Waste Research from the Social Sciences and Humanities Perspectives

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Reopening the Bin

Edited by
Alison Stowell,
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INTRODUCTION

REOPENING THE BIN TO THE SOCIAL SCIENCES AND HUMANITIES

ALISON STOWELL, JUTTA GUTBERLET, FRANCISCO VALENZUELA, PATRIK ZAPATA AND MARÍA JOSÉ ZAPATA CAMPOS

Time to Reopen the Bin!

Waste and discard research has over the past few decades become a lively field of research within the social sciences and the humanities (Gille and Lepawsky 2022; Ek and Johansson 2020). Within these broad fields, the diverse, complex embodiments of waste have been increasingly recognized. Waste has been approached in the form of rubbish and pollution, but also in terms of organic, industrial, construction, mining residues, and as the by-product of activities so diverse as to include fast fashion and military operations. Furthermore, it has been understood as waste-management practices and technologies, from highly efficient industrial systems, community-based waste-management systems to greenhouse-gas emission capturing, and from material perspectives related to value-chain management. At the same time, waste management is seen as generating soil, air and water pollution and harm, and, depending on the system in place, as reproducing existing injustices and unsustainability. Defining waste and organizing waste knowledges are littered with assumptions and framings attached to a myriad of norms, behaviours, infrastructures, politics, power dynamics, inequalities, and the permeant reminder of the crisis our planet faces in the Anthropocene, which Corvellec (2019) has called "the age of waste." Despite welcomed advances in the field, continued examinations and ongoing encounters are required in order to

make sense of the economies, livelihoods, lifestyles, consumption patterns, social movements, infrastructures, epistemologies and materialities that shape urban, peri-urban and rural spaces, and which are in turn shaped by the organizing of waste (or lack thereof).

Waste is pervasive and persistently present, and it appear to us as unavoidable most of the time. Nonetheless, it often goes unnoticed by both academic and non-academic eyes. To make waste visible, we need to *Re-open the Bin* and "reconsider those things that initially appear so logical and natural" (Ek and Johansson 2020, 1). We can do that by drawing upon transdisciplinary perspectives that come across the many faces and dimensions of waste, questioning what waste is and what it means to different people, who has access to waste and can use or benefit from it, who cares for it, and who feels responsible for producing it. Waste and discard studies examine the situatedness of waste and the relationship communities have with it, the infrastructures used to treat or separate waste, and the power dynamics that unfold during the process of governing it, as well as all the practices that have evolved in collecting, transforming or avoiding waste, which take place all around the world (Liboiron and Lepawsky 2022).

Social sciences and humanities perspectives on waste are fundamental in revealing the silent, often hidden role of communities of practice engaging with waste in many different ways. Key actors, although often invisible and stigmatized, are the informal autonomous or organized waste pickers, as well as sanitary workers and community organizations working with the reuse, repair, recycling and transformation of waste into saved resources and materials. These perspectives are also crucial in shedding light on the power dynamics of the intimate connections between waste and capitalism, and colonialism and neoliberalism; as well as the promises and the failures of waste policies and the governance of waste in Global South and North countries. Particularly in view of climate change, a just transition towards liveable and more sustainable cities is essential to provide a voice to these key protagonists in waste management.

Social sciences and the humanities bring the necessary tools to de-colonize waste studies, not least by engaging scholars and studies from the Global South and North in the epistemological construction of this field.

Bringing Waste Scholars Together Again

This book is the second anthology after the successful Cambridge Scholars publication *Perspectives on Waste from the Social Science and Humanities: Opening the Bin*. This emerged from the 2021 Re-opening the Bin – Waste, Economy, Culture and Society conference that had the specific aims of bringing together scholars from the social sciences and humanities from Global South and North communities to critically discuss the places, roles and trajectories, as well as materialities, meanings, practices and vocabularies, of waste in culture, economy and society.

The book builds upon the successes of the 2017 Opening the Bin conference, where close to one hundred scholars from the social sciences and humanities from all over the world met, and the 2021 Re-opening the Bin online conference of June 10–12, 2021, which again attracted over one hundred researchers. Together, a rich dialogue continued between disciplines, geographies and professions, discussing new ways to imagine, conceptualize, design and theorize waste as a complex socio-material phenomenon. We hope this anthology reflects this diversity of thought that emerged during the 2021 conference where we aimed at adding to the body of existing research to stimulate further scholarship within the field. The contributions are spilt into three themes: waste communities, policy and governance, and waste practices.

Waste Communities

Part I introduces the study of waste communities, covering both communities of practice working with waste (e.g. professions and labour), and community organizations engaging with reuse, recycling and waste.

In chapter one, "What Gets Measured Gets Managed: Targets, Reporting and the Benefits of Community Reuse Organizations in the Circular Economy," Ruth Lane and Matthew Kerr Allen discuss the risks of circular-economy policies framed in terms of materials efficiency and end-of-life bulk materials recycling, rather than reuse. By reviewing targets and reporting practices of reuse activities developed by not-for-profit community organizations, they demonstrate the need to broaden the principles underlying the circular economy to provide a specific focus on

social dimensions, and to call for a more explicit debate around what constitutes a "good" circular economy.

In chapter two, "Pittsburgh's Construction Junction as an Urban Reuse Social Programmer: A Case Study on Sites of Building Materials Exchange," Susan M. Ross shifts the focus to examine the critical role of space in facilitating the potential of circular solutions through reuse, providing spatial infrastructure, education exchanges and material salvages, while fostering place-making and storytelling. The chapter contributes to waste studies by underlining the necessity to encourage the repair and reuse of construction renovation and demolition discards, a sector that makes up a significant proportion of the waste that enters our landfills.

Finally, in chapter three, "Reframing the Fatberg: Pride, Promotion and Disgust," Annabelle Mooney focuses on public reactions, through social media, to the issues of fatbergs in sewage systems and communities of professionals, as well as the broad audiences involved in solving the challenges. Issues related to education, frustration, promotion, the environment and humour emerge in her analysis. Particularly relevant in this chapter is the visibility/invisibility dichotomy. Framing workers keeping sewers functioning as "heroes" and making their invisible work visible bring waste issues to the attention of the public, providing motivation for policy and infrastructure reform. This chapter particularly contributes to our understanding of waste as a consequence of consumption, lifestyles and habits, and helps us reframe particularly those who work with waste and address the consequences of waste accumulation (in this case fatbergs), revaluing their labour.

Waste Policy and Governance

Part II discusses issues of waste policies and waste governance in Global South and North contexts. In chapter four, "Waste-picker Organizations Influencing Solid-waste Policies: Insights from Grassroots Perspectives in Brazil," Adalberto Mantovani Martiniano de Azevedo and Jutta Gutberlet shift the attention towards the massive role of waste pickers in waste management across the world, a role that is disproportional to their participation in the formulation and implementation of waste-management policies, and the formation of current waste regimes. Informed by the case

of waste-picker organizations in Brazil and their participation in local, federal and national policy on solid waste, Adalberto and Jutta bring forward the power struggles, asymmetries and conflicts arising for the recognition, remuneration and inclusion of this relevant community of practice in the incumbent waste regime. This chapter describes how waste pickers act as key players in generating bottom-up solutions to waste management, addressing community needs and priorities, and yet are often excluded from waste governance.

In chapter five, "The Shifting Boundaries of Municipal Solid-waste Management in Global South Countries," Mathieu Durand, Jérémie Cavé and Irène Salenson examine shifting the framing of public solid-waste management services and stakeholders in Global South countries to also include waste pickers. Drawing on the study of six Global South cities, they examine a set of innovations developed by waste-picker communities to integrate activities previously seen as being outside the municipal service, or even illegal, marginal or reprehensible. This chapter contributes to the debate about participatory waste management.

In chapter six, "Worker, Owner, Volunteer, Employee or Worse? Registers of Work in Organizing Waste Work in India," Advaita Rajendra and Ankur Sarin expand the discussion on practices of workers working with waste to encompass existing bureaucracy, caste and gender hierarchies in India. With an increasing national-policy emphasis on waste and cleanliness, waste workers are ambiguously framed at different times as "owners," "labourers," "employees," "volunteers" and several other registers. This chapter also contributes to the exploration of new ways and associated tensions of integrating waste pickers into waste collection and processing activities. There are also lessons learnt from other urban areas across the world, underlining the importance of mobilizing and integrating waste pickers in meaningful ways.

To end this second part, in chapter seven, "Designing a Non-market: The Case of a Civic Amenity Site that Commodifies Waste," Vincent Jourdain brings the attention back to circular-economy policies and innovations in France, such as a "reversed supermarket" where citizens dump, give and take their end-of-life products. Vincent shows how the (imaginary) marketization of reuse practices both allows and restrains the reconfiguration of waste regimes. He also demonstrates that citizens are not

equal in front of waste infrastructures. This chapter develops important contributions to waste studies by questioning consumption and providing first-hand examples of reducing waste.

Waste Practices

In Part III, a broad array of waste practices, specifically related to complex-plastic matters, emerging in different parts of the world is examined. In chapter eight, "Collective Action and Politics in Waste Management in France," Claudia Cirelli and Patrice Melé explore citizen involvement in waste debates and waste-management policies. They show the ambition of grassroots communities involved in awareness-raising actions to be recognized as legitimate actors on the basis of not only their practices and knowledge of the local context but also their competence in a specific field of public action. In their chapter, they show the importance of translating scientific knowledge into the capacity to act, as well as the learning and "expertification" entailing mastery of the technical discourse of professionals. This chapter contributes to waste studies by highlighting the role of citizen knowledge and participation in the design and implementation of environmental policies. By focusing on collective action and engaged citizens, it is possible to question the political dimension of waste management, and in particular the conditions for a more democratic public debate on waste issues.

Dario Minervini, Giuseppe Michele Padricelli and Antonino Rapicano, in chapter nine, "Exploring the Dwelling Practices of Littering in Southern Italy: The Case of Naples and Sorrento," explore the dwelling practices featured by littering in Italy from a practice-theory perspective. The chapter sets a non-anthropocentric focus on how littering happens in practice along the supply-chain path, distribution and consumption, rather than questioning the why of littering, demonstrating the relationship between littering practices and urban space in everyday life. In this chapter we learn about the "banality of littering" and the perception of a dirty place as worthless and one that no one cares about, thus stimulating further littering. The explanations underline a widespread sense of legitimization and normalization of the litterer's actions.

In chapter ten, "The Morality and Discipline of Single-use Plastics," Marta Ferri narrows down waste practices to the planetary plastic crisis in which we live. Marta explores how the plastic crisis has drawn attention to the issue of plastic pollution and moralized single-use plastics as "bad," "out of place" (Douglas 1966) and "undisciplined," and as "good," "in place" and "disciplined" (Latour 1988; 1991; Hawkins 2009). By bridging waste studies with an actor-network science and technology studies approach, Marta shows how single-use plastics get simultaneously moralized, undisciplined and disciplined (Liboiron 2016) within a particular organizational context, and how studying these movements can shed light on the process of organizing solutions to tackle the plastic crisis. The chapter contributes to a critical reflection on social norms and single-use plastic avoidance by "moralizing" these plastics as pollution within the space of the plastic crisis.

In chapter eleven, "Waste Safari XMass: A Visual Narrative with Single-use Plastics," Katarina Dimitrijevic offers an original visual-narrative chapter on single-use plastics from a humanist and do-it-yourself craft-tactics perspective. The chapter unpacks a waste-safari video exploration based on a self-ethnographic plastic installation. Katarina's installation visually critiques and raises awareness around plastic mismanagement and pollution, and its presence in nature through reuse. In this last chapter, the author offers both a visionary aesthetic response and a visual narrative that re-connect design with open-loop reuse and nature. Questions remain however on whether the artistic reuse of single-use plastic materials constitutes useful reuse, and whether it will be able to compete with the aesthetic beauty of the natural.

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References

Corvellec, H. 2019. "Heterogeneous Answers to Challenges Raised by an Heterogeneous Material." *Business and Society* 14, no. 2: 130–4.

Douglas, M. 1966. *Purity and Danger: An Analysis of Concepts of Pollutions and Taboo*. London: Routledge.

Ek, R., and Johansson, N. 2020. *Perspectives on Waste from the Social Sciences and Humanities: Opening the Bin.* Newcastle Upon Tyne: Cambridge Scholars Publishing.

Gille, Z., and Lepawsky, J. 2022. *The Routledge Handbook of Waste Studies*. Abingdon: Routledge.

Hawkins, G. 2009. "More-than-Human Politics: The Case of Plastic Bags." *Australian Humanities Review* 46: 43–55.

Latour, B. 1988. "Mixing Humans and Nonhumans Together. The Sociology of a Door-closer." *Social Problems* 25, no. 3: 298–310.

Latour, B. 1991. "Technology Is Society Made Durable." In *A Sociology of Monsters: Essays on Power, Technology and Domination*, edited by John Law, 103–31. London and New York: Routledge.

Liboiron, M., and Lepawsky, J. 2022. *Discard Studies: Wasting, Systems and Power.* Cambridge, MA: MIT Press.

Liboiron, M. 2016. "Redefining Pollution and Action: The Matter of Plastics." *Journal of Material Culture* 21, no. 1: 87–110.

PART I

WASTE COMMUNITIES

CHAPTER ONE

WHAT GETS MEASURED GETS MANAGED: TARGETS, REPORTING AND THE BENEFITS OF COMMUNITY REUSE ORGANIZATIONS IN THE CIRCULAR ECONOMY

RUTH LANE AND MATTHEW KERR ALLEN

Introduction

As the development of circular-economy (CE) policy gathers momentum internationally, the approach to setting goals and targets provides important signals about how progress will be measured, and specifically what activities are to be regarded as *economic* (Völker, Kovacic and Strand 2020). So far, the emphasis has been on expansion of the commercial recycling sector, and CE targets focus on the quantities (by weight) of specified types of materials diverted from landfill or sent for recycling. While the principles of CE prioritize product longevity and cycles of repair and reuse over destructive materials recycling, this approach to target-setting and measurement does little to support such activities. Further, it offers no clear measure of social benefits linked to CE activities. In this contribution, we focus on the context of reuse undertaken in not-for-profit community reuse organizations (CROs) and the approaches used in this sector to report on the benefits of reuse activities. While highly relevant, CRO reporting approaches remain an unexplored dimension of CE policy and practice. We consider how such approaches, which emphasize social as well as environmental benefits, could be drawn on to expand the focus of the circular economy to foreground reuse in CE targets and reporting, and to extend the underlying principles of the CE to include social dimensions.

The form that the circular economy takes and how it reframes economic activity will have social and political consequences with implications for

social equity and inclusiveness (Hobson and Lynch 2016; Murray, Skene and Haynes 2017; Moreau et al. 2017, Kębłowski, Lambert and Bassens 2020). However, circular-economy policy initiatives are overwhelmingly framed in environmental rather than social or political terms (Ghisellini, Cialani and Ulgiati 2016; Moreau et al. 2017; Korhonen et al. 2018). Their main aim is to address the environmental challenge of unsustainable material flows defined in terms of materials and energy consumption and emissions. Policy goals and rhetoric suggest an ideal of a closed-loop materials economy that maximizes materials efficiency through successive cycles of recycling, and minimizes inputs of virgin resources and losses in the form of waste or emissions.

Community reuse organizations provide an opportunity to consider the alignment between reuse as a strategy for materials efficiency and as a strategy for achieving social benefits, and to prompt debate around what a socially desirable or "good" circular economy might look like. Reuse often requires investment in activities and labour that are not profitable, so it is unsurprising that charitable and community-sector organizations, driven by social goals like job creation and training, facilitate forms of reuse that profit-driven businesses cannot. Hobson and Lynch (2016) suggest that community reuse and recycling organizations represent a potentially radical reconfiguring of social and economic relationships, and provide an ideal vehicle for achieving forms of economic activity that are attentive to both the management of ecological limitations and the generation of socially beneficial outcomes. Some organizations have a specific focus on engaging the broader community in forms of behaviour change required for shifting social norms around consumption in the context of CE transitions (Moreau et al. 2017). There have been a range of initiatives in this sector to measure reuse and its environmental and social benefits, as community-sector organizations are frequently required to quantify the benefits when bidding for government contracts. While many have beneficial activities beyond reuse (Petrescu et al. 2021), we focus on reuse-related activities to consider the potential for integrating these reporting approaches with current CE targets and reporting frameworks.

In the first section we argue that targets and reporting constitute specific calculative practices that enact and help bring into being a particular type of circular economy. We review the focus of current CE-policy rhetoric and

how targets and measurement approaches prioritize specific CE strategies over others, and reflect on the consequences for the kind of economy that is envisaged, and the actors and activities involved. In the second section we review the approaches used by community-reuse organizations for reporting on their activities in relation to underlying principles that prioritize objectives of social equity and inclusion, but increasingly include environmental sustainability. We group these measurement approaches under six overarching strategies and reflect on how they both contrast and overlap with current CE strategies. In the final section, we suggest how CE targets and measurement approaches could be expanded to include measures of social benefits alongside those for materials efficiency in order to cover the kind of activities performed by not-for-profit organizations. This, in turn, highlights the need to broaden the principles underlying the CE to provide a specific focus on social dimensions and for more explicit debate around what constitutes a "good" circular economy.

How CE Policy Rhetoric, Targets and Measurement Approaches Enact a Specific Type of CE

The way that CE rhetoric, targets and measurement approaches are framed influences how material resources in a CE will be (re)assembled, and which actors and activities will be included as a recognized part of this economy, and which will be excluded. MacKenzie, Muniesa and Siu (2007) and Çalışkan and Callon (2009; 2010) have argued that economies are not pre-existing phenomena but are produced socially and materially. The conceptual tools of economists, like other scientific or technical innovations, have a reflexive capacity in that they influence the phenomena they seek to describe and predict. Tools developed to model and predict economic phenomena can influence what is considered a commodity and how it is valued in a market (Çalışkan and Callon 2009). There are important connections between circulation, transformation and valuation that explain why materials move from one place to another, as, "The forces that explain the circulation-transformation of things are the same forces that give things value" (Çalışkan and Callon 2009, 390). In measurement approaches used in material assessments of used products and materials, Crang et al. (2013, 15) argue that classifications and standards for used goods and materials are

critical, (1) for prohibiting the movement of some end-of-life goods by classifying them as hazardous waste requiring specific forms of reprocessing, and (2) because the classifications of what is waste and what is a potential resource "enable value to be created when the former can be transformed into the latter."

In line with understandings of the conceptual tools of economists as performative, CE measurement and reporting approaches can be understood to have a performative dynamic that is generative of a certain type of materials economy. Statements of guiding principles underpinning the circular economy, the strategies identified to deliver them, and the targets employed to measure them are potentially significant for determining the activities and organizations to be supported, influencing investments in equipment and infrastructure. Principles are often summarized in policy documents in the form of material-flow diagrams that are then translated into relevant strategies. Examples are the Ellen MacArthur Foundation butterfly diagram (Ellen MacArthur Foundation 2012) and the EC Circular economy action plan (European Commission 2020). These strategies, when translated into targets and reporting, then become performative, as activities linked to them are designated to be part of the CE, becoming increasingly visible (through measurement), and further supported through policy and management. Activities linked to reuse, for which there are no standardized measurement approaches, effectively remain outside of the circular economy.

Reuse has been identified as a strategy that supports the principles of materials efficiency and waste avoidance since the development of the waste hierarchy in the late 1960s (Gersakis and Lewis 2003), and appears in all subsequent representations of the CE. The well-established litany of "Reduce, Reuse and Recycle," commonly referred to as the Three Rs, signals an order of priority for waste reduction in which the highest priority is placed on reducing the generation of waste, followed by extending the useful life of goods and materials by reuse, which in turn is followed by materials recycling. The Three Rs have been expanded on in various ways over time. Potting et al. (2017) identify ten Rs that are arranged in order of priority from R0 to R9, and grouped under three key overarching strategies: (1) Smarter product use and manufacture that avoids or reduces the amount of materials consumed in the first instance, (2) Extend the lifespan of the

product and its parts to keep manufactured products and components in circulation, (3) Useful application of materials including materials recycling and resource recovery (see Fig. 1.1). Reuse is attributed the highest priority for the strategy of extending product lifespans.

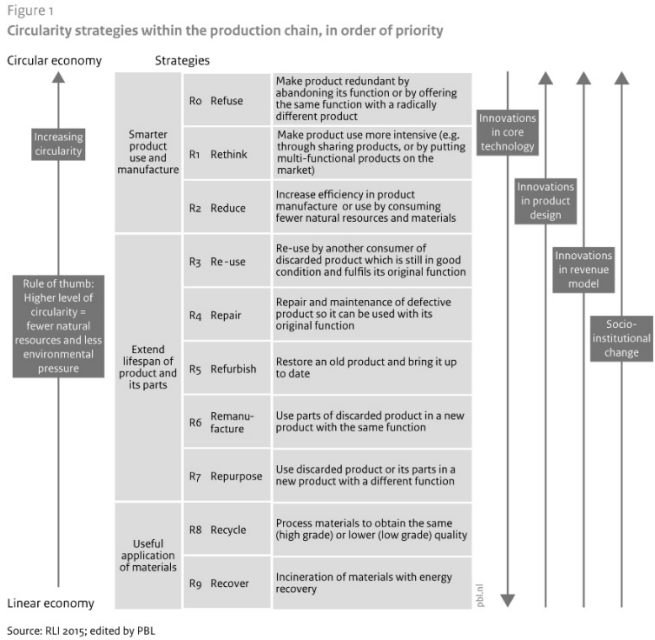

Fig. 1.1 Potting et al. (2017) identify three overarching strategies for moving to a circular economy and list nine approaches under these, all of which are ordered in terms of priority

While CE principles of materials efficiency, materials recovery and waste reduction have underpinned strategies – and in some cases targets – in CE policies, the strategy of reuse has yet to inform policy targets in meaningful ways (Morseletto 2020). Morseletto (2020) undertook a systematic review of strategies and targets identified in government and industry contexts and examined their alignment with the CE principles. Existing CE strategies fall into three main groups identified by Potting et al. (2017) (see Fig. 1.1), but targets are concentrated around group 3, the useful application of materials,

and do not extend to the higher-priority CE strategies that include reuse and refurbishment and alternative consumption approaches, such as product-service systems (see Fig. 1.2).

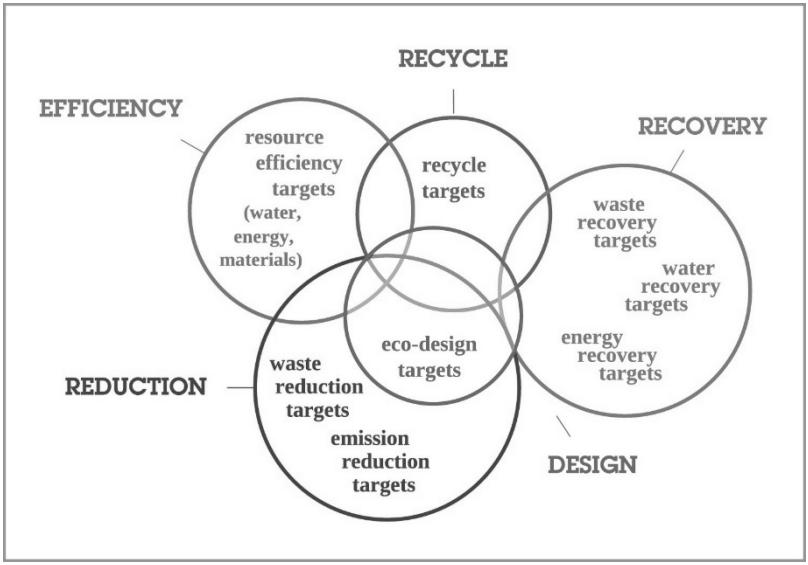

Fig. 1.2. Main existing CE targets by areas of application (Morseletto 2020)

It is difficult to understand the dimension of reuse without engaging with the social context that motivates it. This links with broader critiques of the lack of connection between CE and principles of sustainable development (Moreau et al. 2017; Murray, Skene and Haynes 2017). While high-level endorsements of CE principles frequently reference SDG 12 "Responsible Consumption and Production," there is potential for CE approaches to support additional, more socially focused principles that align with SDG 11: "Sustainable Cities and Communities" and SDG 8: "Decent Work and Economic Growth." The lack of an identified social-benefits principle for the CE translates to a lack of strategies and targets for social benefits. There is little recognition of the not-for-profit reuse sector in the CE as only profit-motivated activities are likely to be measured (Moreau et al. 2017). A

socially beneficial CE would maximize the social benefits associated with material use and minimize the negative impacts.

Reuse and Social Benefits in the Community and Charitable Sector

Many charitable reuse organizations (CROs) historically engaged in reuse as an opportunity to raise revenue through the resale of donated second-hand items, rather than as an explicitly sustainability-related activity. However, they are now also positioning themselves within emerging discourses of sustainability, industrial ecology and the circular economy. Organizations such as Goodwill Industries and the Salvation Army have operated since the late 1880s to divert proceeds from second-hand sales to social causes (Le Zotte 2013), and in more recent years have also begun promoting their activities in terms of environmental sustainability (Osterley and Williams 2019). New organizational types, including the Work Integration Social Enterprise (WISE), have also emerged to engage in reuse-related activities, providing work-experience and training opportunities to people facing disadvantages and job-market exclusion (Barraket et al. 2017). Like older reuse organizations, these enterprises largely situate reuse activities as facilitating a social purpose, with environmental benefits being of secondary importance. Another emerging category of reuse organization exists primarily to serve environmental objectives; however, even with the relatively recent emergence of this newer enterprise type, the vast majority of CROs name the pursuit of social objectives as a core reason for their existence. While CROs (e.g. charitable op-shops) have historically tended to focus on the reuse of materials produced at a household level, this is no longer the case; although clothing and household furniture remain a central part of CRO activity, many CROs also deal with a diverse range of domestic, commercial and industrial-waste streams, including office supplies, building demolition materials, and industrial discards (Yousefpour, Barraket and Furneaux 2012).

As a number of governments and institutions around the world seek pathways for implementing CE policies and targets, there is increasing attention on CROs for their potential roles (Krueger, Schulz and Gibbs 2017; Lane and Gumley 2018; Gibson-Graham et al. 2019). Given the

historical and current emphasis of CROs on achieving social and socioeconomic objectives through their reuse and recycling activity, their benefits and measurement practices are highly relevant to CE policy and practice. They offer approaches for expanding the measurement of the CE beyond materials efficiency to incorporate broader social goods. For the purpose of our analysis, we searched for publications where the primary focus was on presenting a set of benefits and/or indicators for measuring the benefits of CRO activity. This process deliberately excluded the wide range of impact-report publications, including annual reports, from CROs, which tend to reflect the specific interests and motivations of individual organizations rather than those of the CRO sector as a whole. The publications were collected from 2017 to 2021, primarily by searching Scopus and Google Scholar databases for a combination of "community reuse," "reuse," "reuse social enterprise" and "reuse charity," with the keywords "impact," "impact measurement," "measures" and "benefits." Further relevant publications were made available through the personal contacts of the authors (Reuse Network 2020; Wray 2020).

While circular-economy measurement approaches typically focus on the recovery and recycling of raw materials, it is clear that CROs – and their measurement practices – are motivated by a broader range of principles, including those of social equity and economic development. It is also common for CROs to describe themselves as "triple-bottom-line" enterprises in order to distinguish them from both mainstream recycling businesses and traditional non-profits (Alexander and Smaje 2008; Miller and Purcell 2017). As such, it is useful to conceptualize CROs and their measurement practices as being motivated by social, economic and environmental principles. Drawing on Morseletto's (2020) framework for exploring CE targets, we examined twelve key sources that identified specific and measurable benefits of CRO activity. These were then grouped by context/purpose of study and analysed for their alignment with environmental, economic and social principles. Four were refereed academic publications, four were government commissioned reports, three were reports commissioned by CROs, and one was an honours thesis.

The majority of approaches to measuring the benefits of CROs classify and articulate their impacts along social, economic and environmental lines (see Table 1.1). Unsurprisingly, environmental impacts were identified for

measurement in all twelve publications, followed by social (eleven) and economic (ten). To compare targets and reporting in CRO with CE approaches, such as those outlined by Morseletto (2020), it is useful to think of CRO measurement practices as relating to various sets of strategies that align with overarching motivating principles. We therefore propose a framework for understanding and categorizing CRO measurement practices according to six strategies, as shown in Table 1.1: (1) Extending the useful life of post-consumer items; (2) Engaging community members in sustainability-related behaviour change; (3) Strengthening local and regional communities; (4) Increasing the affordability and efficiency of post-consumer markets; (5) Providing work experience, volunteering and job opportunities; and (6) contributing to social equity and wellbeing. Table 1.1 lists all the benefits and indicators found in the twelve publications reviewed, grouped according to strategy.

It is important to highlight the diverse and heterogenous nature of the indicators that were found across the twelve publications. Thirty-five unique indicators were identified. Of these, none were present in all twelve publications, and sixteen appeared in only one publication. Similarly, although the majority of publications framed their indicator sets in terms of social, economic and environmental impacts, indicators were not classified as social, economic or environmental in a consistent manner. In particular, there was significant overlap between definitions of the "social" and the "economic"; for example, Delanoeije and Bachus (2020) classify labour equity and social wellbeing as economic impacts, whereas a number of other publications (e.g. Hines et al. 2008; Osterley and Williams 2019) classify the same as social impacts. The blurring of what is considered economically beneficial and what is considered socially beneficial in CRO reporting is indicative of inherent tensions in separating social from economic domains (Polanyi 1947; Gibson et al. 2019). Some publications propose additional categories beyond those of the triple bottom line, including cultural impacts (Wray 2020) and institutional impacts (Alexander and Smaje 2008).

Motivating principles	**Strategies**	**Benefits/Indicators**
Environmental	Extending the useful life of post-consumer items	Weight and/or volume of materials diverted from landfill (Alexander & Smaje 2008; Darby & Jenkins 2006; Fortuna & Castaldi 2018; McNeill, Barraket & Elmes 2017; Miller & Purcell 2017; James 2011; Harrison-Evans 2016; Hines et al. 2008; Osterley & Williams 2019; Wray 2020; Reuse Network 2020)
		Avoided resource/virgin material use (Alexander & Smaje 2008; James 2011; Hines et al. 2008)
		Greenhouse Gas/CO_2 emissions avoided (Fortuna & Castaldi 2018; James 2011; Harrison-Evans 2016; Hines et al. 2008; Osterley & Williams 2019; Wray 2020; Reuse Network 2020)
		Embodied energy conservation (Fortuna & Castaldi 2018; James 2011)
		Number and type of items reused (Miller & Purcell 2017; Osterley & Williams 2019)
		Product life extension (Delanoeije & Bachus 2020)
	Engaging community members in sustainability-related behaviour change	Value of reuse scheme to participants and beneficiaries (Alexander & Smaje 2008)
		Recreational/emotional/affective benefits of "op-shopping" (Delanoeije & Bachus 2020; Harrison-Evans 2016)
		Promoting better waste management in business and community (Darby & Jenkins 2006; Hines et al. 2008; McNeill, Barraket & Elmes 2017; Hines et al. 2008)
		Customer/participant engagement, satisfaction and reach (Wray 2020)
		To what extent this work impacts on the "pro zero waste" identity of employees (Wray 2020)

		Exploring the ways your organization engages with Te Tiriti o Waitangi (Wray 2020)
		To what extent this work impacts on the identity of your employees as a "global citizen" (Wray 2020)
		Capacity building in national and international networks (Darby & Jenkins 2006)
Economics	Strengthening local and regional communities	Grassroots mobilization of local communities (Alexander & Smaje 2008)
		Products reused locally (Delanoeije & Bachus 2020)
		Providing direct local services in local areas (Osterley & Williams 2019)
		Money brought into local community/distributed to charitable and community organizations (Darby & Jenkins 2006; James 2011; Hines et al. 2008; Osterley & Williams 2019; Wray 2020)
		Contribution of charity shops to revitalization of town centres (Harrison-Evans 2016; Osterley & Williams 2019)
	Increasing the affordability and efficiency of post-consumer markets	Value of in-kind contributions given and received (Wray 2020)
		Revenue/value of products sold (Alexander & Smaje 2008; Miller & Purcell 2017; Wray 2020)
		Return on investment, e.g. for councils or other funders (Wray 2020)
		Avoidance of alternative collection and disposal costs (Alexander & Smaje 2008; Hines et al. 2008)
		Availability of affordable goods (Delanoeije & Bachus 2020; Hines et al. 2008; Osterley & Williams 2019; Reuse Network 2020)

Social	Providing work experience, volunteering and job opportunities	Jobs provided (Darby & Jenkins 2006; McNeill, Barraket & Elmes 2017; Miller & Purcell 2017; James 2011; Delanoeije & Bachus 2020; Osterley & Williams 2019; Wray 2020)
		Training opportunities provided, including traineeships and apprenticeships (Darby & Jenkins 2006; McNeill, Barraket & Elmes 2017; Miller & Purcell 2017)
		Jobs provided to disadvantaged individuals (Darby & Jenkins 2006; Miller & Purcell 2017; Hines et al. 2008; McNeill, Barraket & Elmes 2017; Reuse Network 2020)
		Voluntary roles created (McNeill, Barraket & Elmes 2017; James 2011; Osterley & Williams 2019; Wray 2020)
		Volunteers and employees gaining work experience, skills, confidence and the opportunity to socialise (Harrison-Evans 2016; Hines et al. 2008)
	Contributing to social equity and wellbeing	Number of people using products/services (Darby & Jenkins 2006; McNeill, Barraket & Elmes 2017; Miller & Purcell 2017)
		Relief of client hardship (Alexander & Smaje 2008)
		Improving social housing (Alexander & Smaje 2008)
		Improved equity and/or social wellbeing (Delanoeije & Bachus 2020; Hines et al. 2008; Osterley & Williams 2019)
		Promoting access to charities and other services (Osterley & Williams 2019)
		Developing human capital (Alexander & Smaje 2008)

Table 1.1. Benefits and indicators used or proposed for use in community reuse organizations grouped according to strategy

Table 1.1 demonstrates that CROs have the capacity to engage in impact measurement and target-setting around key circular-economy strategies, including reuse, rethink, reduce, refuse, repair, refurbish and repurpose. These strategies, relating as they do to the "inner loops" or "high circularity" elements of the circular economy model, are arguably some of the most important to measure. While governments and organizations have struggled to develop standardized measures and targets for the circular economy (Morseletto 2020), CRO measurement practices could make a significant contribution to this essential work. Although not all the CRO publications reviewed were specifically concerned with target-setting, it is clear that CROs are, in many cases, able to measure and quantify their activities in a way that is conducive to the setting of goals and targets for future action. This is particularly the case where CROs have sought to develop and adopt measurement practices that are aligned with government waste-reduction reporting frameworks (e.g. McNeill, Barraket and Elmes 2017; Hines et al. 2008). Furthermore, CRO strategies and measurement practices extend beyond those relating directly to material conservation to encompass broader social, environmental and economic benefits. In particular, CRO strategies and their accompanying measurement practices have a strong focus on local, equitable and sustainable economic development. This attention to measuring the locally situated and socially equitable dimensions of their activities is one that has no parallel in mainstream circular economy literature, despite broad commitments to systems-thinking approaches and the creation of localized "circular loops" (Ellen MacArthur Foundation 2012; Schulze 2016).

Conclusion: Including Social Benefits and Reuse in CE Strategies and Targets

Our analysis of principles and strategies that inform reporting by CROs suggests avenues for incorporating socially embedded inner loops of reuse within CE reporting frameworks. It also highlights how social motivations and goals can be intertwined to such an extent that it makes no sense to consider CE purely in terms of the environmental benefits of materials recycling. Including a wider range of social and economic objectives linked to multiple forms of materials circularity would give more prominence to

the existing CE strategy of reuse and the activities of not-for-profit reuse organizations. Table 1.2 sets out the potential alignment between CRO and CE strategies. There is a clear alignment between CRO and CE strategies around environmental-sustainability principles, and some alignment around economic sustainability, although economic strategies are less clearly defined in both CROs and CE frameworks. At present, only CRO strategies are aligned with social sustainability.

CRO Principles	CRO Strategies	CE Strategies
Environmental	Extending the useful life of post-consumer items	R3: Reuse
		R4: Repair
		R5: Refurbish
		R7: Repurpose
		R8: Recycle
	Engaging community members in sustainability-related behaviour change	R0: Refuse
		R1: Rethink
Economics	Increasing the affordability and efficiency of post-consumer markets	R3: Reuse
		R8: Recycle
	Strengthening local and regional communities	R3: Reuse
Social	Providing work experience, volunteering and job opportunities	N/A
	Contributing to social equity and wellbeing	N/A

Table 1.2. Alignment of CRO and CE strategies grouped in line with triple bottom-line principles for sustainable development

Environmental principles are central to both CROs and the CE, and represent an area of significant overlap between CRO and CE strategies. In particular, the CRO strategy of extending the useful life of post-consumer

items is aligned with the CE strategies of reuse, repair, refurbish, remanufacture and recycle. The CRO strategy of engaging community members in sustainability-related behaviour change can be seen as aligning with the CE strategy of rethink, in that the types of behaviour change being encouraged are typically to do with intensifying the use of existing products via community-level sharing schemes. It could also be argued that this CRO strategy operates to support uptake of other circularity strategies by enhancing public awareness and engagement with the circular economy (Inigo and Blok 2019; Selvefors et al. 2019). While the majority of CRO activity could be classified as supporting the CE strategies of reuse and/or repair, there are many examples of CROs refurbishing post-consumer items for resale, as well as a smaller number of CROs that create new products by remanufacturing discarded items into a new form. While CROs are typically concerned with maintaining items at a high level of circularity, they also engage in recycling as a strategy for products not suited to other pathways. CRO approaches to reporting on economic benefits are clearly focused on community and regional scales, and suggest some approaches also relevant to the CE. CRO strategies and reporting approaches for economic sustainability align with a number of CE strategies, particularly Reuse and Recycle. However, there are also sharp distinctions between CRO strategies and CE strategies, with CROs foregrounding the economic benefits of their activities that accrue to their local and regional communities, through the provision of efficient, affordable and accessible circularity solutions. These objectives, while closely aligned with the theoretical underpinnings of the circular economy (Murray, Skene and Haynes 2015), find no parallel in the various strategies and measurement practices that have been developed to drive progress towards CE objectives. This is due to a fundamental tension in the concept of the circular economy, which seeks to significantly reshape the drivers and impacts of the global economy without necessarily challenging or altering existing market relations (Temesgen, Storsletten and Jakobsen 2019). Similarly, the complete absence of social principles highlights a significant gap in the circular economy that a number of authors have addressed, yet which remains largely unexamined in existing CE strategy and measurement frameworks (Kirchherr, Reike and Hekkert 2017; Schröder et al. 2020). Conversely, the ability of CROs to deliver high-circularity solutions for a wide range of product types, while simultaneously