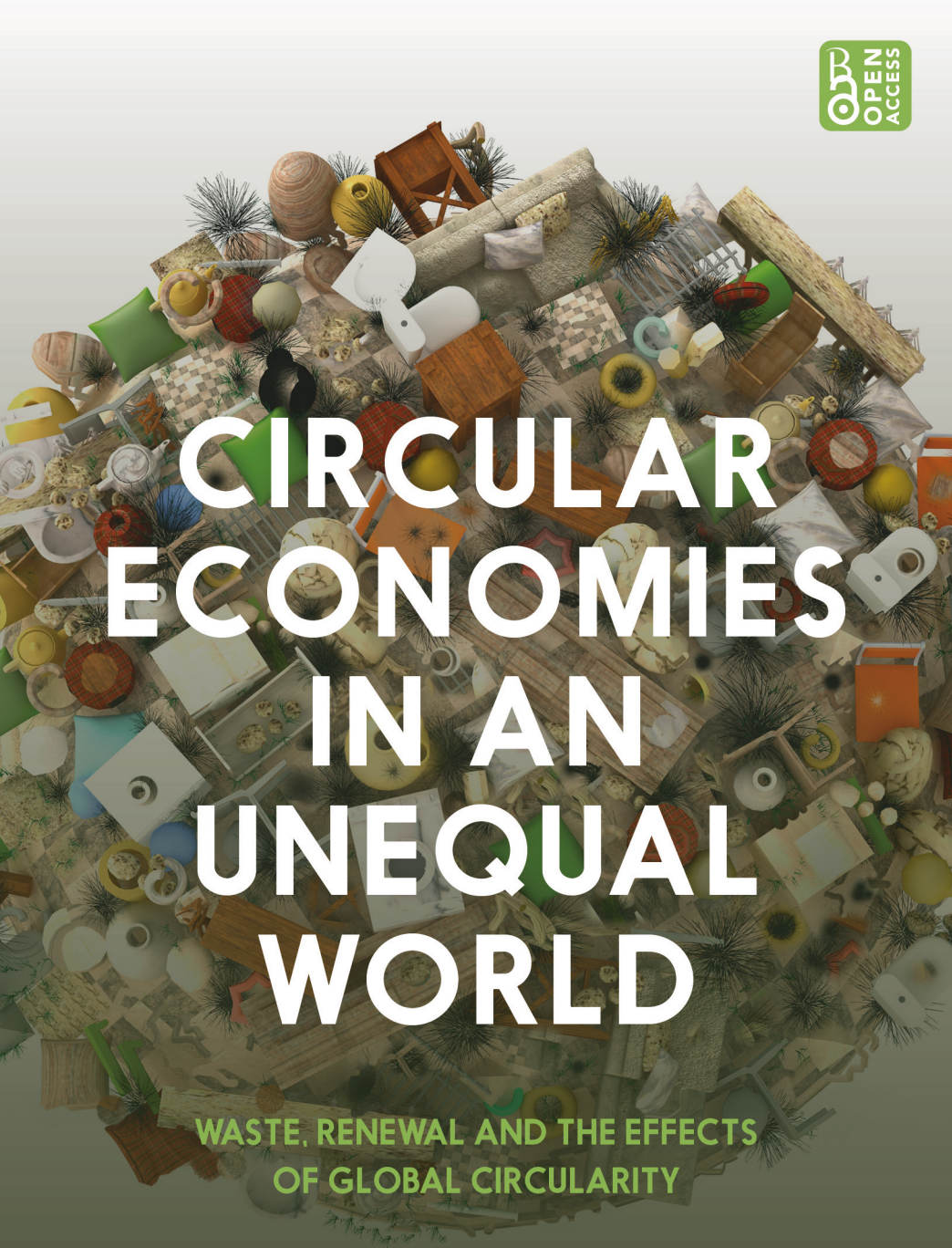

CIRCULAR ECONOMIES IN AN UNEQUAL WORLD

WASTE, RENEWAL AND THE EFFECTS OF GLOBAL CIRCULARITY

Edited by Patrick O'Hare
and Dagna Rams

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Chapter 5

Disruptive but normalizing?

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

Sebastián Carenzo and Lucas Becerra

Introduction

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

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

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

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

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

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

Setting the debate: Ontological and methodological definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Circularity rules! (but formalization matters)

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

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

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

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

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

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

Looping odd recyclables and disrupting asymmetries

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

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

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

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

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

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

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

Circularity, innovation and formalization

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

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

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

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

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

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

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

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

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

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

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

Conclusion

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

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

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

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

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