio-material tendency to leak. All this also reminds us that although the rules are there to define and regulate the flow of e-waste, their enactment requires constant material arrangements to make the virtuous circle distinguishable from the vicious ones.

Conclusion

After I had left the field, BE stopped working with Sahih Kaam, indicating both that the sense of crisis on that day in the office was real and that they did not find it justified to pay more for services that they could get for less. At the same time, GRS stopped their photo ops antics and started really buying up waste from aggregators that I had worked closely with, showing that Sahih Kaam's material arrangements had indeed put pressure to introduce industry standards into the ecosystem. At the same time, instead of making Shaheed into a fully regularised e-waste dealer, the PRO blacklisted him for not providing quality waste.

In this chapter, I have explored the processes through which the circular economy, and its implied potential for decoupling production from resource use and pollution, is made ethical. It demonstrates that, while it may be necessary, involving producers in green transitions is far from straightforward. Having traced Sahih Kaam's earnest efforts to make business out of the transition to the circular economy, I offer an example of how the institution of market rules does not necessarily lead to healthy competition in responsible environmental services.

Sahih Kaam's example shows that the circular economy transition requires institutionalization if it is to garner trust required for widespread adoption in the industry. I argue that the key to this institutionalization lies in pacifying unruly materials into secondary resources to become substitutable for virgin ones and managing the intensely social loops and circles created by waste's possible revaluations. The case study points not only to the challenges of

establishing an environmentally responsible handling of e-waste but also to the even greater struggle of turning the regeneration of materials into a profitable enterprise. Material arrangements of honesty inscribe the circular economy ethic into social and material relations, which in turn do not always fulfil wider understandings of environmental responsibility.

Despite this disparaging conclusion about the circular economy, I would argue that Sahih Kaam's material arrangements do hold the promise of aligning the interests of wildly diverse stakeholders to radically change the way in which e-waste is recycled. The PRO brings diverse socio-economic groups into cooperation across scales, from corporate actors to unruly scrap dealers and recycling plant owners. Yet, the already existing material arrangements limit the capacity for a wholesale transition, while the trouble is found at a conceptual level. Instead of having to transition from a linear economy to a circular economy, the task ahead of Sahih Kaam is to address the different loops and circular movements of waste material, some of which lead to contamination, others of which are not accompanied by any material regeneration.

The producers who work with Sahih Kaam are now expressing a wish that their own branded products are collected once discarded under their EPR so that they can be fed back into their own production processes. This points towards another use of compliance infrastructures developed in private sector-led waste management and environmental compliance. Making producers take responsibility not only for selling products but also for the entire life cycle may sound like a great move forward in shifting responsibility from the individual consumer to the producer. At the same time, however, the move opens up space for large international companies with global manufacturing and sales interest to define what it means to be environmentally responsible. And that may mean, as for example in this case, that the order of the three Rs of waste management – reduce, reuse, recycle – may be circumvented, while the decoupling of production from resource extraction and wastes remains a pipe dream.

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Chapter 3

STIMULATING ECONOMIES

Making plastics circular in Uruguay

Patrick O'Hare

Introduction

Uruguay is considered one of the early pioneers in the adoption of circular economy programmes in Latin America, with Chile often positioned as the continent's leading light. With a centralized CE strategy only recently being drawn up, Uruguay's policies have instead consisted of a dispersed range of prizes, certifications and funding streams that have sought to finance, reward and recognize business endeavours that contribute to a transition towards a more circular economy. These are dispersed in the sense that some of them are organized by state institutions while others represent corporate attempts at self-regulation. Since 2018, for instance, the *Oportunidades Circulares* (Circular Opportunities) scheme, organized by the Uruguayan Ministry of Industry, Energy, and Mining (MIEM), the National Development Agency (ANDE) and various UN bodies, has given out millions of dollars in funding to hundreds of businesses. In 2020 and 2021, meanwhile, the same organizations held rounds of the 'Uruguay Más Circular' prize, through which awards were given to big businesses, SMEs, 'start-ups', cooperatives and associations, communities and educational institutions for their efforts to progress towards circularity.

The plastics industry was selected as one of the key target industries for transformation by the Circular Opportunities programme and has featured strongly as a recipient of both its funding and recognition in Uruguay. In 2018, for instance, the wine and plastics sectors were those that received the highest levels of funding, with five approved projects per sector, receiving a combined total of 16 per cent of the overall Circular Opportunities budget (Sanz 2020). Beyond such

external pushes, internally, the plastics industry has itself taken measures to assess, certify and improve circular practices. One example of this has been the launch of what effectively amounts to an exercise in public relations: a virtual initiative called '*recircular*' (recirculate) that seeks to publicize how the sector is contributing to a circular economy. A more substantial endeavour is BigCircle, a certification scheme established by PLASTEC, a joint public–private venture that seeks to improve associativity, productivity and formality in the plastics industry and latterly took up themes of environmental responsibility.[1] With BigCircle, lauded as the first CE certification scheme for the plastics industry in Latin America, PLASTEC offers a service to plastics companies which are then graded on their level of circularity.

The priority given to the plastics industry within the CE landscape, not only in Uruguay but also globally, leads us to ask what circularity looks like within an industry that has been castigated for producing colossal amounts of plastic waste. Of the 10 billion metric tonnes of plastic (Geyer, Lambek and Law 2017) that have been manufactured, mostly since the 1950s, it is estimated that only 9 per cent have ever been recycled and 12 per cent incinerated, meaning that 79 per cent of all plastics produced have ended up accumulating in landfills or marine and terrestrial environments (Simon et al. 2021). In 2019, over 368 million metric tonnes of virgin plastics were produced, and these numbers are expected to rise rapidly over the coming decades (Simon et al. 2021). For the Ellen MacArthur Foundation (World Economic Forum et al. 2016), which has been behind a series of plastics pacts between large companies and nation states, a circular economy of plastics involves eliminating unnecessary and problematic plastics, innovative design to make plastics more reusable, recyclable or compostable, and circulating existing plastics to keep them out of landfill.

Plastics are particularly provocative for thinking through the circular economy for other reasons too. On the one hand, through their embodiment of the ideal of plasticity, plastic suggests that its forms can be eternally born and reborn (see Boetzkes and Pendakis 2013). As Heather Davis (2021: 22) notes, what she calls the 'myth of recycling reinforces this notion that plastic is full of plasticity', despite the fact that the material is also 'incredibly recalcitrant and resistant in the face

1. Pseudonyms are used here and for the individuals named in this chapter.

of change'. Plastic also figures as the synthetic material par excellence, resistant to decay and degradation, a justification for the division of the circular economy into two separate cycles, one cultural/technical, the other natural/biological. Yet, as Davis argues, 'the cleavage of the natural from the cultural can only ever be … violent abstraction, doomed to failure' (60). Derived from fossil fuels, plastics return as 'techno-fossils' (Zalasiewicz et al. 2016), joining with rock, clay and wood to become plastiglomerate naturecultures (Haraway 2003) as they 'eventually become part of the cycles of the earth' (Davis 2021: 55). Although this chapter focuses its gaze upon plastics as they are manufactured and recycled in Uruguay, it is worth bearing in mind that the productive cycle of plastics takes us beyond any single nation state: the material that is moulded in Uruguay did not originate there, and much of it will eventually find its way beyond its borders, sparking affects and transforming ecosystems along the way.

In Uruguay, the plastics industry was launched in the decade following the Second World War, with the founding of the Uruguayan Plastics Industry Association (AUIP), in 1956, which succeeded the short-lived 'Association of Plastic Moulders'. The formal plastics sector is currently made up of around 226 businesses, of which 95 per cent are SMEs, which together employ 3,353 people (Larronda 2021). Although these companies often recycle their own industrial 'scrap', the wider recycling of plastic often takes place in informal or quasi-formal milieu, and most operators are not affiliated to the AUIP; their own trade organization has been dormant for several years. The AUIP's motto is 'an industry for industries' and the sector serves both a domestic and an international market. In 2020, for instance, Uruguayan producers exported US$250 million worth of plastics, with the export of expanded polystyrene (EPS), PVC film and PET 'preforms' particularly noteworthy.

While Uruguay refines imported oil, it does not have the industrial capacity for the 'cracking' process that produces hydrocarbon monomers such as ethylene and propylene and it does not produce virgin plastic pellet, the raw material for the elaboration of many different plastic products. Instead, such virgin plastic is imported from countries such as Brazil, China and the United States. Uruguayan 'plastiqueros' effectively add value to these pellets through extruding, blow-moulding and injecting them into diverse forms, from polystyrene trays to buckets, children's toys to toilet seats. This in itself causes certain problems with regard to creating a circular plastics economy in Uruguay, because there is little that can be done in the country to influence or change the first

stages of plastics production. The focus on circular economy initiatives at an advanced stage of the plastics life cycle, and into its treatment as waste, replicates the global international focus on avoiding plastics pollution, with the same problem that this does little to 'turn off the tap' of virgin plastic production (Liboiron et al. 2020), including those plastics that are regarded as single use, unnecessary and problematic (Barrowclough and Deere Birkbeck 2020).

This chapter focuses on two plastics companies that have been recognized in Uruguay for taking steps towards a circular economy of plastic. The first, Uruplac, is a company that makes plastic board from a diverse array of mostly post-industrial plastic packaging, including polypropylene (PP), polyethylene (PE), polyethylene teraphate (PET) and mixed materials such as Tetra-Pak. It is a small, Uruguayan company with two business partners and a handful of staff. The other company, which I will call Roseta, is part of a large multinational plastics company that produces food-grade expanded polystyrene (EPS) and PVC film, and employs over 200 people at its large plant. While Uruplac works only with recycled material, Roseta only works with virgin polymers, largely because food-grade recycled EPS has not yet been developed. Despite this important difference, both companies have been considered as contributing to a circular economy of plastics in Uruguay. Roseta received the highest circularity rating in PLASTEC's BigCircle audit, while Uruplac has received Circular Opportunities funding and was the 2020 winner of the Circular Uruguay award for the SME category. This chapter will explore the criteria by which such different business models can both be regarded as forming part of the circular plastics economy in Uruguay.

Ethnographic research was conducted at the two companies in question. In the case of Roseta, this was limited to the day before the BigCircle audit was carried out, the day of the audit itself and a subsequent follow-up visit and interviews with senior staff. The fieldwork in Uruplac involved following production in the plant over a period of six months, charting the flows of plastics into the company and the employment of plastic board in a range of uses, from agricultural roofing to carefully designed craft. Mixed methods – interviews, participation observation, analysis of company reports and audits – facilitated an understanding of how the circular economy was perceived at both company and shopfloor levels. It also allowed me to track the term as it moved from theory to practice and back again.

While retaining a critical perspective, this chapter distinguishes itself from a position often found in the literature, where either the circular

economy is critiqued for not entailing systemic change or particular CE schemes are critiqued for not sufficiently adhering to a 'true' version of the circular economy. This chapter takes a different route, focusing instead on how a circular plastics economy is taking shape in Uruguayan economic and social life. Is circular economy recognition allowing plastics companies to carry on with business as usual or is it in fact reshaping business models? Is it shifting relations between the private and public sectors and between national and international organizations? Is it entrenching inequalities or bringing about positive environmental and social change? In its conclusions, the chapter points to two ways that the localized case studies discussed here can contribute to wider tendencies in the circular economy. First, it notes the way that universalizing theoretical principles of the circular economy inevitably become entangled in local priorities that often have little to do with environmental concerns. Second, it argues that the well-intentioned prioritization of design innovation over recycling in circular economy discourse can actually enable the continued mass production of difficult-to-recycle packaging.

URUPLAC

Uruplac was founded in 2012 by an active and a passive business partner. Diego is the active partner, who set up the company after a career in logistics and the plastics industry. Enrique is the sleeping partner, who runs the scrap yard within which the Uruplac plant is located. Though not formally a business partner, a third important figure is Eduardo, who has supported the project since its inception. The company also employs a business manager, an administrative assistant, a foreman and several shopfloor workers.

Diego and Eduardo met working for what was at the time one of the largest companies in all of South America, a plastics firm that I will here call Remar. According to Eduardo, this was a company that 'marked a before and after in the [Uruguayan] plastics industry' in the sense of a step-change in production and technical capacity, as it operated out of six plants and manufactured 'anything you could imagine out of plastic'. While Eduardo was in charge of a sixty-plus maintenance team, Diego was brought in to revolutionize internal recycling and improve efficiency, instituting a system that minimized waste while maximizing the reincorporation of industrial scrap into productive processes. Nevertheless, the company still worked with

virgin polymers and produced large amounts of flexible, multi-layered packaging that was difficult to recycle once it had been released onto the consumer market. According to Diego, it was on visits to Uruguay's precarious informal plastics recycling industry that working in Remar began to bother him: 'I stopped seeing maximizing profits of a company that was producing 100% disposable waste [plastics] as virtuous. There was too much waste and a social reality [of post-consumer recycling] that had to be stopped.' With this comment, Diego was most likely alluding to the informal labour, poor health and safety practices, and environmental contamination that could often be found in the recycling sector.

At first, Eduardo, Diego and another Remar engineer started their first, now defunct, firm that recycled conventional 'mono-material' plastics such as polyethylene (used in much packaging) and polypropylene (used for packaging and household objects and toys, such as Lego), even managing to sell high-quality post-consumer plastics back to companies like Remar to be fashioned into new products. However, both Remar and this first recycling firm were shuttered – partly as a result of the 2001 Argentine and Uruguayan financial crash – and it would be a decade before Diego launched another recycling endeavour, this time focused on mixed materials that could not otherwise be recycled in Uruguay. A key partner in this regard was Tetra-Pak Argentina, which was seeking a way to recover and recycle the Tetra-Brik (e.g. litre drinks containers) products that were both increasingly successful on the Uruguayan market and largely ending up in landfill and the environment. This led Tetra to finance the purchase of Uruplac's most important piece of machinery, a hot press that melts chipped plastic into a standardized board.

Although this press has been improved with small upgrades in recent years, Uruplac's basic machinery and industrial processes have mostly remained the same since its founding. The company receives, largely for free from industries, post-industrial mixed plastics packaging and materials, such as Tetra-Brik, aluminized plastic foil, pharmaceutical PET blisters and multi-layered polypropylene wrappers. It shreds these plastics using a mill, breaking them down into small pieces. Each of the three 'ingredients' of the formula was stored in different silos, meaning that when composing the mix, workers took and weighed a fraction from each silo, before mixing them together and pouring them onto a conveyer belt. These were then spread out evenly before a sheet of heat-resistant plastic film was placed across the top and the belt was moved under the press, which applied heat and pressure discontinuously,

allowing humidity to be released as the pressure was lifted while also preventing the boards from suffering scorch marks.

Immediately after having been pressed, the board were reduced to what one worker referred to as a 'gelatinous, jelly-like consistency'. They were then placed under a manually operated cold press, and after having cooled, they were cut according to specification using a three-piece circular saw that trimmed the rough edges of the board across their depth and breadth. Each plastic board weighed around 25kg, measured 2.44m × 1.22m, and was manufactured at an average rate of forty boards per day. These could be sold as they were for roofing and insulation, or to companies that cut the board down to manufacture new products such as Wendy houses, waste receptacles, compost bins and smaller design items.

In the small Uruplac office, heated only by a wood-burning stove, Diego picked up a sample of what is known as 'plastic wood or lumber', a product made solely from recycled high-density polyethylene (HDPE), which had been dropped off the previous day by a construction company that wanted to know if he could manufacture a product to the same technical and material specifications. Diego replied, dismissing the offer:

> I could make a very good board like this, but I'd need to pay for my raw materials, because there is already market demand for this raw material [recycled or virgin HDPE] from those who use it to make buckets, pipes, and so on. So I'm not solving a problem and Uruplac turns into a purely and exclusively commercial enterprise and ethically, we don't want to go there. Our technical objective is to continue down the path of being the only ones who can do something with the waste for which there is no demand in the market.

Diego thus relies on a stream of what has been called 'problem plastics' (WRAP 2022) – laminates that have different layers of different plastics, a combination of plastics and non-plastics, troublesome additives and/or an excess of printed ink. Mechanical plastics recycling essentially relies on shredding recycled plastic and then melting it down at a certain temperature so as to produce either plastic pellets or new products. The problem is that different plastics melt at different temperatures (they have different 'melt indexes') and they also react differently depending on the process (blowing, extrusion or injection) that they have previously undergone in their first incarnation. Injecting or extruding mixed plastics or plastics combined with other materials

such as aluminium and cardboard, which either do not melt or melt at vastly different temperatures, can result in below-par products and/or damage to machinery. With Uruplac's method, on the other hand, the formula used means that enough plastics melt under the hot press to act as a glue to hold the rest of the materials together, with small amounts of cardboard and aluminium adding, according to Diego, an aesthetic appeal and improved mechanical properties.

Diego is considered a pioneer in the Uruguayan circular economy, known not only for Uruplac but also for his involvement in an extended producer responsibility (EPR) scheme for rubber car tyres, which has resulted in large amounts of these tyres being recovered and burnt as fuel in a cement plant. The latter scheme was often held up by Diego as a model for the plastics industry, yet the diversity of plastic, its frequent contamination with organic matter (e.g. food) in its post-consumer state and its mixing with other materials in packaging products such as Tetra-Brik, means that a single end-of-pipe solution is unlikely. Diego himself is critical of both politicians and virgin plastics producers, arguing that measures such as minimizing printed advertising or legislating against the production of multi-layered and multi-material laminated packaging could have been adopted had there been political will. In the meantime, he added, he was doing the plastics industry a favour, and therefore he shouldn't be expected to pay for his raw materials and was fully deserving of his circular economy funding and accolades.

The Circular Opportunities funding that Uruplac received was for a specific project that involved another company closing a loop in their plastics production. Uruguay's national dairy cooperative, CONAPROLE, is regarded as a national treasure, is one of the country's largest exporters, directly or indirectly employs over 25,000 people and processes the milk of around 90 per cent of the country's small and medium dairy farmers. It is also indirectly one of the largest producers of plastic packaging in the country, manufacturing, through a subsidiary and procurement, flexible plastics for its range of milks, yogurts, puddings and ice creams. Most of this packaging is multi-layered and/or multi-material, making it extremely difficult to recycle. Even before the single-use carrier bag became an international symbol of environmental plastics pollution, CONAPROLE's milk sachet was a target for societal critique in Uruguay, after the cooperative switched from its traditional glass bottle and the sachets began accumulating in the environment, prompting an initial EPR recovery and recycling scheme in the 1990s. Now, with a huge increase in the amount and

diversity of its plastics packaging, CONAPROLE turned to Diego, to whom they sent their post-industrial packaging 'scrap' and in turn received large orders of corrugated plastic board to provide roofed shelter to its cows in two initial 'pilot' circular economy dairy farms.

It is worth stepping back to remember that, in general, the transformation of food-grade plastic packaging into something like plastic lumber or wood is not considered by organizations like the Ellen MacArthur Foundation as a prime example of circular economic activity but rather a case of down-cycling: the creation of a product that is inferior in its technical specifications and function to the purpose for which it was originally put. More valued is recycling that is closed-loop or 'bottle-to-bottle', where PET bottles can be recycled into new PET bottles, or in this case plastic dairy packaging can be recycled into plastic dairy packaging. In theory, such 'bottle-to-bottle' recycling decreases the demand for virgin plastics, while in the CONAPROLE–Uruplac example, virgin plastics are still required for CONAPROLE's food packaging.

A further weakness of this scheme is that it finds a partial solution for post-industrial but not for post-consumer plastic. The plastics industry, in Uruguay and elsewhere, tends to be rather good at recycling what is often called 'industrial scrap'. This consists of plastic off-cuts and trimmings, products with a default or, as in the materials that often arrived at Uruplac, rolls of packaging that contained printing errors. Although more difficult to recycle once it had been printed on, this material was still homogenous, available in relatively large quantities and unsullied by contact with food. The composition of post-consumer waste, by contrast, is more difficult to ascertain, is collected in small quantities from individual households and contains various degrees of contamination. There was no scheme for Uruplac to receive and recycle the 'problematic' mixed materials that CONAPROLE put onto the market, only the smaller fraction that never made it into the hands of the public to begin with.

Roseta

In Uruguay, expanded polystyrene (EPS) is known as 'Espumaplast', short for 'foam plastic', a term that is often cut down to simply 'espuma' or foam. The production of espuma was brought to Uruguay by a British plastics company in the early 2000s, with Prince Charles even stopping off to inaugurate the plant when he found himself nearby

on the Malvinas islands. After the plant burnt to the ground several years later – espuma is extremely flammable since it is injected with butane gas – it was rebuilt from scratch and is now run by a Mexican multinational, Roseta, which also operates an on-site sister plant that manufactures PVC film.

In Uruguay, the advertising campaign for a new national waste management plan, subtitled 'a more Circular Uruguay', featured a picture of fruit sitting in a polystyrene tray and wrapped in cling-film, alongside the command 'reject', suggesting both state disapproval and that responsibility for rejecting single-use packaging is being delegated to the consumer. While EPS trays have been banned in both Peru and Chile, plans to ban single-use plastics in Uruguay have been watered down and the new national waste management strategy speaks of non-binding reduction targets rather than prohibition. A recent ministerial resolution that originally might have banned a series of single-use plastics was stripped down to focus on a single item: the plastic straw. One of the reasons why there is no hard ban is that Roseta and the Uruguayan plastics industry have been lobbying hard against it. The company is a significant employer, with a team of over 200 permanent staff and a contribution to thousands of indirect jobs. Its Uruguayan chief executive is the head of Environment for the multinational and was also until recently the vice-president of the Union of Uruguayan Exporters. Representatives of other plastics companies that make up the AUIP repeatedly named Roseta as the most professional plastics manufacturer in the country, one that met international standards in terms of its size and the quality of its production and processes.

Yet the company clearly has a problem: it manufactures a product at a rate of roughly 6 per second (0.5 million per day), for which there is to all intents and purposes no recycling market and no proven case of being transformed back into a food-grade product, which has effectively become the gold standard in food packaging recycling. One of espuma's selling points is its lightness, and this becomes a huge problem both for its collection and its economically viable recyclability. Empty polystyrene trays regularly blow away in Montevideo's strong coastal winds, and once I had an eye for them, I began to notice the trays dancing along Montevideo's twenty-kilometre-long riverside promenade, known as La Rambla. On a one-hour beach clean-up further along the coast in which I participated, I counted thirty-seven different fragments of EPS, many of which had been manufactured by Roseta.

A few weeks after the beach clean-up, I was invited to the circular economy audit to be carried out at Roseta by PLASTEC. According

to its website, BigCircle is an interdisciplinary project that seeks to improve the productivity of companies in the plastics industry value chain and that strengthens post-industrial and post-consumer plastics recycling through formalization. This initial definition is rather striking for its failure to mention waste and its focus instead on formalization and productivity. PLASTEC uses as the basis for its BigCircle audits a manual that it first published in 2018 and updated in 2019. The guide is divided into four sections or axes: *órden y limpieza* (good housekeeping or order and cleanliness), productivity, circular economy and associativity. It is interesting to note that although this is ostensibly a circular economy certification scheme, circular economy is only one of the criteria against which a company is evaluated. A few weeks after the audit, the verdict was out: Roseta were the first plastics company in Uruguay to have been granted a level 3 certification in Sustainability and Circularity.

This, then, is my ethnographic puzzle: How could Roseta, a company that produces up to 0.5 million polystyrene trays per day of which only a tiny fraction is recycled, be granted effectively the highest mark with regard to circularity in the national plastics industry, higher than that accorded to companies that produce plastics that are much more easily recyclable or that might contain recycled material? In answering this question, I shed some light on the way that the circular economy as a business proposal and policy aspiration is being rolled out and evaluated in particular places, as it moves from theory to practice and back again.

Uruguay is a small country with very few degrees of separation between its inhabitants. The plastics industry is accordingly small and PLASTEC has strong links with many actors. The president of PLASTEC is also the Chief Operations Officer for the country's largest plastics firm. Its lab manager is a former shop floor manager of the same firm. One of its teaching staff used to be the head of Roseta's PVC plant when it was run by the British firm, and when Roseta was looking to ensure that it performed well in the BigCircle audit, it contracted one of the authors of the manual as a consultant. These interconnections clearly demonstrate certain problems of governance and potential conflicts of interest at the heart of an emergent Uruguayan circular economy in plastics. The plastics industry, through its involvement in PLASTEC, plays a role in certifying itself with regard to how circular it is. Yet these links do not alone explain why a manufacturer of difficult-to-recycle single-use plastics might be given such a high circularity score.

Globally, proponents of the circular economy tend to put a greater emphasis on design interventions than on recycling. Accordingly, the

centrepiece for Roseta's presentation to the BigCircle audit committee, effectively its pitch for why it should earn a high rating, was a minute reform made to the curvature of its trademark polystyrene tray, which meant that it used less raw material for every tray that it manufactured. This adaptation started from the supposition that a bigger curved radius would provide better resistance in the product. According to Roseta, this was a proven hypothesis in metalwork, and they had 'taken it to the world of plastic'. Trials had occurred at a small scale (in the company laboratory), at a medium scale and then at an industrial scale, where new metal moulds had been cast with the adapted curvature and rolled out on the production line. The trials had shown that increased curvature enabled a reduction of 25 per cent of the thickness of the normal trays and 18 per cent in absorbent trays, meaning less plastic per tray. As the chief executive explained, this was a case where 'an economic improvement aligned with an environmental one'. Other production advances were also highlighted, particularly the way that the plant had become increasingly 'closed', with PVC and EPS obviously going out into the world but other by-products incorporated back into productive processes. They had reached a rate of 100 per cent reintroduction of internal EPS scrap back into the production line and 99 per cent of PVC. One modification that the company had made with regard to PVC was the capture of liquids that evaporate as the film is heated, then turn back into liquids when they are cooled during the production process, 80 per cent of which are 'plastifiers'.

One curious detail from the audit was that because a new circularity index was about to be launched, but which businesses hadn't yet seen, no stand-alone circular economy indicator was used, as it had in previous years. Indeed, the reason that a new index was being launched was partly due to complaints that its previous incarnation, which drew strongly on EMF principles, was unsuitable for single-use products, unduly favouring those companies that made more durable and reusable plastics. The original indicator was, according to PLASTEC staff, 'a bit basic and with unclear definitions'. It also used a single indicator, something that the revised index sought to address. Effectively, PLASTEC wanted to avoid products being 'penalized', in the words of one of its staff, for being of petrochemical origin, for being single-use or for having low national recycling rates, which were deemed to be outside of the producer or company's control. The new indicator paid attention to three phases in the life of a product: the production stage and the materials out of which it was made; the consumption stage and the efforts made to extend the active life of the product; and, finally, the disposal stage and the extent

to which the product was recyclable or compostable. Yet an exception was made for single-use plastics, which were only evaluated with regard to the production and disposal stages, discounting the possibility of an extended life. This was, according to the PLASTEC employee devising the new index, because 'it is understood that single-use plastics are designed to have a very short life cycle and so it doesn't make sense for us to measure the lengthening of their useful life'.

It is worth remembering that this new index was not used in Roseta's BigCircle audit, and what was being audited at Roseta were its company-wide processes rather than a single product. Nevertheless, Roseta's Uruguayan factory effectively makes two products, with very little difference in their specifications. As a product, however, it is hard to see how polystyrene trays could achieve a high rating within either the curtailed or the full circularity index given that it does not perform at all on two out of three of its indicators. Although they contain some post-industrial scrap or recyclate, they do not contain any post-consumer material; by definition they are designed to be single use and they are difficult to recycle into new products and have very low recovery rates in Uruguay. As much as Roseta are committed to minimizing internal waste, supporting local community and environmental initiatives and generally projecting a green image, the question nevertheless remains of whether a company that makes such a product could and should be given a Circular Economy certification, never mind the highest rating possible in PLASTEC's scheme.

This was a question that I put to the lead auditor and one of the authors of PLASTEC's manual. In response, he said that inclusion of post-consumer EPS in new trays was a moot point because in Uruguay it was forbidden to use recycled plastic in food-grade products. This was a key issue that linked both disposal and production and would bring them together in a new cycle, in that the possibility of incorporating recycled EPS into new trays would create a market for recycled EPS, which currently does not exist. The inclusion of recycled EPS would thus contribute to a higher score in both indicators for which they would be evaluated: that of production and disposal. Roseta was effectively being let off the hook on this point because it was assumed that even if it were technically possible and financially viable to reincorporate this material, it would still be illegal in Uruguay. Yet in fact this assertion was mistaken, because water and drinks bottles made with 100 per cent recycled PET (RPET) were both legal and widely available in Uruguay, meaning that there was no legal obstacle to using food-grade recycled EPS in the country.

The issue of 'closing the loop' ('cerrando el círculo'), that is to say, recovering post-consumer EPS trays, was not neglected during the audit, however. Roseta's management highlighted their commitment to an extended producer responsibility (EPR) scheme, whereby they, along with other, smaller, importers and manufacturers of EPS, committed to purchasing post-consumer EPS from public–private waste sorting plants. They effectively engineered a market in this material, paying 40 US cents a kilo, which is transferred to the sorting plants by a recycling and waste management company. This company compacts and melts down the EPS into 20kg blocks, which are then sold to Asian markets, particularly Malaysia, where they might be transformed into items such as clothes hangers, skirting boards and picture frames. Even though the recycling company is effectively giving these EPS blocks away, they do not find easy buyers and must be sold as part of a mixed plastic 'selection box' container that includes more valuable plastics such as polyethylene.

Between 2017, when it was launched, and 2021, the scheme increased the amount of EPS recovered from 1.3 to 5 tonnes per year, but with roughly 50 tonnes of EPS released onto Uruguayan markets every month, the latter figure only amounts to a recovery rate of less than 1 per cent. Roseta were keen to stress that they wanted to increase this amount, and they are thinking of creating a school utensil kit that they currently make from recycled EPS elsewhere in Latin America and import into Uruguay to distribute in schools. The problem, said the company director, was that they simply couldn't get a hold of the stuff: they weren't responsible for segregated collection and recycling schemes, he said, and 'when you have alienated the product, it is very difficult to maintain circularity'. The local governments responsible for collection had put out some publicity about the recyclability of EPS but were reluctant to do more, given concerns about how long the recycling company would continue to be able to find a buyer for it. The director accompanied his criticism of municipal collection with oft-repeated comments about Uruguayans not having a sufficiently developed environmental consciousness and not engaging in domestic classification, an example of what the climatologist Michael E. Mann (2021) calls 'deflection strategies' that shift blame for pollution away from producers and onto consumers.

It is worth comparing the actual destination and flows of Roseta's EPS with that put forward in the publicity for its EPR scheme. The publicity plays with temporal frames positing a linear past before (*antes*), in which EPS ended up in landfill, and a present circular now

(*ahora*). The author (O' Hare 2021) and others have made the point that in its dichotomous framing of a current linear economy, proponents of the circular economy often obfuscate the variety of loops, circles and deviations in which many materials and objects are embedded. In the case of EPS, it is hard to argue with the idea that it mostly follows a linear pathway, yet the fragments of *espuma* that I found on my beach clean-up highlighted that not all of the material ended up in landfill. Thus, the starting point of a supposedly bad past, where all EPS was landfilled, was not fully accurate and would have been an improvement on the current situation. A striking feature of the diagrams that greeted company visitors is that they are given temporal markers, something that is absent from the generic circular economy graphs from which they are adapted. Even more striking is the fact that within this temporal framework, the linear economy is banished to the past, despite the fact that, as we have seen, the EPR scheme currently captures less than 1 per cent of the polystyrene that Roseta produces for the Uruguayan market, the rest ending up in landfill or dispersed in the environment.

We might thus say that the 'now' of the circular economy is only accurate for 1 per cent of Roseta's Uruguayan production, while 99 per cent of its trays live in a linear past, that is, in fact the present. Yet we can challenge whether or not the circular graphic, which carries the title 'process of sustainable utilisation' (aprovechamiento), even accurately describes what happens to the 1 per cent of the polystyrene that is recovered. The diagram, to a certain extent, sets a high standard that the recycling of EPS is seemingly unable to meet, since it suggests that after it has been classified, it will then be recycled into a 'high-quality raw material' that will re-enter the production line to be transformed into another product. The language of 'high-quality recycling' is not accidental – it is the concept used both by the EU in its Circular Economy plans and by the Uruguayan government in its national waste management plan. In Uruguay at least, there has been criticism that this term has been thrown around without a sharp definition, while in the EU there have been belated attempts at conceptual clarity. A publication from the EU Commission Joint Research Centre (Grant et al. 2020) has proposed the following definition for the quality of recycling: 'the extent to which, through the recycling chain, the distinct characteristics of the material (the polymer, or the glass, or the paper fibre) are preserved or recovered so as to maximise their potential to be re-used in the circular economy'. The report goes on to note that 'these characteristics vary by material but may include for example food contact suitability, structural characteristics (e.g. uniformity and viscosity), clarity and colour, form,

and odour'. What is first used as a definition of quality is then used to define 'high-quality recycling' against recycling per se: 'whereas recycling keeps resources in circulation within the material economy; high quality recycling preserves the characteristics of materials which make them most useful (avoiding the loss of material characteristics relevant to its re-use in key product sectors)' (7).

In the case of the EPS that is recovered and melted down into blocks for export, it is difficult to see how the 'distinct characteristics' of the material are conserved. Effectively, through the heat applied, expanded polystyrene foam becomes polystyrene or PS ingots. As I have noted, the expansion of polystyrene is caused by the injection of butane gas into solid polystyrene beads, with the gas expanded by heating. Through this process, the volume of the bead is increased forty-fold, giving EPS its key properties of lightness and voluminousness, with 98 per cent of EPS composed of air. The melting of EPS through the application of heat and physical force effectively brings about the reverse process, with EPS densifying at a rate of at most 50:1 as it is transformed back into polystyrene. Yet this is not a simple reversal of EPS back into PS. As Kazuyuki Hattori (2014) notes, 'the melting process is simple, but brings about some chemical degradation and cannot avoid debasing the quality of the original polystyrene.' Not only does melting bring about chemical degradation, the fact that Roseta's trays have been in contact with food means that its post-consumer foam is contaminated to varying degrees by organic particles. Finally, and notwithstanding these issues, it is white EPS that finds a more stable Asian export market. Despite this fact, Roseta continues to produce a wide gamma of colours that correspond to the different products that their packaging is used to enclose: white, black, red, yellow and blue.

The Ellen MacArthur Foundation, for its part, has put out its own 'vision for a circular economy of plastic'. It follows the waste hierarchy in suggesting that the first steps towards such a circular economy should be the elimination of unnecessary plastic packaging and then the creation of reusable packaging as a priority for what remains. At the very least, all plastic packaging should be fully recyclable, reusable or compostable by 2030, with a preference for the so-called 'bottle-to-bottle' or closed-loop model, where a product is recycled into the same product. The rationale behind this is fairly obvious: the so-called down-cycling of food-grade plastics into plastic lumber, synthetic fibre or in this case skirting boards does not decrease the demand for the virgin plastic that is generally used for food packaging. The amount of plastic generated, and the dependence of the plastics industry on

fossil fuels, continues apace. This is what the EMF refers to as 'open loop recycling' where, 'since such applications are not economically recyclable after use', this 'often adds just one additional use cycle rather than creating a truly circular model' (World Economic Forum et al. 2016: 4). Recycling in this variant is a cycle then, but not a circle.

Returning to our ethnographic puzzle, how then did Roseta manage to receive its high circularity rating? In part, this was because what was being audited at Roseta were its company-wide processes rather than a single product. High scores in the three axes of the manual of good practices on which the audit was based – good housekeeping, productivity and associativity – were able to offset the fact that EPS is barely being recovered and even where it is, it does not comply with standard definitions of high-quality recycling. Associativity in this context meant creating alliances with other businesses and community groups in order to attain a common objective, under the premise that 'circularizing production requires cooperation between providers, clients, consumers and public bodies, according to the third Circular Economy principle'. Yet the third CE principle, according to the EMF website that is referenced, is the regeneration of natural systems, something that seems very far removed from the examples of potential associative ventures given by the manual that guides the audit: joint purchase of machinery, joint commercial missions, launch of new products, access to new markets. These have little to do with any circular economy. Rather, they have migrated directly from the founding aims of PLASTEC – which obtained public money in order to improve the efficiency, competitivity and knowledge base of the plastics sector – into a circular economy manual, audit and certification scheme.

Conclusion

There are several ways in which the case of circular economy initiatives in the Uruguayan plastics industry might prove instructive for examining the international roll-out of CE schemes in the plastics sector and more broadly. The first point to note is that the universalizing principles of the circular economy advocated by the EMF and international organizations inevitably become grounded in specific places and entangled with local priorities that might only tangentially connect to the circular economy or that may indeed undermine moves towards circularity. This is the

case for instance with the associativity strand of PLASTEC's circularity audit, associativity being a founding aim of the centre that was only latterly tagged on to the circularity index with the justification that no company could hope to 'close the loop' by themselves. Yet associativity for Roseta in part involved leveraging its links to PLASTEC to present a united front with its competitors and national research institutions against the prohibition of its product. The involvement of such research institutions in PLASTEC helped it to present its circular economy certification scheme as independent, despite the influence of the plastics industry in the development of its manual, metrics and audits. A circularity certification scheme, legitimized with a national circular economy prize in which international organizations participated as judges, thus became a shield with which plastics companies could protect themselves against economically damaging national legislation, while simultaneously spurring them to reduce waste and make efficiency savings in their industrial processes.

The second point to emphasize is that the prioritization of so-called eco-design over recyclability enables companies that continue to produce unrecyclable products to be classified as circular or transitioning to a circular economy. Another case from the Uruguayan plastics industry involved a company that switched from high-density polyethylene containers to layered polypropylene sachets for one of its product ranges, lowering not only its costs but also the amount of plastic packaging used. Yet the switch also entailed a move from a plastic that is relatively easy to recycle and has a robust market to one that is difficult to recycle and has no active market. As Diego stated, Uruplac is currently the only company in Uruguay that recycles these plastics, and the company in any case only has a capacity to process a limited amount of post-industrial rather than post-consumer packaging. On the one hand, any 'valorization' avenue for packaging, whether it is a one-way ticket to Malaysia for some of Roseta's EPS or the transformation of CONAPROLE's polypropylene rolls into shade provision for its cows, enables such companies to signpost the possibilities of recycling while continuing to churn out materials that are difficult to recycle and invariably are not. On the other hand, of course, Uruplac and Roseta's recovery schemes, however limited, meant that some plastics that would otherwise end up in landfill or the environment were given a new lease of life.

Rather than only making the negative assertion that neither Roseta nor Uruplac constitute valid examples of a circular economy in plastics and that the awards and certification schemes are flawed, my ultimate

point in this chapter has been to highlight the effects of a particular definition of the circular economy in Uruguay. This brings with it enhanced company productivity and efficiency, less industrial waste, strengthened associativity, and assessments and prizes that are both internally coherent and designed in such a way as to allow for the continued production of single-use plastics with low rates of recovery and recycling. In this instance at least, the circular plastics economy is not the same as recycling, and in the sense that it provides legitimacy to the mass production of difficult-to-recycle packaging, it is potentially much worse for the environment.

As to the question of whether the circular economy is enabling companies to carry on with business as usual, the two cases presented indicate that large plastics producers seek to avoid closure and a switch to replacement materials by emphasizing design innovations and the fact that their products can be recycled, however difficult that may be in practice. Through the creation of Uruplac, meanwhile, Diego sought to make a meaningful intervention in the plastics industry, but by providing an outlet for the recycling of small amounts of Tetra-Brik and flexible laminates, he also provides an excuse for the continued production and use of such packaging, even if most of it will never find its way to his plant. The informal practices, poor working conditions and low wages in the wider Uruguayan plastics waste picking and recycling industry continue unabated, despite the fact that it is these cottage industries that continue to do the lion's share of plastics recycling in Uruguay and can arguably be considered the unsung heroes of a Uruguayan circular plastics economy.

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Chapter 4

Circular economy and servitization

Negotiating the EU's new green agenda in Greece

Aliki Angelidou and Mimina Pateraki

Introduction

On 10 December 2019, a 'multiplier event'[1] took place at the Municipal Hall of Klisthenis,[2] a lowermiddle-class suburb of Athens.[3] Its aim was to introduce the concepts of circular economy (CE) and servitization – keeping products in use through their servicing – to local citizens including businesspersons, teachers, pensioners and voluntary organizations. The Municipal Hall was filled with people and the atmosphere was warm despite the cold weather outside. The event had a festive spirit though it was neither a pre-Christmas feast nor a political gathering, but rather a carefully scheduled training with promotional bags and leaflets for the attendants. The invitees seemed joyous but showed a trace of embarrassment on their faces as most of them heard the terms 'circular economy' and 'servitization' for the first time. In addition, some could hardly tell the difference between these concepts and recycling, with which they were more familiar.

1. In the EU jargon, a 'multiplier event' is a public event that each partner in a EU-funded project must organize in order to disseminate the information about the project to a wide range of citizens and institutions concerned with the aim of familiarizing them with new notions and practices.

2. All the names of the municipalities as well as those of our interlocutors are pseudonyms.

3. Klisthenis is one of the western suburbs of Athens, located between the port of Piraeus and the city centre. It is a relatively small municipality, with a population of 52,903 within the capital's total population of 3,792,469 (National Census of 2021).

The event opened with the welcome speeches of the mayor and the deputy mayor who emphasized the benefits of EU-funded CE programmes for Klisthenis and the significance of the CE for exiting the decennial economic crisis in Greece. An academic expert followed with a presentation on 'circular economy as a collaborative venture for sustainability in modern societies'. Finally, a private company specializing in 'reciprocal recycling' services presented its various digital programs to give participants a hands-on experience of green entrepreneurship. After the presentations, the foyer was full of chatting, aromas of coffee, tangerines and tasty biscuits. Mimina[4] talked to a group of citizens and Eftychia, a 71-year-old housewife in attendance, commented: 'Listen my child, all these ideas presented sound great. But at the moment we have a lot of problems here. People do not have jobs, they struggle for their survival. . . they don't have the time to think how they will save the planet through their litter.' Such a mixed sentiment of approval and distrust in EU policies that fashion CE as an antidote to the post-crisis struggle for economic survival was often heard in our interviews in the Athenian suburb of Klisthenis.

This chapter explores the response of participants to the implementation of EU circular economy strategies in post-memoranda Greece.[5] Lately, the green economy has been promoted as a way out

4. Mimina Pateraki has a long-standing professional relation with Klisthenis. She has been working as a civil servant at the municipality for almost twenty years, alongside her teaching and research activities. Since 2012, she specializes in European projects' management, and as member of the working team of CLEAR, she took part in the conception of the project and participated in all the related activities. She has also participated in the training that took place in Austria for the management of bio-waste and has worked with the local entrepreneurs in Klisthenis during the pilot project on the implementation of the National Waste Management Plan. Aliki Angelidou is an academic scholar specializing in economic anthropology. She was introduced to the field via Mimina and has followed the two programmes throughout the period of their implementation.

5. In 2010, 2012 and 2015, three consecutive Memoranda of Understanding were signed between the Greek state and its lenders, the so-called *Troika* (IMF, European Commission and European Bank), that bailed out Greece from bankruptcy. In exchange the Greek state adopted measures of fiscal consolidation which were translated in austerity measures that led the majority of the population to a deterioration of its living conditions. In addition, the

from the last decade's austerity. The chapter examines the ambivalent ways people engage in new forms of consumption that combine market liberalization with environmental protection. More precisely, the ethnographic data in this chapter shows how politicians, civil servants and citizens in Klisthenis react to EU circular economy programmes. We focus on two programmes which we analyse together as they are among the first endeavours related to CE to be applied in this Greek municipality with the aim of targeting local citizens and small business to change their consumer habits towards more sustainable ones.[6] They also both tied sustainability to economic recovery.

The first was the CLEAR project (2017–20), which was a EU training project implemented in four member states (Spain, Portugal, Malta and Greece) by a consortium of private, non-profit and municipal organizations. The project's goal was to familiarize citizens with the CE and the 'servitization business model'. CLEAR is the acronym of 'CircuLar Economy Adult training toolbox – knowledge Reuse'. It was funded from the European Commission (ERASMUS+) in the framework of the first European Circular Economy Action Plan (2015). The programme resulted in a number of public events like the one described in the opening paragraph. It also led to the creation of an open-access digital repository of training materials for SMEs and adult education stakeholders who seek to gain knowledge about CE and servitization, their principles and potential benefits to both society and industry.[7]

MoUs accelerated structural reforms, such as the liberalization of the labour market or the privatization of public assets and public sectors, like education, health and transport. Officially in August 2018 Greece exited the memoranda and regained autonomy in the decisions upon its economy, but still remained in a strict supervision from its lenders for more four years, until August 2022.

6. The selection of Klisthenis as a fieldsite was both related to Mimina's long-standing relation to it but also because since the 2010s it is a municipality relatively active in promoting various eco-friendly and energy-saving activities. Moreover, it is a low-middle-class suburb where people have been – relatively – heavily impacted by the decennial socio-economic crisis in their making of a living and at the same time they show resistances in changing their consumer habits towards more sustainable ones.

7. Project reference: 2017-1-ES01-KA204-038172, https://projectclear.eu/.

The second programme was a pilot bio-waste management project (2019-20) that was part of the 'National Waste Management Plan (NWMP) of Greece', which was also funded by the EU. It was implemented in five municipalities around Athens. Since 2019, both national and local authorities in Greece have been prioritizing biowaste management as a post-crisis growth lever and the pilot biowaste management project was a top priority in Klisthenis' sustainable development strategy. The programme included a training trip to Austria for civil servants from the five municipalities in order to get a hands-on experience of biowaste practices and of a circular economy in action. Another deliverable was the setting up of a plan for the municipality's biowaste management. The plan foresaw that the municipality would systematically collect[8] private and municipal bio-waste through the installation of brown bins. It would then deliver the waste to the prefecture's collection point for treatment to make either compost for private and public gardens or biofuel for the municipality's cleaning vehicles.

Both projects ended in 2020 during the pandemic and did not have follow-ups. The CLEAR platform with all the training material is no longer available, while the bio-waste management pilot programme ended without the installation of any brown bins in the city. In both cases, no further funding by local resources or through a new application to the EU was secured. As a result, despite reported good intentions, both programmes have not brought any substantial changes in the consumer, business or municipal practices in the city of Klisthenis.

We focus on the perceptions of the CE among local politicians and civil servants that have organized the above EU-funded programmes and among local citizens that participated in them. The chapter accounts for a lack of grassroots engagement with these programmes. We argue that despite the use of green and ethical rhetoric, such top–down projects propose neither convincing responses to acute subsistence problems nor alternative forms of sociality. They struggle to go beyond the neoliberal objectives of market liberalization and corporate profitability. As a result, they garnered mixed sentiments of a willingness to work for a better future, on the one hand, and suspicion, mistrust and disappointment towards the CE as a way for exiting socio-economic and environmental crises, on the other.

8. In Greece the prefectures and the municipalities are responsible for garbage collection.

Circular economy and servitization

Circular economy and servitization are concepts that are mostly used by technocrats, policymakers and environmental activists (Pál 2022). The CE implies among other things a new consumption model that shifts its primary focus from creating value by selling a product to creating value by delivering and maintaining a service throughout the product's life cycle.[9] The aim is to keep products in circulation. In addition, some proponents expect circular economy to contribute 'to citizens' empowerment and community development and [to] establish new principles for democratic dialogue, mutual understanding, sharing, responsibility, commitment, and awareness-raising in societies' (Stratigea et al. 2018).

Along the same lines, servitization implies a shift towards an extended services' model where producer-consumer relations are reshaped through after-sale maintenance services that allow consumers to continually use various products, from a dress to an aeroplane, which by extension reduces waste and saves energy. Servitization is facilitated by new modes of communication between producers and customers enabled by the digital technology. Among economists, politicians, EU and other international technocrats both CE and servitization are positively portrayed as win–win socio-economic practices that combine market profit with social engagement and environmental sustainability.

The anthropological interest in CE is part of a renewed attentiveness to ecology during the last decade, inspired by environmental crises and the critique of neoliberal capitalism characterized by excessive consumption, overexploitation of resources, reduced product life, accumulation of waste and other pressures on ecosystems (Ingold 2000; Eriksen and Schober 2018). As climate change, natural catastrophes, energy poverty, desertification, deforestation and biodiversity loss become common global experiences and challenges, numerous ethnographies provide locally situated analyses that approach such changes from the perspective of individual or collective actors,

9. According to the EU's Circular Economy Action Plan (CEAP) a 'circular economy' is one 'where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized' (2015: 2). For an overview of the EU vision on the transition of the European economy from a linear to a circular model see the Circular Economy Action Plans 2015 and 2020.

highlighting their daily practices, perceptions and contributions. Recent ethnographies have shown the relationship between political economies and natural catastrophes (Oliver-Smith 2002; Jones and Murphy 2009; Kotsira 2021), energy (Franquesa 2018; Howe and Boyer 2019; Vetta 2020) or waste (Alexander and Reno 2012; Liboiron 2015; Mauch 2016; Alexander and Sanchez 2019; O'Hare 2019; Alexander and O'Hare 2020) as complex nodes of social relations and operations of power.

The concept of circular economy is the object of a few recent works that focus on the reimagination and revaluation of discarded goods through repair and reuse (Isenhour and Reno 2019), rural–urban links through reuse and repair (Berry and Isenhour 2019) or plastic (re)uses as forms of 'actually existing circularity' that provide an alternative to circular economy schemes premised on retained corporate ownership (O'Hare 2021). These recent ethnographically informed studies of CE voice a critical stance towards the technocratic approaches to the CE by grounding the schema in various lived experiences and embedding them within larger political and economic processes of capitalist accumulation. They also question the novelty of practices such as circularity, reuse and recycling, offering instead grassroots understandings and visions of the circular economy rooted in equity, sustainability and mutuality. They also unveil the power relations embedded in these new commodity chains, challenging in this way the dominant business-friendly visions of circular economy.

Green and circular economy in Greece

In the context of the decennial socio-economic crisis in Greece, a handful of anthropologists have followed the interest in environmental issues and have critically approached the green economy and energy transition. These works inform the framework for our study on the CE. As Vetta notes (2022), since the 1990s, an energy restructuring has been taking place under the common EU policies pushing for a new energy mix in which natural gas and renewable sources gain importance. This restructuring was combined with consecutive waves of privatization and state-backed private investments. The 2010 economic crisis intensified the opening of the Greek economy to multinational investors (Argenti and Knight 2015). This led to cases of the exploitation of nature by the expropriation of protected public land for touristic development

and gold mining, and to the 'green grabbing' of agricultural land for renewable energy investments (Hadjimichalis 2014). Since the early 2010s, Greece has seen a surge in renewable energy developments in rural areas and islands which ushered in new employment opportunities and technological innovations (Knight 2017). However, most of these entrepreneurial activities did not prove viable in the long run, and one decade later the green economy has betrayed local expectations of employment and prosperity (Knight 2019). As a result, renewable energy investment failed to prove an alternative for local populations towards sustainable growth and 'helped maintain the fundamental structures of neoliberalism that led to the current economic crisis: short-term projects of accumulation, exploitation of local and national resources to serve big business and corporate opportunism driven by market economics' (Knight 2017: 30). With regard to the CE, Corvellec, Towell and Johansson (2021) note that the EU has developed a vague definition of the circular economy and treats it as an essentially technocratic policy approach with clear economic ambitions which overlook issues such as social justice and environmental protection (Corvellec, Towell and Johansson 2021: 4).

This absence of 'social and ethical calculus' (Fairhead, Leach and Scoones 2012: 240) provoked strong mistrust both from people and from national and local authorities. In some cases, renewable energy initiatives have been perceived in a negative light and linked to foreign 'conquest' and 'occupation' not through warfare but through the economy (Argenti and Knight 2015: 781). The technology used in these projects is predominantly German or Chinese, and the energy produced in the Greek countryside is exported to the national urban centres or to northern Europe. Usually, such projects are administered by multinational companies or big Greek enterprises and not by SMEs or community collectives. This is why local populations either enter into internal conflicts and divisions around the possibility of changing the use of their land from agriculture to energy parks (Petrou 2017) or voice strong opposition to such economic activities in their territory, as they feel that the green projects do not meet their expectations for employment or for individual and collective prosperity.

Our ethnographic example joins the conclusions of the aforementioned anthropological works on the green economy. The lack of bottom–up engagement and mixed sentiments of people at a grassroots level due to the lack of social and environmental concerns observed in the renewable energy projects in Greece also hold true for the implementation of the various circular economy schemes.

Interestingly, training programmes initiated by the EU such as CLEAR were designed to respond to this deficiency of grassroots engagement, trying to make people understand better what the circular economy is and how to engage with it. In what follows, we explore the difficulties that such top–down efforts face in gaining popularity among local citizens, who challenge the circularity advocated by the EU programmes but at the same time do not offer any bottom–up initiatives or counter definitions of circular action of their own.

Circular EU programmes perceived 'from below'

During the last thirty years, the anthropology of the European Union has highlighted the role of EU policies and programmes as means for constructing a common European identity and promoting European integration (McDonald 1996; Shore 1993, 2000; Wilson and Bellier 2000). Anthropologists working on the EU and European identity formation have argued that policies can be usefully thought of as 'political technologies', that is, as instruments for ordering bodies in space and time and acting upon human subjects and subjectivities (Shore 2000: 9; see also Shore and Wright 1997). As Shore (2000) notes, '"policy" implies a course of action that is expedient, rational and goal-oriented; an objectified programme for penetrating and acting upon the social' (9). According to Deltsou (2014), the EU constructs and promotes itself through its policies and programmes while providing the lived experience of a European unification. Moreover, Shore (2000) argues that since the 1990s 'culture' progressively became an important instrument used by the EU in its efforts to ensure that Europeans live a common present and imagine a common future. In the context of current crises, the environment has arguably become a new leading symbol of unity among European people and its protection as a common mission. CE can be viewed as an instantiation of such a shared European path towards sustainability.

Nevertheless, the majority of anthropological works on the process of Europeanization focus on the top–down efforts of the EU elites to transform the region and get Europeans engaged with the European project. Less research has been conducted regarding the effects of those policies and programmes on different categories of EU citizens, whose habits are being targeting or whose participation is elicited. In the Greek case, Deltsou (2014: 302) observes that people who prepare funding proposals and work on their implementation do not always agree with

them or with the ways in which they are implemented. Studying EU schemes as they are rolled out locally advances multiple questions about the realities and meanings of the EU for actors and reveals the schemes' unexpected results vis-à-vis intended outcomes (Deltsou 2002, 2014).

Since Greece joined the European Economic Community (EEC) in the 1980s, European programmes had been positively perceived both in urban settings and in the countryside as levers of economic prosperity (Gintidis 2011) as well as means for fostering Greece's European identity (Deltsou 2014). However, the austerity measures that EU partners imposed after 2010 increased unemployment, housing repossession, household debt and downwards social mobility. As a result, the positive views most Greeks had about the EU have been severely tested, if not reversed, during the economic crisis. The European institutions previously perceived as an abundant 'source of money' (Deltsou 2002: 222; Gintidis 2011: 149) have become severe lenders that demand strict economic and social restructuring. The introduction of the EU projects on green and circular economy coincided with such reversal of public perception and with the escalating dependence of public institutions and private businesses on EU funding. Environmental concerns and green policies are relatively recent in Greece, and the first objective of EU projects in this context was to inform citizens about, and motivate them to join, such initiatives.

In Klisthenis, the Municipality organized two public events in order to present the CLEAR project and acquaint local citizens and businessmen with the circular economy and servitization. The first was a workshop that took place in June 2018 and was addressed to pensioners enrolled at the Municipal Centre for Adult Learning. The second one was the 'multiplier event' organized in December 2019 and described in the beginning of this chapter. In September 2019, in the framework of the pilot Waste Management Program, employees from Klisthenis, together with colleagues from four other municipalities, made a trip to Austria in order to learn about bio-waste practices in a country with long experience in this domain. As we show, most of the participants in all of the aforementioned events expressed objections and second thoughts regarding circularity and servitization as consumption models.

'This is not for us!': Subsistence and profit-making

One frequent concern was that under the current circumstances of economic crisis and degradation, circular practices seemed

disconnected from the everyday survival problems many people in Klisthenis faced. These problems have an immediate time horizon and seem incompatible with more sustainable models that foresee solutions to problems in the long term and demand participants project their life into the future. Although positive towards the green economy in general and the circular economy in particular, participating citizens and businessmen suggested that their major concern nowadays was the survival of their families and businesses. They did not detect any direct economic benefit in the new models; hence they were not willing to invest their time and energy.

Sotiris, owner of a bar-restaurant, commented:

> I cannot think of the environment, I have to bring food to my child every day, my obligations must be met, I work 16-18 hours a day, I struggle to make a living (*viopali*). This lack of interest is not selfishness though. We hear every day of people, often young, who have heart attacks or suicide because they cannot keep running their business. There is no room for environmental concerns here.

Manos, owner of an accountancy firm, expressed the opinion that the CE is a 'luxury' that most SMEs in Greece cannot afford:

> All this is great if we have in our mind the question 'what kind of world do we want to deliver to our children'. But such things concern only those who don't have to fight for their day-to-day survival. The CE is for the big industries. In Greece, most enterprises are very small. They don't have the money and the know-how to invest in circular production, they cannot afford green policies.

For a few local businessmen, recycling was already a habit and a source of income. Some restaurants sold the oils used for cooking to private recycling companies. Others did the same with large packaging: 'We did not need any incentives from the municipality, the state or the EU to do this, it was a way to get some extra revenue from our garbage', commented Marios, owner of a restaurant. Other businessmen complained that recycling in Greece is rarely a source of income for those who were asked to separate their garbage at source. Margarita, owner of a printing house, noted:

> We have been recycling for many years but not in such a systematic way as proposed now by the municipality. For example, our printing

> company keeps the scrap of the paper we use and Egyptian, Pakistani or other migrants come to pick them up and sell them to companies that make pulp from them. There used to be ninety such companies in Attica, they picked up the paper without giving us a penny. With the crisis most of these companies collapsed. . . . Now the ones who survived pay the migrants to do the work. They pay pennies but this permits those poor people to get some bread for themselves and send some money to their families back home.

Additionally, local residents expressed the same arguments that such practices do not generate any revenue for them nor help them solve their subsistence problems. At the end of the CLEAR multiplier event, Markos, aged 55, made a thought-provoking comment. He had owned a shop selling fishing equipment for over twenty years in Klisthenis but three years ago he had to close his business due to economic hardship. He said:

> We live under capitalism. EU and state policies must give the opportunity to the citizens to get a profit from the litter as the waste management companies do. If we admit that garbage is gold, then it has to be gold for me who owns it as well. But now citizens are asked to select it, to share it in different bins and finally to give it to a private company who will make profit from it. You ask me to do the job without any benefits, and this is an extra benefit for the private companies that probably wouldn't do this work if they had to pay. Why do I have to do it for free?

Municipal civil servants had a contrary vision regarding CE and bio-waste management. Michalis, a civil servant who works in cleaning and recycling services, emphasized the indirect benefits of such practices: 'if people throw less garbage, the municipality will not be burdened with additional charges, so it will not increase municipal fees, the neighbourhoods will be cleaner as the green bins will not overflow and gradually this management will help the public interest.'

And Stathis, another civil servant, continued:

> At the moment, the general goal is that the prefecture or private companies collect the bio-waste and give some compost back to the municipalities, proportionate to the sorting percentages in the brown bins achieved by each municipality. Some municipalities already distribute it to the citizens; others use it in public green spaces. As

> the waste landfills (*xomateres*)[10] all around Athens need fresh soil, sometimes the compost goes there. It is very important for the waste landfills to operate; otherwise the problem will be huge, so indirectly the benefit from the management of bio-waste reaches us.

Adriana, a 57-year-old teacher, replied to such statements about the management of bio-waste and the benefits for people using the compost and the biogas in Austria:

> I have been recycling for years. I considered it my obligation for the environment and the next generations. I used to empty my house every six months of any useless object; I was selling or giving them away. This is to say that I am in favour of circular economy and recycling. What is useless to me is useful to someone else. But I cannot stand this mockery with the garbage anymore! So I stopped recycling, it is not me that has to wash and distribute in the proper bins so that all the dirt stays in my house! No, they [the municipality, the state] must hire people and do the sorting wherever they want, at the source, in the warehouse, but not in my house. I do not see any benefit for the citizens here.

Servitization, meanwhile, seemed a business model that was very distant and unattainable.[11]'Most businesses here in Klisthenis are very small and already provide services, like bars and restaurants or retail shops. Recycling can give them extra revenue but how to reconvert to circular services? I find this difficult to understand', Marios, a business owner, said voicing the popular opinion.

It was a common view among the participants that the indirect benefits were not a sufficient motive for reconsidering the way that they used their waste and that if there are profits to be made through the CE and servitization, these have to be direct and shared with the citizens who make the collection. Otherwise, such policies were perceived as 'free' labour provided by consumers to the private enterprises. SME

10. In Greece non-recycled garbage is interred and not incinerated.

11. Businesses in the municipality of Klisthenis consist of small and very small, mostly family-run enterprises. The majority are active in retail commerce (such as clothing and footwear, food and beverages, pharmacies, electronic appliances), services (such as telecommunications, hair and beauty salons, accounting or IT services) and leisure (coffee shops, bars and restaurants).

participants made it clear that such policies have to be accompanied by substantial funding and information sharing from the state and the EU. Both citizens and small businessmen considered the policies to be primarily concerned with the profit of big corporations and not a fairer distribution of such profits among the different categories of participants in circular projects.

Diverging temporalities: 'This is not new' . . . but 'it is something brand new!'

Another form of a critique came from some older participants in the events organized by the municipality in order to promote the CLEAR project. Those present in the workshop in June 2018 were mostly pensioners that were also attending the courses for digital education offered by the municipality. Most of them were motivated to take these courses in order to learn how to use the internet for communicating with their children and grandchildren, who, because of the crisis, had migrated to work or study abroad. During their computer courses they had accessed the CLEAR webpage, as well as the Municipality's website, to explore all the sections and the material it contained. Most of them said they were interested in the CLEAR project. For many, it was the first time that they were coming into contact with a collaborative European project and were delighted to participate.

When the workshop was about to finish, Stella, a retired primary school teacher, who had stayed silent during the meeting, turned to Mimina and said with a wry smile: 'This is not new! My grandma never had problems with waste management in her house in the village sixty years ago. People at that time respected their place, their animals, the people around them, and threw nothing away.' Others shared similar stories from their childhood in different Greek villages during the 1940s and 1950s, remembering how almost everything was used and very little waste was generated. 'If I understood the presentation well, our parents did a kind of circular economy!' Maria, a 72-year-old housewife, concluded proudly. Looking at their faces, Mimina discerned that there was a new glint in their eyes. They seemed happy realizing that they knew how to deal with such a supposedly 'new and innovative project' that had the ambition to ameliorate their everyday lives and make the future more sustainable for their children and grandchildren. As Georgia, a 66-year-old pensioner and ex-bank employee, reflected:

> Our discussion reminded me of a documentary I saw on the TV some time ago: in the UK there are some new supermarkets where products are sold without packaging, you have to go with your own cloth bags, as we used to do when I was a child here in Klisthenis. We went to the grocery and bought bulk rice, bulk pulses, bulk oil. It seemed strange to me to return to such practices, but now it makes more sense, this is a way to get rid of all these polluting single-use plastic packages.

As the discussion continued, they realized that although recycling is part of their everyday practices, the reuse of materials and repair of objects are not a common habit anymore, and even when they are, they are not recognized as important. Whereas in the past repair and reuse used to be part of the family's daily routine, today the convenience of single-use products and the low cost of mass-produced goods mean such practices are not considered necessary. On the contrary, especially among people with lower income, the possibility of over-consuming and discarding waste is considered a modern practice associated with prosperity. Antonis, a retired electrician, noted:

> Our parents and our own generation used to take care of our stuff, we didn't throw anything away, even if we lived in the town. Because we thought that this or that part of a pencil, of a radio, whatever, might be of some use one day. Our children learned to throw everything away and buy new clothes, new washing machines, new cars, everything new! Well, the truth is that now the quality of the products is less good and their duration much shorter, so that we are pushed to buy new ones all the time.

Then, Michalis, a retired taxi driver, replied to another participant amid a discussion: 'Stella you are right, that was life back then! But nobody would have thought that today we would return to that again! We are in the twenty-first century and everybody in my neighbourhood burns whatever wood they can find in order to warm their houses because they cannot afford central heating any more. Aren't we going steps backward?' Eleni, a senior housewife, continued this argument: 'my granddaughter asked me to teach her how to sew. Before, she was buying new clothes all the time, now as she lost her job and has less money she thinks it is useful for her to know how to repair them or make something new out of an old piece of cloth.' Finally, Dimosthenis, a retired plumber, pinpointed another aspect:

> Regarding the servitisation model, as you describe it, I do not need to own a car, I can just lease it, it will be cheaper for me and better for the environment. But for my generation, to build your own home and to own a good car were the proofs of a successful life. For me, it is difficult to abandon this idea.

The ownership of the car in this context was not only a practical matter of transportation but also one of economic affluence, prestige and social position. Not owning such an asset was considered an economically reasonable choice but a socially unacceptable one.

Although most of the seminar's participants recognized that traditions centred on sharing, solidarity, trust, respect and responsibility could be of use in their current lives, they were reluctant to envision a different future from the modern ideals of affluence and improvement of living standards. Since the Second World War, Greece experienced economic growth as well as a massive rural exodus. After the accession of Greece to the European Community in 1981, a large strata of the population enjoyed increased prosperity, associated with a consumerist model of development. The success was to escape from the hardships of rural life and share in the comforts of an urban life instead. But such standards and ideals were severely challenged by the crisis that put livelihoods into a reverse course. It was difficult for many Greeks to accept that recognizing the scarcity of natural resources and limiting overconsumption could be a way to get through economic hardship without threatening their participation in modernity or progress.

While some of our older interviewees recognized that CE practices were not so novel to them, others found the EU drive towards more sustainable consumption to be too hasty for the case of Greece. For example, the civil servants that participated in the training trip in Austria – most of whom worked in the cleaning services of their municipality and had experience in waste collection and management – mentioned the precipitous character of the implementation of the EU demands on bio-waste management and the lack of consideration of the different practical and cultural conditions in the different EU countries that are asked to implement similar environmental goals.

One of the arguments advanced was that big changes in waste collection were demanded by the EU in a very short period of time. After the visit to the bio-waste processing unit of a small Austrian town, during the dinner in a restaurant Grigoris, a 56-year-old head of

department for cleaning and recycling in the municipality of Kydonies, commented:

> It is easy to introduce new labels like 'bio-waste management' or 'circular economy' but it is really difficult to put them into practice. The situation in garbage management is already difficult in Greece: the vehicle fleet is getting old; the workers are retiring or getting old. Bio-waste is something brand new. Such radical changes in people's habits take time and systematic work is not done overnight.

Elias, a mechanical engineer and the director of the cleaning and recycling services and trade unionist at nearby municipality, added:

> The EU sets some common goals among the member-states. But the distance between them is huge: look at Austria which has been working on bio-waste for thirty years, and at Greece which is just starting. How can they ask them to perform equally, have the same quotas and performances? The demands are impossible to meet and the actions required need time, substantial amounts of money and people to work for them.

Similar ideas about the disparity in financial resources, know-how and historical conditions among different EU countries were advanced during the 'multiplier event' some months later. Stamatis, a municipal employee involved in the bio-waste management and a PhD candidate in environment and recycling, reflected:

> The reduction of household waste is most often identified with the recycling of packaging materials, without making a conscious effort to manage waste in such ways so as to reduce its volume. Organic waste composting is an unknown practice for most, not to mention reuse practices or shopping in bulk! In Greece recycling – mostly of paper, aluminium, glass, packaging plastic, batteries, car lubricants and tires, electrical and electronic appliances – has been around for fifteen years. It gradually becomes a habit and something people get to know well and understand. The rhythms are slow and the means restricted. We will definitely need time to reach the bio-waste management goals, never mind circular economy practices. We have to be patient and very active.

Amalia, a pensioner lawyer, noted too: 'When did the Austrians face an economic crisis? Let me tell you, no crisis affected them for the

last 100 years, not even during World War II. How can we compare to them?'.

Such comments show a preoccupation with the unequal temporalities between member states regarding the application of EU measures on waste management and changing consuming habits. Our interlocutors recognized the necessity of such measures but felt that countries like Greece lack the financial means and do not have established ecological habits among the population and as such should be given more time for people to become familiarized with and accept green and circular policies. Moreover, they acknowledge that there is a need for specific actions by national and local authorities to work with people's perceptions and values, especially in lower middle-class locations like Klisthenis. There, people who fought all their life to join a model of an affluent consumer society express doubts and resistance towards circular practices, which they consider as a return to a premodern condition and as a direct challenge to their conception of what a modern way of life entails.

'We need motives not fines. We need a new, social, vision!'

In order to reduce waste, some measures are planned by the government at the time of writing this chapter. One of these measures is the calculation of municipal charges for waste collection. Such an idea is not specifically Greek but harmonizes with relevant EU directives. Presently, the cost of waste management in Greece is covered by a local tax that is calculated by the square footage of each house. This practice goes in the opposite direction to the EU principle of 'the polluter pays' in which each household is taxed on the amount of waste it produces. National and local authorities have been preparing to introduce organic waste bags that will have a code and will aim to limit how much waste each household can generate without facing extra charges. This is an indirect way of pushing people to adopt recycling practices. Still, they hesitate to apply such a measure as they know that most citizens are hostile to it. According to our interviewees, such policies imply a kind of 'punishment' for those who do not recycle their garbage rather than providing 'benefits' for those who do. Most participants disagree with such disciplinary measures and are in favour of being treated as active participants in a common engagement for the future. As Toula, a teacher, comments: 'they (the EU, the state, the municipality) talk about servitization, about making citizens provide

something new and useful though their litter and become more sensitive to environmental issues through circular practices, but then they treat us like children who haven't done their homework and have to be punished.' Vicky, another teacher, added, 'we need incentives to endorse recycling and circular economy, not fines!'

On the contrary, some officials seem to share the idea that punitive measures can prove effective for the application of green policies. For example, the deputy mayor, responsible for the general tidiness of the town, highlighted the indifference of many citizens, and of businessmen more specifically, to keeping the city clean. He referred to the promotional leaflets that the various companies throw in the streets without thinking about the pollution they cause. He argued that this was because they knew they would not be fined as legal loopholes allow them to go unpunished.

Among the most sceptical to the official definition of the CE during the 'multiplier event' were teachers invited in order to be informed about the CE and transmit this knowledge to their students. Alex, a teacher, emphasized the role of 'sharing' and 'reciprocity' in environmental policies:

> This is what we have to focus on. To share our garbage treasure and be all of us part of the profit that it can produce. We need to create local groups of interest, in our neighbourhoods, in schools, to participate in a municipal or regional network and collaborate. And then take something back, for instance compost for our gardens or a discount on our taxes, or any other reciprocal benefit from our collective work.

Many expressed a will to engage in changing everyday habits and creating social synergies, but demanded information and guidance 'from above'. As Magda, a physical education teacher, noticed: 'citizens have a big lack of civic education and throw their litter in nature without a second thought. The Greek government and especially municipalities have to pay attention to citizens' awareness. We need to work in groups and act collectively, guided by well-informed coordinators'. Some of the teachers noted that the most successful environmental projects to date took place in schools. Kiki, a primary school teacher, explained:

> We have related courses and do a lot of recycling programmes at school and both children and their parents respond. This is because there is a school community there, and a small size task that

> everyone can invest in. Municipalities and the state should support this. Recently, we did an upcycling activity in my class: we used paper, cardboard and other materials children brought from home in order to make Christmas ornaments and handcrafts. In that way, I overcame the lack of money for the decoration of our class and passed on the message that you can make something new, beautiful and useful from your garbage.

Similarly, some civil servants stressed during their trip in Austria the major importance of the cooperation of citizens in the success of such a shift in the ordinary habits related to the generation of waste. Everyone admitted that in order to achieve this shift in mentality and everyday practices, bio-waste management should first be implemented in a small part of the city and in consultation with the residents. Dimos, a cleaning supervisor from the municipality of Lefkonoi, explained:

> Look what we did, we chose a neighbourhood of the city to start with and the mayor with a team of experts has literally visited every house. They talked face-to-face to the citizens and explained what the brown bins are for and how they will transform their neighbourhoods. People embraced this action; this is the reason why Lefkonoi is one of the few successful examples in Athens regarding the use of brown bins.

Another problem they pinpoint is the lack of space for proper waste management in an overpopulated region like Athens. Stamatis commented: 'I'm in favour of a circular economy but I think such projects can be applied in small spaces, i.e. small communities that have spaces to manage their bio-waste but also less garbage to manage. But it is much more complicated to apply it in Athens, where half of the country's population lives.' And Dimitris, an engineer, continued: 'We have densely populated neighbourhoods and almost no free spaces either in the city or in the region, so it is difficult to configure bio-waste treatment areas so that the compost can be delivered immediately to the local citizens, as it is the case in Austria.'

From the discussions, it was evident that most of the participants were not against changing their everyday consumption and waste management practices but sought better information and guidance. They looked for a more inspiring social perspective that provides economic benefits but also brings people together for a common goal and promotes interpersonal relationships, reciprocity and small-scale

action. They also objected to being treated as passive recipients that will just follow a directive from a distant office in Brussels and asked for a consumption model that goes beyond considering citizens only as consumers or customers: 'citizens should be placed at the centre as a driving and creating force of a more general move, that doesn't generate only profit but also a vision for the future', concluded Magda.

Conclusion

The example of Klisthenis shows how EU projects on circular economy that engage people in new ways of practicing and imagining their economic and civic action are questioned by the participants. People in our study rejected hegemonic ways of thinking and practicing circular economy, yet they did not appropriate CE according to their own visions or promote grassroots alternatives. We argue that the reason for such a mixed response is that the CE projects assume that convincing people about the value of sustainability is crucial to success. According to our research, people tend to appreciate such values and link the CE to practices of frugality they associate with the past, but at the same time they struggle to see the CE as viable in the context of post-crisis Greece. Such everyday practices as sorting waste, collecting bio-waste or pressuring businesses to add new models to their operations are perceived as too much of a burden to take in the context of the everyday struggle for economic survival. In addition, people feel that the CE programmes devolve too much responsibility onto people, making them 'work' (e.g. by sorting out household waste) for big enterprises. Such suspicions gel with a post-crisis sentiment of exploitation amid intra-European and class inequalities.

Moreover, the lack of grassroots engagement can be explained by the mistrust of a circular economy vision which challenges a productive economic model based on continuous development, affluence and consumption that for many generations of Greeks was seen as the means to go beyond a traditional way of life and attain modernity. The lack of local engagement also seems to be related to the fact that such EU projects do not provide alternative ways to solve everyday subsistence problems. Although they are supposed to promote technological innovation, environmental sustainability and social cohesion, big corporate profit seems to be the priority and thus the CE fails to represent an alternative to austerity and environmental degradation. For local citizens, the CE ought to be about different modes of sociality rather than making money through green values. People seem to look

for a multi-level collaborative process that includes them not only as entrepreneurs, consumers or users but also as citizens and social beings. Thus, invoking the CE in isolation from its particular social and historical context seems ineffective and detached from their lives, needs and expectations.

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Chapter 5

Disruptive but normalizing?

What the formalization of informality can tell us about the circular economy in the Global South

Sebastián Carenzo and Lucas Becerra

Introduction

The circular economy (CE) framework provides a new perspective on waste and resource management. It invites a rethinking of current social and economic patterns of production and consumption by encouraging reuse and recycling as a means to reduce resource extraction (EMF 2012). The most optimistic approach to the economy highlights its potential to decouple the use of virgin resources from economic growth, thereby contributing to sustainable development (Reike, Vermeulen and Witjes 2018; European Commission 2015). The promoters of a systemic and global CE highlight that this proposal provides a coherent and feasible roadmap to transition from a linear economy (take-waste-dump) to a circular one based on flows of materials and energy which are integrated again into the productive processes through loops and cascades (Webster 2013). This transition advocates for restorative and regenerative design of products and production processes (Stahel 2016), as well as new relations of consumption and distribution of goods, minimizing individual use and discarding in favour of collaborative dynamics (Cohen and Muñoz 2016). Therefore, the CE could be framed as a powerful narrative of change (Blomsma and Brennan 2017) which has seen a broad deployment in industrialized countries and has also spread to the Global South (Schröder et al. 2019; Muchangos 2021).

As the concept travels to new territories, it confronts more heterogeneous contexts, driving new theoretical and empirical tensions. Brennan and Alexander (2017) warn that mainstream

CE models have made little effort to incorporate social and cultural differences in a systematic and rigorous way. They argue that the development of the CE shows a strong bias towards business models focused on industrial design, engineering solutions and products of mass consumption.

Our argument builds on the identification of two complementary tensions regarding the potential implementation of Circular Business Models (CBM) in the Global South. The first tension unfolds when considering the potential role of the CE in fostering or inhibiting social inclusion in the context of a sharp growth of social inequalities since the 1970s all over the region (Mohanty 2018). As we already mentioned (Becerra, Carenzo and Juarez 2020), circular economy initiatives are considered to be green and lucrative business opportunities. However, it is still unclear how these new circular guidelines could create mechanisms aimed at the individual and social development of workers and their communities. Complementarily, the second tension focuses on the CE's adequacy for the Global South, as up until now many of the local initiatives have followed the mainstream interpretation of the CE elaborated with the Global North realities in mind. Such a narrow view of the CE could foster the involvement of corporate and business actors in the CE, while community-based organizations (CBOs) and social movements are kept out, even when they have developed a wide range of innovative techno-productive and ideological practices that adhere to the CE principles (Carenzo, Becerra and Juarez 2022). Hence, the CE narrative shows an interesting ambiguity, as it provides a disruptive narrative in the North – that is, contesting linear production and consumption patterns – but, at the same time, represents a normalizing narrative in the South – promoting a unique global sustainability benchmark. In this sense, the 'formalization' of so-called 'informal recycling' provides a powerful tool to problematize the ambiguity of the CE within the Latin American context. It is possible to follow the disruption versus normalization dyad in terms of how it translates onto models of organization for the 'informal' workers within local CE initiatives offering contrasting visions of waste, knowledge and labour. What dynamics of formalization of grassroots recyclers are promoted within CE initiatives? And to what extent do these dynamics deal with the social asymmetries and inequalities faced by grassroots recyclers?

To answer these questions, first, we introduce a set of ontological and methodological definitions in order to frame a debate linking political ecology, circular economy and formality/informality dynamics.

Second, based on empirical data, we characterize the prevalent forms of formalization of grassroots recyclers in local CE initiatives. Third, we provide a comparison between these forms in order to problematize the deployment of the CE in the Global South.

Setting the debate: Ontological and methodological definitions

Based on a review of 114 definitions, Kirchherr, Reike and Hekkert (2017) developed a comprehensive theoretical category of 'Circular Economy' as

> an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim of accomplishing sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers. (Kirchherr, Reike and Hekkert 2017: 230)

The generic and ideal notion proposed by these authors implies a set of second-order definitions in order to identify – at the empirical level, in the policy agenda and in the concrete actions of relevant social groups – any of the elements involved in different socio-economic contexts. In this sense, the categories such as an 'economic system' or 'novel business models and responsible consumers' require other definitions to make the CE concrete.

Since this chapter works with dynamics situated in Argentina, seen here as a country with very similar socio-economic dynamics to the rest of Latin America, it is necessary to establish a preliminary ontological discussion. Following Barreda's (2017) and Giesen's (2017) contributions to the political ecology of waste in Latin America, we distinguish three key elements to frame the ontological status of the CE in the Global South: waste, space and labour.

Currently, within the northern hemisphere, most waste streams are considered to be economic resources once they become an input, for example, as fuel in waste-to-energy plants. In this context, the creation of an alternative CE flow, which moves away from burning waste

towards encouraging minimization, reuse, recycling and repairing, does not change the ontological condition of waste. This is because it is a fixed material redirected into a new valorization cycle. Both flows – WtE and CE – exist in the economic system involving formal and legal actors and tracked resources.

In contrast, in Latin American countries, the most common way to create value from waste is by managing it as stocks. To guarantee waste's disposal in landfills or dumpsites, various waste services, infrastructures and logistics are needed on a daily basis. Most service providers are private corporations, and the more waste they stock in landfills, the more money they earn. In fact, until 2006, waste picking was considered a criminal offence in Argentina as it represented competition to the various more established waste actors (Sorroche 2017). Therefore, we should note that within these Latin American contexts, circularity as a disruptive proposition was associated with waste pickers. It is their activities that adhere to a contrasting value-adding logic, not one based on stocking waste in landfills but creating new opportunities for reuse and recycling of discarded materials (Carenzo 2011). This phenomenon had an enormous impact as it provided an alternative setting for considering waste (as a flux), space (marginal spaces), and labour (waste picking as a proper job). Therefore, unlike in the Global North, here the CE of waste was already being built from the margins, and embodied in the daily practices of hundreds of thousands of so-called 'informal recyclers', a precarized population that still faces structural violence and struggles for a social recognition.[1] In that sense, what remains to be seen is the extent to which the CE as a narrative of change commits to social inclusion of these marginalized groups.

Following Anantharaman (2017), we should note that 'informality' has been scarcely tackled as a key issue in the early specialized literature about the CE. Beyond rhetorical references to the benefits of taking

1. We are aware that this characterization is not restricted to Global South contexts or Latin America. A growing literature evidences that even in industrialized Global North countries there are populations who make a living from valuing recyclables from waste streams (e.g. Wittmer and Parrizeau 2016; Scheinberg et al. 2016). However, what we are stressing as a difference is that, beyond the differences regarding the size and political weight of these populations, in Latin American contexts wastepickers' existence was key to thinking about waste as a potential flux instead of a stock, something that existed long before in industrialized countries linked to the WxE schemes.

into account informal recycling in Global South contexts (Velis 2017; Conlon and Ranahansa 2019; Ferronato et al. 2019), a growing literature is focusing specifically on how to match inclusive recycling and the CE (Gall et al. 2020; Schröder et al. 2019; Barford and Ahmad 2021). Particularly regarding Latin America, a number of contributions focus on the governance models (Noble 2019; Miranda 2020) and regulatory and financial frameworks (Calderón Márquez and Rutkowski 2020) in fostering or inhibiting the inclusion of informal waste pickers in local CE initiatives. Other scholars have also criticized the adoption of mainstream CE frameworks developed in industrialized economies, questioning its adequacy for local contexts and calling for a clearer dialogue with other conceptual frameworks such as the Social and Solidarity Economy (Gutberlet et al. 2017) and Environmental Justice (Amorim de Oliveira 2021).

This literature has greatly contributed to highlighting the key role of waste pickers in fostering the CE in countries like Brazil, Colombia, Ecuador and Argentina, among others. At the same time, it has stressed the need for further developing the CE approach by taking into account not only the local economic, political and cultural frameworks but also the analytical and methodological tools used to interrogate or implement the CE in such contexts. However, we should also note that in most of this literature, waste pickers are considered as an unbounded object, which may include a range of actors, from individuals who collect recyclables to make a living through to established cooperatives providing specialized waste services to municipalities or enterprises. In parallel, the formalization of so-called 'informal recyclers' remains loosely analysed on its own terms. Instead, it is often subsumed in the broader conceptualization of 'inclusive recycling', which addresses a very heterogeneous range of public policies targeting waste pickers, including promoting their social recognition or citizenship and the implementation of EPR mechanisms to finance their collection initiatives.

No process of formalization could be considered linear or even homogeneous. However, in order to further develop our argument, in what follows we characterize three main models in which the formalization of waste pickers proceeds:

Formalization as workforce: This model conceives of formalization in terms of the transformation of waste pickers who used to engage in kerbside or dumpsite collection into waged workers devoted to sorting recyclables in industrial facilities, managed by either private enterprises or governmental agencies (Cross 2013; Lethbridge 2017). It takes its

origin in public initiatives aimed at the closure of open-air dumpsites or the banning of informal collection in public spaces, framed as integrated sustainable waste management (ISWM) policies. It entails engineering-based solutions (mechanical infrastructures like conveyer belts, balers and presses) to increase the labour productivity of those sorting the waste collected by public or private companies with the aim of providing a continuous flow of sorted materials to the recycling industry. This model formalizes waste pickers as a cheap workforce in recycling facilities which they do not own, generating an output they do not control as it is marketed by the managers of such sorting facilities.

Formalization as social entrepreneurship: The second model achieves recyclers' inclusion through fostering social entrepreneurship initiatives (Perrini and Vurro 2006), which in Latin America countries have taken the form of workers cooperatives fostered by public policies and programmes (Medina 2007; Marello and Helwege 2018). This scheme aims to encourage the association of waste pickers who used to work in an atomized and individualized way. The underlying assumption here is that when working collectively waste pickers can gain comparative advantages (e.g. avoiding intermediaries as they reach more waste volume together in order to then sell it to big buyers). This model has been encouraged by public policies through the constitution of working cooperatives, becoming a key governmentality tool linked to the ISWM paradigm (Carenzo and Fernández Álvarez 2011). From its perspective, governmental support should be limited to guaranteeing access to legal and fiscal assistance. The aim is for cooperatives to become autonomous and independent economic entities devoted to collecting and sorting recyclables. However, such schemes tend to overlook the existence of oligopolies that set purchase prices or such collectives' spatial concentration in metropolitan areas (da Silva 2019). As such, waste pickers cooperatives have few chances of getting out of their subordinate position. Instead, while they provide key inputs to the recycling industry, they appropriate a minimal portion of the income generated in the value chain (Rogan et al. 2017).

Formalization as social and environmental service provision: This third model is also based on the establishment of cooperatives enabled by public policies. However, it differs from the previous one, as it involves the official recognition by public authorities of these organizations as providers of social and environmental services to the public. From this perspective, waste picker cooperatives are involved in the co-management of the waste infrastructure along with local governments and private firms. Beyond their ability to collect, sort

and market recyclables, waste picker cooperatives can charge third parties for the specialized services that they provide. This model of formalization aims to equate the working conditions of the recycling cooperatives with those of private or public companies that provide the regular collection and transportation of waste. This model has been created by several cooperatives and federations around the continent, which were then included within the municipal waste management systems in countries like Brazil (Gutberlet 2015), Colombia (Parra 2015) and Argentina (Schamber 2012). However, for the majority of waste pickers' organizations on the continent such a form of formalization is an aspiration that is difficult to achieve (EIU 2017).

Our emphasis on deepening the analysis of the formalization modalities is based on the fact that, as we aim to demonstrate, formalization has broad implications for the specific roles assigned to waste pickers within the CE, and for the selection and implementation of CE models. In the following section, we examine the implications of these forms of formalization for the potentials and constraints of CE initiatives in the Global South.

Circularity rules! (but formalization matters)

In what follows, we develop an in-depth empirical analysis of the most distinct waste picker formalization models ('formalization as a workforce' and 'formalization as social and environmental service provision') in order to consider the extent to which the CE may cement social inequalities or disrupt them.

In the extreme south of Argentina (city of Ushuaia, province of Tierra del Fuego), Pulpo S.A. provides waste management services to several industries located in its free trade zone. By reusing discarded paper and cardboard, they manufacture PULPAK®, a green product for household appliance packaging. This cellulose-based packaging replaces standard expanded polystyrene (EPS), which cannot be recycled in its post-consumer phase. Due to this innovation, the company gained recognition as a corporate model in the local CE field. According to the specialized literature, Pulpo S.A. is an exemplary model of a triple impact corporation which deploys a circular economy in a win–win scheme. First, they contribute to minimizing the volume of waste generated by large industries, preventing it from being dumped in oversaturated municipal landfills. Second, through eco-design they replace single-use plastic packaging with an alternative made of recycled paper pulp, thus

extending the life cycle of raw materials. Third, they contribute to the SDGs through the provision of 'decent work' for people who previously engaged in the informal collection of waste. Finally, they generate a very profitable business, as they charge manufacturers for managing their waste from which they make PULPAK®, selling it as a recycled input back to the same manufacturers (Kowszyk and Maher 2018).

The local impact of Pulpo S.A. as an important CE actor needs to be seen in the context of waste management within Ushuaia. Over the last decades, the city was riven with social and environmental conflicts linked to the existence of 'informal' waste management practices. On the one hand, both large and small factories used to unload industrial scrap in clandestine garbage dumps to avoid paying municipal landfill fees. On the other hand, those places attracted an unemployed population that collected recyclable materials for resale (Orzanco 1999; Bergero et al. 2012). In 2007, the city government launched the programme 'Ushuaia Recicla' (Ushuaia Recycles) to formalize its waste management. It focused on the collection of discarded tires and plastic/glass containers, educational campaigns in schools and eradication of clandestine dumps (Chiari 2013). During the first stage, more than seventy collection points were established. However, as they lacked recycling facilities, the materials had to be transported 200 km far, to the regional capital of Rio Grande (Municipality of Ushuaia 2013). In 2012, Pulpo S.A. started to operate in the industrial park. The municipal elections of 2015 changed the political leadership of the local administration, and the public recycling initiative was replaced by 'Ushuaia Sustentable' (Sustainable Ushuaia), which maintained the municipal collection system through 'eco-points' but delegated the processing of all recyclable streams (paper, cardboard and plastics) to Pulpo S.A. (Chiari 2013). The company doubled the volume of processed recyclables and updated its equipment by acquiring expensive machinery from abroad. The agreement also benefited the company as it enjoyed a fee exemption for dumping waste in the municipal landfill (NotiTDF 2016). In 2018, the parties signed an addendum to renew the agreement that allowed for doubling the volume of PET that the municipality collects to be treated by the company (El Surenio 2018). Since then, Pulpo S.A. has obtained half a dozen awards for environmental sustainability, including the one granted by the Eu-Lac Foundation, which recognizes the best business strategies for integrating Circular Economy and Sustainable Development Goals (SDG) in the European Union, Latin America and the Caribbean (EuLac 2018).

Despite these successes, the Pulpo S.A. case provides an example of the shortcomings of CE initiatives driven by the 'formalization as workforce' model. Echoing the contributions of scholars that evidenced processes of exclusion and dispossession of informal recyclers in Latin American cities such as Managua (Zapata Campos and Zapata 2015), Bogotá (Tovar 2018) and Montevideo (O´Hare 2019), what happened in Ushuaia can be framed in terms of a 'privatization of informality' (Roy cited in Tovar 2018). This is because a process of appropriation and accumulation in favour of a private enterprise underpins the narrative of a successful sustainable innovation in the spirit of the CE. First, Pulpo S.A. was allowed to have exclusive access to the flows of recyclable materials collected by the local government without having to pay for these supplies. Second, the company made use of a formalized cheap workforce that previously gained skills as informal waste pickers to perform the sorting of recyclables to be incorporated into the company's flagship products.

Under the lens of the mainstream perspective on the CE, this process is described as the core of the company's 'social inclusion policy' (Kowszyk and Maher 2018). The underlying assumption is that for precarized and unskilled populations like informal recyclers, any kind of formalization is positive. As evidenced in the next case, formalization trajectories of waste pickers within the CE may overcome subordination.

Looping odd recyclables and disrupting asymmetries

Other innovations also targeted EPS waste in order to minimize its environmental impact. Rather than being corporate waste management enterprises with full access to financial and political resources, the innovation developers were members of Reciclando Sueños, a waste pickers' cooperative located in the outskirts of Buenos Aires. They designed a new process to reuse discarded EPS and create a new product. They produce 'recycled polystyrene pearls' by shredding EPS chunks, which they then sell to the building industry for lightweight concrete structures and thermal insulation. Products of this kind are already offered in the local market, yet they are made from virgin polystyrene. This alternative product thus has a direct impact on minimizing the extraction of fossil fuels used to produce plastic polymers and the volume of waste buried in landfills. Economically, the innovation allowed the cooperative to add value to an unmarketable material, passing from zero

to Argentinian $1 peso per kilogram. In fact, currently the cooperative produces up to 10 tonnes per month of recycled pearls, which represents one of their main sources of income after their cardboard and PET sales. In addition, the innovation had a direct impact on the creation of green jobs, as it allowed for the recruitment of ten new associates to be involved in the new productive process. It also benefited four other waste picker cooperatives located nearby, which were now able to sell the recovered EPS that they previously would discard. Last but not least, the association is negotiating with another cooperative to transfer them the developed technology in order to set up another node of recycled EPS pearl production.

The whole trajectory of this innovation took almost a decade of experimentation, which, beyond some resources provided by public agencies for R&D projects, was mostly funded by the cooperative. This implied that the process was characterized by several discontinuities, pauses and restarts, linked to the weak economic performance of the waste pickers' cooperative that on many occasions even put at risk the very continuity of the process (Carenzo 2020). Furthermore, the cooperative not only faced a lack of access to financial and technical resources, it even had to struggle to get their techno-cognitive skills recognized by science and technology professionals and governmental officials (Carenzo and Trentini 2020).

Despite these constraints, the EPS innovation developed by Reciclando Sueños needs to be framed in the context of the waste picker sector demands for the recognition (in social and economic terms) of the specialized waste management service they provide. The cooperative was one of the first in being accredited as a 'Sustainable Destination' by the environmental authority of the Buenos Aires province (OPDS), which allowed them to provide management of the recyclables fraction to the so-called 'Large Generators' (LG) of waste (Sarandón 2016). Due to this recognition, the cooperative not only gets access to those recyclables streams but may also charge the LGs for the provided service. In turn, the cooperative can issue an official certificate to the companies, establishing the type and volume of recyclables that are recovered, which will be reincorporated into other productive processes. Actors, cooperatives and companies are periodically audited by the OPDS.

Within this framework, Reciclando Sueños have signed contracts with two LGs which, among other recyclables like cardboard and HDPE, produce a high amount of EPS waste. The cooperative's innovation was key to getting these contracts as no other private waste management

service provider (including big corporate players like Veolia) could offer an environmentally sound treatment of EPS. Therefore, the service offered by the cooperative was far more convenient for the LGs, as recycling EPS improved their waste recyclability rates. Consequently, the case also contributed to strengthening the recognition of the waste pickers' cooperatives as specialized service providers that bring about positive impacts in the economic, social and environmental conditions linked to waste management (Gutberlet et al. 2017; Gutberlet and Carenzo 2020).

Despite its obvious contributions to both the CE and the SDGs, the innovation trajectory developed by Reciclando Sueños has never been acknowledged as such by the mainstream actors in the CE field. With neither awards nor recognition for the circular loops they designed and implemented, the Reciclando Sueños case (among others) evidences what we call a circular economy 'from below' (LabIEC 2020), which contests the normalization of existing asymmetries linked to circular dynamics prompted by the 'privatization of informality' model. In contrast, we propose to capture the kind of innovations developed by Reciclando Sueños in terms of social practices of commoning. Following David Bollier's definition, we consider these practices as 'acts of mutual support, conflict, negotiation, communication and experimentation that are needed to create systems to manage shared resources' (2016: 13). This notion is based on Linebaugh's (2009) framing, in which commoning constitutes a practice and not a given idea or a material resource. In this sense, as an oppositional category to the privatization of informality, we propose the notion of 'formalization of commoning' by which the formalization implies a process of strengthening collective organization, which includes increasing the flows of knowledge and developing new circular loops as an experiment governed by the grassroots themselves.

Circularity, innovation and formalization

Drawing on the analysis of the two cases, we want to very briefly summarize a set of learnings. To do so, we define criteria that focus on the relation between the innovation process for designing and implementing circular loops and the formalizing model which backs it up.

First, let us consider the problem and solution dynamics involved in each innovation trajectory. In both cases there is no differentiation

between designers and users. Those who define the problem will also be the ones who adopt the solution. Particularly, in the case of Reciclando Sueños, this is an important emphasis considering that waste pickers are usually seen as mere adopters in technology transfer schemes.

The cooperative also has a specific approach to how it defines systemic problems compared to an enterprise. For Pulpo S.A., the key objective has been to add value to standard recyclables. For Reciclando Sueños, the problem revolves around how to widen the range of materials that could be effectively processed, as happens in the case of materials like EPS. However, the cases differ significantly in relation to the solutions provided. The solution of Pulpo S.A. is determined by existing technologies. In contrast, even when Reciclando Sueños' innovation also involves a creation of a new product (recycled EPS pearls), the product gets framed in a wider systemic perspective as the innovation targets the very foundations of the criteria from which recyclability is defined. Therefore, the non-recyclability of EPS is not derived from its material and technical complexity but from its market determining factors (mainly its costly logistics). From the point of view of corporate waste management companies, it is cheaper to dispose of EPS waste in landfills rather than invest in R&D to come up with new recycling procedures for this unusual material which is very expensive to transport before its treatment. In contrast, from the perspective of Reciclando Sueños, to find a way to recycle EPS through an R&D process, underlines their role as providers of specialized social and environmental waste management services. In doing so, they put at the forefront the scandal of dumping plastics due to market considerations that are shaping the local recycling field.

One key difference between both innovations is with regard to the type of knowledge involved. Besides large investments in machinery, the development of PULPAK® required the hiring of industrial engineers and designers in order to provide expert advice. In contrast, the EPS pearls were developed by the waste pickers themselves based on their own knowledge repertoire derived from experience with the discarded material. This makes a lot of difference in terms of epistemic politics, as while the former is carried out within the boundaries of legitimated professional-cum-technological knowledge, the latter pushes forward to open those boundaries to make room for the unexpected but valid knowledge repertoires developed by waste pickers. The knowledge dynamics in PULPAK® guarantee the private appropriation of its results, which are protected through a set of property rights on the innovative

product (patents and registrations). The development of EPS pearls also required a high amount of local expert knowledge. However, rather than being restricted to the cooperative which has developed it, the innovation gets shared with other cooperatives to strengthen sectoral possibilities of being recognized as specialized service providers. Through visits from other cooperatives to the Reciclando Sueños and frequent sectoral workshops, the innovation is shared and diffused. In this sense, our support as academics in systematizing the process and results serves as a contribution to the collaborative knowledge exchanges among different cooperatives.

One common positive attribute of the circular economy initiatives developed by both Pulpo S.A. and Reciclando Sueños is that they involve several production units. The former takes the shape of a loop which consumes the collected cardboard to elaborate a new cellulose-based packaging to be sold to some of those industries that initially provided the material. The latter is configured through a cascade model by which discarded EPS becomes a product for the building industry. Both loop and cascade contribute to waste disposal minimization, as well as generating alternative mass consumption products made from recycled sources.

Nonetheless, there are also significant differences among them, first, in terms of the temporality of its circular environmental impacts. While Pulpak S.A. producers aim to replace the use of EPS in the future by raising consciousness among its current industrial consumers, the cooperative's innovation operates here and now, minimizing the existing EPS stocks within the system. Second, differences exist in terms of the deepness of its circular social impacts. Pulpak S.A. is based on discarded cardboard, which has a very stabilized market when sold as plain cardboard. Thus, this upcycling innovation targets the potential for improving its current value as a recyclable material. However, as was said before, the benefits derived are concentrated in the firm, rather than being distributed along the different actors of the recyclables value chain. In contrast, the EPS pearls are made from a material which cannot be sold in the recyclables market. Thus, this down-cycling innovation aims to widen the range of discarded materials which can be effectively recycled. Moreover, it socializes the benefits through involving other cooperatives, thus expanding the value chain organized around this material that was previously discarded.

In the case of Pulpo S.A., grassroots recyclers are included as a workforce already trained in sorting recyclables, a skill that was acquired by the recyclers in their previous 'informal' work. The company profits

from the privatization of those de facto knowledge repertoires and skills, but without recognizing them in terms of wages. Furthermore, as a labour force involved in a productive process which is tech- and capital-intensive, they have no other destiny than to be subordinated within an overwhelming technological system, limiting their role to the alienated practice of sorting waste.

In contrast, the Reciclando Sueños model facilitates the translation of 'formalization' into 'recognition', transcending the narrow mercantile limits that define the previous model, in what could be framed as a formalization of commoning. In this way, the corpus of knowledge and expertise developed by the members of the cooperative (as part of a broader sector) wins recognition in several dimensions at the same time. In economic terms, they are remunerated for the specialized service they provide and not only for the sale of the materials they manage to recover. In addition, they achieved the recognition of their work as a complex practice that integrates techno-cognitive and socio-productive skills for which there is little accumulated experience available, as they show for 'recyclables without a market' like EPS. Thus, they strengthen their organization through their own knowledge, skills and expertise as leverages of new products and processes, while sharing their knowledge in a collaborative and horizontal fashion.

Conclusion

We argue that not every grassroots recyclers' formalization model corresponds to a 'deep' circular economy. In the context of the Global South, recycling is intertwined with the existence of a vast and growing population that makes a living from collecting, sorting and transforming recyclables from waste. It is also entwined with ways of learning, innovating and creating new productive systems. Thus, the question of what type of formalization could be boosted or inhibited by respective CE models is anything but irrelevant.

As we have pointed out, the initiatives that are recognized as 'successful cases' within the scarce literature on this subject in the Global South often promote CBMs that, far from supporting inclusive SDGs, tend to be examples of the 'privatization of informality'. In this chapter, we show that this paradox can only be sustained because of the existence of a firmly rooted assumption that the private appropriation of the informal labour force is justified, given its low formal qualifications and low alternative employability in the market.

The notion of 'formalization of commoning' could be useful in addressing the daily work carried out by hundreds of thousands of grassroots recyclers around the world. The huge amount of (largely self-managed) daily labour provided by this population guarantees the socially necessary work of reintroducing recyclable materials that would otherwise be discarded and buried, exacerbating one of the most critical urban environmental problems in these contexts. But it also reveals the innovative development of techno-cognitive inputs, in relative autonomy from mainstream science and technology systems, where there is very little information about how to organize and implement recovery and recycling systems for problematic materials such as EPS.

The chapter has brought to light some 'under the radar' grassroots initiatives in order to give evidence of other models of production, innovation, and organization that are feeding what we conceive as a circular economy 'from below', whose aim is to be sustainable but also inclusive. The possibility of learning from these contributions is blocked when participation in the circular economy is restricted exclusively to those actors who have the necessary economic and symbolic capital to register their practices in the formal sector of the economy. At least in the countries of the Global South, this means not only subordinating a significant set of economic actors but also ignoring a set of creative techno-cognitive resources that can constitute a building block of inclusive innovation.

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Chapter 6

In the shadow of the circular economy

Waste pickers' formalization and the politics of a changing recycling economy in Cartagena, Colombia

Laura Neville

Introduction

Marta Lucía Ramírez, the vice-president of Colombia, took to the floor of the Convention Centre in Cartagena de Indias,[1] Colombia, in May 2019, to launch the ceremony of the signing of the Bolívar Regional Pact for the National Circular Economy Strategy. '*I want to give a special recognition to the recicladora* (waste pickers) *population*', she proclaimed, in front of a large audience of entrepreneurs, politicians, and representatives of the city's main waste pickers organizations. Her speech was an ode to recycling that incorporates waste pickers into the country's formalization process as *recicladores de oficio* (professional recyclers). This is in the context of the waste pickers movement's decades-long struggle to be incorporated into municipal solid waste management systems. Ramírez stressed the importance of *recicladores*' work, which she defined as 'the backbone of recycling and reuse in the city'[2] and as such central to the country's new circular economy strategy. For the waste pickers in the room, who had thus far experienced exclusion, displacement and dispossession despite the past policy of inclusive formalization, Ramírez's rhetoric about the new promises of the circular economy rang hollow. In the eyes of the waste pickers, the circular economy strategy gave no guarantee of protection to the waste picker population.

1. Referred to as Cartagena in the text.
2. Fieldnotes, May 2019.

Since 2018, the Colombian government has been implementing a national circular economy (CE) strategy, later agreed at the regional level, proclaiming itself the first in Latin America and a continental leader in the area (Gobierno de Colombia 2019). Directly inspired by the Ellen MacArthur Foundation's (EMF) definition of the circular economy, the aims of the Colombian government's CE strategy are to transform production systems from linear to circular models. By pursuing the circularity of materials, the reduction of waste materials through their return to productive cycles has become a new vision for economic development and a solution to meet the challenges of municipal solid waste. The CE strategy builds on existing national policy documents, notably regarding waste management.[3] One of the aims is to increase the rate of recycling to 18 per cent by 2030 (Gobierno de Colombia 2019: 8). By giving prominence in the strategy to the separation at source and recycling of waste materials, the government's political commitment to move towards a circular economy model goes hand in hand with an ethical and discursive promise of inclusive recycling (Gobierno de Colombia 2019; Calderón and Rutkowski 2020). The CE strategy builds on the country's existing inclusive recycling policies and formalization process of the *recicladores de oficio* (Gobierno de Colombia 2018). Colombia is considered by some a world pioneer in recognizing and linking waste pickers to formal waste management systems (Tovar 2018; Durand and De Oliveira Neves 2019). The inclusion of waste pickers into waste management schemes has been inscribed in Colombian law since 2011, following a ruling by the Constitutional Court of Colombia legally obliging municipalities across the country to reconsider the role of informal waste pickers (Rateau and Tovar 2019).[4]

This chapter shows how Colombia's CE aspirations clash with its profit-driven waste infrastructure that rewards waste collection and landfilling. In this context, informal waste pickers, whose work aims to recover value from waste and resell it as recyclable material, are not only silenced actors of an actually existing CE but also invent political economies of its possibility. At the same time, despite the rhetoric of waste pickers' inclusion in the CE, the latter represents a continuity with

3. National policy on integrated solid waste management Conpes 3874 of 2016 (Gobierno de Colombia 2018: 4).

4. A transitional regime for the formalization of waste pickers' organizations in the country followed in 2016 with the Decree 596 (Tovar 2018).

historical processes of marginalization, as well as instituting new forms of dispossession.

Colombia's more than 60,000 waste pickers[5] collect recyclables individually or collectively from streets or buildings that they subsequently sell to intermediary buyers who, in turn, sell them in large quantities to national or global industries. Diverse processes of value-adding by waste pickers precede the recirculation of materials in the economy, enabled by their detailed knowledge of materials, markets, collection routes and waste generators, thus preventing flows of recyclable materials ending up in landfills. The Colombian recyclers' movement takes pride in their role as environmental pioneers, yet despite the Colombian government's political commitment to move towards a circular economy and the ethical promise to place *recicladores* at the centre of these new public policies, similar to other Latin American contexts, waste pickers' grassroots knowledge of circularity (Gutberlet and Carenzo 2020; Carenzo et al. 2022) is not acknowledged and historical processes of dispossession are extended (O'Hare 2021).

This chapter draws on ten months of ethnographic fieldwork conducted between 2017 and 2021 in the coastal city of Cartagena, Colombia, to explore the situated socio-spatial work of waste pickers in the process of formalization and circular economy policies. Cartagena's urban recycling economy is constituted by flows of materials and is defined by the city's political and socio-spatial relations that read together offer a privileged terrain for attending to the circular economy as historically situated. 'Circular economy' has often been analysed from the standpoint of presumably global economies in a quest for green growth, sustained by policies and frameworks. In this chapter, by engaging with materiality as 'transformation and process' (Kirsch 2013: 439), it is precisely the situated everyday socio-spatial and political struggles surrounding waste pickers' recycling activities that become the starting point for reconsidering where and how circular economies emerge and who takes agency in shaping diverse understandings of circularity in Cartagena. An empirical focus on waste pickers' labour emphasizes their role in circulations of material in the city, resulting in the production of new circularity patterns in ordinary spaces of urban life.

The chapter draws attention to the frictions of the everyday and emphasizes that despite conceiving the work of waste pickers as an

5. According to the National Association of Waste Pickers in 2019 (Parra 2020: 127).

indispensable link in a value chain for the commercialization of recovered materials, the CE strategy acts as a façade concealing existing socio-material enclosures and processes of dispossession. The chapter also sheds light on the circular economy not as a dominant project emanating from green economy agendas but rather as a contested notion that emerges from situated urban settings and is thus always plural and constantly changing. In the first section, this chapter analyses the situated sociopolitical history of waste pickers' dispossession in Cartagena that has defined their struggle to access waste materials. The second section then centres on the complex socio-spatial dimension of dispossession as waste pickers compete to establish collection routes and illustrates how the formalization process reinstates existing power dynamics. The third section turns to waste pickers' interactions with state bureaucracy mediated through the complex administrative requirements and barriers to the formalization process. In the state's attempts to extract economic value from recycling, the chapter shows how imagining waste pickers as 'waste entrepreneurs' allows for new forms of dispossession. In conclusion, the chapter argues that waste pickers' labour sets the frame for negotiating recyclables as circulating socio-materials and thus becomes a crucial practice for the making of diverse circular economies in the city's rapidly changing recycling economy.

'Recycling without recyclers is rubbish':[6] *From the dumps to the streets*

The discursive acknowledgement of waste pickers' labour in the CE strategy can be read as an effect of the Colombian recyclers movement's legal achievements. Colombia's recyclers movement consolidated through decades of struggle to be recognized in municipal waste management systems after having been previously dispossessed from dumps and streets (Parra 2016; Rosaldo 2019; Tovar 2018). A shift in the mid-1980s and 1990s from open-air dumpsites to sanitary landfills (Calderón Márquez and Rutkowski 2020; Molano 2019; Parra 2020) translated into dump closures and waste pickers' evictions from the surrounding informal settlements, exclusion from landfills,

6. The Colombian recyclers organization's motto is '*Reciclaje sin recicladores es basura*' ('Recycling without recyclers is rubbish').

increased restriction of access to waste materials and criminalization of labour (Rosaldo 2019; Parra 2020). They faced a surge of social hatred which materialized in the appearance of the so-called 'social cleansing squads' (*grupos de limpieza social*), often working with the complicity of the police, and notorious for the murdering of populations they designed as *desechables* (disposable people). During that time, over 2,000 Colombian waste pickers, sex workers and beggars were killed (Rosaldo 2019; Molano 2019). The Barranquilla scandal epitomizes the violence of the '*limpieza social*'. On the 29th of February 1992, in the city of Barranquilla, two waste pickers were attacked and shot at after having been asked to enter the university premises to collect cardboard. One of them managed to escape and report the case to the police. Following the police's intervention, eleven bodies – mainly of waste pickers – were discovered within the university perimeter bringing to light a macabre human organ trafficking scandal. To commemorate the victims, the waste pickers organize the International Waste Pickers Day each first of March (Fieldnotes 17/08/17; Molano 2019). This case and others triggered national protests led by waste pickers in the 1990s, and the pressure on Congress resulted in passing the first national recycler rights legislation (Parra 2016; Rosaldo 2019).

While they were unable to access landfills, waste pickers organized their activity around recovering recyclables from the streets. In response, in 2002, a national decree attempted to transform waste left on the street into the private property of waste management firms. This was no surprise for waste pickers. Since the mid-1990s, city governments have been selling off rights to the recyclable waste to private recycling businesses (Rosaldo 2019). A judicial struggle was led by recyclers' organizations in Bogotá in 2003 to prevent the privatization of garbage (Parra 2016; Tovar 2018; Rosaldo 2016, 2019). In 2008, ex-president Álvaro Uribe's sons launched a private recycling firm competing directly with recyclers, and a law banning informal recycling was passed in Colombia's Congress (Rosaldo 2016, 2019). Waste pickers' further dispossession from the streets led the Colombian recyclers movement to consolidate as a political movement (Rosaldo 2019), targeting changes in national policy (Tovar 2018; Parra 2016; Rosaldo 2016, 2019). In the 2002–8 period, Colombian recyclers demanded not only to be recognized but also to receive fair compensation from the state and the public for their work (Tovar 2018). They won several human rights cases in the Constitutional Court (Rosaldo 2019; Parra 2016) and established

the current inclusive recycling programme and a shift in the waste management paradigm.

In Colombia, the formalization process has given organized informal waste pickers improvements in their incomes and work conditions. Nevertheless, the state's scheme for formalization inscribed in neoliberal governance logics created the possibility for waste pickers' exclusion and marginalization (Tovar 2018; Parra 2020; Rosaldo 2016, 2019; Neville and Tovar 2023). In the context where state actors have an interest in appropriating the spaces and industries occupied by informal waste pickers, this population continues to face structural constraints. In the case of Bogota, Rosaldo (2019) argues that the state adopted 'a more subversive tactic: dispossession through formalisation, couched in the duplicitous language of recycler empowerment' (2) risking undermining the victories achieved by the recyclers' movement.

Waste pickers labour and landfill politics in Cartagena

Waste pickers' labour in Cartagena constitutes a crucial step towards the circularity of recyclable materials at the urban scale. Situating the sociopolitical history of their work in the city sheds light on how existing power dynamics reinstate waste pickers' dispossession despite circular economy and inclusive recycling policies. Embedded in the acts of resistance and collective action of the Colombian recyclers' movement, waste pickers in Cartagena have engaged in a historical socio-spatial and political struggle to access waste materials while facing dump closures and the privatization of waste. The situated context of waste pickers' dispossession in Cartagena can be read in continuity with the processes observed at a national level but also speaks to the city's specific socio-material and political relations. This shows how, in order for waste pickers to become involved in formal circular economy processes, the larger political economies of waste in Colombia and in Cartagena would have had to be reorganized.

In Cartagena, the legacy of coloniality and race and gender dynamics are crucial to understanding the impact of the racialized marginalization and dispossession on waste pickers, a majority of whom are Afro-descendants. Cartagena was founded in 1533 and became one of the major colonial centres of the Spanish Empire in Latin America (Cunin and Rinaudo 2006) and a central location for the transatlantic slave trade (Abello Vives and Florez Bolivar 2015). The city first expanded

inside its fortified walls and through neighbourhoods segregated along a socio-racial hierarchy (Helg 2004). These early histories still define the city's urban map. Meanwhile, the history of racial- and class-based aesthetics of hygiene has sustained spatial divisions, stigma and displacement in the city through urban hygiene projects as well as discourses and representations of urban cleanliness.

In the early 1960s, residents of a self-built settlement next to the municipal open-air dumpsite in the predominantly Afro-descendant San Francisco neighbourhood located at the north-west of the city named the vacant urban lot where they were about to set up their housing with the term *Amboyede*, a vernacular local term referring to distilling unpleasant smells – the word is a contraction of *ambos* (both) and *hieden* (stink) (García Martínez et al. 2008). Residents of the neighbourhood recall that the term *Amboyede* was also used to refer to the waste collection truck workers of the *Empresas Públicas Municipales*, the former municipal waste collection company. These waste workers were predominantly Afro-descendant men, often originating from the surrounding *Palenques* (rural communities of maroons).

In 1969, the open-air dumpsite in San Francisco was closed and transferred to Henequén, a self-built settlement located in the south-western part of Cartagena. The residents followed the dumpsite, taking the name *Amboyede* with them. Thereby, a new *Amboyede* was born, marking the beginning of the city dumpsite's incessant itinerant journeys around the city. Henequén was one of the numerous peripheral neighbourhoods inhabited by a population of *campesinos* (peasants) who arrived as migrants or internally displaced[7] by the violence of the armed conflict from Afro-descendant territories in the South of Bolívar (Atehortúa and Baena 2015). The residents lived from small-scale agriculture (Atehortúa and Baena 2015) and progressively began to work on the newly arrived dumpsite. '*We are all 'desplazados*'[8] (internally displaced population), recounted Miguel, an Afro-descendant waste picker and resident of Henequén, emphasizing the displacement as the defining feature of collective biographies.

Landfills and waste in the Global South have become a new commodity frontier and thus a subject of enclosures and dispossession (Fredericks 2021; Hartmann 2012; Millar 2012; Millar 2018; Zapata and Zapata

7. Colombia has a population of 7.3 million internally displaced people, one of the largest in the world (2017, UNHCR).

8. Fieldnotes, February 2019.

Campos 2015; Samson 2015). The landfill politics unfolding in Cartagena since the mid-1990s are evocative of the structural constraints shaping waste pickers' labour in the city. After decades of functioning as the city's main dump and providing a livelihood for the residents of Henequén, the open-air dumpsite was closed in 1994 and replaced by a sanitary landfill in the same neighbourhood, abruptly excluding waste pickers from access inside its perimeter. Waste pickers protested intensely against the ban on entering the landfill and were violently repressed by the police. After collective negotiation with the waste management company in charge of the newly privatized landfill, a small group of Henequén waste pickers organized into cooperatives that were eventually granted access to the landfill. However, the remaining majority moved on to collecting waste on the streets and door-to-door. Despite having reached its capacity, the Henequén landfill continued functioning until 2005, when a twenty-year concession was finally granted to another waste management company to build and run a new landfill located at the outskirts of the city, named *La Lomita*.[9] Thereafter, waste pickers were formally denied access to *La Lomita*, meaning that even the small cooperatives of waste pickers were now fully reliant on street and door-to-door collection.

This last relocation of the landfill was transformative for the waste management regime in the city. The awarding of the concession for the new landfill was the result of judicial actions and corrupt practices of a powerful entrepreneur, commonly referred to as the 'invisible mayor', who had close ties with paramilitary groups and other criminal bands. In Colombia, the relations between political elites – as well as city mayors – and narco-paramilitaries (Gutiérrez-Sanín 2015, 2019), known as 'para-política', are particularly relevant for understanding urban politics. The 'invisible mayor' resorted to a range of shadowy practices that resulted in the brutal closure of the Henequén landfill overnight. During an interview in 2019, a former government official recounted the pressure he was under: 'they were extorting us!' The municipal government was given no time to find a site for waste disposal in the meanwhile. Due to the accumulation of waste on the streets, a sanitary crisis unfolded in the city, and given the urgency of the situation, the landfill was transferred to *La Lomita* in accordance with the invisible mayor's secret plan. The businessman was then able to persuade the municipality to give him a contract to run the new landfill as well as other landfills in the Bolívar department, making the waste infrastructure into an oligopolistic and profit-oriented business. The new landfill operated

9. Pseudonym.

on an economic incentive system determined by the quantity of waste going into the landfill. The system is lucrative both for the company running the landfill and for the two official waste collection companies that haul waste to it. These power dynamics are inextricably bound to the country's history of violence and dispossession, and need to be fully acknowledged when looking at who has appropriate agency in the development of Cartagena's CE strategy.

The overlapping political powers shaping the oligopolistic waste infrastructure are central to understanding the new forms of waste accumulation in Cartagena. For waste pickers, these power relations hamper their inclusion in the waste management system. Noria, a lifelong resident of Henequén, further commented on the political structure and alliances that define waste pickers organizations' possibility of accessing the urban recycling economy; lowering her voice as she refered to the role played by the 'invisible mayor', she added in a whisper: 'Here in Cartagena, the waste pickers' organisations that survive are those that know the territory, the history' (Interview, 17 July 2021).

Racing for the collection routes

With a strong tourist economy and industrial sector, Cartagena is a large generator of recyclable materials, yet their production and value are not consistent across the city. The spatiality of the circulation of recyclable materials is continuously evolving, but its unpredictability is routinized through the labour of waste pickers who salvage materials and devise new patterns of circularity in everyday spaces of urban life. The waste pickers' labour attunes to the constantly changing socio-material relationships within the urban recycling economy. Waste pickers' spatial practices create new forms of circulation of recyclate within Cartagena's circular economy. Focusing on the competition for collection routes emerging in the present context of the implementation of recycling policies, this section disentangles waste pickers' dispossession from their routes and the resistance to the quiet encroachments of municipal waste collection companies and private recycling businesses.

Cartagena's 2016–27 new waste management plan (PGIRS)[10] argues for recyclers' integration[11] into the official waste management system.

10. *Plan de Gestión Integral De Los Residuos Sólidos* (PGIRS).

11. *Programa de Inclusión de Recicladores*, according to the 2015 decree n°1077.

This policy sets the frame for the implementation of the CE strategy at the municipal level. One of the objectives of the national CE strategy is to continue the work of *recicladores de oficio*'s inclusion while generating new employment arising from CE business models (Gobierno de Colombia 2019). Yet the centrality of the principle of free competition present in these strategies riddles inclusive policy with contradictions and undermines the inclusion and protection of waste pickers (Parra 2020). After decades of state-led waste management until 1985, waste collection was privatized in the second half of the 1980s as part of a broader programme of economic structural adjustment in Colombia. The policy changes brought by the Constitution of 1991 further established neoliberal principles of free competition, affirming that the guiding principle of waste management is profitability (Calderón Márquez and Rutkowski 2020; Parra 2020). The inclusive recycling policies and CE strategy are placed in continuity with the 'free market' principle, opening the door for a multitude of non-waste picker entities, including waste collection companies and private recycling businesses, such as the large French multinational waste management company Veolia, to enter the recycling economy (Durand and De Oliveira Neves 2019). According to Roberto, a long-time *reciclador*, and other waste pickers, Veolia shares part of the blame for the dispossession of waste pickers. Roberto explained that the landfill's existing economic incentive system encourages waste collection companies to bring as much waste as possible into the landfill, a logic that is conflicting with that of waste pickers salvaging and diverting materials from the landfill. Roberto added:

> It's the business of the [waste collection] companies to bring more (waste) into the landfill. It's good business (*Es un negocio redondo*). They want *recicladores* to disappear. . . If they stop bringing that material in, they can't charge for it. . . They [the waste collection companies] don't like to have millions taken out of their pockets. It's a mafia. If only it was fair! (*laughs*) (Interview, 25 February 2019)

One method for including waste pickers is through a *tarifa.* The *tarifa* is a unique legal innovation to recognize waste pickers in Latin America, conceived by the Constitutional Court of Colombia (*Resolutión 720* of 2015) as a type of affirmative action, entitling formalized waste pickers organizations to receive a portion of the municipal service tax paid by citizens alongside the money they receive in exchange for the collected materials (Parra 2020). The *tarifa* is fixed at the same price as is paid to private companies responsible for the collection, transport and final disposal of waste (Neville and Tovar 2023).

Ruben, a waste picker who has dedicated his whole life to recycling activities in Cartagena, explained to me that he had been facing increased difficulty in maintaining one of his long-standing collection routes in the city's touristic sectors. Ruben defines himself as a *reciclador de oficio* as he has been collecting recyclables from the streets for decades, yet like many, he crosses the boundaries of the fixed roles assigned to waste pickers' labour in the formalization policies by working as a small-scale intermediary buying and reselling materials from other waste pickers in his *bodega*, a small backyard warehouse. His recycling *bodega* is located just by a new *Estación de Clasificación y Aprovechamiento* (ECA), a recycling site dedicated to the weighing, storing and sorting of recyclable materials following strict regulations and environmental authorizations considered a requirement in the formalization process. The ECA was founded via the city's largest plastic industry's Corporate Responsibility Policy, committed to move towards using more recycled plastic in its production. The ECA was deliberately located in a strategic location near a large number of profitable recycling routes in the city's touristic sector and high-income neighbourhoods. Ruben considered this competition disloyal as he argued that the new ECA attracted recyclers by setting higher buying prices compared to his *bodega*. He explained:

> They arrived with resources. Here, we don't have resources. . . They installed themselves in the same place as us. They are taking my job away. . . . It's unfair competition. They bought cardboard at 200 pesos, then at 600 pesos to draw the attention of the recyclers. For 20 pesos extra a recycler goes elsewhere. . . Free market, this is where the danger is. (Interview, 3 April 2019)

The larger infrastructure of these private recycling firms makes it difficult for small-scale waste pickers organizations to engage in competition. Unlike the majority of waste pickers in Cartagena, who work on foot or with hand-pushed carts, larger private recycling businesses have trucks that allow them to travel longer distances in a shorter period of time and collect larger amounts of recyclables across the city. Ruben further explains how he also faces competition from other private recycling companies that seize his and his waste pickers' collection routes:

> The *Tierra*[12] people are the most annoying because they are not *recicladores*. They are in various cities. They report (materials on the

12. Pseudonym given to a recycling firm.

> SUI platform) such an incredible amount of materials and you don't even know where it comes from! My recyclers wear green (uniforms), people recognize them, other recyclers collecting here wear blue, and so on. But this company, nobody sees them collecting, no one knows what colour they wear, but they report more (materials) than those of us who are doing the work. . . With the long-established recyclers organisations, those of Henequén for example, we respect each other's sites, we don't collect from each other's clients. But a company like *Tierra* does! (Interview, 3 April 2019)

In Cartagena, recyclers' dispossession from strategic collection routes by larger recycling companies is further accentuated through the purchase of recyclable materials. According to the national legislation (Decree 596 of 2016), recyclers organizations are required to collect recyclable materials for free, yet in practice larger recycling companies circumvent this legal framework by buying materials at source to secure their exclusive access to it. Pablo, a leader of the city's main recyclers organization, denounced the recycling companies' strategy: 'Here in Cartagena, for example, a company from Medellín displaced us. They offered money for the recyclables. This is against the decree (596 of 2016)!' (Interview, 13 March 2019).

Consequently, Pablo denounced the implications for waste pickers maintaining their long-standing recycling routes during an internal meeting. To ensure access to recyclables, some recyclers organizations have also begun – in a similar manner to the larger recycling companies but at a smaller scale – to buy materials at source. Pablo further explained how many waste pickers are faced with a dilemma and end up, in turn, circumventing the inclusive recycling legislation designed to protect waste pickers' labour and incomes:

> We have to work against Decree 596. If we don't buy (recyclable materials), somebody else buys them. . . Dispossession happens through purchase. . . This is not possible so behind our backs we are passing the cash; this is how it is (*por detrás estamos pasando el billete, así es*). (Fieldnotes, February 2019)

For waste pickers organizations, this practice involves small sums of money, as illustrated during a collection route accompanying a waste picker who paid 2000 Colombian pesos[13] to the guard of a condominium

13. Approx. 50 cents USD.

to make sure he kept the material for him (Fieldnotes, April 2019). As such, waste appears as increasingly commodified and enclosed, kept behind doors and gates, and for which waste pickers organizations make agreements – monetary or not – to ensure their exclusive access. In Pablo's case, this strategy is feasible as his waste pickers' organization is flourishing, yet this is not possible for the majority of waste pickers in the city.

As pressures grow to seize profitable collection routes, waste becomes scarce and less available on the streets, pushing the less well-off waste pickers off the more lucrative collection routes. Pushed to the edges, waste pickers open new, smaller collection routes in middle-income residential neighbourhoods, allowing new patterns of circularity to emerge across the city. This process was exacerbated during the Covid-19 pandemic as hotels, bars and restaurants shut down for months and access to condominiums in elite neighbourhoods was prohibited by the police or building guards due to fear of spreading the virus. For Ruben, this meant giving up one of his last recycling collection routes in the touristic district and finding alternative routes in residential neighbourhoods close to where he lives with his family. Nevertheless, these alternative routes did not provide sufficient materials for his waste pickers to make a living. Ruben reported a drop in income of 80 per cent. In some cases, waste pickers were forced out of the recycling economy altogether. While the prevailing narratives in development and policy circles laud formalization as an improvement to waste pickers' livelihoods and environmental sustainability, this partial understanding of waste pickers' labour overshadows its heterogeneity, constant evolution and adaptation that is central in understanding the micro patterns of circularity generated in everyday spaces of urban life.

The economic imagination of formalization

New forms of 'dispossession through formalisation' (Rosaldo 2019) exist in everyday encounters with the state. On the one hand, the complex administrative requirements and digitalization of waste pickers' labour established through the country's formalization process are experienced by waste pickers as an added obstacle on the road to inclusion. On the other hand, existing structures of power and governance in Cartagena undermine the possibility of implementing 'affirmative action' policies recognizing waste pickers' labour in the waste management system.

The formalization process is divided into eight phases through which the *recicladores de oficio*'s organizations must navigate to gradually fulfil the administrative, commercial, financial and technical requirements established by the Ministry of Housing, City and Territory within an eight-year period. The latter starts from the moment waste pickers organizations register with the governments' monitoring system, the *Sistema Único de Información* (SUI).[14] The SUI is an online platform on which waste pickers organizations report the data relative to the amount of recyclable materials collected and weighed. According to the tons of recyclate reported on the SUI, waste pickers should subsequently get paid the *tarifa*. Designed as a tool contributing to the recognition of waste pickers' labour, the SUI platform nevertheless also represents a greater possibility for the state to monitor and generate statistics on the flows of recyclable materials, as well as the means to extract greater revenues from waste work through formal taxation. Similar to the ongoing digitalization of waste pickers' labour, the CE strategy aims to develop further an information system to monitor and measure the progress in the implementation of the strategy (Gobierno de Colombia 2019) whose potential could reach US$ 11.7 billion in annual material savings and new business opportunities (Gobierno de Colombia 2019: 9).

Negotiating the intricacies of the complex administrative requirements of formalization becomes highly significant for waste pickers' everyday labour and further exacerbates the difficulties of establishing themselves in the recycling economy. Sustained by inclusive recycling policies and the CE strategy, the top–down economic imagining of waste pickers as neoliberal micro-entrepreneurs materializes through waste pickers' day-to-day negotiating of formalization status. Indeed, the legal and administrative requirements for the formalization of waste pickers organizations were designed with the requirements and administrative capacities of formal businesses in mind rather than the informal waste pickers organizations that function mainly as 'solidarity-based economic entities' (Parra 2020: 134).

Ernesto leads one of the numerous recyclers organizations in the city which has been facing the challenges of engaging with the bureaucracy of the formalization process. He has worked in recycling his whole life. As he progressively expanded his collection route, he set up a warehouse to stock his recyclables, which included cardboard, paper, glass and

14. The 2016 decree n°596.

scrap metals, PET and plastic materials, sustaining a living for his family. He witnessed the ebbs and flows of various NGOs' support, as well as the policy changes that brought inclusive recycling across the country. In 2014, a social worker from a local NGO walked into his warehouse and introduced him to the opportunities of the formalization process. In July 2014, after constituting a recycling association, together with the support of an NGO, he carried out a demand for action for the protection of waste pickers' rights, known as an *acción de tutela de primera instanci*a, on the mayor's office, claiming their 'fundamental rights to work, human dignity, life with dignity and equality'.[15] With the support of the NGO, he campaigned for the recognition and inclusion of the population of waste pickers and their labour in the city. After winning his case against the municipality, his individual action soon began to grow with the collective support of the city's recently conformed waste pickers organization (Asociación de Recicladores de Cartagena, ARCA) demanding recognition of their work through protests. In return, the municipality granted Ernesto's co-workers uniforms and carts. These 'affirmative actions' fell into place under the pressure of the legal situation rather than out of political goodwill as Ernesto put it: 'it is not because they had the political will (*voluntad política*), they did it because of our demand for action (*tutela*) with the mayor.'

Since then, Ernesto recounts the numerous administrative barriers he had faced to formalize his waste pickers organization. As Ernesto explains, he had to register his association with the *Cámara de Comercio* (Chamber of Commerce) and the *Dirección de Impuestos y Aduanas Nacionales* (National Tax and Customs Department) (DIAN) to pay taxes. He had to regularize the recyclers association's situation by paying overdue taxes of three years and the fines incurred for non-compliance. While he decided, with the help of his son, to pursue the formalization process, hoping to access the remuneration by the *tarifa*, many of his colleagues did not. The difficulties, and at times impossibility, of collecting the necessary documents and archives discouraged many recyclers organizations who continued working informally. Ernesto regrets that most of his colleagues did not engage in the process as it undermined waste pickers' possibility of collective political action in the city.

For Ernesto, navigating the intricacies of the SUI platform also implied having computer literacy, internet access, and infrastructure,

15. As stated in a copy of the 2014 *tutela* provided by Ernesto in 2019.

which he only achieved with the support of his son. The SUI platform represents a barrier for recycler organizations, given the difficulty of reporting the information and the risk of facing high fines in case of errors. Once his situation with the tax office was regularized, sustained by the constant labour of the members of the recycling association and the support of different NGOs, Ernesto's recycling association progressively developed. Today, it is one of the few formalized entities but still does not receive remuneration by the *tarifa*. Unlike Ernesto, other waste pickers organizations were unable to gather the required documents to register the tons of recyclable materials on the government's official SUI platform. To overcome this administrative challenge, a few waste pickers organizations across the city rely on inventive and complex strategies, such as the administrative arrangement to work *in sombrilla* (in umbrella) with other more established recyclers associations to record their recyclables on the SUI and later get paid the corresponding *tarifa*.

According to the national policy changes, the Municipality of Cartagena has the obligation to establish 'affirmative actions' to allow recyclers to enter the solid waste management system and guarantee financial and technical support to recyclers organizations. Ernesto nevertheless remains sceptical about the implementation of the formalization process in the city. Despite the first affirmative action awarded to his organization in 2014, he has witnessed decades of exclusion:

> We as *recicladores* have survived because of the strength of will we have to keep going, but not because the state has done anything to help us. . . We started to stick to the objective that these resources (of the city's inclusive recycling policy) would reach the *recicladores* but the state always catches you, misleads you and deceives you. (Interview 2017)

The municipality's official discourse on inclusive recycling does not translate into official budgets, where investments are largely absent, and whatever money there is vanishes before reaching the *recicladores*. During an official meeting in February 2019 between the mayor and a local NGO set up by the recyclers, the *Procuradora Ambiental y Agraria de Bolívar*,[16] the latter denounced the mismanagement of funds at the city

16. Office of the Attorney General for Environmental and Agricultural Affairs.

level and the lack of compliance with regulations by failing to include in the budget the resources needed to execute the waste pickers' inclusion programme as stipulated in the city's new waste management plan (PGIRS). The *Procuradora*'s words during the meeting confirmed the claims made a few months earlier by the leaders of the city's main recyclers organization, who collectively walked out of a meeting organized by the municipality to express their discontent with practices of corruption and with the (inexistent) official budgets dedicated to inclusive recycling (Fieldnotes, January 2019). In addition to the structures of power shaping Cartagena's wastescape, the city's urban politics are driven by a volatile political atmosphere. This has caused a rapid mayoral turnover with eleven mayors in the past seven years, and four in 2018 alone. The consequent discontinuity in the city's government policies and short-term programmes hinder the progress of inclusive recycling policies.

Conclusion: Waste pickers' exclusion in the shadow of the circular economy

Despite the appeal of the circular economy's promises of win–win outcomes and green growth (Corvellec, Stowell and Johansson 2022), rethinking 'circularity' from the perspective of the formalization of waste pickers challenges the notion of a unique and hegemonic circular economy. Through an ethnographic exploration of waste pickers' formalization in Cartagena, this chapter foregrounds the everyday practices and politics surrounding recyclers' formalization and points to the nuances and frictions of the political and ethical promises of inclusive recycling. The daily processes of recycling in everyday spaces of the urban economy thus constitute a fruitful starting point for understanding how 'circularity' is articulated with the work of vulnerable economic actors and marginalized populations.

The chapter traces the stories of waste pickers' exclusion, displacement and dispossession starting by historically contextualizing the exclusion of recyclers in Cartagena and the political conflicts over the access and new localization of the city's landfill. Together with these historical processes, more recent effects of neoliberal capitalism located in the intricacies of formalization policies have shaped waste pickers' practices to compete for recycling collection routes as well as their struggle to engage with bureaucracy and government.

The consequences of formalization policies for waste pickers' work illustrate in different ways the complex relations between state policies,

capitalist markets and the situated socio-material relations that become constitutive of urban politics. Rather than establishing a new connection between Cartagana's local recycling economy and a global circular economy, there is a risk that the CE strategy will simply cement the socio-spatial enclosure of recyclable material. The situated dynamics of inclusive recycling policies have not eased waste pickers' connections to city politics and global economies but rather deepened their exclusion. In exploring waste pickers' continuous experiences of dispossession and the spatial consequences for their labour in the city, the chapter further points to the strategies developed in response by waste pickers participating in the city's rapidly changing waste infrastructure. In a context of inclusive recycling policies, understanding of waste pickers' labour and political struggle as a terrain of social relations is forged on their historical marginalization and more recent experiences of 'dispossession through formalisation' (Rosaldo 2019: 2) that remap the geographies of a circular economy in the city.

Waste pickers' work appears to be left behind in the shadow of the promises of the circular economy promoted by the Colombian government. The value reclaimed from recyclable materials becomes increasingly competed for by private recycling businesses and large waste management companies. At the same time, it becomes accounted for by the state for whom the traceability and formal taxation of recyclables becomes a new frontier for accumulation. As the stories of the contentious sociopolitical and spatial struggle of waste pickers in Cartagena to access waste materials and position themselves in the recycling economy make clear, what formalization policies and circular economy discourses have transformed are not the exclusion of disenfranchised population, but rather the forms of dispossessions that are taking place, the possibilities of collective struggle and the relationship to the state.

The work of *recicladores* reinfuses value into discards by providing materials for the recycling industry and recirculating them in the global economy, thus articulating global capitalist economies with situated recycling, consumption and production practices. The Colombian state's ideal and promises of a circular economy, which relies on the formalization of *recicladores*, conceals the contradictions, frictions and limitations encountered at the urban micro-level that blur clear-cut understandings of circularity. In the shadow of circular economy discourses, no further protection for the population of waste pickers is guaranteed, thus raising probing questions about the understanding of the virtuous circularity celebrated in the circular economy.

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Chapter 7

Circular economy of wastewater

Recirculation, spinning and rolling to the future

Daniel Sosna

Introduction

It was a hot summer's day in 2015 and I was hiding in the shade of a trailer at the Pureland landfill[1] in the Czech Republic with two landfill workers, Petr and Jindra. The sun dried the landfill's surface. Garbage lorries, which were bumping along the rough road, released massive clouds of dust. The wind was making spirals of ascending hot air that occasionally took plastic bags on their flying trip. Suddenly, the manager reminded the two workers via a walkie-talkie that they should start spraying the surface with the landfill leachate. Leachate is wastewater which stems from rainwater and liquid in waste percolating through the landfill (Teng et al. 2021: 1). The workers frowned, uttered something about the 'damned manager' and slowly moved towards the edge of the landfill where fire hoses lay in the bushes. Jindra and I pulled the unyielding hoses up closer to the area where the arriving garbage was dumped, while Petr went down the hill to turn the pump on. During the next hour, we sprayed the landfill's surface. This was an everyday activity and a subject of ongoing complaints from the workers. They would breathe in the leachate's droplets, exposing themselves to the leachate's toxicity and bad smells. Despite the activity's toll on their bodies, the workers were not convinced about its utility. For the management, spraying the leachate over the surface was part of the established landfill technoscience referred to as leachate recirculation. The process is meant to reduce the amount of leachate from inside

1. Pureland landfill is run by a joint-stock company where 65 per cent of shares is owned by a municipality and 35 per cent by a private company.

the landfill by hosing it over the landfill's surface which, in turn, traps the dust and prevents it from being taken by the wind. The technical literature describes the process as cost-effective, while its effects on workers' health and the environment are often ignored. It is ostensibly a strategy of containment (Reno 2016) to ensure that the landfill's matter stays within its parameter.

I approach the recirculation of landfill leachate as a kind of circular economy (CE) because it is based on processes that organize matter, energy, technology and labour using the logic of circular movement. The CE has advocated for a new resource management model since the 1970s (Geissdoerfer et al. 2017: 759). It calls for an economy centred on resource preservation and regeneration rather than exploitation and wastefulness. To reorganize resource management, the concept encourages us to look in the direction of the natural cycles of water, nitrogen and carbon (Garcier 2012: 83) as well as the natural circulatory systems of the body such as the heart and pulmonary circulation. Such models of circulation are represented by closed loops and imply dynamism within an overall stability. The CE thus constructs a seemingly new economic order while referring to familiar examples from nature. It also discursively distances itself from the recycling economies whose operations 'defy simple moral narratives' (Alexander and Reno 2012b: 2). While the CE constructs nature as separate to human activities and a positive guide for CE schemes, the example of leachate recirculation draws our attention to the ways in which seemingly separate natural processes such as the water cycle entwine with a human-made world and its technologies.

As Eduardo Kohn (2013, 157–65) argues, it is productive to think about the emergence and propagation of forms that crosscut the boundaries between ecology (nature) and economy (culture). To follow this kind of reasoning, one can examine such forms along scalar registers. Recirculation is an 'inter-scalar vehicle' (Hecht 2018) that crosses scales: from the micro-scale of a landfill to the macro scale of water cycle. 'Thinking with fluid' through following leachate's relational forms (Strang 2014) highlights key issues that an actually existing circularity (O'Hare 2021) presents and limitations circular models might encounter if used uncritically. A critical scholarship already suggests multiple issues associated with CE's prominence as the model for the future management of resources (e.g. Corvellec, Stowell and Johansson 2022, Gregson et al. 2015).

In Czech public discourse, there are two coexisting translations of the CE concept. One is a direct translation – *cirkulární ekonomika*.

The other is *oběhové hospodářství*, which uses the term *hospodárný* (hospitable), meaning being generous to guests and managing resources well (cf. Hájek, Kaderka and Nekvapil 2019: 43). *Oběhové*, in turn, is an adjective form of *obíhání* (to run around) and it connotes evasion as in running around while avoiding the middle or an obstacle to the movement. The second translation underlies – what I argue to be – the principle ambiguity of circular economy, that is, its explicit aspiration to conserve resources and its implicit tendency to avoid addressing the primary causes of the crisis which CE is supposed to mitigate, namely the profit motive (Block and Sommers 2014) feeding the voracious appetite of neoliberal capitalism.

In this chapter, I examine the practices and ideas associated with the recirculation of landfill leachate at Czech landfills to understand the relationship between the circle as an abstract ideal and the circle as an economic model that functions in a complicated world. I explore the forms of representation that the circle engenders and the consequences that circular dynamics produce. I pay attention to the techniques of spatial dislocation and temporal postponement as encouraged by Garcier (2012). Referring to nuclear waste management, Garcier demonstrates that circulation can be a means to keep toxic matter in motion across space and to postpone the problem of its final disposal. Extending circulation can also conceal dangers associated with the toxicity of the circulating matter. I draw on Alexander and O'Hare's (2020) ideas about 'technologies of unknowing' to examine the ways in which landfill leachate is silenced and pushed out of view. I focus especially on the spatial, temporal and epistemological techniques of unknowing proposed by the authors. The first technique of unknowing refers to disappearing waste via its containment and separation as well as transport elsewhere. The second one refers to the association of waste with the past or the future. The last one refers to deliberate withholding of knowledge about waste (Alexander and O'Hare 2020: 14–20). I will demonstrate that multiple techniques are in play when recirculation attempts to make the issues related to landfill leachate absent.

I show that circulation, nonetheless, can also be an opportunity. The market can use the abstract notions of circulation to colonize new economic niches. Steve Gudeman (2016: 23) argues that market economies tend to develop increasing levels of abstraction. CE not only fits this trend but has a special quality of its own. Unlike complex economic instruments and models in meta-finance, it takes advantage of the seeming simplicity of the circle. It does not mystify the economic relations using blockchain or technologies for transferring information

in nanoseconds, although it leaves a possibility for their incorporation in the CE open. Instead, it conceals the complexities of economic relations behind the familiarity of a circle. Although the marriage between waste and market is of a longue durée (see Laporte 2000), the CE seems to bring new opportunities for an expansion growing from a need to develop new technologies and means of management that would maximize the restorative and regenerative capacities of the CE.

The material for this paper comes primarily from my ethnographic research conducted at three Czech sanitary landfills from 2012 to 2022. Although the research foci were different at these sites (everyday ethics of waste workers, life of informal waste pickers and ecologies emerging via activities of birds), recirculation of leachate was one of the unifying themes that has emerged over time. During my fieldwork with the waste workers, I observed the everyday hosing of leachate and participated in the activity to learn what it feels like. I witnessed and engaged in discussions concerning the leachate with workers. During the fieldwork among the waste pickers, leachate emerged primarily as an obstacle that made the garbage unpleasant to walk over and touch when one had to move piles of material or tear plastic bags apart. Also, the routines of leachate transport and hosing operated as a kind of background to the everyday buzz at the landfill. In the multispecies research focused primarily on ravens' scavenging, leachate figured again as a kind of background noise that structured bird behaviour because of the placement of sprinkle heads at the landfill's surface.

Recirculation of wastewater

Landfill leachate is arguably the most critical kind of matter at sanitary landfills, which are designed for the disposal of municipal solid waste. Although often overlooked amid the 'apotheosis of waste' (Hecht 2018), leachate too can be hazardous and cause trouble. Leachate is a fluid found in the body of landfills inside the pipes that drain it and inside sumps or pools that hold it. It contains pollutants such as degradable organic matter, inorganic macro components, heavy metals and xenobiotic organic compounds (Kjeldsen et al. 2002). The concentration of pollutants varies not only between the landfills (Teng et al. 2021: 10) but also within a single landfill because of the different decomposition stages in its various parts (Kjeldsen et al. 2002: 298). In consequence, leachate's toxicity is difficult to predict (Hird 2012: 465). Its variability means that it does not automatically fall into the category of 'hazardous

waste' but nonetheless its toxicity can be high (Wynne 1987: 457). In addition, there is a risk of leaks, which becomes especially prominent when leachate gets through the plastic liner below the body of the landfill – a barrier that divides it from the surrounding environment. Even years after the landfill's closure, leachate can linger and spill.

There is a certain degree of variation in practices at the landfills that I visited for my fieldwork but all include some kind of leachate recirculation. To understand leachate recirculation, it is useful to describe the design of sanitary landfills. Although they started being constructed in the 1930s in different parts of the world (Melosi 2005: 153), in Czechoslovakia they were opened only in the early 1990s as a response to raising awareness about environmental pollution after almost four decades of socialism that paid limited attention to the spread of pollutants into the air and water (Carter 1985; Pavlínek and Pickels 2002). Sanitary landfills in the region usually have layers of concrete, bitumen and plastic liner at the bottom (Kizlink 2014: 127). In addition, gravel and old tyres serve as protection against ruptures of the lining from the inside and as a bed for the drainage system. These materials are supposed to contain the waste and render it determinate (Hird 2012: 465). Such a struggle for determinacy is supported by a system of pipes that drain the leachate and sumps for its collection (cf. Kizlink 2014: 127). From the sumps, leachate has to be pumped off to prevent its overflow. Once pumped off, it can either be sent to a leachate treatment plant for processing or be recirculated within the landfill (Knox, Beaven and Cossu 2018; Teng et al. 2021). In the first instance, leachate becomes part of a water cycle because its purified version is discharged into natural waters. Eventually, it may come back to the landfill in the form of rain and water in the garbage, especially bio-waste. In the second instance, recirculation introduces a smaller version of circular movement, minimizing the costs of leachate's treatment.[2]

Recirculation has been used at landfills for more than half a century (Knox, Beaven and Cossu 2018: 691). There are two ways to go about it. Collected leachate can be either applied directly onto the landfill's

2. Beyond these two human-managed processes, limited amounts of leachate evaporate from landfills through the pipes along with landfill gas which is a mixture that contains methane, CO2, and other compounds including water in its gaseous state (Alibardi and Cossu 2018: 231). It is important to note this to cover the spectrum of leachate pathways.

surface or injected into its body using injection trenches or wells (Beaven and Knox 2018). The technical literature gives different reasons for recirculation. Beyond its importance in preventing overflow, the recirculation contributes to the stabilization of waste mass, the stimulation of methanogenesis and the control of dust and fires (Knox, Beaven and Cossu 2018). The wide use of recirculation across the world, nonetheless, can be explained primarily with reference to its convenience and reduction of costs (Knox, Beaven and Cossu 2018: 691; Teng et al. 2021: 6). The cost-cutting logic behind recirculation is evident in research which includes treatment costs as a critical parameter of leachate treatment technologies (Calabro et al. 2018; Hendrych et al. 2019). There are even explicit statements in technical literature that underline such advantages of recirculation. For example, Chunying Teng and others argue that 'landfill leachate recirculation has been widely employed in previous decades due to its convenience and low operational costs' (2021: 6).

Looking from the perspective of the actors on the ground, I was puzzled by the contrast between leachate's critical role in everyday life at landfills and its absence in conversations or wider discourse about landfills in the Czech Republic. As Hetherington (2004) argues, the presence of absence is a vehicle for understanding social relations. It has become clear to me that leachate's silencing is significant. In official representations in the Czech Republic such as the webpages of local landfills or waste management companies, educational trails or media presentations, mentions of leachate are rare. None of the four landfill managers whom I got to know over the last decade ever raised the topic with me. Some of them were willing to discuss certain aspects of informality at their respective landfills such as waste recovery and repair, smuggling, tolerance for waste pickers or playing tricks with waste classification and reporting (for details see Sosna 2022; Sosna in press). However, whenever I raised the topic of leachate, the managers responded curtly and the discussion was quickly redirected. This diversion or even denial of leachate as a topic represents an example of what Alexander and O'Hare (2020) call technologies of unknowing. The managers omit leachate to minimize the chances that problems containing it will be discovered and scrutinized. Since leachate results from water, it has a capacity to emerge in surprising quantities and get through various barriers (cf. Strang 2014). It is an uncanny matter always able to create a surprise. Playing down its presence minimizes the need to explain the causes of leaks or solve them. On the rare occasion when leachate emerged in conversation, it was neutralized by

references to labour, the laziness of the workers or the infrastructure used for its recirculation.

Spraying leachate was part of everyday work rhythms. Pulling the hoses, turning on the pumps, moving the sprinklers or holding the hoses with the fire nozzles were regular, if often unpopular, activities. At those landfills, where spraying was facilitated by a system of stands and sprinklers and the hoses were left lying on the slopes releasing leachate, the recirculation was simply commented on by the workers as a necessary bane of the job. At other landfills, where the managers ordered the workers to spray leachate by holding the fire nozzles and changing the locations frequently, recirculation was a major issue. At one of the latter landfills in particular, recirculation was a central reason for tensions between the workers and the manager. As Peter, one of the landfill's workers, noted: 'All our diseases are from this nasty water here, from the droplets we breathe. For what? We spray it, it soaks through the landfill, we pump it off and spray it again. How much sense does it make to spray when there is no dust?' The workers did not always understand why they were asked to perform the activity, sometimes they felt it was just a way for the management to solidify the work hierarchy. Nonetheless, they had to handle the leachate's negative effects on their bodies.

Landfill leachate is one of the most unpleasant substances I have experienced. It is dark, volatile and it stinks. During windy days, it is not uncommon to get sprays into the face and droplets into mouths, especially when one holds a fire nozzle and manipulates old hoses that have punctures. In some landfills, the hoses were second-hand donations from fire services that bore signs of wear and tear. From time to time, it was necessary to climb into underground sumps to clean the drainage system or solve technical problems. The odour of the foggy fumes would get deep into workers' noses and hair. The workers would adapt to this fluid and did not share a sense of disgust that would resonate with Julia Kristeva's (1982) notion of abjection. Rather, they were worried about the potential consequences of the intimate relations with leachate for their future (cf. Millar 2018: 59). They murmured about possible but uncertain harm.

Importantly, recirculation increases the capacity of leachate to affect living beings and the environment. In particular, the evaporative effect of leachate spraying at the landfills where the managers pushed for this kind of recirculation increased the contagion, because of the presence of leachate droplets in the air. The circular logic helped the company to reduce the amount of leachate via evaporation at the expense of those,

who carried the potential negative effects of leachate recirculation in their bodies.

One day in mid-December 2014, the reasons behind recirculation became clearer. When I came to one of the landfills in my study in the morning, it was cold and foggy. The temperature was 0°C and there was 89 per cent humidity. Despite the weather and limited potential for evaporation, the manager ordered the workers to spray the leachate. He did not want to discuss the reasons but insisted that it 'must be done'. The decision seemed counter-productive to me because spraying worsened the muddy surface of the landfill and increased the danger that the incoming garbage lorries would get stuck. I initially interpreted the order as revenge of the manager on the workers for their misbehaviour and thus as part of their mutual tensions. A few months later, Jindra, one of the workers, suggested that the manager was afraid of the leaks from the sump situated at the bottom of the landfill. He did not want to elaborate further and instead advised me not to stick my nose in the matter. When I probed the manager on the subject, he did not mention the leaks, but he did say that leachate should ideally be treated at a plant that specializes in hazardous waste. He admitted that 'every now and then', he had to use a cistern lorry to transport the leachate for processing at a high expense. It was clear that he wanted to avoid or at least minimize recourse to the processing. Without any explicit explanation, recirculation was thus a preferable option for the management as it solved the issue of large amounts of leachate and did not require any additional expenses. It solely required mobilizing the workers to do the dirty work.

The managers' dream of recirculation, however, was not perfect. When the degree of infiltration and the amount of collected leachate in the sumps exceed the capacity of recirculation, leachate would 'leak'. Such leakage or the need to send the excess for processing shows that the movement of wastewater was not fully represented by a reference to a circle.

The case reveals some key limits of circular models. Indeed, the engineers who develop models of leachate recirculation do not imagine them as consisting of closed loops. Unlike the managers who tend to think about recirculation as circular because such a model would sweep complexities of leachate under the carpet, they depict a landfill as an entity that accepts inputs from the outside and releases outputs back (see Alibardi and Cossu 2018, Figure 6.1.2). Leachate is imagined as either circulating within landfills or being purified in special facilities that release it into waters. Leachate, however, travels well beyond this

model to play a role in circulations and transformations at different scales.

Managing toxicity

The landfill managers have to deal with the irregular excess of leachate and coordinate with special facilities for its processing. However, there is a grey zone of decision-making where the boundary between legitimate and illegitimate decisions becomes blurred (cf. Frederiksen and Knudsen 2015: 2). In the case of leachate processing, there are usually two options. It can be sent to a sewage-treatment plant where leachate gets treated after being mixed with other kinds of wastewater or to a plant that specializes in hazardous waste. The choice of these two options depends on the degree of leachate toxicity. Whether leachate falls or does not fall into the category 'hazardous waste', and therefore enters a special regime of treatment, depends on a decision by certified specialists who take samples and analyse the concentration of specific chemical substances. The Czech technical standard ČSN 83 8036 prescribes quarterly sampling, which means that the specialists announce their arrival at a landfill in advance four times a year. The EU Landfill Directive does not provide specific limits for the discharge of leachate into surface waters but rather delegates this responsibility to individual countries (Stegmann 2018: 502). Given the absence of such limits, there are no EU standards concerning the treatment method either.

In Czech legislation,[3] the leaching limit values are fixed so that the concentrations below the limits enable cheaper treatment in sewage-treatment plants while above the limits require more sophisticated and expensive treatment based on biological, chemical or physico-chemical processes in the special facilities (see Teng et al. 2021). All this reasoning depends on the threshold theory of pollution, which assumes that lower concentrations of pollutants are acceptable because of the self-purification capacity of natural waters (Liboiron 2021: 57). This understanding of leachate's capacity to pollute only after crossing certain thresholds is shared worldwide (Ma et al. 2022).

3. Decree no. 294/2005 Coll. (until 2020) and recently in Decree no. 273/2021 Coll. (since 2021).

Limit values are not always as rigid as they seem; rather they are open to interpretation, modification and negotiation. This nuances Max Liboiron's (2021) critique of the assumption that pollution can be conceptualized through limit values. Liboiron points to the problems of treating threshold as a rigid standard for distinguishing pollution from non-pollution and proposes to investigate pollution in ways that promote collaboration among various stakeholders. While I embrace this perspective, I would like to emphasize that the thresholds represented by limit values are numbers and, as such, become part of "number ecologies" (Day, Lury and Wakeford 2014). It means that numbers are part of relations and live rich social lives themselves. A rigid technicist perspective or what Bob Kuřík (2021) calls 'engineering of the world' fails to account for these qualities. In the case of leachate treatment, limit values are lax. First, the very fact that different EU countries set different limit values for leachate pollution weakens their aura as universals. Second, the limit values and exact requirements for leachate treatment are hidden using multiple technologies of unknowing (see Alexander and O'Hare 2020). For example, information is not widely available and it requires energy and time to sieve through complex Czech and EU acts, decrees and norms to find relevant information.[4] Most important facts are often found in appendices or referred to through web-like structures when one has to follow multiple steps to reach the relevant information, creating a barely penetrable information fog. This may be an unintentional consequence of complex institutions and frictions across the EU-national scalar axis or an explicit intention to restrict access to sensitive information. The environmentalists' conviction that 'landfills are time bombs' (Enviweb 2004) and environmental NGOs' bad reputation among waste industry actors[5] might be some

4. For example, Czech State Norms (ČSN) concerning waste management are not normally available in libraries nor online. Hard copies can be bought but they are expensive. Access to online versions can be secured only through a special commercial database with temporal restrictions on viewing and printing unless one pays a fortune.

5. This 'open secret' became apparent in 2021, when a new Waste Act came into effect including a brief modified section about the state's inability to demand fines retrospectively, which was pushed through into the text by two parliament members who later could not explain publicly their reasoning that had caused significant financial damage to the state.

of the reasons why this information is not readily available. Third, both the official documents and scholarly publications from natural and technical sciences, which deal with landfilling and leachate, tend to avoid strict language that would impose a causal logic of 'if concentration X, then Y'. Differential leachate treatment is rhetorically approached using 'recommendations' or 'suggestions', types of treatment are accompanied by words such as 'usually', 'normally' or 'it is possible to'. It is intriguing to see scientists, who normally use dry and explicit language, carefully avoiding similar rhetoric when they enter the sphere of recommendations related to leachate treatment.

The world of texts and rules differs markedly from life on the ground. Even if limit values exist on paper, it does not mean that they govern the praxis. During one of the few occasions when I witnessed leachate transport directly, one of the workers, Slávek, took me to the sump at the bottom of their landfill. There was already a cistern lorry waiting for us. Slávek attached a hose to an outlet valve, turned the pump on, and leachate started flowing into the lorry. We had plenty of time during the filling to chat with the driver, who described his experience taking a previous load to a sewagetreatment plant: 'Man, I was lucky that nobody took a sample [grin]. Otherwise, I would be screwed. I would have to take it to Alita [the name of the special treatment plant for hazardous waste]. That wouldn't be good.' Avoiding sampling was a way to treat leachate as non-hazardous waste. This topic was sensitive, and hence information about it was not shared. It was exceptional that the driver had raised the issue himself. There were also other indirect signals that sampling deserved attention. I recall one of the discussions with the landfill manager about sampling of bottom ashes in the nearby incinerator to evaluate its toxicity: 'They take samples but the way they select the pieces . . . man, I don't know.' The manager expressed doubts about the sampling procedure and suggested that things could be done to influence the outcome. He was willing to speak on the subject only as long as it pertained to other landfills. Although these are only indirect suggestions about the informality associated with sampling, it would be naïve to expect a clear-cut answer. One of the key features of informality is its ambivalence (Ledeneva 2018: 5). Representative sampling is one of the components of scientific research (Hacking 1990: 6) but it is equally an arena where informality can easily sneak in. Manipulation or bypassing sampling can serve as a tactic to minimize the costs of leachate treatment and externalize the consequences of potential pollution and harm. In sewagetreatment plants, wastewater from multiple sources gets mixed, so responsibility for potentially high toxicity gets dissolved.

Moreover, the discharged water from the sewageprocessing plant will flow away, taking all the evidence with it.

Landfills are places where 'anything goes'. Although Feyerabend's (1975) use of this expression relates to scientific methodology and knowledge production, it works well for the landfills and waste management too. These are places noted for their legacies of informal arrangements and practices (Butt 2020; Millar 2018; Nas and Jaffe 2004; O'Hare 2020). A recent police investigation in the Czech Republic, focusing on reclassification of waste as a 'construction material' in order to avoid taxes, estimates the financial loss to the state at more than one billion US dollars.[6] An illegal import of 25,000 tonnes of plastic waste by a single company over little more than a year demonstrates another strategy to bypass the normative treatment of waste.[7] In 2015, the Czech Environmental Inspectorate was puzzled by the disappearance of tens of thousands of tonnes of hazardous waste via complex rotating transactions among multiple companies.[8] A manipulation of leachate sampling can hardly be surprising in this context.

Leachate management does not only offer opportunities for creative solutions but also represents an environmental challenge. Leachate's unpredictability in terms of both its quality and quantity makes it a difficult matter to contain using recirculation. It rather confirms Serres' (2011) claim that emanation and percolation inevitably spread pollution in space regardless of how much we try to contain it. Understanding and facing such pollution, however, should mean abandoning universalistic fantasies and instead paying attention to the particularities of each case, as Liboiron (2021) suggests. Although specialists in leachate treatment use a more limited understanding of what these particularities entail, they emphasize the unique conditions of each landfill that need to be taken into account (Ehrig and Stegmann 2018). This particularistic approach seems reasonable but it may struggle to assign responsibility for pollution. In post-socialist communities with a low degree of

6. https://ct24.ceskatelevize.cz/domaci/3426394-reporteri-ct-caslav-chce-po-statu-miliony-tvrdi-ze-o-ne-prisla-kvuli-skladce.

7. https://ct24.ceskatelevize.cz/ekonomika/3204284-firma-z-prestic-dostala-pokutu-za-dovoz-odpadu-z-italie-zaluje-ministerstvo#:~:text=P%C5%AFlmilionovou%20pokutu%20za%20dovoz%20odpad%C5%AF,a%20%C5%BEaluje%20Ministerstvo%20%C5%BEivotn%C3%ADho%20prost%C5%99ed%C3%AD.

8. https://inodpady.cz/tisice-tun-nebezpecneho-odpadu-zmizelo/

enthusiasm for and limited tradition of participation in public life, a 'softer' conceptualization of pollution would enable the polluters to hide behind the diffused network of relational responsibility (cf. Gille 2013).

Spinning and rolling in times of CE

CE schemes have been conquering public space in the Czech Republic. Webpages of the Czech Ministry of Environment, NGOs focused on environmental issues, popular magazines, newspapers and debates in academia or on TV – all these outlets have thematized CE. Moreover, new institutes, consultants and start-ups have been exploring the potential of the CE. Businesses have clearly recognized the enchanting power of the circle. Being successful depends on good marketing and circularity is a clear and pervasive semiotic vehicle to demonstrate that a company is progressive. There are two major magazines for professionals in waste management in the Czech Republic: *Odpady* (Wastes) and *Odpadové fórum* (Waste Forum). During the last decade, the CE concept presented in these magazines has stimulated immense interest in its potential for profit generation. New technologies and practical solutions are presented as fitting into the growing family of CE advancements. Conferences and educational courses promote the concept and facilitate networking among the entrepreneurs who would like to join the exciting movement. Business must roll over the old-fashioned linear imagination without turning back. It takes advantage especially of the link to sustainability which is presented as part of the CE. There is little critical reflection that these two concepts do not necessarily have to go hand in hand (Corvellec, Stowell and Johansson 2022: 425). Moreover, it is striking how much the promoters of the CE in the Czech Republic embraced dominant business *habitus*, classificatory logic and representations. The leaders are '*CEOs*' with business plans. Indeed, the visual depiction of the CE may include money as its critical part; notably the logo of the Institute for Circular Economy based in Prague features a circle and euro coins. The promoters of CE rely on the essential premises of the market. They are rhetorically radical while keeping certain economic principles intact (Niskanen, Anshelm and McLaren 2020). Markets not only colonize the rest of economic life through the processes of cascading (Gudeman 2008: 60; Gudeman 2016: 137) but CE narratives present the market as synonymous with the economy itself. Any notion that the economy was primarily tied with *oikos* and its good management (Gudeman and Hann 2015: 3) is significantly suppressed, perhaps as an untenable archaism. The contemporary research on the self-provisioning of

food shows it to be close to the logic of the circular flow of value: growing plants and raising animals, consuming self-grown products and returning the food waste back through composting and feed for animals (Daněk and Jehlička 2020; Sosna, Brunclíková and Galeta 2019; Sovová, Jehlička and Daněk 2021). This kind of circulation, however, is less attractive for the promoters of the CE because it is based on old-fashioned ideas and practices[9] which are only weakly tied to the market and do not provide opportunities for neoliberal ideals.

The circular models need to be more realistic. Landfill workers and occasionally also managers have to get their boots on, check the sumps and solve the imperfections and departures from the ideal circle. When one gets one's feet back on the ground, it becomes clear that waste management produces residues and needs places of final disposal. Raffaello Cossu (2018: 86) argues that loop closure in the CE cannot be achieved without paying serious attention to residues and their treatment. Nicky Gregson and her colleagues (2015: 235) argue that achieving CE goals would require radical transformation of the economic order.

Conclusion

To paraphrase Joe Smith and Petr Jehlička (2013), recirculation of landfill leachate is a kind of 'quiet circular economy'. It is quiet because it is neither ideological nor activist. It is not applauded; it just happens, preferably without witnesses. While the origins of the CE and leachate recirculation seem to coincide in the 1970s, there is no direct link between them. The reasoning behind recirculation is not necessarily green in terms of saving materials and giving them an opportunity to last. An intensification and long-term practicing of recirculation, in fact, may cause trouble. Instead of symbolizing regeneration, recirculation of leachate rather indexes the creeping potentiality of harm externalized to the bodies of organisms who come into direct contact with it on a regular basis. This relates not only to humans but also to other organisms, including landfill bacteria, which can experience harm when leachate deteriorates their living conditions. Harm can also be externalized to other places and beings when informality paves the road to cheaper but potentially more polluting ways of treating leachate away from the landfill.

9. Smith and Jehlička (2013) coined the term 'quiet sustainability' to refer to the practices that do not need to be discovered and loudly advocated because they have been practiced for decades.

The recirculation of leachate has been practiced for five decades as a response to unpredictable quantities and qualities of wastewater. Although recirculation has been defended for multiple reasons, the most critical factor seems to be costefficiency for waste management companies. Recirculation is a way to minimize the danger of leaks and, therefore, potential fines for environmental pollution spreading directly from the landfills. It also takes advantage of evaporation and the water cycle to minimize the frequency of expensive transport and external treatment of leachate at special facilities. The market logic is backed by the conveniency of recirculation because it only requires the mobilization of the labour of the workers and keeps the impure substance in movement at the sites of disposal. The whole process of recirculation is a temporal game reminiscent of the Czech proverb 'walking around the hot mash'. It postpones the painful moment when things will have to be solved because extending the circulation becomes untenable.

There is little doubt about the need to search for more sensitive ways to manage resources. The CE's call for a search for new sources of energy and value as well as the emphasis on the prefix 're' are well-founded. The CE's enchanting capacity derives from its simplicity and aura of being natural; nonetheless, it is problematic because it oversimplifies and conceals, shrinks scalar differences and suppresses the problems of residues. The spinning effect of the plethora of circles in public space may even bring a vertigo, suggesting that too much circulation is not healthy either. When the promoters of the CE marvel at its new business opportunities, they unconsciously facilitate the expansion of the market at the expense of more silent forms of economic life. There is a danger that uncritical acceptance of the CE may bring more unexpected consequences and problems than benefits in the future.

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Chapter 8

The Circular Economy Law for Textiles in Germany and its Predecessors

Heike Derwanz

Introduction

Worn textiles have always been reused, torn into pieces, resown or repurposed as cloths inside people's homes. They have also served as resource for paper mills and industrial production. This latter use meant that old clothes and their circulation have been subject to state regulation and control to ensure supply. In Germany, the ideologies and practices of feeding domestic waste into production have seen various iterations. For example, the Third Reich urged that all 'das Wertlose' (the valuelessness) of consumption should be collected and used as a raw material to make Germany independent from imports (Ungewitter 1938). Today, the practice instead is captured by concepts such as *cradle-to-cradle* or the *closed loop* and it is valorized with reference to the circular economy.

In this chapter, I shed light on the historical milestones preceding today's circular economy in textiles in Germany and the subsequent emergence of circular economy paradigms and practices. I show that not only clothes as material but also the narratives about their circulation have been around for decades. Clothes and textile recycling are subjects of two disciplines: fashion studies, which examines the clothes' relationship to humans, and textile engineering, which develops ways to produce and recycle textiles for clothes. An assemblage theory deriving from science and technology studies brings these two inquiries together. The chapter is based on an ethnographic study (2014–20) of economic practices of recirculating pre-owned clothes from households in the North German city of Hamburg. In *Clothes in Affluence* (2021), I follow piles of sorted-out clothes throughout the city to repair shops, second-hand stores, flea markets, online shops,

swapping parties, charitable clothes collections, upcycling workshops for consumers, small enterprises as well as two textile collecting and recycling companies. This chapter follows the development of textile recycling and its governance in Germany through its historical stages, culminating in today's circular economy practices. Through this historical exploration, I show how and why used clothes became waste and what the appeal of the 'circular economy' is for an industry that has been recycling textiles for centuries. Rather than offer a detailed history of textile recycling, I zoom in on four key historical moments that saw shifts in discourse and practice.

Rags for paper: German bans on textile exports in the eighteenth and nineteenth centuries

The early history of textile recycling lies in the rag trade referred to as 'Lumpen', a word denoting both rags and rag-and-bone men.[1] Johann Georg Krünitz defines rags in his *Economic Encyclopedia* (published from 1773 onwards) as 'worn out ripped piece of cloth' (1773: Lumpen). According to Krünitz's description, rag traders paid rag-and-bone men according to weight after the latter collected rags in cities and in villages. Materials such as wool, linen and cotton were used for different paper qualities with specific purposes such as writing, printing, cardboard, packing paper and blotting paper.

Historical research dates the first law that protected rags for paper making to 1366 in the Venetian senate (Sandermann 1988: 95). These were the beginnings of the paper mills, including in Germany, where the first such mill opened in 1390 in Nuremberg (Roth 2006: 54). Paper at the time was made from textile fibres, mostly linen and later cotton, and bones. Starting from Gutenberg's introduction of the printing press in the fifteenth century, the demand for rags exceeded the supply and this lasted until the twentieth century due to rags' primary role in paper making. Although inventions featured other materials, such as grass, rags remained the preferred material until, in the mid-nineteenth century, technological

1. I differentiate rag from second-hand clothes trading, although the difference is theoretical. Rag-and-bone men would decide if they could sell material as second-hand clothes or as rags. In Krünitz's encyclopedia, meanwhile, the term 'Lumpensammler' is defined specifically as selling to paper mills.

change allowed for the addition of wood into the mix. Against these historical developments, rag collecting became a common and recognized occupation. Many states introduced high taxes on the export of rags. One well-known export ban stemmed from the period of Frederick the Great in Prussia. The country published a law in 1764 against the export of rags and other material used for paper making such as animal skin or sheep feet. The penalty for taking rags out of Prussia was three months of forced labour (Roth 2006: 55). Rag collection was associated with crime due to cases of rag theft and smuggling during periods of accentuated shortage. To prevent shortfalls and crime, registered collectors were bound to specific paper mills and areas of collection (Roth 2006: 55). As such, textiles were part of a governed economy that can be seen as a precursor to the circular economy. Measures were not based on contemporary tenets of the circular economy as waste reduction or strengthening natural systems but rather aimed to satisfy the ever-growing artisanal and industrial demand: 'It is a fact that cannot be denied that in general not enough waste was "produced" to meet the demand of the processing industries' (Stern 1916: 97, translation HD).

Textile historians also point to a whole range of recycling practices carried out by women at home or to a lesser extent by companies. These practices presented competition to industrial quotas as they kept materials in households (e.g. Fenneteaux 2015: 125; Strasser 1999: 81). As Strasser (1999) writes, historical sources concerning textiles and fashion usually work with bourgeois or upper-class sources in urban contexts, where new textiles could be bought frequently, while used textiles were given to employees or were sold. Outside these rare privileged contexts, most textiles were consumed in poorer households that used materials until the dissolution of the fabric. Applying today's life-cycle thinking would chart different material forms that garments would take inside such households, for example, from clothes to children's clothes, cushion sleeves and filling, or patches and cleaning rags. Such household circulation transformed form and purpose. Meanwhile, the commercialization of rags involved an exchange with another household or sale to the paper industry through rag-and-bone men. Whereas style, fit and condition were essential for a second-hand market in clothes, the initial fibre was what determined prices and paper mill buyers.

Rags for thread: The German war collection orders from 1941–44

Industrialization in the nineteenth century reshaped the supply of rags. The ready-made clothing industry provided more and cheaper

clothes for ever-growing middle classes, which meant more waste. In consequence, the rag trade expanded and German enterprises were now able to export to other European countries (Stern 1916: 113). Like the term 'circular economy' today, the developments at the time were reflected in a new terminology. Associations like the German trade organization for raw material traders (*Verein der Rohproduktenhändler Deutschlands*) were founded and they heralded the renaming of rag traders as traders of products ('Produktenhändler') or raw products ('Rohproduktenhändler') referring to 'product' as domestically made material. Hermann Stern, author of a history of the German rag trade, opted for the name 'Abfallstoffhandel' (old material trade; 1916: 4) in his work that sought to define the trade – a term which was later adopted by the Nazi government (Weber 2021: 3). Clothes were worn, repaired and altered and only became rags once they could no longer fulfil their original function or other domestic functions. This differs from our current practice where pre-owned clothes are given away and are still functional as second-hand clothes. In the first decades of the twentieth century, the trade found diverse destinations for its 'product': upholstery, banknotes, roofing felt and blankets to name but a few, with the use as cleaning rags or fertilizers already in place (Weber 2021: 8).

The first half of the twentieth century laid the foundation for a fundamental change in the textile business through the mass production of man-made fibres[2] such as viscose ('Zellwolle') and artificial silk ('Kunstseide', Bluma 2011: 7). Already in the early 1940s, 240 different man-made fibres existed, some of which developed from milk and fish protein (Gottfried 2018: 282). As the mass production of clothes in Germany enabled increased production, the demand for cotton, silk, wool and others outgrew domestic resources. In consequence, by the 1930s, 20 per cent of all imports to Nazi Germany were textile fibres (Schmidt 2018: 168). In the context of this dependency, scientists were eager not only to invent new materials but also to establish an autarkic German state that would not rely on foreign resources or require foreign currency to trade. The lobbyist for the German chemical industries Claus Ungewitter (1944) designed a 'total' waste recovery scheme for all materials. Historian Heike Weber interprets the Reich's ideas about a

2. 'Man-made fibres' is the official term, although it would be more correct to use 'human-made fibres' today.

national collection of all kinds of fibres to be re-spun into recycled yarn (*Reichspinnstoffsammlung*) as making people aware:

> 'that there is a perpetual cycle of raw materials'; if the individual consumer discarded or destroyed a piece of clothing or a rag instead of recovering it – only because it has lost in personal value – the 'cycle' was broken and could no longer effect its 'usefulness for the collectivity'. (Heck 1941a: 595) (Weber 2021: 16)

Weber's archival research shows frequent uses of flow charts to depict a closed loop as the symbol of a self-reliant economy (Weber 2021: 16). In her interpretation, those portrayals neglected costs, losses and inefficiencies and were rather hopeful that 'mechanical and chemical transformation processes would close the material loop' (Weber 2021: 16).

In December 1935, the law on spinning fibres ('Spinnstoffgesetz') was introduced to regulate fibres that could be used for spinning. Spinning is a process of making threads that can be then used to make specific textiles. The law fixed the amounts of raw material that the textile industry was allowed to use and controlled the textiles' commercialization as well as factory working hours (Schmidt 2018: 169). The law was renewed several times, and in 1936 it set the amount of recyclate that had to be mixed in with virgin fibres at 8 per cent. One year later it set the percentage at 20 per cent for specific fibres such as viscose (Schmidt 2018: 170). Alongside many newly invented fibres, the leading role was played by the 'Reißspinnwolle' (recycled fibre). But the 'Reißspinnwolle' was not popular among consumers because such clothes were neither durable nor had the functional qualities of traditional fibres.

As preparations for war progressed and the national management of the economy intensified, people who kept materials at home were seen to act against the official economic management of fibres that relied on such materials. People were advised to sort through households' forgotten places in search of value, as in this pamphlet by Hans Eggebrecht from 1940: '[…] and much that sleeps in cupboards and chests like sleeping beauty and awaits the prince, who will awake it to new life in favour of the community' (transl. HD, cited in Syré 2018: 241). In the yearly collections named 'Reichsspinnstoffsammlung' from 1941 until 1944, the government mobilized children and young people towards the cause (picture 1; Weber 2021: 9).

After 1937, the trade with raw materials, not only textiles, was reorganized completely, which included erasing the term 'Lumpensammler' (rag-and-bone men) from official discourse (Weber

2021: 57). Historian Susanne Köstering (1997) explains how the old organization of the rag trade was restructured through the new system consisting of three stages: the first stage of 'Altstoffe' (old material) was to focus on collection within Germany; the second stage included the mass production of man-made fibres as 'Ersatzstoffe' (substitutes) produced in Germany; and in the final stage, the plan was to source resources from subjugated countries instead of buying them from enemy states (Weber 2021: 49). Heike Weber summarizes that 'waste salvage was an intrinsic component of the Nazi economy as well as the regime's ideological, racial, and expansionist ambition' (2021: 2). Even though the collection quotas were not met, Köstering (1997) argues that the collection had a striking impact on a symbolic level, recasting it as an act of patriotism. Many of the rag collectors themselves had been driven out of business by the Aryanization of Jewish businesses and competition with National Socialist organizations.

As in earlier periods, during the Nazi era rag circulation was regulated in favour of national self-sufficiency. With outside raw materials such as cotton, silk and wool becoming scarce, the full exploitation of all possible textile resources was called upon to maintain production in the war economy. Women were managing textiles at home and thus they were a target audience of propaganda to convince them to hand over the rags to the state. The difference with this period was, first, the antisemitic nature of the regime, and, second, expansionist self-sufficiency as the driving force for the collection rather than pure maintenance of industrial production as in the previous period.

Rags for the 'developing world': The 'Basel Ban' in 1989

After decades of post-war scarcity, charities took over the collection of textiles in West Germany in the 1960s. It was only when the charities had too much that they sold the surplus to rag traders (Strobusch/Terpinc 1995: 14f). The prices on the global market would go up and down depending on the demand for second-hand clothes (Tranberg Hansen 2000: 119f). Today, municipal departments organize the collection of clothes in Germany with companies having to register to participate (KrWG 2017: Section 18). The companies have to define their activity as either collecting, transporting or trading.

In 1972, the 'Abfallbeseitigungsgesetz' (Waste Disposal Act) unified all (West) German regulations concerning waste (Umweltbundesamt 2020). Here, waste is 'movable property which the owner wants to

dispose of' (Kuchenbuch 1988: 168). It was never clear if collected clothes were waste until in 1993 textiles appeared in the German register for waste which implemented the EU registers (OJEU 2000). This meant that they could not be exported to sixty-nine countries in Africa, the Caribbean and the Pacific according to the EU Regulation 259/93 (Hütz-Adams 1997: 136). Despite this, the subsequent Basel Convention stated that they were free to be exported when they were not hazardous.

Since waste began circulating on the global market with greater intensity, the 1980s were marked by efforts to ensure that such circulation did not displace environmental hazards from one country to another. The Basel Convention from 1989 was organized with the aim of enabling customs agencies to control cross-border waste transport in order to prevent the disposal of toxic wastes in regions such as Eastern Europe or Africa. The resultant 'Basel Ban' prohibits the export of waste for disposal, which became a pressing problem in the 1980s and has been interpreted as a capitalist reinstatement of a colonial world order (Alexander and Reno 2012: 16). Among the wastes listed in the convention, 'worn clothing' and used rags appear in group B3030 (Basel Convention 2014:84). Textiles are not on list A for hazardous wastes, but they can be mixed with hazardous materials to obtain new products such as liquids or building materials. At this time, however, the regulations still listed only raw materials such as cotton, wool, flax, hemp or man-made fibres, thus neglecting mixtures and contamination.

In the context of the ban, a discussion grew around the global circulation of used clothes[3] to countries in the Global South – a circulation which was often done under the guise of charity (Tranberg Hansen 2000: 18). Specific practices led to scandals in Germany, where it was found that some textile recycling companies used the name of the German Red Cross (DRK) on their bins, leading people to believe that the clothes went directly to the DRK to hand out to 'people in need' (Hopfinger 1985: 206; Hütz-Adams 1997: 13, 30; Strobusch/Terpinc 1995: 14). The reports found it particularly problematic that the

3. The combined EU and German law today works on the basis of the ISO/TS 20245:2014 for 'Cross-border trade in second-hand goods', which defines 'goods or components/parts that have been in service (leased, loaned or owned) and that are re-entering a market for sale, lease or use by a second user or an end use' (ISO 2017).

'donated' clothes were sold in Africa and were suspected of destroying African industries (see Hütz-Adams 1997; Brooks 2015). Some African states banned imports of second-hand clothes but these could be circumvented by declaring second-hand clothes as rags (Hütz-Adams 1997: 33).

With the Basel Convention, the United Nations reacted to different developments in the 1980s. First, as the production of clothing increased, leading to an increase in textile waste, environmental awareness and the global justice movements called for a regulation of the global market to avoid dumping in poorer countries. The production of textiles and clothes moved entirely to the Global South. This means that clothes and rags discarded in the Global North were usually transported to these places of production on other continents. The flow of value is therefore threefold for the economy: low-cost production in the South, high sales revenue in the North and low profits through resale in the Global South. The Basel Ban reacted to this third historical period of the rag and textiles trade at the end of the twentieth century. In completely different circumstances than the former two phases, the circular reuse of textile resources is globalized in a new way, often labelled as charitable gifts in the name of social justice.

Textile recycling in practice in the twenty-first century

The Basel Ban has changed the working practices of the textile recycling industry. I illustrate these changes through a reference to two companies in which I have conducted ethnographic fieldwork. One of the companies, Meyer,[4] was established in Hamburg during the First World War and is led by a fifth-generation executive. The ancestors of today's owners used to be rag-and-bone collectors (Int. HD: company owner, 08.09.2020). The other enterprise, ABC Group, is one of the global leaders in textile recycling. It is important to emphasize that 'textile recycling' is often used as an umbrella term for different practices such as collecting, sorting and processing. Recycling, as historian Susan Strasser underlines, reverses the logic of production in supply chains: 'the return of household wastes to manufacturers for use as raw material' (1999: 72). 'Here', she writes, 'households supply factories, rather than vice versa' (1999: 72).

4. The names of the enterprises are pseudonyms.

I would argue that industrial textile recycling techniques start at the stage of sorting, which defines the categories of the material that will later be recycled. What is called rough or fine sorting is counted by how many times the sorters must 'touch' ('durch wie viele Hände gehen', Int. HD: manager, 08.05.2017) the material. In interviews, the executives would often mention the challenges and complexities of marketing the sorted products into production lines for other industries because their products have an ever-changing quality depending on the composition of natural and man-made fibres. The manager of the ABC Group explains that for them the 'first touch' separates out home textiles, shoes, bedding and all other broader categories. The 'second touch' separates 'usable' from 'non-usable' clothes because clothes are the category with the highest earnings. At this stage, material for recycling is 'constructed' through the evaluation as non-usable by the sorters. The so-called 'third touch' separates reusable clothes according to their quality – with clothes marked as 'vintage' or 'crème', which is the German expression for something luxurious, being considered to be of the highest quality and fetching the highest prices on the world market. In contrast, recyclers detect the material instead of the aesthetic and extract a material value when the social value is gone. The manager describes their circular thinking perspective on clothes in that we often *use up* the fashion element of clothes when discarding them and what stays is the material.

In consequence, the umbrella term 'recycling' only rarely involves the production of a new fabric. The manager of one of the companies explained to me that there are basically two main techniques they use to treat textiles that cannot be used for their original functions. The first involves cutting the garments into cleaning cloths. Such cloths are not destined for household use but for the automobile or heavy industry. Their use is mainly to soak up oils or polishes, which means they are disposed of as contaminated after a single use, a practice that while akin to 'closing the loop' also only represents a single further use (Int. HD: company owner, 08.09.2020).

The second method applied in the recycling of textiles is shredding, which opens up the fabrics or glues them together as a new non-woven textile material. They are used as insulation in the automobile industry or as carpet underlay (Int. HD: manager, 08.05.2017). The textile industry and scientific research neglected the field of mechanical recycling, the manager of ABC Group told me, so technological change stagnated for years. Although the machines that are used today by the company are electronically controlled and with higher efficiency than those of the past, their basic logic is still the same mechanical dissolution. However, a

large proportion of textiles that arrive at the sorting company cannot be recycled by the company and need to be resold. The dust that is produced by the ripping of garments can, however, be reused. It is pressed into briquette and is burnt for energy or used in the paper industry.

With this, the company officially follows a *zero-waste* strategy, meaning there will be no waste but only raw materials, which they try to find innovative ways to turn into valuable resources again. This philosophy led to a reassessment of all material streams that they process. The manager defines three challenges for putting this philosophy into practice in the recycling business. First, it must be understood what materials they consist of and which of them are usable. Second, this material must be separated from the rest. Third, there needs to be a clarification of what can be integrated and how (Int. HD: manager, 08.05.2017). Effectively, recyclates only exist when there is a market for materials and dumping would cost more money. The recycling industry sells its products when their price is lower than for virgin products, such as wool or cotton, and when their material qualities are different from those of virgin fibres. All other factors that would prioritize the use of recyclates over raw materials are not taken into account.

A third and newer strategy is chemical recycling. It gained momentum with today's dominance of fibre blends that enabled increased production at a time when natural fibres have reached their global production limit. Whereas the production of cotton decreased in the 2000s, according to OECD data from 1993 to 2012, 'synthetic fibres represent the majority and the fastest-growing segment of global fibre consumption' (Peters, Granberg and Sweet 2015: 184). Peters, Granberg and Sweet (2015) argue that synthetic fibres have disadvantages from the perspective of recycling. First, technology to identify blended fibres does not exist. Second, synthetic fibres tend to jam shredding and other machines. Third, the blends are so different that it is hard to apply the correct chemical quantities for chemical recycling (2015: 189).

Calculations about the 'savings' of raw material and energy through recycling do not yet exist for recycling techniques such as cutting, shredding and chemical recycling. There are studies on the *life-cycle assessment (LCA)*[5] of polyester but here the polyester is mainly sourced

5. LCA and cradle-to-cradle are part of the paradigms of the *life-cycle perspective*: 'an approach to the management of products and processes that aims to intervene in the design process to avoid end-of-pipe solutions for polluting industries' (Peters, Granberg and Sweet 2015: 182). This perspective can potentially include environmental and social aspects with a focus on

from old PET bottles (Periyasami/Militky 2020). Periyasami and Militky find different technologies to process polyester, saving up to 59 per cent of the energy (Periyasami/Militky 2020: 22). However, the authors conclude that many more components such as water or chemicals are affected. They demand more and careful LCAs to make decisions if chemical recycling is viable at all. Textile researchers Niinimäki and Karell (2020: 135) underline that the field is of high interest in the future because virgin fibre will be even more scarce and therefore more expensive. The European Union has stepped in to develop this field into a broader economic vision for its member states such as Germany (2020: 135).

Rags as waste: The circular economy law in 2017

Nearly thirty years later after the Basel Convention, the new German Circular Economy Act ('Kreislaufwirtschaftsgesetz' [KrWG]) defines collected used and pre-owned clothes in the times of Fast Fashion as textile waste: 'Waste within the meaning of this Act shall be any substance or object which its owner discards, intends to discard or is required to discard' (KrWG 2020: 6, §3 (1); transl. HD). The logic applied here is that everything that is given away is, waste and only if processed, it reverts to being second-hand clothing or other merchandise. The circular economy is defined by the law as the 'prevention and reclamation of waste' (KrWG 2020: §3 (19)). While this definition is an adoption of EU frameworks, an item ceases to be categorized as waste in Germany when any of the following conditions are met: it is normally used for a specific purpose; there is a market or a demand for it; it complies with all technical requirements applicable to its intended use and with all legal provisions and applicable standards for products; and its use,

sustainability. Peters et al. note that there is, however, not a fixed method and the quicker and cheaper the method, the less accurate and precise the assessments (Peters, Granberg and Sweet 2015: 182). Sustainability and textile specialist Subramanian Senthilkannan Muthu (2015), who publishes prominent technical research, differentiates LCAs into *cradle-to-gate* assessments, *gate-to-gate* assessments, *cradle-to-grave* assessments and *cradle-to-cradle* assessments (Peters, Granberg and Sweet 2015: 86) and lists 21 parameters that could be relevant. Even though LCAs are vital to him, he concludes that 'LCA studies are not meant truly for "apple-to-apple" comparisons' (Peters, Granberg and Sweet 2015: 90).

taken as a whole, does not lead to harmful effects on humans or the environment (KrWG 2020: 9; transl. HD).

The law therefore presses companies to sort in the country of origin and not transport unsorted waste to states with other regulations. The European Clothing Action Plan (EU 2015-2019), meanwhile, 'aimed to reduce clothing waste across Europe and embed a circular economy approach'; 'divert clothing waste from landfill and incineration'; 'ensure that fewer low grade textiles go to incineration and landfill'; and 'encourage innovation in […] recycling of textile fibres' (ECAP).

The Circular Economy Act, adopted in 2012, no longer used the term 'Abfall' ('waste'), thus underlining what the recycling industry advertised for over 100 years: that waste should be seen as a product to use. The Circular Economy Act also essentially transcribed all EU regulations into German law (Umweltbundesamt 2020). The main aspects emphasized are the four criteria when something is successfully transferred from the legal category of waste to merchandise. The second and most meaningful regulation is the creation of a hierarchy of treatments for waste, mostly represented in an upside-down pyramid and officially named the *Waste Framework Directive*. The highest form is prevention when items are still defined as products and non-waste. The waste category starts at the next level, where preparation for reuse is demanded. The level below is recycling, followed by recovery and then disposal, which occupies the very small tip of the pyramid (European Commission 2020). The last milestone that led to the contemporary situation is the Commission Implementing Decision 2019/1004 from June 2019, which demands that all countries quantify their waste according to different categories by 2025.

This narrated history of waste regulation for clothes and textiles shows that as clothes are 'inwasted' – as German law professor Jens Kersten terms the cultural process that produces the category of waste (2016: 9) – they become part of a new social entity called the circular economy. The circular economy did not exist on a larger scale for textiles beside the aforementioned recycling practices but consists at the level of small-scale initiatives such as a circular fashion consulting company in Berlin[6] or bigger transdisciplinary pilot projects between universities and industrial enterprises.[7] However, the majority of current practices still involve the down-cycling of clothing into other materials. In May 2020,

6. https://circular.fashion/de/, 02.09.2022.

7. Projects are for example Mistra Future Fashion in Sweden from 2011 to 2019, Reloop Fashion in Finland from 2015 to 2017 and Resyntex, an EU-project from 2015 until 2018.

the German Federal Parliament answered an officially posed question about the promotion of recycling fibre blends from fast fashion clothing: 'The material recycling of mixed fibres is at this time technically not possible on an industrial scale' (Drucksache 19/19345: 5; transl. HD). The name and attention recycling has been given have changed. After years of neglect where the shipping of clothes has been the focal point, recycling was rediscovered as a necessity, operating now within the framework of a circular economy. Besides practices such as burning (thermal use) and the re-use of clothing, recycling is one of the key practices within a circular economy. However, despite the new terminology, the circular economy in its current phase hasn't yet fundamentally changed the older practices of material circulation or treatment of textiles.

Assembling a global circulation, recycling technology and sustainability

The historical milestones illustrating the coming into being of the circular economy for textiles contain different aspects that should be addressed as arguments in their own right. I will therefore examine, first, circulation; second, recycling; third, sustainability; and finally, circular economy as different layers of the socio-material assemblage of the four presented legislations. Within this description components such as the cultural background, discourses and scientific perspectives from waste studies are assembled.

The most fundamental and historical level to start with is the notion of the social and material circulation of textiles. The circulation of used or pre-owned clothes takes place in private settings, in informal settings or in businesses. It is a circulation that is able to enhance the value of worn textiles – for example, when Michael Jackson's gloves or rare vintage pieces that were lost in cupboards are auctioned. In my interviews about people's wardrobes, where interviewees were asked to sort out their wardrobes and verbalize their thoughts (Derwanz 2021), gift-giving raises value beyond the functional or aesthetic qualities of clothes. Most processes in the circulation of clothes through businesses lower the value of clothes. This low value even translates into the social standing of the wasteworkers such as in the figure of the rag-and-bone man in Europe.

With industrialization and the mass production of clothes, the circulation of rags or recently used clothes became part of industrial production processes, in which both became raw material. However, the focus of today's circular economy of clothes as seen in its definition and legislation is on industrial business practices and not small-scale or household practices where recycling is also part of the exchange.

In their text about the narratives of organizing waste, Zapata Campos and Hall explain that its governance is socially constructed, which is obfuscated by the 'narrow engineering, economic and/or physical scientific discourses' that are presented to the public (2013: 1). When the definition of the circular economy is applied to industrial production and consumption only, as Corvellec, Stowell and Johansson suggest (2021: 3), such science-centred discourses are reproduced. Conversely, anthropological perspectives can draw attention to alternative economic and informal practices.

What is presented to the public through the Circular Economy Act is a narrow representation of recycling techniques. The cycle and closed system idea was politically appealing, as historians have agreed (Weber 2020, 2021; Trischler 2016; Hauser 2010). Recycling as a metaphor made a career in the 1970s, as cultural historian Susanne Hauser writes (2010: 51; see also Alexander/Reno 2012; Trischler 2016; Weber 2020). However, the idea that everything was used everywhere until the very end in former times is rather oversimplified. There are historic examples of textile rag dumps, be it the Roman site of Mons Claudianus in the North African desert, which contained heavily worn clothes from the first to the middle of the third century (Jørgensen 2018), or a site that fashion historian Lou Taylor found in Normandy. Taylor describes: 'Abandoned, it seems, in the mid-1950s, the dump consisted of large, bound, and compressed bales piled up on top of each other and left to rot' (2018: 2). Most of the material found here was already many decades old, heavily patched and mended.

Sustainability discourse is entwined with the circular economy. Moreover, both concepts are often bound to economic growth, and in their representation, cultural and social aspects are overshadowed by economic and technical ones. However, circular economy practices such as recycling are not inherently sustainable. The factors are captured by sustainability and fashion expert Kate Fletcher's concept of *embodied energy*, which 'includes the energy consumed in winning materials, processing them as well as transporting materials between and within the processes' (2008: 101). Going along the supply chain, from fibre to fabric to garment, materials gain more embodied energy and the aim of sustainable treatment would be to preserve the highest level – that is, the garment – for the longest possible time (2008: 101). These sustainability factors seem to be left out in the marketing of recycled products.

Considered as a whole, with bins and ripping machines, legal forms and mountains of collected clothes, fashion waste assemblages make tonnes of textile waste *disappear* from cities in the Global North every day. The socio-material assemblage is constantly subject to social and technical

change. As already touched upon, waste is a pressing future problem with, first, new quantities; second, the knowledge of the quantity of hazardous textile waste in it; and third, the still unresolved problem of fibre blends. The answer to these problems should be the circular economy, which 'closes a loop' (Sandin/Peters 2017: 355) and leaves the linear system behind. It is also a form of moral economy when it defines linearity that ends in disposal as wrong. One of the actors providing data about achievements and innovations in this field is the Ellen MacArthur Foundation (2017), which published *A New Textile Economy. Redesigning Fashion's Future* in 2017, working with partners such as the C&A Foundation, H&M and Lenzing, the producer of Tencel fibre. This league of powerful producers teams up with governmental actors to define the circular economy as bringing together innovation and sustainable development. Yet critics point to the emergence of consumer responsibility as a strategy by the industry and politicians to make consumers responsible for the production of non-sustainable products and the lack of recycling (Zapata Campos/Hall 2013: 10), while Corvellec et al. find that the circular economy discourse can lead to more consumption as a rebound effect (Corvellec, Stowell and Johansson 2021: 8).

Conclusion: Narrating technology, economics and governance

While shedding light on specific legal arrangements, I have presented three different organizational phases of the circulation of used textiles in the last 400 years preceding the fourth and last, the circular economy law of 2017. In recent years, the circulation and recycling of used textiles has been defined by various actors in the EU as a 'circular economy' in order to 'achieve a cleaner and more competitive Europe' (European Commission 2020). I have shown that used textiles and rags are and have been of public interest and therefore managed through waste governance for centuries. The four milestones portrayed the assemblage of legal arrangements around used textiles as constantly changing according to the demand and organization of the trade. The economic constellation alone has changed from not enough material with a high value and too many workers competing for it to too much material of low value and not enough people willing to process it (Int. HD: company owner, 08.09.2020). Now, man-made fibres and fibre mixes dominate the recycling processes and profitability is questioned. The market consists of ever fewer companies but those that still exist have grown considerably. As in many branches of the waste or recycling industry, the sorting and processing of textiles has been gradually outsourced, not only from Germany but from the Global

North. This means higher transportation costs and higher emissions that call a supposedly 'green industry' into question. Within the assemblage, local actors depend on global second-hand market prices, on recycling technologies and ultimately on the prices of virgin raw materials. Different narratives have been provided not only by the industry itself but by small German states, the German nation state and, following the Second World War, by international organizations such as the EU or OECD, which translated them down to the local level again. The EU, like the individual nation states before and now, continues the work of strengthening the recycling industry, only now with the language of the circular economy.

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Chapter 9

The circular economy in China

For the people, with the people?

Benjamin Steuer

Since the early 2000s, scientific literature has overflowed with discussions of China's economic catchup in the wake of Deng Xiaoping's Reform and Opening policy. More recently, a similar transformative pattern can be discerned in regard to China's economic shift towards sustainability. Publications, particularly in the domains of environmental economics, environmental engineering and generally quantitative sciences, that hail the People's Republic of China's (PRC) sustainable development achievements dominate the scene. There is per se nothing wrong with that, and indeed there is much about China's second economic transformation, towards sustainability, that deserves recognition. After having embarked on a massively resource-intensive and export-oriented growth model that generated large capital returns but also ecological devastation, China's leadership took inspiration from and emulated international strategies to cope with domestic environmental challenges. The translation of concepts from the international to the domestic context began with the adaptation of the United Nation's sustainable development (SD) concept in 1992 (Yi and Liu 2015). This practice extended to transferring resource-efficiency, industrial symbiosis and green growth-related concepts such as cleaner production, eco-industrial parks and low-carbon development (Luo and Leipold 2022). A notable success derived from imitation, adaptation and indigenous refinement efforts is the circular economy (CE). The PRC's leadership began to experiment with this sustainability concept in the early 1990s to raise resource efficiency in the economy. Thanks to politically favourable evaluations, the CE was branded a national industrial policy and cast in a legislative mould in 2008 (Zhu 2008; NPC 2008).

In terms of definitions, the CE is anything but clearly delineated, with most perspectives stressing the need to treat waste as a secondary resource, abolish the end-of-life idea for materials and products and re-model industrial systems to ensure resource cycling (Preston 2012). Chinese researchers seem to be particularly attracted to the CE's idea of closing and looping material flows (Geng and Doberstein 2008) and the cascading reuse of energy and materials within that closed cycle (Yuan, Bi and Moriguichi 2006). By the late 2000s, in line with real-time integration of the CE in policymaking, key figures in China's CE research even hailed the concept as the new paradigm for economic development (Geng and Doberstein 2008; Zhu 2008).

What permeates the CE discourse in the political and scientific realm, traditionally closely interrelated in the PRC, is the excessive preoccupation with the concept's contribution to the domestic economy. The Chinese CE is by law and interpretation an economic strategy that is expected to entail environmental improvements (Zhu 2008: 2; NPC 2008: art.3) but environmental and social sustainability are subordinated objectives to ensuring growth that is greener and more equitable (SEPA 2005). By and large, the Chinese government has over the past twenty years incorporated the CE into its 'developmental state', which favours top–down coordination of socio-economic actors. As of present, official China's CE efforts led to the formation of circular industrial estates and recycling infrastructures. Often, however, this is less the result of a coordinated blueprint and more an outcome of the growing problem of resource scarcities in the Chinese economy (Ghisellini, Cialani and Ulgiati 2016) and non-harmonized initiatives of competing central government stakeholders that pursue their respective interests in the CE. This contest is clearly visible in various domains such as the management of circular industrial park estates, where the Ministry of Ecology and Environment (MEE) and the National Reform and Development Commission (NDRC) vie for dominance (Steuer 2018). In a similar vein, the label of Eco-cities and Eco-provinces that strive for a minimization of resource demand and waste generation was separately awarded to 158 competing administrative entities by the MEE, the NDRC and the Ministry of Housing and Urban-Rural Development (de Jong et al. 2016). Finally, the domain of municipal solid waste management is simultaneously governed by thirty-four ministerial departments and sub-departments, which have issued 300 policies since 2000 (He et al. 2018). This has, in turn, led to a concurrence of implemented management approaches, whereby rigid administrative coordination has often amended more

laissez-faire and market-based solutions (Steuer 2018). Underpinning these efforts is a focus on secondary resource management. At its broadest, three structural levels of such efforts can be distinguished: medium-and-large-sized enterprises are to adopt cleaner production systems and prevent emissions; cities should form circular material chains centering on waste recovery; and industrial clusters are to be redesigned into eco-industrial parks (EIPs) and circular economic development zones and parks, in which industrial symbiosis, the use of waste from one entity as production feedstock by another, constitutes the general operating principle (SEPA 2005). To monitor and guide the progress of the CE, quantitative indicator systems were set up, which are unified for the macro (national) and meso (industrial park) level, whereas much variation exists at city levels. Measurements at the macro and meso levels aim to capture the resource output and consumption rates, integrated resource utilization (reuse and recycling) as well as waste disposal and emission rates (Geng et al. 2012; Thieriot and Sawyer 2015). In all of these four instances, subordinated indicators were set up to enable an encompassing insight into how well materials are looped in the officially monitored CE.

So far, however, macro-level success to achieve CE has been limited. Cities, for example, still struggle to develop effective systems to collect recyclables from household waste. Testimony to these shortcomings are the sheer endless numbers of urban waste recycling pilots (Xiao et al. 2018), which are cost-intensive and in most instances fail to achieve high recycling rates. The secondary raw materials valuable for industry and the CE at large are instead recovered by the urban informal recycling sector (IRS), which has time and again resisted official formalization or integration (Goldstein 2021). As a result, the industrial segment of China's CE that centres on recycling is critically dependent on collection that is outside of state control and of official measurement frameworks. Similarly, at the meso layer, industrial parks are having a difficult time in realizing circularity patterns. For companies in eco-industrial parks or CE industrial clusters, where industrial symbiosis through secondary material exchanges is key, official top–down governance has had limited aspirations. For example, official target indicators for emissions and resource conservation remained extremely lax for the first one and a half decades and were only made compulsory in 2015 (MEP 2015). The lack of bindingness implied that industrial processes in these industrial estates remained relatively free from obligations to advance effectively in line with CE indicators. As a result, eco-industrial park activities still exhibit increases in resource consumption despite

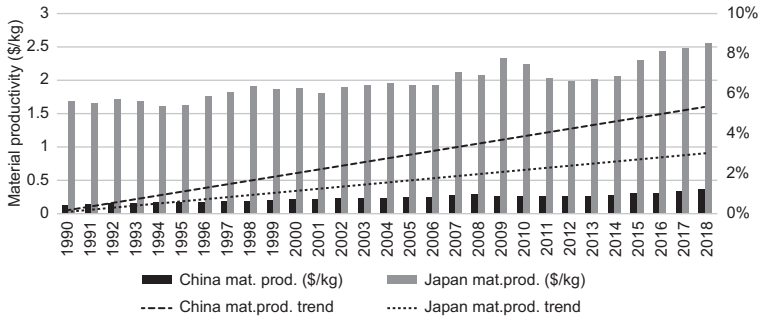

Figure 9.1 Material productivity ($/kg) of China's and Japan's economy (the author, based on www.scp-hat.lifecycleinitiative.org).

advances in energy efficiency and greenhouse gas reduction (Hong and Gasparatos 2020). This trend extends to the larger CE dynamic in China, which continues to feature low resource productivity levels (the monetary value generated per unit or resource consumed) at the macro scale. When compared to Japan, the PRC ranks at a substantially lower material productivity level, which also grows at a relatively slow pace (4.1%) (Figure 9.1). At this rate, it would take the PRC about fifty years to reach Japan's material productivity in 2018. A comparatively low-tech, straightforward step to improve indicator performance is to increase the recovery of secondary materials, which extends resource utilization rates and thus productivity. Yet, here again official figures convey only weak improvements. Over twenty years, from 1995 to 2015, the share of recovered materials reprocessed and fed back to production merely rose from 2.7 per cent to 5.8 per cent (Wang et al. 2020).

The foregoing is not meant to belittle the PRC's efforts to advance its CE. On the contrary, the practical achievements in respect to legal codifications of CE principles for the economy and experiments promoting circularity in industrial parks indicate significant progress in the country. Rather, the main argument of this chapter is that China's CE has seen rather timid progress in the context of its own aspirations, the key reason being that the societal dimension, that is, non-state actors constituting the variety of contemporary China's society and their respectively practiced institutions or systems of rules, are sidelined by the government-led CE. Hereto critical are three domains, which will form the centre of discussions over the following sections. First, at the political level, China's sustainability concepts have been wedded with a quasi-dogmatic paradigm of technological determinism. The implicit problem is that policy concepts are geared towards technological

innovation as the prime source of solving CE-related problems, which offers limited headway in terms of establishing novel material flows. Second, similar to other governments, China's leadership nearly exclusively defines the CE by means of recycling. In light of alternative CE patterns such as redesigning production being significantly more resource-conserving as well as labour- and consumer-friendly (Potting et al. 2017; Stahel 2019), a lack of legal codification and policy attention implies incomplete exploitation of the concept's potential. Both particularities are related to the third, likely most pressing problem, which is the neglect or exemption of society and its practice of CE-related rule systems. While consumers and individual practitioners are central CE stakeholders that have formed circular networks of resource and product recovery (Chow and Steuer 2022; Steuer 2016), the government has so far excluded these groups from cooperation.

As I show, the sidelining of society's non-state actors and their CE-related institutions renders China's CE relatively monothematic. As there is little leeway provided to circular innovation emerging bottom–up, the country's circular system is essentially designed, decided and implemented on the basis of what government deems best. This, in turn, has shaped the CE development trajectory towards one that favours technology- and recycling-focused solutions and comes at the expense of CE solutions generic to China's urban society, which are often more effective (Steuer, Ramusch and Salhofer 2018; Steuer 2020). Before assessing China's official CE and its relation to wider societal practices, the next section first provides an analytical framework that explains how institutions or rule-based solutions are critical in shaping a circular system.

Interpreting (China's) circular economy from an institutional, qualitative perspective

In institutional economics, institutions are understood as systems of rules that structure behaviour and the interaction of actors (Groenewegen, Spithoven and Van den Berg 2010). Institutions can be seen as solutions devised by actors to solve an encountered problem (Mantzavinos 2001). Such rule systems are differentiated into two broad classes according to their legal nature. Formal, codified institutions are laws, regulations, industrial standards and so on that are implemented and monitored by an authority with vested executive powers. Informal institutions, on the other hand, are norms, routines and business patterns that emerge

within a societal group or an organization. Despite the absence of an authoritative entity, informal institutions exhibit normative effects among members of a group. Individual violations against an informal rule might be sanctioned by other stakeholders of a particular group (self-regulating); above that, an infringement of an informal institution might simply be prevented, if it runs counter to the self-interest of actors practicing that very rule (self-enforcing) (Groenewegen, Spithoven and Van den Berg 2010). It should be stressed that the terminology and conceptualization of 'formal' and 'informal' rule systems in this chapter and the institutional economic theory generally are used to describe the legal codification of a rule. It does therefore not attribute a qualitative evaluation (e.g. effectiveness or legality) to rule systems nor to the practicing stakeholders. Hence, the concept of the 'informal' recycling sector (IRS) – broadly used in waste management literature – in this chapter serves to describe and analyse a group of stakeholders, which has developed and operates in line with their generic rule systems.

Using the institutional perspective and its distinction between formal and informal rules to discuss CE patterns and their emergence in the Chinese context helps highlighting the difference in how state and non-state actors envisage and practice circularity. Choosing institutions as means of analysis moreover offers a qualitative complement to the otherwise quantitatively dominated canon of CE analyses. A lot is written on recycled amounts and reduced emission quantities, but such figures only constitute a quantitatively measurable output and quantitative results critically depend on how CE principles are put into practice. These processes that embody CE principles and, in turn, result in the 'hard facts and figures' are institutions. It is therefore the (institutionalized) ways and means of how things are done that critically determine the quantitative dimension of the process or output. Additionally, a dynamic institutional analysis that tracks rule changes among different stakeholder domains helps to clarify the relation between state and society and the dominance over China's CE. While the government pursues its idea of a CE, stakeholders in society – companies, consumers and informal recyclers – develop their own ideals about circular material and product patterns.

As of now, there is a significant divergence and disconnection between both sides, which for the case of recycling in China has been most comprehensively analysed by Goldstein (2021). Due to the environmental impact of China's resource-intensive development and resulting ecological deterioration, prospects for linear economic growth are increasingly curtailed. Adding to that limitation, China's

citizens' interests are gradually shifting from economic desires to the environmental concerns. Their demands for a more hospitable environment, in turn, constitute a growing legitimacy challenge for the ruling system. By implication, concepts such as the CE and akin governance approaches can be seen as a means to accommodate both official and societal interests. However, if the official domain does not or cannot provide adequate solutions, a systemic (institutional) contest is bound to emerge. This contest can potentially turn into a substantial challenge for the formal system. If non-official solutions to the environmental–economic–social nexus perform effectively yet are denied official approval or incorporation into the formal system, then the stage is set for a formal–informal contest. Furthermore, if these alternative solutions of ostracized, non-state actors spread in practice and acceptance by society, they may very quickly turn out to undermine and supersede official rules. While this has essentially been happening in urban waste recycling and the refurbishment of discarded electronics, the question is to which extent formal institutions innovate and adjust to gain traction with socio-economic realities of society.

China's sustainable development concepts: The fetish for technological solutions

As international political and scientific engagement increasingly centres on climate change and sustainable development, interest clashes and contests on who has the best and most sustainable solution have intensified. Discussions around the CE are no exception. Recent exchanges seem to be particularly focused on the role of technology or technical applications vis-à-vis rule systems and the underlying human agency as key ingredients for effective CE solutions. On the one hand, scholars have criticized conceptualizations of the CE that centre on a technological–organizational approach and neglect sociocultural dimensions (Schulz, Hjaltadottir and Hild 2019). Similar criticism has also been directed at business circles that entertain an idea of the CE that offers a quick, green fix. Clube (2022) indicates a growing business interest in a technocratic approach to circularity, which manifests in efficiency-increasing, 4.0 technologies such as automation, robotics and additive manufacturing. The herein inherent danger is that such technocentric solutions may result in problem displacement rather than problem engagement (Corvellec et al. 2022). Moreover, technological determinism may disregard the sociocultural (institutional) dimensions

around policy implementation. Instead, it narrows down the CE challenge to product- and or material-specific technology solutions that ignore socio-economic consumer and supplier realities (Schulz, Hjaltadottir and Hild 2019). As for direct impacts on industrial relations, labour and employment aspects are prone to be negatively affected by technologically deterministic solutions (Clube 2022).

Yet, there are also more socially inclusive perspectives on the CE. First, Walter Stahel (2019) convincingly outlined how increased inclusion of labour can generate profits for circular systems. His approach accounts for society's interest in employment security and argues for more labour-intensive and less resource-intensive manufacturing patterns, which are to be supported by shifting taxation from labour to resources. Second, one of the most thorough, empirical country studies on the CE transition found that socio-institutional change plays a significantly bigger role than radical technological innovation (Potting et al. 2017). The fact that technology is attributed a minor role underlines that systemic change in the CE is significantly distinct to other sustainability transitions which critically depend on technological drivers. The authors further underscore that institutions are needed in most forms of CE transitions to provide a place for technology in society and mediating between vested interests attached to existing and novel technologies (Potting et al. 2017).

When looking at governance ideology in China, the transition towards a sustainable growth model seems to be foremost permeated by the veneration of a top–down, technology-centred paradigm. Central to these narratives have been the concepts of science (*kexue*) and technology (*jishu*) to propel the country's goal of catching up to leading Western countries (Geall and Ely 2018; Luo and Leipold 2022). The more recent strategy of remoulding China's development model into a more sustainable form is equally embedded in narratives around science, technology and innovation (Geall and Ely 2018). The CE as key constituent part of this ideology is well aligned with China's national scientific development strategy (Geng and Doberstein 2008; Winans and Deng 2017). Preceding the CE, various sustainability paradigms have been incorporated into China's governance model since the first decade of the twenty-first century. The first CE-related tenet, the Harmonious Society (*hexie shehui*), formed part of the Scientific Development Outlook (*kexue fazhanguan*). Increasingly cited in official documents since 2007, the Harmonious Society asserts the need for policy to solve conflicts between society and the environment (Heilmann 2016). The synthetic output of environmental concerns, political power claims and

social reengineering came in the form of the Ecological Civilisation strategy (*shengtai wenming*). Its essential idea states that the impact of human activities on the earth's climate constitutes the key culprit for environmental disruptions, which in turn requires mitigation via synchronizing environmental, social and economic dynamics. The fact that the CE is considered central to the Ecological Civilisation strategy (Geng, Sarkis and Ulgiati 2016; McDowall et al. 2017), implicitly hints at sustainability preferences in official governance theory: while economics are clearly ranked first, somewhat closely followed by environmental concerns, there is yet little notion in the concept dedicated to the social dimension of sustainable development pattern, for example, poverty reduction, social safety networks and inclusiveness.

The common ground that unifies these different theories is the critical emphasis on technology as key ingredient for the development of institutional solutions. Since the thirteenth Five-Year Plan (2016–20), the government's expectation has been placed on technological breakthroughs to tackle problems pertaining to energy conservation, resource recycling and pollution prevention (Geall and Ely 2018). In that sense, green technologies (*lüse jishu*) are envisaged for achieving industrial upgrading and modernization and are therefore backed by substantial financial support and policy experimentation at local and central levels (Holzmann and Gruenberg 2021). The positive result of these efforts, as noted by some commentators, is that China is globally on par or leading in some climate change mitigation technologies (Geall and Ely 2018). In adhering to this strategy, policymakers have since stressed the need for pushing innovation in applications to raise resource productivity and facilitate CE-relevant industrial upgrades, particularly in eco-industrial estates and among manufacturing companies (Yuan, Bi and Moriguichi 2006). For discarded consumer electronics that are traditionally difficult to recover, IT solutions such as internet of things applications, electronic labelling and big data have been enthusiastically promoted as best practice to promote innovation in and professionalize the recycling sector (Schulz 2018). Resorting to data as a magic tool for sorting out socio-economic problems is hardly a novelty in China. As discussed for the earliest official trials of Green GDP (*lüse jingji*) accounting, the government's aspiration was simply to rely on algorithms creating big data that is 'free of human intervention'. What is, however, conveniently forgotten or concealed is that the source code for big data programs is ultimately man-made (Weigelin-Schwiedrzik 2018).

What this trend shows is that China seems to be in search of a different form of social development, in which pursuing economic interests via green technologies is thought to positively impact socio-environmental well-being (Zuev 2018). When boiling down the narrative to its essentials, it seems that key expectations are followed by vague and overly optimistic projections: tech-based solutions in China's sustainability governance have to directly advance economic development, which eventually should benefit society and thus preserve the political legitimacy of China's government (Goron 2018). The ulterior ambition, as spelt out by Heilmann (2017), is that achieving a big data-reliant, top–down effective and responsive governance system could be presented as global role model.

For the case of the CE, however, such thinking proves to be problematic. There is as of now still a notable absence of how the socio-economic system is to be adjusted to novel technological applications. In short, reflections on how day-to-day rules for managing a tech-centred CE transition are to be designed are not on leaders' minds (Geall and Ely 2018) nor conveyed to the level of actual practice. The shortcoming of such technologically deterministic solutions becomes evident when examining the institutional layer below the micro (corporate) level that is internal processing patterns and work routines. Here, exclusively tech-centred solution approaches tend to obscure that alternative, more effective manual labour-centred systems exist. For example, manual waste sorting and manual waste classification still produce higher purity grades of recyclate with less need for technology- and energy-intensive inputs (Bilitewski 2011; Schulz 2018). What this reveals is a very dangerous distortion: once governance solutions, such as the CE, are framed into a particular direction, some options (institutional systems, human behaviour etc.) are sidelined and others are overstressed (technology). Reality is selectively tailored into pre-set theoretical frameworks, rather than adjusting the framework to on-the-ground realities in China.

Omitting society: The contested domain of post-consumer waste recycling

One of the significant shortcomings of the CE in all of its global conceptualizations is the neglect of the social dimension. Social aspects regarding labour practices, human rights or community well-being are addressed only peripherally by CE frameworks, with job creation being

the sole exception (Mies and Gold 2021). Yet in regard to this particular aspect, the critical questions raised by Clube (2022) are whether people aspire to such employment, whether they have the skills to do it and how they can acquire the necessary qualifications. Evidently there is a lot that hinges on human actors and their institutions, which are particularly critical in regard to CE innovation. Stahel (2019) sees the practitioners of and innovation in the CE as inseparable. Instead of looking for CE solutions from R&D centres or academia, he stresses the significance of bottom–up innovation. For example, he emphasizes the importance of companies that encourage suggestions for improvement from those who are hands-on with the production process. Stahel's view of learning-by-doing as an integral part of the CE is somewhat paralleled by the early evolutionary institutional work from Nelson and Winter (1982). Central to the authors' argument is that companies' operational routines are key determinants for their business performance. Here, the authors put particular stress on the ability of rountines to change over time based on company-internal trial-and-error learning and how resulting knowledge shapes the company's business operations. In essence, Nelson and Winter's theory points to the critical importance of routinized practices, which are developed by individuals in a company that constitute the central element towards improving productivity and innovation.

Translated to the case of China's CE, one finds similar institutional structures in the realm of urban waste recycling. Here, the central stakeholders are practitioners of the informal recycling sector (IRS), who are engaged in collecting, pre-processing (sorting, cleaning, baling etc.) and refurbishing recyclable waste and discarded products from households, commerce and retail. As will be shown in the following two sections, informal stakeholders have developed institutional settings that effectively reclaim waste materials and products into the economy. Their solutions feature a strong degree of interest-inclusiveness benefiting consumers and generators of waste as well as municipalities: IRS operations recover recyclables at a comparatively low cost and sell these after adding value through pre-processing, which, in turn, generates additional income and budget savings for consumers and municipalities, respectively (Steuer 2020; Steuer and Li 2022). Despite these benefits, the official system has for over four decades either ignored or, worse, ostracized these actors from officially approved recycling activities. Again, it seems that this stance is in line with the official CE narrative, in which technical systems are at the centre of solution-finding efforts, while a discussion of socio-technical systems such as societal behavioural norms is left out of the picture (Geall and Ely 2018).

Another challenge is that China's CE is similar to other front-running countries in the international context as it nearly exclusively focuses on recycling. A key indicator is the PRC's 'Circular Economy Promotion Law'. Albeit referencing the three main R-principles of reduction, reuse and recycling, a text analysis shows that 'recycling' is the dominating term. When measured in terms of how often these 3Rs are used, recycling accounts for 60 per cent of all mentions, whereas reduce and reuse merely occupy 30 per cent and 10 per cent, respectively (Steuer 2018). In practice, recycling has been a predominately informal domain since China's economic reform and in many instances even before that (Goldstein 2021).

Public services on the other side mostly focus on treating waste by landfilling and incineration, possibly because the IRS' dominance leaves very little to recycle (Chen et al. 2018; Steuer, Ramusch and Salhofer 2018). A key institutional technique that has safeguarded informal collectors' supply is the 'cash-for-trash' concept, by which collectors would remunerate households and retailers for their recyclables (Steuer 2020). Over the last decades, municipal governments have tried to interrupt this system, yet to little avail as Goldstein (2021) has meticulously shown. However, in recent years, the central government became increasingly involved and went directly for the main source of wastes. Households, the major generators of municipal solid waste in urban China (Gu et al. 2015), got into the crosshairs of national legislation and were incorporated into regional pilots in major cities (Xiao et al. 2018). These aimed to set up sorting and separation programmes to re-channel materials into public or officially sanctioned private recycling systems. A successful model in this regard is that of Shanghai, which operates under a high degree of official monitoring and guidance, which is supplemented by massive technology inputs. Attempts to replicate Shanghai's system in other cities seem to be less successful. Observations in the city of Zhengzhou and Changsha showed that official campaigning and mobilization did not induce significant changes into household waste segregation patterns – much of it being attributed to a lack of willingness on the part of residents (Li and Wang 2021). The author visited another household sorting pilot in Changchun in 2018, where the operating company said that neither sorting purity nor recyclable supply was sufficient to maintain operations of the pilot site (personal communication with Mr Li D., 29.10.2018, Changchun).

This contest revolving around effective solutions between the state and the IRS is also fought at the narrative level, albeit rather one-sided due to the former's information monopoly. State communication often denies the IRS's existence or future. Governmental representatives would

in exchange with foreign observers state that China had no informal recycling sector (Schulz 2018). Alternatively, as communicated to the author in the mid-2010s, officials would assert that the IRS would not make it beyond the next five years (personal communication with Zhang M., 11.09.2014, Yichang, Hubei Province). If taken to the next level, the tone would become more defiant, claiming that transfer of e-waste to the IRS would be adverse to the aim of the CE and sustain the 'wrong' type of stakeholders (Schulz 2018). In its harshest form, the official media has been documented as campaigning against the IRS by criminalizing the segment as ruthless polluters, a practice not uncommon in the international domain (Goldstein 2021). These are attributed a tendency to form syndicates in pursual of criminal endeavours (Schulz 2018), while its members are recruited from 'low-value population' (*di suzhi renkou*) (Goldstein 2021: 225). For official media, the remedy to the 'socio-ecological problem' lies in regulatory standardization and technological–industrial upscaling of operations (BJX, 22/06/2021).

Yet, the result of official measures appears to be failure. In the first instance, the government's stance keeps informal recyclers, who are by and large composed of the marginalized working poor, ostracized from society. As institutional solution, it fails to absorb innovative potential from informal systems, which encompass value generation, recovery and transaction networks as well as product refurbishment and remanufacturing techniques (Steuer 2016; Steuer, Ramusch and Salhofer 2018). Second, this shortcoming directly provides leeway for competition from the informal system, which turns out to be more popular with consumers and hence more effective. A historical analysis stretching over two centuries (Goldstein 2021) and research on present-day urban waste recycling show that informal collection and pre-processing is by far outpacing past and present official and private corporate efforts (Li 2002; Chen et al. 2018; Schulz 2018; Steuer, Ramusch and Salhofer 2018; Steuer and Li 2022). Part and parcel of this outcome is that operations of the IRS are in some instances also accommodating interests of governmental stakeholders. What appears to be contradictory at first – often governmental narratives oppose but official stakeholders support informal recycling activities – merely shows that the Chinese political system is not a monolith. Rather, policies towards the IRS vary, sometimes even significantly. The city of Guangzhou, for example, tacitly endorses post-consumer trash for cash transactions to the IRS, despite the existence of formal corporate alternatives (Schulz 2018). Here, the main motivation for the local government might be informal contributions to reducing urban waste loads. Another reason are

waste management budget savings that accrue to municipalities due to IRS operations. The implicit benefit entailed by the IRS is that it helps municipalities to economize on waste collection. This segment is the most cost-intensive element in waste management and may amount to 70 per cent of overall operational costs (Steuer, Ramusch and Salhofer 2018). Additionally, earlier research has also highlighted profit-driven decisions that prevented curtailments of informal WEEE processing. Schulz (2018), for example, argued that informal WEEE processing hubs such as in Guiyu could only flourish because they helped to increase local GDP-growth rates. Increased economic activity, in turn, benefited local cadre evaluations, which until recently centred on officials' ability to increase economic growth. In the final instance, and in stark contrast to the predominately negative narrative conveyed in official media, some ministerial players have adopted a comparatively positive stance towards the IRS in recent years. Policy documents, alternately issued by the Ministry of Commerce (MOC) and the State Council (SC), convey strong suggestions of integrating the IRS into the formal domain. Focus is set on registering and formalizing management structures of the informal sector (MOC 2010: art. 3; SC 2011: art. 9). In 2016, the MOC went further and even suggested 'making full use of waste collectors' (*chongfen liyong shihuang renyuan*), which is reminiscent of a similar liberal, pro-market stance the Ministry took in 1985 (MOC et al. 1985). The main driver behind this decision may be less founded in a concern for societal sustainability. Rather the appreciation of the IRS' contribution to refeeding discarded materials into the economy might have induced this tacit support by two ministerial bodies with strong economic portfolios and interests. Such instances of official institutional divergence from the dominating, officially communicated narrative show that there is room for collaborative and even effective solution mechanisms in China's CE. Yet, official acceptance for such cooperation appears to be based on economic and resource merit, rather than on considerations on how to include bottom–up solutions from non-state stakeholders.

Urban China's hidden CE: Reuse, refurbishment and remanufacturing patterns

While recycling clearly constitutes the main field of CE practice, high material losses and the weak cost-competitiveness of recovered resources lay bare the limitations of this approach. The general consensus in recent research is that recycling represents a comparatively

ineffective approach to the CE and material efficiency (Potting et al. 2017), which some interpret as an indication of a strong technological and management focus dominating the discourse. This attitude has sidelined the need for broader sociocultural change and thus weakens the potential of the CE as a new paradigm (Schulz, Hjaltadottir and Hild 2019). Beyond recycling, prominent CE proponents emphasize the more socially compatible practices of reuse, repair/refurbishment or remanufacturing. These bring into play a more socially viable CE, in which more value is attributed to labour and worker experience. Under the premise of shifting taxation from labour to material- and energy-use, the application of reuse and refurbishment can also result in significant environmental and economic benefits (Stahel 2019).

With regard to these higher-ranked R-principles, China exhibits a notable duality in CE systems. In the formally codified system, regulations pertaining to reuse, refurbishment and remanufacturing of e-waste, a waste stream most discussed in the context of the CE, are dwarfed by the plethora of rules dedicated to recycling (Chow and Steuer 2022). Practices that have been widespread in the first two decades of the twenty-first century mostly emanate from the informal domain. Here, Goldstein (2021) has vividly depicted the various refurbishment and reuse networks that have permeated Beijing's everyday life since the early twentieth century. Products from cooking pots to clothing to expensive jewellery have been refurbished, repaired and traded by doorstep merchants as well as in segment- and product-specific markets. All took place outside of governmental control or oversight (Goldstein 2021: 45–60). For some product categories, such as electrical and electronic equipment (EEE), similar trends exist today, yet to different degrees and often in a regionally limited dimensions. In the mid-2000s, discarded electronics reclaimed by the IRS were less likely to be recycled, rather than refurbished or repaired. Higher profit and widespread demand have critically guided such business routines. Significant, large nodes for exchanges are second-hand markets for electronics. Common in China's urban environments during the 2010s, stall dealers were specialized in appliance types (Schulz 2018) and often embedded in a symbiotic network of small repair and remanufacturing shops that operated in close proximity to these larger trading hubs (Steuer 2016). Profits were central to these circular dynamics, as margins could, depending on the location of markets, range between 50 per cent to 300 per cent of the discarded device's purchasing price. Yet, once official stakeholders stepped in to formalize such activities and eventually siphon off some of the value chain's economic benefits,

operations would come to a halt. In the case of Guiyu's formal recycling park in 2015, regulations on product standardization, licensing and documentation would weigh heavily on refurbishing stakeholders' costs and therefore incapacitate them from competing in the mostly informally dominated segment (Steuer 2016).

What sustains reuse, repair and remanufacturing patterns of discarded EEE in China are two layers of socio-economic institutions. In the first instance, refurbishing discarded electronics is in many cases done by informal recyclers for lower-income groups. For example, in the urban village of Gangxia in Shenzhen, labour migrants, who have been involved in these activities since the outset of informal e-waste management, build their refurbishment business structures through kinship networks. Cooperation based on trust and relatedness is key to successful business relationships in these systems. The typical customers of repaired white goods such as ACs and refrigerators are local migrant workers. Less financially affluent than Shenzhen's vast middle class and with the need of retaining flexible relationships with employers, labour migrants prefer rental apartments and temporary home electronics to save as much as possible (Chow and Steuer 2022). The second, yet still young institutional structure, is a gradually growing acceptance of reuse of consumer electronics (Kuah and Wang 2020). Major corporate platforms such as Ai Huishou, Xianyu and Zhuanzhuan seem to succeed in promoting the trade in and use of second-hand smartphones among customers due to lower prices (36KR 2019). While not yet a mature regulatory segment on its own, national legislation supportive of repair, reuse, refurbishment and remanufacturing is tacitly increasing (Chow and Steuer 2022). Amid these, three policy measures stand out. First, the 2020 Plan to Revitalize Recycling and Consumption of Household Appliances calls for the formal development of repair, refurbishment and remanufacturing services for electronics (NDRC et al. 2020: art. 5) as well as for a commercialization of stewardship-based business models for this product group (NDRC et al. 2020: art. 6). Second, the 2021 Notice on the CE Development Plan under the fourteenth Five-Year Plan emphasizes the regulatory standardization of second-hand markets for household appliances, mobile phones and cars as well as the fostering of a remanufacturing industry for industrial machinery (NDRC 2021: art. 3 and 4). Finally, the 2022 Green Consumption Program plans in a near-revolutionary fashion to end luxurious squander (*shechi langfei*) of consumables, particularly food products, by 2025 and to render green, low-carbon consumer products as dominant products on the market by 2030 (NDRC 2022: art. 3). The question is

then whether implementing these strategies will include or take into account the norms of society as well as the refurbishment and repair work of the IRS.

Conclusion: A way forward towards a more society-oriented CE in China

One observation on the difficulty of remoulding linear systems into more circular shapes is the need for a strong top–down impetus. Some type of authority within a system is indispensable for designing and implementing rules that push socio-economic activities into more sustainable, circular patterns. The Chinese government has been working on such forcing for some time with notable results in legislation on waste management, related pilot projects and the structural build-up of industrial symbiosis parks. Yet for unlocking even stronger circular potential, two dynamics should be given more leeway in the country's current governance. First, market signals on mineral resource scarcities should be better reflected in resource pricing. Similar to many other markets, resource prices have been kept low by ignoring environmental externalities. Regarding the latter, a recent step towards more sustainable management of mineral resources is China's 2019 reformed resource tax law. Compared to 2016, it raises applicable rate ranges and enables local administrations to adjust these based on emerging scarcities and other environmental concerns (Liddle 2016; NPC 2019). This measure, by implication, gives local governments more leeway to incorporate real-time market and environmental dynamics into their resource governance.

Second, bottom–up, autonomous CE patterns in society need to be encouraged and moreover given more space to evolve. While institutional practices pertaining to recycling and, more importantly, repair and refurbishment for reuse are in full swing in China, most still occur in an informal manner: waste picker and trader networks recover recyclables from households as feedstock for industry (Steuer 2016; Chen et al. 2018; Steuer, Ramusch and Salhofer 2018; Goldstein 2021; Steuer and Li 2022) and in case of higher valued products offer repair and refurbishment services to supply lower-income groups (Chow and Steuer 2022). From the resource-conservation perspective of the CE as well in line with the UN's Sustainable Development Goals and its Waste Wise City's concept, these informal rule practices are in most instances advancing sustainable economic solutions. The specific

problem in China is that 'informality' is too often perceived as a vice, put on par with 'illegality', causing involved stakeholders to be treated as pariahs rather than as part of the solution. This stance, adopted by some yet not all governmental levels, prevents China's CE from tapping into hidden potentials and realizing higher levels of resource-efficient practices. Informal institutions bear the capacity of formalization. In line with such a process, involved stakeholders can be easily included in legally recognized circular structures, which has been successfully demonstrated in Brazil and Argentina (Gutberlet and Carenzo 2020) as well as in China (Steuer and Li 2022). Encouraging signs in China are coming from the business sector, which has begun to offer refurbishment and reuse practices of consumer electronics (Steuer 2016; 36KR 2019), as well as from recent government regulations (NDRC et al. 2020; NDRC 2021, 2022). The latter development, in particular, indicates that some ministerial stakeholders seem willing to offer room for alternative solutions, which are dominated by waste pickers and second-hand product traders. Opening up policy towards these CE practices could enable bottom–up, organically grown CE systems to become part of and not distinct from China's official CE (Steuer 2020; Steuer and Li 2022).

At the same time, a wider reaching-out to include these actors would require a significant turnaround in the official CE ideology and governance. For such a change to happen, the major impediment is the overtone of technological determinism that is deeply embedded into the official governance canon: the CE, the Chinese Dream, the Ecological Civilisation and the Scientific Development Outlook are central tenets which the Chinese leadership uses to advance sustainable development ideas (Geall and Ely 2018; Goron 2018). Too often, that implies searching for technological fixes and sidelining man-made, often low-tech institutions that are needed for a transition towards the CE (Potting et al. 2017). In practice, this approach has led China's official CE to apply tech- and cost-intensive operations, for example, in urban household waste segregation (Xiao et al. 2020; Goldstein 2021), where resulting operational structures (recycling) rank relatively low in the CE hierarchy. Similarly eco-industrial parks, which tend to reduce waste generation compared to traditional counterparts, feature higher overall levels of resource consumption as a result of numeral increases in park estates (Hong and Gasparatos 2020). For both cases, the question is whether further pushing the technological and, by implication, financial frontiers will reap the same resource-conservation improvements as encouraging and supporting the

proliferation of low-cost, socio-institutional structures in China. Only time will tell.

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AFTERWORD

The alchemy of the circular economy

Andrew Sanchez

The idea of the circular economy appeals to me, and I think I know why. I recycle my household rubbish wherever I can, and I try to avoid wasting things. I also conduct anthropological research about waste and what makes something economically valuable. So perhaps the appeal lies in a rational sense that the circular economy is simply a good solution to the everyday problem of what to do with leftover things. Or maybe it is rather an intellectual appeal that allows me to think about how the economy itself functions. However, neither of these explanations is wholly correct. What appeals to me most about the circular economy is that it gives me a comforting feeling of security, at a time when I am worried about the environment. I have an unpleasant suspicion that this feeling conceals the limits to just how circular the economy can ever be.

The idea of the circular economy assumes that technocratic intervention can reform economic life in ways that minimize the environmental impact of human action. In this imagination, processes of production and consumption can be synthesized into an elegant closed cycle, where all that is used is reused. The idea feels intuitively like the biological truth that things that are born will eventually rot, return to the earth and provide sustenance for new life. But it also feels like the technical fantasy of the 'perpetual motion' device that runs on power generated by that very motion itself (cf Schaffer 1995). I tend towards the latter interpretation, and in this chapter, I discuss the circular economy using the metaphor of alchemy. I argue that the fully circular economy is an unrealizable ambition, akin to the techno-magical aspirations of alchemists, whose work sought attractive yet impossible solutions to material problems. The fully circular economy is a hopeful fantasy of control in an age of environmental crisis.

Alchemy was a proto-scientific form of chemistry developed between the first and twelfth centuries CE in China (Pregadio 2012),

Egypt (Festugière 2006), Arabia (Anawati 1996), India (Wujastyk 1984) and Europe (Halleux 1996).[1] Common to these traditions were frustrated experimental efforts to transform one base metal into another. The alchemists used an amalgam of methods that modern thinkers would usually now delineate as spiritual, magical and scientific (Newman, Mauskopf and Eddy 2014). Despite the folly of some of their aims, the alchemists were progressive. They believed that with enough collective ingenuity, humans could overcome obstacles and reshape the world. As recently as Isaac Newton's seventeenth-century forays into alchemy, such methods were understood to be compatible with the search for scientific, material truths (Gosden 2021: 384). Like the quest to transmute common metals into more valuable ones, the circular economy uses experimental technical work to strive towards intuitive possibilities that are nonetheless impossible.

This chapter will explain how a discussion of the alchemy of the circular economy reveals something broader about the nature of work and human society. The first part of the chapter discusses how the human appeal of the circular economy relates to environmental crisis. The second part discusses why the ideal of the circular economy is contradicted by the nature of human work.

The terminal anthropocene

I remember when modern environmental crisis first became part of the popular global imagination. It started when I was a boy in the 1980s. At that time, the main threat to the planet was a nebulous thing called the Hole in the Ozone Layer. It had something to do with aerosol gases and was vaguely kin to a new human concern about the plight of whales, dolphins and the rainforests. Scientists had cautioned us about the terminal dangers of atmospheric pollution since the 1970s (Lovelock 1972), and environmental crises had long happened to millions of people impacted by industrial accidents and human-made famines (Austin 1967; Sen 1982). Such conditions have historically been felt more keenly by poor people, and those living in the Global South (cf

1. Alchemy emerged in unique forms in first-century China (Pregadio 2012) and tenth-century India (Wujastyk 1984). A third parallel form traces its development to fourth-century Egypt (Festugière 2006), seventh-century Arabia (Anawati 1996) and finally twelfth-century Europe (Halleux 1996).

Babidge 2019; Lipsett 2011). The unpleasant truth is that wealthy people in the Global North started to pay more attention to the environment when the crisis reached their own front doors.

For many people at the start of the twenty-first century, global environmental crisis was a vague threat that was just distant enough to be ignorable. For some other people, the very thought of human-made climate change was completely fantastical: they reasoned that the planet was too long-lived and expansive to be permanently impacted by human beings.[2] This way of thinking was still reasonably common until the 2010s. If you believed in climate change during that period, then it was frustrating that so many people did not share your assessment. But in a way that I am embarrassed to admit, it was also somehow comforting to have those voices in public discourse. After all, perhaps there was just the faintest chance that the climate sceptics might be right. If so, then everybody else would look foolish, but the planet would be safe. Those days of secret hope are now behind us, as droughts, wildfires, floods and hurricanes pose an existential threat to our ways of life. It seems likely that many of these catastrophic changes are not reversible on a timescale that is meaningful to human beings. At best, we have only the ability to stop things from becoming even worse, as an emerging global discourse of ecological inheritance worries about the planet that we leave to future generations (Weston 2022).

When I became an undergraduate student of social anthropology in the 2000s, one of the earliest things I learnt was that when people are faced with misfortune that seems beyond their control, they will try to explain it. When they do so, it may be in a manner that allows for human intent and action to have fantastical impacts upon the world. This is partly what anthropologists mean by 'magic', and it is usually supported by an internally rigorous rationality and logic (Evans-Pritchard 1937; Sperber 1985). That logic is where the distinction between magic and science grows hazy (cf Tambiah 1990), and is the space where the alchemists practiced their craft. The idea of the circular economy posits hopeful human intervention into desperate and overwhelming material conditions. The aspiration is grounded in a technocratic language of experimentation, belied by the fact that the total fulfilment of its aims is as implausible as the chemical transformation of lead into gold.

2. A similar assessment motivated Herman Melville to write in *Moby Dick* that the ocean was too vast and well populated for whales to be hunted to extinction (Melville 1994 [1851]: 435–9).

David Graeber argued that the circular economy speaks to us on the same compelling terms as the biological cycles of water and life itself. What makes a cycle so compelling is that it is simultaneously both a process of change and permanence, where the substance of things might transform, but the overall cycle ensures that everything ultimately returns to where it came from (Graeber 2012: 280). Similar observations have been made about human interest in the cyclical systems that relate death to the regeneration of life (Bloch and Parry 1982). However, despite the metaphorical resonances of the cycle in the human imagination, the circular economy is objectively different to such natural processes. This is because the circular economy's processes of reincorporation are neither inevitable nor complete.

It is the fundamental nature of economic action to generate excess and waste (cf Bataille 1988 [1967]). We can understand that waste as the condition of being temporarily out of value, which means that apparently unwanted things might become valuable again when located in the right social context (Sanchez 2020). However, not all things can be wholly reincorporated into the value cycle, and not all things are destined to be even partly reincorporated. For example, some forms of waste remain dangerous in a terminal environmental sense, and cannot be safely returned to the earth once they are drawn from it (see Ialenti 2022 on nuclear waste). Some other products of ingenious human work resist future transformation entirely and must remain in our soil, water, air and bodies, in the original hazardous form that we synthesized them. Here, David Bond's research about synthetic 'forever chemicals' is a good case in point (Bond 2021). These two examples are extreme ones, but they illustrate a more general point about the relationship between economy and environment: climate crisis cannot be averted by a techno-magical effort to reincorporate all the excess generated by economic action. In the face of existential threat, the technical ingenuity of the circular economy will not allow a growing human population to survive without people in developed nations also using less, having less and eating less.

The notion of a human civilization that progressively uses less is compelling but is at odds with a modernist notion of progress that still implicitly informs wider ideas about how human society should work (Berman 2010). These assumptions are integral to many understandings of human development, even those that are critical of growth-based economic models (cf Hickel 2017). My own idea of decent human progress is probably no different. As an anthropologist I care about people. My instinct is that I would like them to have a plentiful range

of food, pharmaceuticals, tools, computers and public transportation. It also seems important that people have the opportunity to do things beyond their narrow biological needs. This is an idea of development premised on the ability to flourish, not simply the ability to live (Sen 1985, 2001; Nussbaum 2011). Here is the tension at the heart of my anthropological engagement with climate crisis, and an explanation for why the idea of the circular economy appeals to me: I would like a progressive human civilization to be comprised of happy people that can consume lots of things. However, I would like us to do so without the evident environmental repercussions that come with that consumption. The ideal of the circular economy is the alchemy that promises to make this impossible thing happen.

The circular economy is an aspirational notion that couples anticipation of the future with a hopeful assessment of the socially transformative potential of innovation. In this regard, one might think of the circular economy as part of a broader affective human engagement with technoscience (cf. Adams, Murphy and Clarke 2009). In such an engagement, specialists are imagined to ingeniously solve problems for the benefit of everybody else. However, despite the long history of human ingenuity, latter-day alchemists cannot meet climate crisis by fully closing the cycle of consumption and production. The next section of the chapter relates these contradictions of the circular economy to ideas about work.

Work isn't perfect

Every year I give a lecture to a large room full of university students, which is supposed to introduce them to economic anthropology. The challenge in that first lecture is to persuade the audience that the economy is worth thinking about and to convince them that it relates to social and political life (which is what most of the students are interested in).

My first economy lecture is really a sales pitch, which says that much of human life depends on the economy, that the economy is shaped by culture and politics and that anthropologists must understand such things to do their job properly. I tell the students that 'economy' refers to the processes by which humans produce, distribute and consume resources. Those processes are facilitated by transformative human action that allows a resource to become useful or desirable to other people. We call those transformative processes 'work'. I spend the rest

of the academic term showing why work and economic exchange are also political and cultural processes. I like giving these lectures because I believe in my own sales pitch, and I think that work speaks to the core of the human condition.

In the opening of this chapter, I said that the idea of the circular economy might have an intellectual appeal to somebody with academic interests like mine. That is partly true, and while writing this chapter, I have wondered whether the circular economy appeals because it offers a techno-magical answer to a problem about work, which is that work is never perfect in its value transformation. In the aftermath of a work action, something is usually either leftover or lost or expelled. With this problem in mind, I will use a discussion of two things to explain why the circular economy concept seems so magical. I will start by discussing the moral value of work, before addressing the economic value of work.

Popular understandings about the moral value of work tend to be shaped by two major ideas that seem opposed to one another but nonetheless coincide to produce a meaningful cultural complex. The first of these ideas is originally rooted in a European cultural and intellectual tradition. The idea says that work is toil. This means that work is hard, and a person who succeeds in avoiding it is privileged. That idea was first developed in a sustained way by Aristotle (Sinclair 1981). Aristotle's perspective was presumably shaped by his experiences of living in an elitist, slave-owning society. However, this idea still became important to how work was understood in European societies. As colonialist Europeans seized control of other people's economies, the idea travelled with them. The second idea is that even if work is toil, it is still somehow good. 'Good' in this sense means that work is the origin of all economic value and is necessary for social reproduction. This was a major assumption in the nineteenth-century European writing of Karl Marx, which reasoned that working for capitalism was toil, but work itself had both value and dignity (Marx 1976 [1867]). Marx's idea of work as both toil and social service made a significant impact on popular understandings of work, particularly in societies shaped by state socialist economies. However, the notion of work as social reproduction has a much longer and more culturally varied vintage: Olivia Harris explored as much in her analysis of Andean conceptions of work as the action that 'makes the earth bear fruit' (Harris 2000).

The idea of the circular economy is magical because it seems to cancel out the contradiction between the two things discussed earlier. A circular economy promises to allow the full value of social reproduction to be realized, while obscuring unproductive or exploitative toil. In

societies which paradoxically think that work is both toil and good at the same time, a circular economy allows for all economic action to be deemed socially reproductive. The waste and recycling industries can be reconceived as 'making the earth bear fruit', in a manner that unites all economic parties in shared complex of fundamentally decent action. Doing so elides the fact that the person who consumes recycled resources, or who facilitates the recycling of their own waste, may be necessarily complicit in the deeply exploitative structures of that industry. This is partly how the appeal of the circular economy relates to perceptions of the moral value of work.

The circular economy appeals to popular understandings about the economic value of work because the concept strives to negate a frustrating truth about the inefficiency of human action. Despite the resonances of cycles in the imagination, and despite the value placed on the progressive capacity of people to solve problems, whenever humans work, they always waste or expel something. Work is economically imperfect, and we have not reached a point of human ingenuity where this fact has been overcome. When you labour, you sweat. When you travel somewhere, you lose time. When you squeeze an orange, you can never extract all the juice. More broadly, there will be entropy and loss when one form of energy is converted into another. In our deliberate economic actions, we strive to resist such processes and subvert the natural orders of imperfection. Perfect cycles of value posit a new anthropogenic order that overcomes natural restraints on the transformative capacity of human work. Such an impulse is akin to alchemy and expresses the broader urge to assert the primacy of culture over nature (cf. Ortner 1974).

Conclusion

In this chapter, I have tried to explain why people are attracted to the idea of the circular economy, and why that idea is based on a misunderstanding of the relationship between work and action. I have argued that no economy can ever be fully circular. However, this does not imply that the circular economy project is a wasted effort. Rather, my intent is to locate the circular economy within the most pressing environmental problems of our time and highlight the final limits of the project. In doing so, the critique is intended to inspire reflection on what else needs to be done.

The circular economy is a socially productive set of projects that can make a positive contribution to the challenge of environmental crisis. However, the circular economy can never be fully circular on the grand scale that the concept implies; such a techno-magical notion would tend to comfort those who engage with it. In doing so, a narrow focus on the possibilities of the circular economy diverts attention from the more radical total reduction in human consumption that environmental crisis calls for. Waste will always be generated by processes of production and consumption because human action is economically imperfect. Not all such waste has the capacity to be reincorporated back into the value cycle, and the efforts to do so may themselves be socially harmful. As attractive as the proposition may be, the economy cannot function like alchemy.

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