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Jutta Gutberlet and Sebastián Carenzo

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RESEARCH

Waste Pickers at the Heart of the Circular Economy: A Perspective of Inclusive Recycling from the Global South

Jutta Gutberlet* and Sebastián Careno†

While the circular economy (CE) is discussed in the global North as an innovative approach to waste management, the idea of circular resource flows has long been central in the work of waste pickers all over the world. They work independently or in groups, collecting, classifying, and reinserting a wide range of discarded materials into the economy. These grassroots initiatives have accumulated valuable knowledge and offer innovative perspectives on handling waste, informed and framed by their everyday experiences. Yet their efforts are hardly recognized as contributions to the circular economy, nor are most of the services they provide remunerated. Despite their precarious working and living conditions, waste pickers provide a specialized workforce, proven to be efficient in the reclamation of discarded and wasted materials, in reverse logistics such as extended producer responsibility (EPR) and service contracts involving municipalities and industries. With some exceptions, the organization of human labour that underpins the circular flows of matter and energy is an absent analytical dimension in most of the literature in this field. The dominant CE concept focuses primarily on environmental and ecological sustainability outcomes but lacks attention to social sustainability and livelihood aspects. Our paper bridges this gap in the literature by discussing results of qualitative research conducted in the metropolitan regions of São Paulo, Brazil, and Buenos Aires, Argentina, in 2017 and 2018, illustrating how waste picker organizations provide selective waste collection services to communities and businesses and thus contribute to resource recovery and social inclusion, at the heart of the CE.

Keywords: circular economy; global South; waste pickers; reverse logistics; social and solidarity economy

1. Introduction

This article focuses on waste picker cooperatives and their contribution to circular economy. Worldwide waste pickers reclaim a wide array of different materials from household waste; ranging from paper and cardboard, plastics, metals, glass, and wood to sometimes more specific materials such as cooking oil, fluorescent lamps, batteries, and electric or electronic waste (Wilson et al. 2006). The amounts recovered are significant, although quantified data is not always available for all types of materials and for every city. There are no formal selective waste collection programs in most cities in the global South, and there is growing evidence about the fact that it is the informal sector that retrieves most of the recyclable materials (Chokhandre, Singh & Kashyap 2017; Conceição 2005; EIU 2017; Hartmann 2012; Kasinja & Tilley 2018; Kumar et al. 2018).

They collect, sort, recycle, repurpose, and/or sell these materials to middlemen or the recycling industry. In the English language these waste pickers are also called

reclaimers, recyclers, collectors of recyclable materials, diverters, or informal recyclers. They are the urban commons who create their own employment (Zapata & Campos 2015). Most of them do not have access to any kind of state-sponsored social protection and barely survive, having to sometimes expose themselves to hazards and risks in order to get to valuable materials. Waste pickers have the lowest pay in the recycling chain and often face social stigma and economic exploitation, working under precarious conditions in a disadvantageous market.

Over the past decade, waste pickers in many Latin American cities have begun to organize in cooperatives and associations, creating regional networks and social movements (Dutra et al. 2018). Here organized waste pickers have built a dialogue with the government to become included in waste management programs and have partnered with industry to provide extended producer responsibility (EPR) services of waste collection and separation.

The activity of organized recovery of resource performed by waste pickers is inscribed in social and solidarity economy (SSE) theory and praxis (Moulaert & Ailenei 2005). The key principles of the SSE are autonomy in governance and self-management, solidarity among community members, striving for self-sufficiency, productive diversification

* University of Victoria, CA

† CONICET, Universidad Nacional de Quilmes, AR

Corresponding author: Jutta Gutberlet (gutber@uvic.ca)

on the market, and sustainable management of regional resources (Barkin & Lemus 2014). These values shape the everyday of organized waste pickers and while there are differences in leadership and participation among cooperative members, there is a broad consensus among organized waste pickers to honour autonomy and solidarity in their relationships. The work of waste pickers results in environmental contributions and climate change mitigation, and promotes the transitioning towards more sustainable economies, discussed under the ecological economy (EE) (Bauhardt 2017; Escobar 2015).

In this paper we present two case studies (one focused on the situation in Brazil and the other on Argentina) involving waste picker organizations and their participation in municipal recycling programs or in partnerships with industries. We want to understand how these waste picker organizations contribute to the circular economy, providing insights to the environmental and social contributions of their activity. Our findings are based on empirical research conducted in São Paulo and Buenos Aires from June to August 2017 and from October to December 2018, as part of a larger research project, under which we applied a questionnaire and conducted interviews, involving respectively 18 cooperatives/associations in the metropolitan regions of São Paulo and Buenos Aires.

We argue that waste pickers are central in supporting the circular economy (CE). While in most cases their contribution is not formally recognized, partnerships with NGOs and academic centres exist and the indirect contributions of the knowledge of waste pickers becomes more evident; in those spaces they are accepted as legitimate actors in the waste management system. Their daily work provides them with distinct learnings on waste, waste disposal, and resource recovery. Seldom do local governments draw on these insights, for example, when setting up new waste management programs in their cities or when outfitting recycling centres. Local authorities generally do not recognize the opportunity of generating employment and income, particularly for youth and women, and of tackling poverty reduction with more inclusive waste management (Velis et al. 2012). There seems to persist a lack of acknowledgement of the fact that in most global South cities waste pickers also contribute to mitigate climate change, by diverting recyclables from the landfills.

In the following section, we introduce and explain the concept of the circular economy and its relation to the social economy and the ecological economy. A brief description of our methodology will follow, explaining how and why we have conducted this study. We then present and discuss the empirical evidence and the supporting literature to answer the main research questions related to the roles waste picker organizations play in the circular economy. In our discussion section we contrast the business as usual scenario, which we call the standard recycling model, with an inclusive recycling model. The concluding section recognizes the links and contributions of waste picker organizations to the SSE and the EE and thus their intrinsic and long-standing input to the circular economy. Finally, we highlight some considerations for future research to further advance the recognition of waste pickers and to facilitate their involvement in the CE.

2. Circularity and Waste Management

2.1. Introduction to the circular economy

In opposition to the prevailing take – make – use – dispose linear economy (Pearce & Turner 1989), circular economy means a system where ‘a fixed number of atoms currently formed into today’s products should be repeatedly reorganized into future products without requiring any further injection of new atoms’ (Allwood 2014: 446) and without jeopardizing environmental and human health (Schroeder et al. 2019). It is about capturing, transforming and re-processing materials (Winans et al. 2017). The CE incorporates end-of-life recyclability into material and product design as a prerequisite for its cradle to cradle characteristic. The CE proposes to reduce, reuse, repurpose, remanufacture, recycle, and redesign to ultimately eliminate waste. Moving towards circularity is central in addressing the climate challenges but also to stop the depletion of natural resources, the loss of biodiversity, the degradation of ecosystems, and the contamination of the environment (Lowe 2005; Ghisellini et al. 2016, Gregson et al. 2015; Suárez-Eiroa et al. 2019).

In the global North current challenges are often related to how engineering and governance aspects of resources loops can be improved to make them more circular (Geissdoerfer et al. 2017), while the global South brings additional questions related to how the CE may also address poverty reduction, social inclusion, and the sustainable development goals (SDGs) (Velis 2017, Gutberlet et al. 2017). One way of promoting circularity is through extended producer responsibility (EPR). EPR implies that ‘producers take over the financial and/or organisational responsibility for collecting or taking back used goods, as well as sorting and treatment for their recycling’ (EPRS-Briefing 2016: 5). This provides opportunities for innovative waste management and recycling strategies, and it allows for the involvement of different actors.

Our case studies from Brazil and Argentina discuss the benefits and challenges for waste picker organizations with EPR and service contracts involving municipalities and industries.

2.2. The ecological and social/solidarity economy in the context of the circular economy

Ecological economy (EE) is concerned with links and overlaps between ecological and economic systems. It is thus per se also a very geographic perception of human–environment interactions. The EE debate also includes ‘transition discourses’ that call for significant paradigmatic or civilizational transformations, and transitioning into circular economy is part of the agenda of the EE (Spash 2012; Weiss 2017). While centring on the integration of ecological, social, and economic goals, EE is based on principles of responsibility, precaution, adaptive co-evolutionary resource management, and participation, seeking for sustainable governance. Reuse, reduce, recycling, zero waste, urban foraging, responsible consumption, and other eco-friendly waste system related concepts and ideas that are core to the EE, particularly in view of the current climate change debate. The ecological relevance of the work of waste pickers is apparent in their contribution to resource recovery, closing the loop of material flows and reducing

greenhouse gases (King & Gutberlet 2013). In Brazil, for example, 92% of all aluminium and 80% of cardboard is being recovered by waste pickers (Dias 2016, 2011).

EE seeks to further the understanding of the borders and interplays between ecosystems and the economy with the goal of promoting human well-being, sustainability, and justice (Constanza 1989). Today the EE also engages with new ways of examining democracy, economy, and society (Escobar 2015) and assesses non-capitalist political practices, such as the sharing economy or voluntary simplicity initiatives (Coraggio 2011; Kothari, Demaria & Acosta 2014). There are many overlaps between EE and SSE.

The social and solidarity economy (SSE) centres on everyday practices of alternative ways of engaging in economic activities, synonymous with transitioning to sustainability, offering tools for organizing, enabling people to support each other and to anticipate different practices and relationships, guiding concrete actions (Dinerstein 2015, Kawano & Miller 2008). It is concerned with the livelihoods, working conditions, different forms of organization, and policy requirements, highlighting the social and human assets dimensions (Caruana & Srnec 2013; Laville 2015, Singer 2009). Key values are solidarity, autonomy, cooperation, and reciprocity (Álvarez Quispe 2012). The SSE seeks to go beyond the market economy relations and forms of organization, aiming to transform hierarchical and authoritarian models and operations (Moulaert & Ailenei 2005; Moulaert & Nussbaumer 2005). Reciprocity is expressed through mutualistic approaches of collective ownership by members of a cooperative or association, for their and the wider community's benefit.

This definition matches the mission, objective, and form of organization we can find in waste picker cooperatives. The SSE privileges those groups in society that have been historically marginalized, discriminated against, and politically, socially, and economically excluded (Saguier & Brent 2017). According to the International Labour Organization, "SSE refers to enterprises and organizations (cooperatives, mutual benefit societies, associations, foundations and social enterprises) which produce goods, services and knowledge that meet the needs of the community they serve, through the pursuit of specific social and environmental objectives and the fostering of solidarity" (ILO, 2019). Waste picker cooperatives are an example of the SSE and their everyday practices demonstrate their capacity to advance social, economic, and environmental sustainability. Our case studies demonstrate the multifaceted roles of waste pickers in Brazil (called *Catadores*) and in Argentina (called *Cartoneros*), establishing service contracts with cities and industries.

In both countries federal and municipal policies have significantly supported the role of waste pickers in the SSE, as a result of the continuous struggles for recognition of those organizations. Within the Brazilian context, the best example for institutional support is the National Solid Waste Legislation (*Política Nacional de Resíduos Sólidos PNRS*) (Law 12.305/10), which since 2010 has been instrumental in the social and economic inclusion of waste pickers. In the same year the federal government initiated the PRÓ-CATADOR program, to coordinate all federal government efforts to strengthen and support the work of waste

pickers and their organizations. The other noteworthy federal program is called *CATAFORTE*, which seeks to expand the infrastructure, the organization and the skills of waste pickers in recycling cooperatives (MMA 2019). There have been three consecutive programs in 2009, 2010, and 2014. The last, *CATAFORTE III*, supported 33 networks, with more than 450 solidarity economy initiatives, integrating 13,000 waste pickers in 13 different states in Brazil (CEADEC 2019). Furthermore, several municipal policies have established the recognition of waste picker organizations, allowing them to engage in service contracts with the city. Diadema was the first city in Brazil to have a law on Sustainable Solid Waste Management (Law 2.336/04) remunerating waste pickers for their service.

Argentina does not have a national-level policy framework specifically related to waste pickers. Nevertheless, between 2003 and 2015, several municipal and regional public policies were targeted towards strengthening working cooperatives among the unemployed population, including more than 200 waste picker cooperatives within the country (FACCyR 2018). A good example is given by the implementation of the social income program called *Plan Argentina Trabaja* (2009–2018), which in its first five years increased the number of working cooperatives by 60%, gathering 22,824 operating cooperatives (INAES 2015). By 2018, when the program was deactivated by the administration at the time, more than 30,000 cooperatives were created involving up to 1.8 million people, many of which focused on gaining social and economic recognition by the local government for the social and environmental services they provide (Ferrari Mango & Campana 2018). Due to the pressure from waste picker organizations, several provincial and municipal agencies (e.g., the General Directorate for Recycling in Buenos Aires City – DGREC or the Sustainable Development Agency of the Province of Buenos Aires – Organismo Provincial para el Desarrollo Sostenible – OPDS) have included waste picker cooperatives within the waste management system, at least in large metropolitan areas (Lupi 2016; Sarandon 2016). Since 2013, within the city district of Buenos Aires more than 4,500 waste pickers organized in twelve cooperatives, are running the collection and classification of recyclables, as they won the public tenders launched by the city administration to assign this service provision (GCBA 2014). These tenders have been a result of a decade of harsh negotiations between waste pickers, social movements, and government officials, passing from a first stage characterized by the banning and repression of waste picking, to another stage, defined by collaboration to build-up a strategy of inclusive recycling (Schamber 2012).

Both EE and SSE draw the attention to innovative forms of economic interactions, where people and the environment matter, transcending economic growth and profit orientation, which are usually geared towards efficiency only (Moulaert & Ailenei 2005). SSE and EE occur in the same spaces and ask similar questions, generally contrasting the negative outcomes of the capitalist economy. In theory they hold very similar objectives, values, and practices geared by sustainability and justice. Yet there seems to remain a lack of recognition of the integrated nature of these two alternative economic conceptions

and often tensions and ambiguities in the debate originate when either the environment or societal outcomes are prioritized instead of taking an integrated perspective. This is also often reflected in policies supporting entrepreneurship that is rooted in SSE principles but is not in the EE. Waste picker initiatives have been supported by the SSE, recognizing the benefits in terms of social and economic inclusion; however, the environmental contribution of waste pickers working in the circular economy still remains to be acknowledged.

3. Research Methodology

Both authors engage in community-based research with waste pickers, beginning in 2010. Our approach to research is participatory and action oriented, which means that waste pickers often participate in the research as citizen scientists, contributing to the definition of the research agenda and the knowledge generation process. We play the role of facilitators and knowledge brokers, valuing the participants as co-producers of knowledge. The current research was developed under an ongoing research collaboration between the authors. Since 2017, we are working on waste governance issues and have generated mostly qualitative data sets, based on document analysis, questionnaires, and interviews with 18 waste picker organizations in both study regions. Our research received research ethics approval from the University of Victoria, with the protocol number 16–320.

Between June and August 2017, we conducted key informant interviews with six leaders from regional waste picker networks in the metropolitan region and with one leader of the National Waste Picker Movement (*Movimento Nacional dos Catadores de Materiais Recicláveis* – MNCR) in São Paulo. In the metropolitan region of Buenos Aires, we conducted 10 key informant interviews with social movements, business representatives, and NGOs related to the activity of waste pickers. The interviews captured information on the social, economic, and political everyday experiences of these organizations, particularly the pros and cons of recently formed contracts with industry and local governments.

The interviews were conducted at the offices of the organizations and took between 60 to 90 minutes. They were usually followed by an extensive site visit of the cooperative or network, where we could also interact informally with other members. The transcripts were returned to the interviewees to reconfirm the content, and phone or email contacts were maintained to collect additional information if needed. Research updates are regularly sent to the participants by email and posted at a Facebook account. Additional fieldwork was conducted between October and December 2018.

Out of our data pool we selected three examples: the network *Coopcent-ABC* and the cooperative *Cooperpires* (which is part of *Coopcent-ABC*) in Brazil and the cooperative *Reciclando Sueños* in Argentina, to be highlighted in the discussion here. These choices were based on the extensive data available for these three cases and the familiarity of the authors with these groups, to whom first contacts were established over 10 years ago. We knew their trajectories well. We are aware of the fact that each

case is a unique case. The purpose of this study was to gain a deep understanding of the roles, potentials, hurdles, and achievements of waste picker cooperatives, through testimonials. We wanted to learn from their perspectives and meanings in the context of the CE. We were interested in finding out about the challenges and opportunities waste picker organizations are facing in both countries related to the implementation of contracts and legal frameworks involving industries and large waste generators (including malls, supermarkets, country clubs, and manufacturers that produce more than 1 ton of waste per day). Our research findings underline the singularity of these cases and yet provide opportunities to contribute with more general conclusions that can apply to other situations in the region and beyond.

4. Empirical Insights on Waste Picker Organizations Engaging in the Circular Economy

In the following section, we describe the research results and discuss the contributions of waste picker initiatives in terms of contributions to the circular economy.

4.1. Waste picker organizations partnering with government and industry

Based on the Brazilian census data, 387,910 individuals have identified as waste pickers in 2010, of which 39% were organized (Dagnino et al. 2016; IPEA 2013). The National Waste Picker Movement (MNCR) recognised more than 1,600 waste picker organizations in the country, 95 groups in the metropolitan region of São Paulo and 58 in the city of São Paulo. Many of these organizations are part of a network, linking with several other groups in the region. There are six networks (*Redes*) and one federation operating in the region. While the original goal for networking was collective commercialization, today the networks also support their members with knowledge transfer, technical assistance, contract negotiation, capacity building, or internal governance issues (Tirado-Soto & Zamberlan 2013).

In Argentina there is also a lack of official statistical data for waste pickers, however, according to the national federation of waste pickers (FACCyR), this population accounts for around 200,000 people. In both countries part of the waste picker population is organized. When waste pickers form cooperatives, associations, and networks, they acquire additional tools and skills, which also help them compute how much material they collect, how much they divert into the CE, and how much leftover or rejected materials remains as discard.

The following table (**Table 1**) gives some socio-economic insights related to the cooperatives that were part of the wider research conducted since 2017 in both study regions. The data situates our case studies, which are described in the following section.

4.1.1. Brazil: Coopcent-ABC and Cooperpires

The network *Coopcent-ABC* was established in 2007 and currently brings together seven waste picker cooperatives in the metropolitan region of São Paulo (Gutberlet 2015). Five of these groups are already formalized (*Cooperpires* is one of them) and two are in the process of becoming for-

Table 1: Economic indicators from our empirical case studies.

	Brazil	Argentina
Total number of cooperatives surveyed	18	18
Total number of waste pickers involved in the study	804	799
Country minimum wage (2018)	249 US\$	277 US\$
Average income (person/month)	244 US\$	255 US\$
Average paid by contract with the city* or large generator** (per ton)	152 US\$*	213 US\$**
Amount of material diverted into CE per person/month	2.9 tons	3.7 tons
Number of cooperatives with formal contracts with the city and/or industry	5	4

Source: Elaboration based on our research data (Currency exchange rate from 20.11.2019).

mal cooperatives. The network has an elected board that governs the network for three years (president, treasurer, secretary). Each network has their own way of funding. In the case of Coopcent-ABC, 5% of the collective commercialisation is retained to maintain the network, the rest is paid out to each cooperative, according to the quantity of the material they have brought into collective commercialisation. The network is able to sell directly to the industry to get better prices than paid by middlemen.

The extended producer responsibility framework in Brazil is pushing for reverse logistics, putting pressure on industries to take responsibility for their packaging and discarded products and furthermore, to reintroduce their packaging materials into the recycling industry. The National Solid Waste Legislation (PNRS; Law 12.305/10) enforces large waste generators to divert their recyclable waste into the CE and supports waste picker organizations as key actors in selective waste collection, separation, and recycling. As a result, industry associations have a vested interest in establishing contracts with waste picker cooperatives, who can provide them with receipts confirming specific quantities of materials recovered (through the invoices they receive from selling to recycling industries). In return the contract with the waste pickers obliges the industry to fund infrastructure, equipment, or training for the cooperative. To stimulate such partnerships, the Ministry of Environment had launched a public call, in 2012, to select proposals for reverse logistic systems for the packaging industry (including producers, importers, distributors, and marketers).

So far, the law focuses on the reverse logistics of some products only, including pesticides and the related waste and packaging; other products whose packaging after use may be considered hazardous waste; batteries; tires; lubricating oils, their waste materials and packaging; fluorescent lamps; and electronic products and components. The legislation still needs to be implemented for most other materials. Some sectoral agreements are under negotiation and, in some cases, industries have already started to develop their own reverse logistics programs, such as ABIHPEC (Veiga 2013).

In 2016, the network *Coopcent-ABC* signed a two-year contract with the packaging industry association ABIHPEC (*Associação Brasileira da Indústria de Higiene Pessoal, Perfumaria e Cosméticos*), who brings together

the Brazilian packaging industry for cleaning products, personal hygiene, perfumery, and cosmetics. ABIHPEC is currently developing 128 projects with cooperatives in eight Brazilian states. The cooperatives collect the specific packaging, through the local household waste and recycling collection. The waste pickers sort the material into the different plastic types and sell them to the plastic industry. The receipt they receive for the transaction is presented to ABIHPEC, who credits the amount in their projects with waste picker cooperatives. This kind of industry program fits under the reverse logistics legislation, in compliance with the National Solid Waste Policy (PNRS) and the Regulatory Decree No. 7,404/10, focused on sectoral agreements to implement reverse logistics for packaging, signed by the Ministry of the Environment in 2015. In 2017, the federal government creates the Presidential Decree No. 9.177 for isonomy in the fulfillment of the PNRS obligations, placing signatories and non-signatories to sector agreements or terms of commitment as equally responsible for structuring the reverse logistics system and achieving its goals. Under this legislation, companies producing consumer goods are responsible for the correct destination of their packaging and they are encouraged to work with waste picker cooperatives.

The contract established with *Coopcent-ABC* thus helps ABIHPEC comply with their reverse logistics requirements. The implementation of this contract includes specific agreements for participatory strategic planning with all seven cooperatives affiliated to *Coopcent-ABC*, to define specific environmental education initiatives and to decide on the purchase of equipment and infrastructure or the contracting of advisory and professional development services. In return the cooperatives have to account for and further increase their resource recovery rates, which means they have to reduce the amount of rejected materials.

Cooperpires is part of *Coopcent-ABC* and is situated in the city of Ribeirão Pires. It was created in 2004 and became a legal cooperative in 2005. Currently *Cooperpires* has 19 members, of which 11 are women and 8 men. The cooperative has a regular door-to-door collection of recyclable materials in some of the neighbourhoods and they additionally collect at schools, supermarkets, government offices, and private businesses. *Cooperpires* is one of the few examples in Brazil where waste pickers have signed

a contract with the municipal government for the service of selective waste collection. For every tonne of material collected and separated, the city pays 527 Reais (140 US\$). Today, 17% of the weight of all materials that enters *Cooperpires* are rejected materials and have to be collected by the city to be taken to the landfill. These materials are either too contaminated or have no market. *Coopcent-ABC* is also part of the ABHIPEC partnership, through which they have received infrastructure, machinery, and office equipment, purchased by ABIHPEC. Contracting and purchase is always centralized by ABIHPEC, and they also control the funds.

The cooperative is able to sell between 11 to 16 tonnes of material every month. The contract with the city has significantly increased the average income of the waste pickers. Now they earn up to 1,500 Reais/month (390 US\$/month), which is above the Brazilian formal minimum wage (954 Reais/month or 288 US\$).

4.1.2. Argentina: Cooperativa Reciclando Sueños (Cooperative Recycling Dreams)

Since mid 2012, 25 waste picker cooperatives located in the metropolitan region of Buenos Aires were invited by the Sustainable Development Agency (OPDS) of the Province of Buenos Aires to join a task force whose goal it was to elaborate a new regulatory framework for waste management practices of large generators. The ordinances 137, 138, and 139 were launched in 2013, stating that every large generator had to elaborate a waste management plan including segregation for recyclables as a mandatory requirement. On the other hand, this normative framework has established a set of organizational and technical requirements that the waste picker cooperatives have to address in order to be considered as a sustainable destination. As such, they can offer waste management services for large generators, establishing a formal hiring contract. In return, the former can issue official receipts (endorsed by OPDS) for the industry, stating the total amount and type of recyclable materials that entered a circular loop. This official certification process was key for both, the industry and the waste pickers. The large generators began to have reliable metrics about their recyclability standards, which allowed them to address social and environmental licenses (e.g. ISO 14,001 or the UN SDGs). The waste picker cooperatives also benefited from this formalization process, as for the very first time they were able to issue an official document, operating under the same conditions as private waste management companies. This achievement was also key as a first step towards a wider goal shaped by their long-standing struggle to be recognized as providers of public services to the local municipalities (Carenzo and Good 2016).

Under this framework, in 2015, the cooperative *Reciclando Sueños* managed to sign a contract with Limpex chemical industry, to collect and divert their recyclable waste into the circular economy. One remarkable fact of this operation was that this manufacturer decided to end an existing contract with a large private waste management provider in order to make room for the cooperative, something really unusual for the local corporate environment.

Due to this win-win approach, Limpex increased its recyclability rate achieving global corporate standards, passing from 7% to 28%, as the cooperative was able to work with a wider spectrum of materials. Limpex also reduced its overall waste management cost around 20% (60 US\$/ton) on average, as they were able to direct more recyclables to the cooperative, whose operational costs are cheaper than the former private company. In turn, because of this contract *Reciclando Sueños* increased the total volume of recyclables treated to 80 tons/month. This implies a double benefit in terms of income for the cooperative. Firstly, they are working with a larger volume (processing up to 250 tons/month at an average price of 500 US\$/ton) and secondly, they charge the industry for the service as a whole, which brings an extra income of 44 US\$/ton. Beyond the strictly economic benefits, this partnership became a milestone for the waste pickers in their struggle for recognition as a specialized service provider, shaped by sustainable social and environmental waste management standards.

5. Discussion

We have organized the discussion on two axes. The first axis focuses on the opportunities and limitations derived from current legal and administrative frameworks to foster waste governance models based on the waste pickers' contributions to the CE. The second axis expands on those contributions, by comparing a standard model of waste management for CE provided by private companies, with an inclusive recycling model for the CE, supplied by waste picker organizations.

5.1. Waste pickers within waste governance for the circular economy: Advances and shortcomings

Our research describes different arrangements where waste picker initiatives have become recognized actors in the CE. The majority of the waste pickers are not organized, and membership-based organizations are not always aspired by autonomous waste pickers. We acknowledge that formalization comes with barriers, new expectations, and costs to its members, such as set-up costs and administrative costs, as outlined by Ostrom in *Governing the Commons* (1990); it brings advantages but can also have negative effects and consequences for the members (Colombijn & Morbidini 2017; Rial 2016). Formalization can mean that the state and other actors can exert more control over their enterprise, such as pushing them to meet certain qualitative and quantitative goals for resource recovery, which can then also translate into less freedom. Our case studies highlight particularly the positive outcome of having a stronger voice through organization.

In Brazil, waste pickers have created cooperatives and associations, of which some of them are linked to networks, who are also part of the nationwide waste picker movement MNCR (Tirado-Soto & Zamberlan 2013). In Argentina, many waste pickers have organized in a national federation among other social movements. Here public universities have also played a key role in strengthening the waste pickers' movement, supporting their sectorial demands and providing technical support. In both cases,

the aims of networks go beyond collective commercialization and encompass the strengthening of the organizations, the support of negotiations of service contracts with local governments and the creation of partnerships with industries (Dagnino et al. 2016; Dias 2016; Fernandez Alvarez and Carenzo, 2014; Gutberlet 2016; Lupi 2016; Maldovan Bonelli 2018; Rutkowski & Rutkowski 2015).

The specific case studies show some favourable impacts of public policies that support partnerships in service provision between waste picker organizations and the government and/or the industry, as has also been highlighted by the literature for other places (Besen et al. 2014; Sarandon 2016; Tirado-Soto & Zamberlan 2013). In Buenos Aires, the OPDS regulations have provided a useful platform to address the recognition of waste pickers as specialized waste management service providers to the industry; however, this normative regulation does not make the establishment of contracts mandatory. In fact, private waste management companies are offering these kinds of services as well, and are competing with the waste pickers. As presented in **Table 1** in the previous section, the number of cooperatives that have established formal contracts with large generators is still very low (4 out of 18 in Argentina and 5 out of 18 in Brazil).

Considering this scenario, the waste pickers are developing a strategy to differentiate their service by pondering two key aspects. Firstly, by offering a more comprehensive range of recyclables to be collected, sorted, and transformed, than competitive recycling businesses, who usually focus only on the materials that have better prices, such as cardboard, paper, and PET. Secondly, as the waste pickers have better control of the chain in terms of who buys the materials and what is made of them, they also offer a more rigorous traceability of the materials they retrieve from large generators. Unlike private waste management companies that generally sell the materials to large brokers and resellers of recyclable materials, cooperatives market a large part of their materials to small local industries, thus knowing the whole chain, up to the elaboration of a new final product. Even in cases like *Reciclando Sueños*, it is the cooperative that has managed to transform the material collected in situ, developing new uses and new products from the recyclables they recover from the industry. For example, they weave ropes out of the self-adhesive plastic labels, which come in large rolls, discarded by the industry (Carenzo & Schmuckler 2018), or they make cardboard like plaques from reusing the water-resistant paper labels of beer bottles (Carenzo 2018).

In Brazil, the National Solid Waste Legislation (PNRS) also supports waste picker organizations as service providers in municipal waste management. According to the PNRS (Law 12.305/10), local governments are now required to contract waste picker cooperatives, if available in the municipality. Waste pickers can greatly benefit from these specific policies designed for social inclusion (Besen et al. 2017). Few municipalities comply with the law, which is difficult to enforce. Municipalities argue that the local cooperative is not skilled enough and doesn't have the capacity to fulfill the service contract, and then they hire established waste management companies

instead. *Cooperpires* is still an exceptional case in the metropolitan region of São Paulo, having established a contract with the municipality and being remunerated for the waste diversion. Except for the City of Buenos Aires there are no other initiatives where waste picker cooperatives are economically recognized as public service providers in the metropolitan region of Buenos Aires. However, within the Province of Buenos Aires, the OPDS normative establishes some kind of official recognition of that status, at least in relation to large generators, pointing out that collecting and diverting their recyclables into the CE should be considered a paid service. Based on this framework, five municipalities in Greater Buenos Aires are willing to replicate this normative within their jurisdictions, as an attempt to encourage industries and waste picker cooperatives located in their jurisdictions to work together.

In the previously presented **Table 1** we see that waste pickers collect and separate, on average, 2.9 tons of material every month in greater São Paulo and 3.7 tons in the case of greater Buenos Aires, for the CE. The working conditions in many waste picker cooperatives often remain precarious, frequently creating risks and health hazards to waste pickers (Gutberlet & Uddin 2018; Gutberlet et al. 2013; Binion and Gutberlet 2012; Gutberlet & Baeder 2008). Few cooperatives are well equipped in terms of infrastructure, have contracts established with local governments or industries, are successful in their governance, and can achieve higher productivity (Dagnino et al. 2016). *Reciclando Sueños* and *Cooperpires* are some of these few cases.

Being able to negotiate and establish service contracts is a step up. However, there are still many challenges for the waste pickers to overcome. In the case of Brazil, waste pickers mentioned that their contract with ABHIPEC, the packaging industry, did not allow them to be flexible in the spending of the money. Most waste picker cooperatives have very skilled and strong leaders, who question paternalistic relationships with the industry. These leaders collaborate amongst each other informally or through their network (e.g. *Coopcent-ABC*). For important meetings they invite the network leader to also partake in the negotiations.

Decisions within the cooperative are usually made democratically in monthly or bi-weekly general assemblies or extraordinary meetings. Decisions are reached after debating agenda items and reaching majority voting, which is not always an easy process and can take time. Not always the members reach consensus, revealing diverse perspectives of their members. We acknowledge that waste picker cooperatives are complex and contradictory spaces, with individualism and community, competition and collaboration, and autonomy and dependency occurring at the same time; and we highlight that these are also both spaces of care and communing (Gago 2017).

In the case of the networks, *Coopcent-ABC* too requests greater autonomy over how to spend the funding received from ABIPEC. In this specific case, they request individual agreements for each cooperative, because each group has different priorities, allowing for more decision-making

power to the cooperative. This would reduce conflicts and bring about a more democratic process in decision making and would benefit the political principles of solidarity economy (self-management, shared decision making, and people empowerment) (Arruda 2009; Quinones 2008).

Key informant interviews highlighted the importance of regularly conducting participatory strategic planning exercises at the cooperative level, so that priorities can be redefined collectively. Democratic meeting practices to exercise agency and to build sovereignty between the cooperative members and amongst the leaders who represent them at the network level were also mentioned as key qualities to strive for within the waste picker organizations to more effectively participate in the CE.

Organized waste pickers closely operate under the principles of the SSE and EE. They pursue similar values and use their agency to involve bottom-up, grassroots, and community-based initiatives to co-produce a service that benefits the environment and the community (Dinerstein 2014). Government plays an important role in supporting these initiatives, such as facilitating access to funding for professional training and education of waste pickers, as has been the case in Brazil with the various *CATAFORTE* programs. Developing people and community-centred policies, strategies, and appropriate technologies are ways to provide structural support to these SSE initiatives (Dururu et al. 2015).

Waste pickers produce irreplaceable knowledge on material composition and their recyclability that is important to recirculating and maximizing value in waste. They comment that sometimes they encounter packaging that has no market, such as a multilayer plastic milk bottle, which has a black internal coating. Due to that extra layer, the plastic recycling industry does not accept the material. There are cases where waste pickers have sorted out many tons of these bottles, stocked in their centres. To address such situations *Reciclando Suenos*, in collaboration with the University of Quilmes, is testing out different processes to transform those materials that are currently not recycled.¹

The experience and knowledge of waste pickers can create more effectiveness in the CE, saving the industry money, while significantly reducing the amount of industrial waste dumped on landfills. As part of the contract, *Reciclando Suenos* delivers workshops for Limpex employees, allowing the company to increase their efficiency of their waste sorting system in their offices and

in production by 50%. This empirical evidence demonstrates the effectiveness of such pedagogical work of waste pickers, which needs to be recognized, not only in regulatory texts, but also by providing them with practical fiscal and legal tools, such as the official OPDS certificate that *Reciclando Suenos* issues to Limpex, or the invoices *Cooperpires* provides to ABHIPEC on a monthly basis. To include cooperatives in the circular economy is not only a matter of willingness, it also implies in the recognition of their techno-cognitive skills that shape their role as specialized waste management service providers (Carenzo 2011; Carenzo & Schmuckler 2018; Gall 2020).

Another important learning is that the definition of what is in fact recyclable waste must include the waste pickers' perspectives. *Reciclando Suenos* has identified a wide range of valuable materials to be included in the contract as *recyclables*, such as expanded polystyrene (EPS) or low-density polyethylene (LDPE) that previously, when Limpex had a service contract with another company, were discarded as non-recyclable materials because it was considered cheaper to dump them instead of treating these materials. This is no longer an option under the CE. The industry-waste picker partnership generates direct positive impacts not only by increasing the industry's recycling rate, but also by increasing the volume of materials handled by the cooperative, and consequently increasing the profitability of their work (Carenzo, 2014).

5.2. Towards an inclusive recycling model for the circular economy

Drawing on the qualitative findings of our research, we have elaborated the following table (Table 2), which delineates two contrasting models to implementing CE principles for industrial waste management. We call the business as usual scenario standard recycling model (SRM) describing the current baseline scenario, in which large private companies provide waste management services to large generators of waste. In contrast, what we call the inclusive recycling model (IRM) describes an in-progress scenery, in which the waste picker cooperatives start to be involved in the provision of specialized waste management services to the industry, due to the progressive implementation of the EPR framework. By identifying the most evident pros and cons we want to contribute to evaluate both, the challenges and potentials of a transition to a circular economy-based waste management model.

Table 2: Comparing standard and inclusive recycling models for the circular economy.

	Standard Recycling Model (SRM)	Inclusive Recycling Model (IRM)
Pros	<ul style="list-style-type: none"> • Existing legal framework • Existing waste management actors • Ready to implement 	<ul style="list-style-type: none"> • Social and environmental incentives • Long and heterogeneous value chain • Lower cost to customers (government or private)
Cons	<ul style="list-style-type: none"> • Market-driven incentives • Short and homogeneous value chain • Higher cost to customers (government or private) 	<ul style="list-style-type: none"> • Needs to develop a specific framework to fulfill corporate compliance policy • Time consuming and needs third-party support • Needs to harmonise SSE+EE actors and logics (develop cooperatives as service providers)

Source: Elaboration based on our research data.

5.2.1. Pros and cons 1: Circular economy? Yes, but also pragmatic and efficient

Currently most of the private waste management service companies in Latin America are drastically driving their business (and corporate narratives) towards the CE. Ranging from large multinationals, such as Veolia, to small-scale, local, and family-owned, these enterprises are increasingly involved in recycling, rather than merely providing infrastructure and logistics to manage industrial commercial waste, as they used to do before.

Considering this current scenery, we propose to first read **Table 2** in diagonal, which focuses on weighing the pros of the SRM with the cons of the IRM. This reading describes the perspective we found among most of the executives in charge of waste management that we interviewed among ABIHPEC and Limpex. This fact has to be contextualized within the corporate world, in which it is usual that a private company provides services to other private companies, and of course, charging the latter for the service provided. However, the same transaction results unthinkable if the proposed service provider is a waste picker cooperative. As Angel, the plant manager of Limpex, explained:

When contracting an already established private provider, you have the guarantee that they accomplish legal and fiscal requirements... you are buying a turnkey service, don't you? This is not the case with waste picker cooperatives. Most of them show gaps in their formal status, as their papers are not up to date, or they have a poor record keeping ... in sum, these are mandatory requirements to be considered as official service industry (Angel 3/7/2018).

Therefore, to include a waste picker cooperative into the company's waste management system implies the assumption that they will need technical support to fulfill the corporate compliance policy. Or in other terms, this win-win exchange is rarely the starting point, but a goal to be achieved. And moreover, due to the bureaucratic and technical challenges it may involve, it will be necessary to involve third parties such as academics, governmental officials, social movements leaders, NGOs, or others. A big challenge is to align and coordinate the rationales and narratives of corporate and cooperative actors, as Marcelo, the president of *Reciclando Sueños* points out:

Without any fear of being wrong, I can tell you that the day that we really ended our formalization process, was when we signed the contract with the company, not when we obtained the official enrollment as a cooperative. It was the very first time in almost ten years, that we had our documents and registrations up-to-date ... and for that to happen it was key to receive the assistance that you guys gave us from the CONICET and the university (Marcelo 22/5/2018).

From a pragmatic point of view, we can say that to include waste pickers as waste service providers to corporate businesses, it is neither easy nor a given path. To the contrary, it is a time-consuming and resource-intensive process, in which the involved stakeholders require dedication and support to adjust the rationales and skill sets of both parties.

Therefore, even though many corporate managers are truly interested in contracting the services of a waste picker cooperative for their waste management, they are not so keen on taking the risks that come with an out-of-the-box procedure. The Limpex plant manager Angel clearly evidenced the risks and uncertainties involved in contracting the services offered by waste picker cooperatives instead of an established turnkey service provider. Thus, they will probably end up contracting a private operator, even if it would be far less disruptive and more creative to work with a cooperative.

Fortunately, pragmatic and profit-driven perspectives are not the only ones, or the top ranked. As a second reading of the table shows, the achievement of social and environmental goals are not always at odds with gaining in efficiency and even productivity standards.

5.2.2. Pros and cons 2: Circular economy? Yes, but developing long, heterogeneous, and inclusive value chains

A second inverse and complementary reading of **Table 2** departs from addressing the cons of SRM, to then consider the pros of IRM.

Here we have to acknowledge that most of the services offered by private operators are based on a restricted perspective, by which the usual collection, sorting, and selling of recyclable materials seems to be enough to frame the activities as CE. From this perspective, they respond to market-driven incentives and tend to focus on the cost-effectiveness of their operations. In fact, many of the recyclables these firms collect from factories are valueless (e.g., EPS or the uncountable milk plastic bottles with the inner black layer that reach the cooperatives). Therefore, they also end up in the landfill stream (also operated by them), instead of searching for innovative ways to process these materials, such as *Reciclando Sueños* does. Thus, in contrast, the inclusive Recycling Model (IRM) is driven by social and environmental incentives, that lead to build a CE capable to overcome existing market constraints and fulfilling social and environmental justice goals.

Marcelo from *Reciclando Sueños* highlighted this during an interview, by saying:

All the research done with the EPS, required lots of time, money, and resources that we decided not to devote to something else ... such as searching for more contracts with large generators. For many, this seems wrong because it is 'uneconomic' [he makes quotation marks with his hands]. But we do not see it in that way... for us it is an investment. Of course, we want to get paid for providing a comprehensive and reliable service, but we also want to contribute to our environmental quality by solving the problems of discarded *Telgopor* [local commercial brand for EPS].

These examples provide a clearer picture of why building an inclusive CE waste management service requires more time and dedication than buying a turnkey project. The latter involves a short and homogeneous value chain, deployed within the corporate world itself. In contrast, a progressive IRM seeks to develop by linking heterogeneous actors (cooperatives, associations, networks, community-based organizations, etc.) in a much larger and inclusive value chain. The discussed inclusive recycling model proposes important social parameters to the CE framework, which are also reflected in the SDGs, but specifically focus on social and economic inclusion of vulnerable individuals (e.g. youth, long-term unemployed, single mothers, persons with mental or physical disability, migrants, ex-offenders, etc.). Our case studies have captured and made explicit the organization of human labour that underpins these circular flows. Under this model a large number of workplaces can be created sustaining the livelihoods of large numbers of people who are often socially and economically excluded or disadvantaged.

Fortunately, there is a key dimension that has played a significant role in shifting CE corporate initiatives towards an inclusive recycling model, and this is related to the costs. As cooperatives have a much more flexible and simplified cost structure compared to companies, they can offer a more competitive price for their services. This reward awaits those executives who are keen to take the first step and who have the courage to be innovative and establish contracts with recycling cooperatives instead of large private companies.

6. Final Considerations

Waste pickers in the global South are already at the heart of the CE (Gall 2020; Schröder et al. 2019). Waste pickers might not speak the same technical or academic language, but they understand the concept of retrieving materials from the waste stream to redirecting them into the recycling economy, minimizing resource losses, and gaining greater circularity. Waste pickers organize in cooperatives and networks and engage in waste management related services for the public and private sector. The case studies provide insights about some of the assets waste picker organizations bring and some challenges they are facing. Our findings overlap with some of the conclusions made by Dagnin and Johansen (2016); Dias (2016); Rutkowski & Rutkowski (2015); and Velis (2017), recognizing that waste pickers are an integral part of the CE and that resources need to be mobilized to support their efforts, because there clearly are limits of what unsupported and unorganized waste pickers can achieve regarding to their contribution to the CE. These resources can come from diverting costs from landfills or incinerators towards the work of waste pickers, from reverse logistics arrangements such as EPR, or by way of specific public policies that support the building and strengthening of waste picker organizations, such as the policies we mentioned in the case of Brazil and Argentina.

The paper argues that waste pickers are already major protagonists in waste management, particularly when organized into local and regional collectives. Including their representatives in the dialogue on the circular

economy will generate new opportunities and fairer partnerships with better contracts. Waste pickers are still widely neglected within these discussions.

Governments and public policy play an important role in creating more spaces for dialogue and in including them in the conversations with industry, policy makers, universities, and NGOs on closing the resources loop. They need to be part of the planning and implementation of inclusive waste management systems, as specialized waste service providers. We have seen in the case study from Argentina, that specific policies can provide incentives for grassroots initiatives to become innovators of the CE. Waste pickers often call themselves main protagonists in resource reclamation and request access to recyclable materials. Formalizing partnerships between waste picker organizations and governments or industry provides them with greater security. Waste pickers also carry out educational campaigns to encourage more segregation of recyclables and a better quality in source separation. Their activities help destigmatize and reframe themselves as resource reclaimers. Partnerships between waste picker organizations and governments or private businesses exemplify the opportunities that can be created for waste pickers to reinvent themselves as crucial links within the CE.

There are gains from including waste pickers in the CE that meet the vision of the Ecological Economy of closing resources loops, zeroing the waste of resources and promoting educational change for more sustainability. In addition, the SSE brings the values and propositions of alternative ways of living, producing, and consuming and carries hope for transformational change of social and economic relations for a more just and sustainable society. Coupling these two views is essential, given the social and economic disparities lived, particularly in the global South.

As Marcelo from *Reciclando Sueños*, said: 'Circular economy is what we have been doing during all our life.' Organized waste pickers are in the position of spearheading transformational change and particularly the women (who are the majority in recycling cooperatives) are central in these operations. There are differentiated debates on the CE in the global North and the global South. More research is required to learn from grassroots initiatives and to expand the opportunities for them to participate in the CE, as recognized and remunerated service providers. Finally, we found that the organization in cooperatives and networks has particularly helped waste pickers to establish new partnerships in service delivery with cities and in EPR with specific industry sectors. In our study we have learned from the everyday experiences of waste pickers and their partnerships about the complexity and diversity of their political, social, and economic contexts as well as their genuine creativity to address these issues.

The CE values products with the materials they embody and thrives to close the loop again after consumption, unlike in the linear economic model (Pearce & Turner 1989). The concept proposes a paradigm shift from understanding garbage as waste, towards valuing it as resource, recapturing and adding value, something waste pickers have always been doing. This means transforming

manufacturing and consumption standards, expectations, and norms towards sustainability parameters. Waste pickers are key players in these tasks.

Yet the current discourse on the CE does not outline potential opportunities for more equity-oriented business models and the possibilities to target some of the core inequalities. We propose to add social parameters to the CE framework, to capture and make explicit the organization of human labour that underpins the circular flows of matter and energy. The inclusive recycling model targets many of the SDGs, which underlines the request for creating parameters that help define the quality of the CE. The proposed model highlights that it is not just about inserting resources into circularity, but also about human labour. Furthermore, in view of climate change, the work of the multitude of waste pickers around the world must be recognized as contributor to material recovery, sparing virgin natural resources and addressing many of the SDGs. While this paper brings to the forefront social sustainability and livelihood aspects, we acknowledge, that additional research is needed, specifically to describe the parameters that can express such enhanced version of the CE and to define indicators that can measure and communicate the impacts of their work.

Note

¹ This relation is framed under the research, transfer, and extension guidelines developed at the LabIEC (Laboratorio Abierto de Innovación & Economía Circular de la Universidad Nacional de Quilmes). Within this interface, academics and practitioners from cooperatives and CBOs profit from R&D public funding to develop collaborative research and implementation to accelerate the transition towards circular economy, but framed in an inclusive recycling perspective. More info: www.lab-iec.org.

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Competing Interests

The authors have no competing interests to declare.

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