UNIVERSITÀ DEGLI STUDI FIRENZE
DISEI
DIPARTIMENTO DI SCIENZE PER L'ECONOMIA E L'IMPRESA

Working Papers - Economics

A Handbook on the Database of selected cases and good practices on Circular Economy for SMEs

Marco Bellandi, Maria Chiara Cecchetti, Caterina Orlando

Working Paper N. 03/2025

DISEI, Università degli Studi di Firenze
Via delle Pandette 9, 50127 Firenze (Italia) www.disei.unifi.it

A Handbook on the Database of selected cases and good practices on Circular Economy for SMEs

Marco Bellandi*, Maria Chiara Cecchetti*, Caterina Orlando*

**Dipartimento di Scienze per l'Economia e l'Impresa, members of the HEADCET team at the University of Florence working on the Work Package 9 (Circular Economy innovation for SMEs)*

ABSTRACT. This Handbook presents a database of selected cases and good practices on Circular Economy (CE) for Small and Medium-sized Enterprises (SMEs). Developed within the HEADCET project, it constitutes a valuable tool for supporting Higher Education Institutions and policymakers in addressing sustainable development challenges in Latin America and the Caribbean (LAC). Specifically, it provides: a concise review of the CE literature; an analytical framework of indicators for evaluating CE initiatives; 15 literature-based SME case studies adopting CE practices in LAC; 22 empirical case studies derived from a project survey involving SMEs, social enterprises, and business organisations; and 10 good practices identified from the survey and linked to the proposed indicator framework. The Handbook combines conceptual and empirical insights to analyse and assess CE initiatives and innovations at the business level, offering an evidence-based resource to compare and disseminate CE experiences, supporting knowledge transfer and policy-oriented learning around multi-actor initiatives in support of sustainable local and regional development.

Keywords: Circular Economy, Small-Medium Enterprises, Case Study, Latin America and Caribbean
JEL Codes: O44, Q56, R11

Elaborated within

the Project HEADCET "Higher Education pArtnerships for sustainable local Development through Circular Economy and social innovation", co-funded by EU under the ERASMUS-EDU-2022-CBHE, project number101083025

Co-funded by the European Union

Acknowledgment

HEADCET, as an Erasmus+ Capacity Building Higher Education project co-funded for the period January 2024 – December 2025, aimed at supporting Higher Education Institutions (HEIs) of Argentina, Paraguay, and Chile in tackling the challenges of sustainable development by enhancing their relevance for the labour markets and the society at large. The project specifically focused on Circular Economy (CE) and Social Innovation (SI) which are strongly interrelated in Latin American (LA) Countries and are crucial to foster a sustainable development and to identify new jobs opportunities.

The partnership included:

UNIFI - UNIVERSITA DEGLI STUDI DI FIRENZE
EUROSUR - FUNDACION EUROSUR PARA LA COOPERACION ENTRE AMERICA LATINA Y LA UNIONEUROPEA
UNQ - UNIVERSIDAD NACIONAL DE QUILMES
UNI -UNIVERSIDAD NACIONAL DE ITAPUA
UNAB - UNIVERSIDAD ANDRES BELLO
UNCUYO - UNIVERSIDAD NACIONAL DE CUYO
USC - UNIVERSIDAD SAN CARLOS
PUC - PONTIFICIA UNIVERSIDAD CATOLICA DE CHILE
UE VARNA - IKONOMICHESKI UNIVERSITET - VARNA
CEI - FUNDACION PRIVADA CENTRO DE ESTUDIOS INTERNACIONALES
PIN - PIN SOC.CONS. A R.L. - SERVIZI DIDATTICI E SCIENTIFICI PER L UNIVERSITA DI FIRENZE
FUNDUNI - FUNDACIÓN UNIVERSITARIA DE ITAPUA

This Handbook is the result of a research elaborated between September and December 2025 by the team of the University of Florence with the support of the HEADCET teams of PIN Prato (**Leonardo Borsacchi**) and CEI, Barcelona (**Andrea Noferini**), together with the six HEADCET teams of the Latin America partner universities, *viz.* Universidad Nacional de Cuyo and Universidad Nacional de Quilmes and (Argentina), Pontificia Universidad Católica de Chile and Universidad Andrés Bello (Chile), and Universidad Nacional de Itapúa and Universidad San Carlos (Paraguay).

The research also involved directly a set of correspondents of SMEs and business organizations, related to the six LA partner universities, which filled questionnaires related to their case and position concerning the circular economy.

We extend to all of them a warm address of gratitude for their kind and important contribution. The text that follows was concluded the **18 December 2025** and entered the project's Delivery D9.2.

Index

Preface

The HEADCET project (*"Higher Education Partnerships for Sustainable Local Development through Circular Economy and Social Innovation"*) is a three-year initiative, funded by the Erasmus+ Programme and co-funded by the European Union, designed to support Higher Education Institutions (HEIs) in the area of Latin America and Caribbean in addressing the challenges of sustainable development by strengthening their relevance to labour markets and society at large.

Given broader trends of economic stagnation, rising social exclusion and inequality, the adverse socio-economic impacts of climate change, and the rapid transformation of labour-market conditions, the development of coherent sustainable strategies and pathways emerges as a crucial response to these challenges. In particular, the possibility of building more resilient societies, even in developing countries, depends on addressing the *"triple bottom line"* of sustainability, which encompasses economic, social and environmental needs of local communities (Biggeri et al. 2019).

From this perspective, HEIs around the world are widely regarded as key actors within innovation ecosystems, serving as potential drivers of more sustainable transitions and growth. This occurs through the full range of their missions: from teaching—acting as key drivers of capacity building, the reduction of skill mismatches, and socio-cultural development—to research activities addressing issues related to sustainable development, and, more recently, through their Third Mission, which has seen HEIs become progressively engaged in socially inclusive and environmentally sensitive practices in collaboration with their communities.

Building on this rationale, HEADCET focuses on strengthening the commitment of some HEIs in Latin America and Caribbean (hereinafter LAC) to themes of Circular Economy (CE), Social Innovation (SI), and Sustainable Development (SD). These domains are deeply interconnected within the LAC context and are regarded as crucial for fostering more sustainable forms of growth and creating new employment opportunities. This is also reflected in the growing political attention devoted to sustainable strategies in the region: in recent years, the circular economy model has gained high-level political support across LAC, with more than eighty public initiatives already launched in this field (Schröder et al., 2020).

The project has thus established a consortium composed of six HEIs from three LAC countries (Chile, Paraguay, and Argentina)—the target group—and three European HEIs from Italy, Spain, and Bulgaria, together with Fundación EUROSUR as supporting partners with long-standing experience in sustainability issues and Latin American dynamics (the work carried out within the Working Packages (WP) 1 - *Project and Quality Management*).

The backing provided by HEADCET to LAC HEIs has unfolded through a broad set of interrelated actions. Specifically, in its initial phase, the project focused on strengthening both the skills and competences of HEIs on sustainable development, CE and SI, as well as their capacity to apply these practices when working with different stakeholders. This was achieved through specific training sessions tailored to the needs of LAC HEIs. Specifically, HEADCET supported HEIs in engaging with local actors (such as public agencies, Small and Medium Enterprises -SMEs - and NGOs) in line with their expanding Third Mission, by mapping their regional networks and enhancing their ability to share and exchange good practices within them (the activities undertaken under WP2- *Services for Universities Engagement*). Moreover, the project also targeted students and researchers, introducing the Education for Sustainable Development framework (UNESCO, 2015) to support the launch of new programmes and courses aligned with emerging job profiles, such as the Circular Economy Agent and the Social Innovation Manager within the LAC HEIs (the work conducted as part of WP3- *Curricula Update/Upgrade*).

In line with this, three pilot Offices for Sustainable Development and Circular Economy (ODECs, in Spanish *Oficinas de Desarrollo Sustentable y Economía Circular*) were subsequently established within some of the LAC participant institutions, and they are expected to remain active beyond the project's conclusion (the worked developed under WP4- *ODEC Pilot Design*). The ODEC is envisioned as a multidisciplinary hub, providing research activities and advisory support while performing crucial intermediary functions. It offers tangible employment prospects for graduates and early-career researchers, while establishing a lasting interface between universities and local stakeholders. Particularly, SMEs can take advantage of the guidance and services supplied by the office to address the economic and social obstacles that slow down their transition to CE practices. Each ODEC has been structured in line with the specific features of the participating HEIs, as well as the characteristics of their local communities and productive sectors, with the long-term objective of ensuring their durability over time (the work carried out within WP5-*ODEC Pilot Set Up*).

Six experimental Collaborative Local Labs (COLLs) were also launched, one by each LA HEI. They are designed as open and collaborative environments that promote project development and encourage multi-stakeholder engagement through participatory processes involving Quadruple Helix actors (including SMEs, NGOs, universities and local authorities). Their activities aim to address challenges related to CE and sustainability emerging within local communities linked to LAC HEIs, while at the same time stimulating SI (the activities undertaken under WP6 – *COLL Set Up*). These experimental projects include work on textile waste management in both Argentine universities, food-

waste reduction and reforestation initiatives in Chile, and electronic, electrical and general waste management in Paraguay (the work developed under WP7- *COLLs Implementation*).

The commitment of universities to SD was further strengthened through the establishment of six Career Development Centres (CADEC), one in each participating LA HEI, aimed at facilitating meetings and job-matching between students or graduates and companies in relation to CE-related competences and emerging job profiles (the work conducted as part of WP8- *Students Employability and Social Awareness*).

Building on this, the current and final phase of HEADCET concentrates its efforts on a specific group of key actors involved in CE practices: namely, SMEs. The latter are widely recognised as central players within HEIs' networks and in broader sustainable development strategies. In this sense, the current WP9 – *Circular Economy for SMEs* – has been designed to provide HEIs with more consolidated knowledge on CE innovations for LAC SMEs. This objective will be pursued by building a conceptual knowledge base on CE innovation for SMEs and by reinforcing it through an analysis of selected case studies drawn both from the literature and from within the project itself.

The case studies drawn from the literature and from the project are reported in the excel file dataset in the HEADCET webpage (https://www.headcet.eu/private-area/), specifically in the WP9 folder.

These cases enable a close examination of the strengths and opportunities available to SMEs, as well as the barriers they encounter when developing Circular Economy (CE) innovation strategies across the LAC area. The resulting insights are distilled into a set of good practices, which serve as concise guidance notes for the LAC HEIs, but also for the policy actions needed to support the implementation or replicability of successful CE initiatives in SMEs and their networks.

In doing so, the analysis fully aligns with the HEADCET objectives, namely by expanding knowledge on SMEs and CE among LAC HEIs, it contributes to improving the employability of university students and enhancing job matching in the field of sustainable development and circular economy (SOB3); strengthening HEIs' capacity to engage in multi-level governance and partnerships for sustainable strategies (SOB2); and stimulating regional and international networking, cooperation, and the exchange of good practices among HEIs (SOB4). Regarding this latter point, the good practices identified in this handbook not only strengthen the policy sphere and the work carried out by LAC HEIs, but also offer valuable insights for European partners, particularly through the experimentation of reverse innovation processes. These lessons stem from the opportunity to adapt and replicate the good practices gained from Latin American partners within their own local contexts.

To host both a comprehensive discussion of the context and the presentation of the database's cases, this handbook is structured in two parts. The first one proposes the conceptual framework that has

been validated together with the HEADCET partners and the institutional context of CE practices. The second part includes precisely the presentation of the case studies, the emerging good practices, and some concluding remarks.

Part I: Circular Economy and SMEs in Latin America and Beyond

1 The conceptual Framework

1.1 Introduction to Circular Economy (CE)

The concepts of Circular Economy (CE) and Social Innovation (SI), as extensively discussed within WP2—specifically in Deliverable 2.1, *"Strategic Engagement Plan for Circular Economy and Social Innovation"*—have gained growing attention in recent decades as strategic pathways to achieve the broader goal of sustainable development (SD).

Without revisiting the various definitions of these concepts in detail, as a full discussion would fall beyond the scope of this handbook (for further reference, see Deliverable 2.1), it is briefly recalled here that, according to the *Ellen MacArthur Foundation* (2013), CE can be defined as *"an industrial economy that is restorative or regenerative by intention and design"* (EMF, 2013: 14). This idea underpins a productive model in which resource inputs, emissions, and waste are minimised by slowing, closing, and narrowing material and energy cycles and by strengthening strategies of maintenance, reuse, remanufacturing, and recycling that enable the decoupling of economic growth from resource depletion. CE offers a valid alternative to the classical linear model of production of "*take–make–throw away*", in which resources are extracted, turned into products, consumed and finally discarded. In doing so, CE redefines more resilient and inclusive mechanisms of development, with particular attention to ensuring that the benefits extend to society and the environment as a whole (Schröder et al., 2020; Henríquez-Aravena & Martínez-Cerna, 2024).

In particular, social and environmental justice have become equally central to the CE model. Indeed, although the social dimension was initially underemphasised—or at times entirely absent— its value has subsequently been recognised within broader perspectives on sustainable transitions. A social innovation–based approach within the CE model helps ensure a *just transition* (Schröder et al., 2020), mitigating poverty and inequality while fostering human development and supporting more sustainable and resilient societies. In fact, SI promotes innovations driven by social change that remain closely aligned with community needs and characteristics, emerging from participatory, multilevel and multi-actor governance processes—often involving quadruple or quintuple helix models. Within this framework, CE and SI can thus be understood as complementary approaches that primarily address the environmental and social dimensions of sustainability, respectively, while both

contribute to redefining economic models towards more sustainable and inclusive progress (Bellandi et al. 2023; Lehmann, 2024).

In this regard, alongside the contributions of individual citizens and various public actors, the role of businesses is pivotal in structurally promoting and implementing the CE model. Indeed, it has become evident that no transformation aspiring to be lasting and meaningful for society can rely solely on the state; rather, it requires the active participation of businesses and the wider community (Lehmann, 2024). In line with this, the development of innovative business models built around CE strategies proves fundamental for reducing environmental impacts of productive activities while enhancing and promoting social objectives and a more human-centred form of SD (Suchek et al. 2022). Enterprises therefore hold significant potential for advancing specific local models of CE in the LAC region, a region that also has deeply rooted and long-standing different traditions of sufficiency, mutual support and repair, as exemplified by *campesino*s and Indigenous communities (*forthcoming* Bellanca, 2025).

From this perspective, among others, Small and Medium Enterprises (SMEs) emerge as pivotal micro-level actors in developing countries, accounting for 45% of total employment and 33% of national income (GDP) (Pietro-Sandoval et al., 2021). Their centrality makes them crucial organisational settings for promoting and piloting innovative CE experimentations in the LAC region. In turn, the adoption of CE practices strengthens SMEs themselves—by fostering cost savings, innovation, productivity, and resource-efficient management—ultimately contributing to more sustainable local socio-economic development paths in the region.

Nevertheless, the literature on this topic remains limited and insufficiently structured (Cea Valencia et al., 2020; Pietro-Sandoval et al., 2021). For this reason and given the objective of providing a solid knowledge base on the matter, the next section offers a systematised theoretical overview of the potential added value of CE-driven innovations in fostering SME development and reproduction.

1.2 A multidimensional framework

The implementation of CE strategies affects multiple facets of SMEs. These dimensions, beyond the purely economic one, also encompass the socio-cultural, environmental, innovative, and governance spheres of SMEs.

Let us take a closer look at each of them.

1.2.1. The Economic Sphere

The circular economy entails a shift in the business models of SMEs (see Table 1), requiring firms to define or redefine their business strategies in line with the principles of the CE paradigm. In this sense, products and processes are designed to enhance environmental sustainability while

maintaining profitability. In doing so, the CE model generates novel business opportunities, including the launch of differentiated products—typically with higher environmental value added—that can open up new trade possibilities, such as emerging market niches of consumers increasingly inclined towards sustainable consumption (Suchek et al. 2022; Henrìquez et al. 2024, Lehmann, 2024).

From this perspective, CE can also push forward "*product-as-a-service*" models, supporting *servitisation* trends in the manufacture of recycled or reused materials. The shift towards a CE paradigm indeed requires fundamental changes in how businesses and consumers understand and value ownership, as well as the intrinsic — and sometimes hidden — services it embodies. This shift takes place within an increasingly interconnected environment, closely linked to digital technologies and Industry 4.0 model, which — as we will see in Table 4 — enable new forms of services and relationships between SMEs and consumers, as well as between SMEs and their suppliers, all within a greener and more circular paradigm (Schröder et al., 2020, De Propris et Bailey, 2020). In this sense, as will be shown in the second part of the handbook, an illustrative example is provided by the case reported by Valencia and Garzón (2024). The SME analysed bases its sustainability strategy on renting reusable products — that is, offering a service that enables access to the use of a product without transferring its ownership — while also relying on digital technologies and platforms to manage the service and to track, monitor, and report circular performance (Valencia et Garzón, 2024).

Contemporaneously, research on socio-environmental sustainability within SMEs can also support the development of productive organisations whose core business is built around diversified strategies, leveraging the closing and narrowing of material and energy loops that characterise the CE paradigm. This is also closely linked to the potential for designing innovative, durable, and sustainable products, as will be discussed shortly (see Table 1 and 4). When adequately supported, diversification strategies can play a pivotal role in enabling internal economies of scope, thereby becoming an important source of competitive advantage for SMEs across the LAC region. This is precisely the case illustrated, for example, by Silva et al. (2019), as well as in the cases reported by Valencia and Garzón (2024), in which the firms, in order to close CE cycles, reuse industrial scrap within new production lines.

In addition to this, CE initiatives are often connected to SMEs' ability to expand their employment capacity (see Table 1), improving job opportunities also from a qualitative perspective (e.g., better fair-job relations, but also more highly skilled staff who actively participate in production strategies centred on the CE paradigm). This, in turn, generates positive implications for the local community to which such employment opportunities are frequently directed, thereby also increasing local income

prospects (Galatti et Baruque-Ramos, 2022). Illustrative case studies include those reported by Valencia and Garzón (2024) and by Becerra et al. (2020).

***Table 1**: Indicators for CE Innovations in SMEs- Economy Dimension*

Indicators for CE Innovations for SMEs — **Economy Dimension**

General categories	*Specific categories*	*Examples of measures*
Creating value from CE business models	Creating and capturing economic value through loops	Pay level in CE industries.
	Business models oriented to circularity and longevity	SMEs' revenue in eco-industries and CE (% of total regional revenue).
	New green business opportunities (biorefineries, material recovery)	Estimated sales share of recycled/reused products.
	Economic valorisation of abandoned heritage / industrial waste	–
	New markets for CE-related products/services	–
	Financial sustainability via innovative pricing linked to R-strategies	SMEs implementing CE eco-innovation aimed at reducing material input per output unit (%).
	Reduction of production costs through waste minimisation	–
	Reuse / efficient use of natural and recycled resources	% of costs saved from reuse/recycling (e.g. comparison of waste-handling costs pre/post reuse).
Employment	Fair job relations	Number of full-time jobs in CE sectors.
	Income opportunities for local communities	Number of people actively involved.
	New employment generation	–
Investments	Long-term investment horizon	–
	Contribution to collective goods for CE	Local sourcing to reduce transport footprint.
Fiscal and normative issues	Proper use of CE-related taxes and subsidies	–
	Access to CE financial programmes for SMEs	Regional value of green early-stage investments (euro per capita).
	Advocacy for norms/incentives aligned with CE and business stability	–
Value chains and suppliers	Transparency and equity in localised/delocalised value chains	Collaboration with informal recyclers and municipal programmes to track recycled quantities.
	Partnerships and value exchanges among businesses and customers	Identification of suppliers using recycled or renewable materials.

***Source**: Authors' elaboration based on the review of the articles cited in the text.*

Moreover, CE strategies require substantial and long-term investments from SMEs. This, in turn, implies a strong involvement of the private sector, which can be supported by public action not only through dedicated financing instruments (such as specific programmes and public initiatives), but also by fostering new knowledge and awareness of the economic opportunities that the CE can offer to businesses. These include, among others, the potential for increased prestige, enhanced financial

profitability, the restoration of the local environment, and greater long-term sustainability for the company (Schröder et al., 2020; Ostermann et al 2021; Suchek et al. 2022).

A final element of relevance within the economic sphere concerns, as shown in Table 1, the implications of CE models for business ecosystems and value chains. In particular, CE is observed to strengthen both intra- and intersectoral dynamics. This is illustrated, for instance, by the emerging links between the mining and automotive sectors, with the former supplying the latter with lithium for battery production in the context of growing electric-vehicle manufacturing, as reported by Schröder et al. (2020). To enhance systemic innovation, collaboration among diverse local actors is essential, through forms of quadruple and quintuple helix governance — involving, therefore, the participation and support of HEIs and public actors (see also table 4) — as well as along the entire value chain. CE strategies cannot be conceived as initiatives implemented in isolation by SMEs; rather, they must permeate and influence suppliers, creating opportunities to forge and develop new collaborations, and extend to actors operating downstream in the value chain (Bellandi et De Propris, 2021; Henrìquez et al. 2024). As will be shown in the second part of the paper, many case studies identify the co-creation of socio-economic and environmental value through collaborations with a wide range of stakeholders as a key element. By way of illustration, the cases discussed in Silva et al. (2019), Torres-Guevara et al. (2021), Cea Valencia et al. (2020), Valencia and Garzón (2024), and Brenes (2024) can be mentioned here.

1.2.2. The Environmental Sphere

The CE model also reinforces the environmental orientation and dimension of SMEs. As illustrated in Table 2, the CE foundational logic focuses on preventing waste and pollution at the source, extending the lifecycle of products and materials, boosting resource and energy efficiency, and fostering the restoration of natural ecosystems (Rezaie et al., 2025).

Extending the lifecycle of products and materials is grounded in the well-known R-principles: *reduce, reuse, and recycle*. These principles are inherently connected to waste management practices both within and across SMEs. Pursuing such CE strategies generates clear environmental benefits. In this sense, an example is provided in Valencia and Garzón (2024) and examined in the second part of this handbook, which shows how the efficient management of waste through the implementation of reusable products prevented any increase in waste generation in the shopping centres collaborating with the analysed circular enterprise, despite the general trend observed in the country and in the city of Quito (Ecuador). Another case concerns the energy-efficiency recovery from organic waste, as

reported by Cea Valencia et al. (2020), in which one of the cooperatives under analysis provides services for the management and recovery of used cooking oil for biofuel production. Along the same lines is the case reported by Silva et al. (2019), which, in addition to promoting energy efficiency through the replacement of machine parts, the use of low-consumption lamps, and the installation of solar panels, shows how the farms also engage in the production of organic vegetables, limiting the use of pesticides and chemical fertilisers and optimising water use, in order to preserve and enhance natural capital.

***Table 2**: Indicators for CE Innovations in SMEs- Environmental Dimension*

General categories	*Specific categories*	*Examples of measures*
R-principles	Recycle	Recycling process efficiency rate; % of waste reused or recycled.
	Re-use: address the use of a resource once again, giving it a new cycle	Estimate total waste generated monthly and percentage reused or sold for recycling; estimate kg of waste reused or recycled per month / total waste generated.
	Reduce: increase efficiency (minimisation of raw materials)	–
Waste	Waste reduction	Generation of municipal waste per capita.
	Waste for bioenergy	–
	Extend the lifespan of landfills	–
	Waste management	Generation of waste per GDP; use simple records (e.g. Excel or notebook) to register quantities.
Efficiency	Making value of non-virgin resources	Percentage of materials sourced from non-virgin, renewable, regenerative, and/or sustainable sources; % of renewable or recycled materials used; ask suppliers if materials come from recycled or renewable sources.
	Integration of nature-based solutions	Percentage of materials suitable to be recirculated through reuse, redistribution, refurbishment, remanufacture, or recycling.
Energy	Energy efficiency	Record monthly energy bills and production volume; calculate kWh per product or service unit; compare annually and adopt low-cost measures (e.g. LEDs, machine maintenance).
	Energy recovery from organic waste	–
	Valorisation of biomass	–
	Reduction of fossil fuel	–
Preserve and enhance natural capital	Reduction of GHG emissions	GHG emissions reduction (tCO_2e).
	Deforestation and biodiversity reduction	Biodiversity protection measures implemented.
	Soil degradation mitigation	Soil degradation prevention initiatives.
	Extend natural resource lifetime	Average number of product reuse cycles before end-of-life.
	Minimise the extraction of virgin material	–

***Source**: Authors' elaboration based on the review of the articles cited in the text.*

Beyond this, it is also worth noting that, in addition to their environmental value, such green practices are closely connected to organisational and product innovations, thereby intersecting with other

dimensions of firm activity. In this sense, CE-oriented waste practices can stimulate product innovation, for instance through *upcycling* processes (see Table 4), as well as the adoption of diversification strategies within innovative CE business models and broader business networks discussed earlier (see Table 1). From this perspective, illustrative examples can subsequently be found in the case studies of Silva et al. (2019) and Schneider et al. (2024). These strategies not only reinforce environmental performance but also support economic profitability and overall business performance.

1.2.3. The Social Sphere

As aforementioned, the CE model also intersects with the socio-cultural dimension (see Table 3). A SI-based approach to CE enhances the involvement of diverse stakeholders — from local communities, which ultimately benefit from reduced inequalities and the creation of more resilient and inclusive societies to different business partners and research institutes (see also Table 1 and 4). These forms of multistakeholder collaboration make it possible to valorise the co-created value at the local level and to redistribute it among the various participants. As will be seen in the case studies in the second part of the handbook, the strengthening of business networks among firms around CE strategies helps support more robust and resilient ecosystems, with significant positive local socio-economic and environmental spillovers (see, for example, the case presented by Silva et al., 2019 or by Brenes, 2024). Similar conclusions can be drawn for interventions by public agencies or institutions — such as HEIs — which, within a multi-actor governance perspective, can pursue comparable outcomes (see, for instance, the cases discussed in Becerra et al., 2020, and Torres-Guevara et al., 2021, as well as Table 4).

Contemporary, CE practices also intersect with a cultural dimension. At the societal level, they can encourage shifts in behaviour towards more sustainable consumption practices and everyday routines; at the firm level, they can foster changes in corporate culture, steering firms towards environmental sustainability paradigms (see, for example, the case study proposed by Silva et al., 2019 and by Torres-Guevara et al., 2021).

Moreover, CE practices contribute to building safe working environments, for instance by improving hygiene and sanitary conditions (see, for example, the case studies of Valencia and Garzón, 2024 or Muñoz, 2024 discussed in the second part of the handbook), and by ensuring equal and fair opportunities for all social groups, especially those most disadvantaged (see, for instance, the case study on the informal sector of waste pickers discussed in Becerra et al., 2020).

***Table 3**: Indicators for CE Innovations in SMEs- Social Dimension*

Indicators for CE Innovations for SMEs — **Social Dimension**

General categories	*Specific categories*	*Examples of measures*
Stakeholder involvement	Community involvement and customer relationships based on trust and mutual benefit	CE education offerings of universities.
	Involvement of different stakeholders and universities (research and innovation)	–
Training and education	Qualification / requalification of workers to develop new CE skills; professional training on CE practices	Number of CE courses or research projects; educational background of workers in CE industries; workers trained in circular practices; % of employees who received CE-related training.
	Educational policies for suppliers in non-compliance with auditing/certifications and standards	–
	Encouraging behavioural change towards sustainable consumption through education	–
	Including informal recycling sectors and empowering waste collectors through training	–
Safe working environment	Prevention of child labour	–
	Prevention of contemporary slave labour	–
	Workplace safety controls	–
	Workers' health care	–
Diversity and equal opportunities	Employment of people regardless of personal beliefs	–
	Ensuring equal pay for men, women, migrants, ethnic minorities, socially vulnerable groups, and people with disabilities	% of women or vulnerable groups employed.

***Source**: Authors' elaboration based on the review of the articles cited in the text.*

1.2.4. The Innovation and Governance spheres

Let us now discuss the dimensions of innovation and governance driven by the implementation of CE practices within SMEs.

As highlighted in the discussion above, CE practices — particularly those aimed at extending the lifespan of materials and thus enabling their recycling and reuse, even across different production lines — lead to design innovations in recycled products (see Table 4). The literature provides clear examples of these dynamics, such as the reuse of organic waste for animal feed (see the case reported by Valencia and Garzón, 2024), or the design of garments made from recycled post-consumer textile fibres and produced without any residues (see Ostermann et al., 2021).

At the same time, such practices are underpinned by — and also support — the adoption of innovative digital technologies linked to the Industry 4.0 model. Although environmental sustainability cannot be conceived solely through technological advancement, new digital technologies nonetheless represent an essential tool for supporting CE strategies within SMEs (De Propris et Bailey, 2020; Becerra et al. 2020). Digital technologies — including 3D printing, artificial intelligence, the Internet of Things, cloud computing, and augmented and virtual reality — constitute not only a source of economic efficiency and profitability but also key drivers of greater environmental sustainability for SMEs. In particular, these technologies enable the implementation of productive models that maximise product recycling, minimise waste, and reduce energy consumption through smart energy solutions (Schröder et al., 2020). An example in this sense is provided by 3D printing and scanning technologies, which constitute additive manufacturing — that is, a way of producing goods by adding material rather than subtracting it, thereby eliminating waste (Brynjolfsson et McAfee, 2014; Lehmann, 2024). In this sense, the interdependencies between circular practices and technological and digital innovation become particularly relevant.

From this perspective, as will be shown in the second part of the handbook, various case studies identified in the literature leverage digital technologies and foster innovation. As initially discussed in Valencia and Garzón (2024), for example, the circular SME relies on digital technologies — through crucial partnerships with specific start-ups — to implement and enhance the efficiency of its diversified CE business model. Another illustrative case is presented by Brenes (2024), where a digital circular enterprise leverages blockchain technologies to ensure waste traceability and uses digital tools to provide intermediation services among different actors.

Beyond this, as highlighted above, the implementation of CE practices involves collaboration between SMEs and a variety of stakeholders. These collaborations may take place Business-to-Business, but can also extend to different types of actors, including institutional bodies, such HEIs, civil society organisations, associations and other enterprises. Achieving specific performance outcomes through a CE model requires — and simultaneously supports — the creation of multi-actor networks. Indeed, as already emphasised, enterprises do not operate in isolation. Clear signals therefore emerge pointing towards the development of multilevel governance models aligned with quadruple- and quintuple-helix initiatives. When implemented with open and constructive leadership — at times assumed by universities themselves — such initiatives enable the design of projects tailored to local characteristics and needs, thereby supporting social and environmental progress and innovation (Bellandi et De Propris, 2021; Donati et al. 2023). Many of the case studies identified in the scientific literature and presented in the second part of the handbook reveal either well-defined or

still embryonic multilevel and multi-actor collaborations underpinning CE productive models (see, for instance, EMF 2017; Silva et al. 2019; Torres-Guevara et al. 2021; Schneider et al. 2024).

***Table 4**: Indicators for CE Innovations in SMEs- Innovation and Governance Dimensions*

Indicators for CE Innovations for SMEs — **Innovation Dimension**		
General categories	*Specific categories*	*Examples of measures*
Technologies	Innovative biorefineries (sustainable business)	Urban agency for re-use.
	Adoption or development of new technologies related to CE	Use of, for example: anaerobic digestion and biogas technologies; Industry 4.0 technologies for CE; Refuse-Derived Fuel (RDF) technologies; Building Information Modelling (BIM); biomass; renewable energy for hydrogen; innovative recycling; technologies improving energy efficiency; new or adapted technologies adopted.
Design	Product longevity	Reusability Index (RI) as an assessment tool.
	Circular product design and production (recycling packaging)	Average product lifespan extension (years).
	New sustainable materials from biomass	Circular material use rate.
	Expanding product lifespan and its parts	–

Indicators for CE Innovations for SMEs — **Governance Dimension**		
General categories	*Specific categories*	*Examples of measures*
Multi-level governance models	Collaboration of SMEs with stakeholders (public, private, civic, research)	Number of CE projects implemented jointly; participation in CE networks or associations; number of CE-related forums or public–private networks joined.
	Participation of SMEs in sector-specific CE policies and initiatives	Development of new laws discouraging linear models (e.g. resource tax, circular public procurement, materials passport).
	Empowering the informal sector	Adoption and enforcement of water-resource regulations.

***Source**: Authors' elaboration based on the review of the articles cited in the text.*

1.2.5. A set of indicators for CE Innovations in SMEs

The discussion provided so far has made it possible to systematically identify a set of elements linked to CE practices that constitute added value for SMEs choosing to implement such circular initiatives. Clear systematic connections emerge among these elements, outlining a multidimensional and intrinsically interconnected framework.

The result of this knowledge base (summarised in Tables 1 to 4) also provides a solid analytical framework for assessing the implementation of CE within SMEs. The elements constituting this framework can in fact be interpreted as a set of indicators for CE innovation in SMEs in the LAC region and may also be used as objects of study and evaluation by HEIs engaged in such practices.

In line with this, the validity of the framework was assessed by the HEIs involved in the HEADCET WP9 through discussions held during two online meetings.

The meetings were organized the 15th and 16th of October 2025 by the University of Florence with the support of CEI and PIN (the other two strategic partners supporting the project), and attended by Universidad Nacional de Quilmes (UNQ), Pontificia Universidad Católica de Chile (PUC), Universidad San Carlos (USC), Universidad Nacional de Cuyo (UNCUYO), Universidad Andres Bello (UNAB), and Universidad Nacional de Itapúa (UNI).

During the meetings, HEI teams were asked to validate the framework and provide suggestions for improvement. All teams expressed general agreement on the structure and contents of the framework. Importantly, participants emphasized that CE should be understood in a broad sense, extending beyond environmental considerations to encompass life cycle assessment impacts, economic sustainability, employment and social equity, as well as governance and network issues. This holistic perspective aligns with the multi-dimensional structure of the proposed framework, which addresses environmental, economic, social, innovation, and governance indicators.

Furthermore, given the evolving nature of the CE model, it is important to recognise that the multidimensional framework presented here should be understood as an open work-in-progress — one that is subject to future refinements and adaptations — rather than a definitive tool. Nevertheless, its contribution is noteworthy, as it provides a valuable basis for measuring and evaluating circularity processes within local SMEs using clear and precise metrics, an aspect that remains a major challenge and continues to hinder both the implementation and the effective support by specific agencies (e.g. HEIs or local governments) of sustainable practices themselves (Victoriano et al., 2024).

1.2.6. Barriers to CE innovation for SMEs

The implementation of CE practices by SMEs, and thus their potential to support greener socio-economic development and innovation, can be hindered or slowed down by several factors. To conclude this comprehensive framework, we therefore examined a set of possible obstacles, that is, the main barriers to CE innovation for SMEs. Some of these barriers, illustrated in Table 5 and recognised in the scientific literature, can likewise be presented from the multidimensional perspective that characterises the CE model (Silva et al. 2019; Bellandi et De Propris, 2021; Galatti et Baruque-Ramos, 2022; Henrìquez et al. 2024, Bellandi et Stark, 2025).

In this sense, economic barriers remain central: high upfront costs for implementing recycling processes, weak financial mechanisms, resistance from industry to eco-friendly practices, and the lack of stable market and consumer demand for circular products all undermine the economic viability and scalability of CE business models. At the organisational level, limited environmental awareness,

high training costs, weak cooperation among stakeholders and low transparency along value chains reduce SMEs' internal capacity to redesign processes and adopt circular strategies.

Technological and infrastructural constraints — such as poor access to appropriate technologies, high investment costs and a lack of data and indicators to monitor performance — further hinder experimentation and learning.

***Table 5**: Main barriers to CE innovation for SMEs*

Dimension	Main barriers
Economic	• High costs of recycling processes. • Difficulties in scaling CE models. • Hard to measure CE financial benefits. • Scarcity of skilled CE workforce. • Lack of instruments to promote waste recovery • Industry resistance to eco-friendly practices due to costs. • Weak market/consumer demand related to CE economy. • Weak financial mechanisms. • Low wages and intense labour flexibilisation.
Organisational	• Limited environmental awareness. • High training costs. • Weak stakeholder cooperation. • Easy access to informal sector. • Low transparency in value chain.
Technological	• Poor access/cost of CE technologies. • Inadequate infrastructures. • Lack of data and performance indicators.
Governance	• Lack of supportive policies. • Weak regulation aligned with CE and workers' rights. • Insufficient governmental incentives. • Legal shortcomings, human rights violations.
Environmental	• Deforestation, energy supply issues. • High waste generation, low recycling. • Limited pollution monitoring. • Contamination from informal recycling sector.

***Source**: Authors' elaboration based on the review of the articles cited in the text.*

Governance- and legal-related barriers, including insufficient supportive policies, inadequate regulation aligned with CE and workers' rights, limited incentives and even human rights violations, weaken the institutional environment needed to sustain circular transitions.

Finally, environmental conditions such as unreliable energy supply, high waste generation and poor control of pollution and hazardous waste management create an adverse context in which SMEs struggle to develop and consolidate circular practices.

2. The Institutional Framework of CE in LAC

As discussed above, the ability of SMEs to implement effective CE strategies depends also on the existence of an updated policy framework tailored to local needs, supported by specific public agencies operating within broader multi-actor and multi-level governance arrangements. The absence of such conditions, or the presence of organisations insufficiently aligned with local requirements, may indeed constitute significant barriers to the realisation of CE practices. An adequate set of public initiatives and dedicated agencies is indeed an effective lever for encouraging firms — as well as citizens — to adopt circular practices and become drivers of ecological transformation (Losa, 2025). In this regard, this chapter provides a concise overview of Circular Economy policies and institutional frameworks in the European Union and, subsequently, in the LAC region. By outlining the current state of the art in terms of existing policies and institutional actors, the final part of the handbook will be able to present a coherent set of good practices to support CE strategies for SMEs in LAC—both for policymakers and HEIs—ensuring that these recommendations are fully aligned with the existing institutional landscape.

Building on this premise, the review of key European initiatives offers useful insights into potential CE strategies, which may be adapted to the specific conditions of the LAC context. Likewise, examining the CE policy framework in LAC helps clarify the institutional environment in which the case studies—addressed in the second part of the work—are embedded, and makes it possible to identify the areas that would benefit from reinforcement or integration in light of the evidence emerging from the study itself.

2.1 A brief overview of CE policies in EU

The European Union stands as a frontrunner in environmental sustainability and circular economy initiatives. In line with a broader vision of sustainable development, the European Commission has followed a long-standing trajectory of policy initiatives aimed at reducing pressure on natural resources, halting biodiversity loss, achieving climate neutrality by 2050, and building a more resilient, circular and competitive Europe.

In this sense, one of the most important and recent outputs in the field of circularity is the *New Circular Economy Action Plan* launched in 2020 (European Commission, 2020), which builds on an earlier version introduced in 2015 (European Commission, 2015). It constitutes one of the key pillars of the European Green Deal (2019)- Europe's overarching agenda for sustainable growth- and sets out an ambitious package designed to accelerate the transition towards a Circular Economy,

strengthen competitiveness, create jobs, and foster sustainable growth in Europe. In this regard, the Action Plan outlines a comprehensive set of measures covering the entire product life cycle — from sustainable product design, to waste prevention, to keeping materials circulating in the EU economy for as long as possible. It also introduces a mix of regulatory and non-regulatory instruments, focusing on domains where coordinated EU-level action can deliver substantial added value (European Commission, 2025a).

Although it plays a central role in supporting the implementation of a Circular Economy model in Europe, the CE Action Plan is embedded within a broader and increasingly detailed green policy framework shaped by various proposals and directives of the European Commission (Losa, 2025). This broader framework reinforces and complements the CE Action Plan effectiveness, while underscoring both the cross-cutting nature and the breadth of environmental and circular-economy issues.

In particular, this refers both to sector-specific interventions related to well-defined product value chains — among which we recall the new Packaging and Packaging Waste Regulation (PPWR), which entered into force in February 2025, the Battery Regulation (European Parliament, 2023), the End-of-Life Vehicles Directive (European Parliament, 2000, with a new proposal issued in 2023), and the EU Strategy for Sustainable and Circular Textiles adopted in 2022 (European Commission, 2025a) — as well as to a number of cross-sectoral initiatives.

These initiatives aim at aligning with the basic principles underpinning the circular model (Losa, 2025). In particular, one of the cornerstones of the European Commission's CE approach is the Ecodesign for Sustainable Products Regulation (ESPR), which entered into force in July 2024. This Regulation aims to promote increasingly sustainable product design, placing particular emphasis on reuse and repair — two key elements of the circular model. This approach is then complemented by an additional policy tool regulating productive activities and their responsibilities, namely Extended Producer Responsibility (EPR). EPR schemes indeed make producers financially and/or organisationally responsible for the entire lifecycle of their products, especially end-of-life management such as collection, sorting, and recycling. This initiative— developed within the Waste Framework Directive (2008/98/EC, currently under revision) — seeks to boost recycling, reduce waste, and incentivise eco-design. It applies across a wide range of sectors and is further reinforced by specific policies aimed at managing and reducing the use of hazardous substances (Losa, 2025). Along these lines, the 2006 Directive on the Registration, Evaluation, Authorisation and restriction of chemicals is also recalled (European Parliament, 2006).

From a broader perspective, the European Commission has also acted in the areas of consumer rights, awareness, and stakeholder cooperation. In this sense, we briefly recall the recent Directive empowering consumers for the green transition (European Parliament, 2024a), which ensures that consumers are provided with clearer information at the point of sale regarding the durability and reparability of goods and their legal guaranteed rights; the Directive on the repair of goods, which legally establishes a right to repair for consumers and supports more virtuous repair and reuse processes (European Parliament, 2024b); and the Digital Product Passport (DPP), part of the ESPR, introduced as an instrument to provide information on a product's origin, durability, composition, and potential for reuse, repair, dismantling, and end-of-life management (Losa, 2025).

Moreover, a further initiative currently under development is the forthcoming Green Claims Regulation, designed to prevent companies from making misleading environmental claims about their products and services (European Commission, 2025b). This initiative fits within a wider framework of already existing green labels and schemes, namely the EU Ecolabel (European Commission, 2025c) and the Eco-Management and Audit Scheme (EMAS) (European Commission, 2025d). These instruments serve, on the one hand, to improve the environmental performance of companies by increasing the visibility of greener products and, on the other, to support more informed consumer choices towards sustainability.

This brief overview of selected European CE legislation suggests that regulating environmental issues and circular-economy models in practice requires the establishment of a complex and integrated framework of green interventions. Such a framework must not only address specific economic and sectoral domains but also be supported by complementary and cross-cutting measures that extend across multiple social and environmental spheres. However, it is important to recall that, despite these developments, some of the directives mentioned above—particularly the more recent ones, such as the Directive empowering consumers for the green transition and the Directive on the repair of goods—have not yet been transposed into the national legislation of all Member States and therefore are not fully applicable across local contexts.

2.2 A general framework for CE policies and institutions in LAC

The growing interest in, and relevance of, adopting a circular development model has also led the LAC region to begin outlining a general CE framework. This emerging framework is being shaped by various initiatives pursued at both the regional and supra-regional level, as well as by the

engagement of international institutions and national environmental ministries, which collectively support and reinforce the transition process.

2.2.1 CE policies and initiatives in LAC

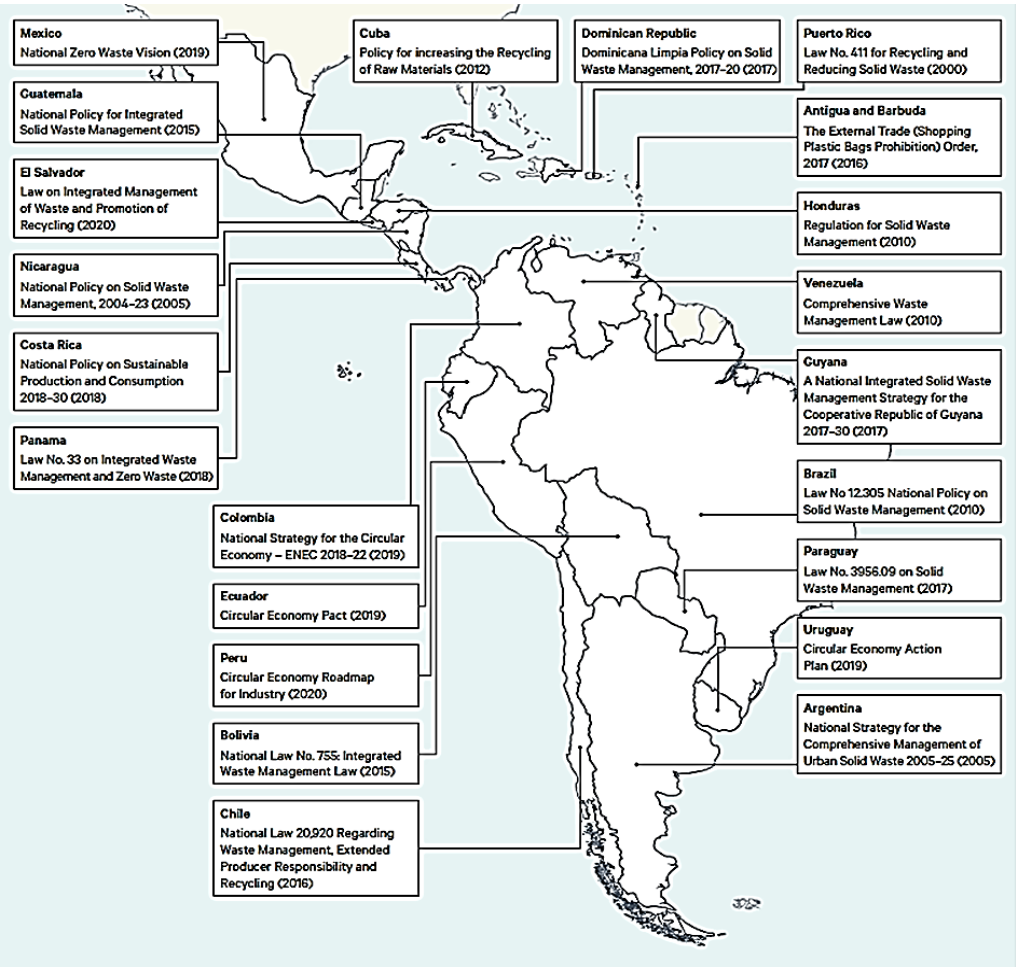
Starting from policies, interest in the Circular Economy has grown significantly in the LAC region, culminating in the launch of the Circular Economy Coalition for Latin America and the Caribbean in 2021 (Rezaie et al, 2025). This represents an innovative initiative aimed at promoting CE, supporting the area in advancing and investing in the circular transition, and fostering more resilient and sustainable socio-economic development. In pursuing these objectives, the Coalition serves as a platform for exchanging best practices and facilitating South–South and North–South cooperation through a collaborative approach involving governments, businesses and civil society. It also provides science-based evidence on the opportunities and co-benefits associated with circular economy approaches. Among its specific goals are reducing resource extraction, safeguarding biodiversity and natural assets, minimising pollution, preventing the deepening of social inequalities, and improving people's health and well-being. Overall, the initiative seeks to foster long-term cooperation among LAC countries on CE-related themes and to promote more systematic and integrated interventions across the region (UNEP et EMF, 2022).

Complementing this effort, several national initiatives have been implemented so far, a selected subset of which is depicted in Figure 1. In particular, various *national CE roadmaps* aimed at promoting circularity have been adopted by several governments, including Colombia, Chile, Ecuador, Peru and Uruguay. All LAC countries have also introduced *waste-management legislation* within their national boundaries, while *Extended Producer Responsibility (EPR)* schemes have so far been launched in Brazil, Colombia, Chile, Costa Rica, Honduras, Mexico, Peru and Uruguay. Of the 33 LAC countries, 18 have introduced regulations on plastics aimed at reducing the use of plastic packaging and promoting its reuse. In addition, several tax-exemption initiatives have been implemented, such as those adopted in Uruguay in 2003 for machinery and facilities intended for lead-acid battery recovery and recycling, in Antigua and Barbuda in 2016 for the import of reusable bags, and, one year later, in Peru through similar fiscal incentives. Moreover, to drastically reduce the use of single-use plastics, Costa Rica has banned the import, marketing and distribution of polystyrene containers by 2021 (Schröder et al., 2020).

Among these countries, Colombia, Chile and Uruguay stand out as frontrunners in CE initiatives within the LAC region (Schröder et al., 2020). Colombia has progressively consolidated its leadership through an early national policy on sustainable production and consumption (2010), the inclusion of

green-growth components in its 2014–2018 national development plan, and the adoption of one of the region's first EPR schemes, introduced in its 2005 hazardous-waste management decree. This trajectory culminated in the launch of the National Circular Economy Strategy (ENEC) in 2018, together with targeted initiatives for agro-industrial development. Chile has similarly positioned itself at the forefront through the 2016 Framework Law on Waste Management and Extended Producer Responsibility, complemented by sector-specific programmes such as Construye (2025) for seeking sustainability in the construction industry and by the National Action Plan on Sustainable Consumption and Production (2017–2022), and the Chilean Plastics Pact launched in 2019. Uruguay stands out for its strong institutional commitment, exemplified by the National System for Productive Transformation and Competitiveness (Transforma Uruguay), the National Circular Economy Action Plan implemented through projects such as Biovalor, and ongoing efforts to develop a national bioeconomy strategy and a sectoral roadmap for forestry. Since 2014, the country has also been recognised by international organisations as a regional leader in green energy (Schröder et al., 2020).

***Figure 1**: Summary of key circular economy policy measures*



***Source**:* Schröder et al., 2020.

2.2.2. CE international institutions in LAC

Beyond CE policies and interventions from national institutions, it is also worth noting the set of international agencies that work on, or provide support for, CE issues and the transition in LAC. In view of their breadth, we present here only a selected number of them.

At the forefront, as the strategic international partner and coordinator of the Latin America and Caribbean Circular Economy Coalition (2021), stands the United Nations Environment Programme (UNEP). UNEP is engaged on several fronts to support healthier ecosystems in LAC and to build more resilient livelihoods. It is also in continuous dialogue with the various Ministers of Environment of Latin America and the Caribbean, coordinating and supporting — most recently — a new meeting of the Forum of Ministers of Environment of LAC (30 September–2 October 2025).

The action of the United Nations also unfolds through the United Nations Industrial Development Organization (UNIDO), another key partner of the CE Coalition launched in 2021. UNIDO supports Latin America and the Caribbean in advancing inclusive and sustainable industrial development that strengthens competitiveness and underpins a just transition. The organisation works with governments and regional partners to enhance industrial competitiveness, promote circular economy approaches and expand renewable-energy solutions, while fostering sustainable industries and strengthening agribusiness and manufacturing value chains. Through its field presence — comprising three subregional offices and four country offices, as well as the Global SIDS Hub for the Caribbean — UNIDO coordinates technical cooperation, supports digital transformation, advances industrial decarbonisation and scales circular production models that protect ecosystems and communities. Overall, through targeted support and regional partnerships, UNIDO contributes to resilient and diversified industrial development and to greater economic and climate resilience across the region.

Following this, the Ellen MacArthur Foundation — in addition to being a pioneering organisation in the field of circular economy — is also an active actor in the LAC region. Through strategic partnerships, including its involvement in the 2021 CE LAC Coalition, it supports various countries in fostering the transition towards circular models, as exemplified by Brazil's first National Circular Economy Strategy.

Further strategic partners of the 2021 CE LAC Coalition include the Climate Technology Centre and Network (CTCN) of the United Nations; the Konrad Adenauer Foundation (KAS), which is engaged in addressing local political and social challenges, including environmental issues; the Platform for Accelerating the Circular Economy (PACE), a neutral public–private collaboration platform that brings together global changemakers and their organisations to accelerate the transition towards a circular economy; and the World Economic Forum (WEF).

In addition to these, there are other international and supranational institutions that over time have funded, and continue to fund, initiatives centred around CE projects. Among these, we highlight (Schröder et al., 2020):

- The World Bank, whose CE-related activities in the LAC region primarily involve supporting waste-management programmes in countries such as Argentina, Brazil and Colombia. In 2018, the World Bank also launched the "Wastewater: From Waste to Resource" initiative, aimed at raising awareness among decision-makers about the potential of wastewater as a resource and at introducing circular-economy principles into wastewater management—ultimately fostering a paradigm shift in the sanitation sector, in which the value proposition of wastewater under a circular-economy approach is fully recognised.
- The Inter-American Development Bank (IADB), the leading source of long-term financing for economic, social and institutional projects in the LAC region, has also played a relevant role in supporting circular-economy initiatives. Through its Multilateral Investment Fund and other financing instruments, the IADB has provided support for a wide range of CE-related projects in Brazil, Chile and Uruguay, as well as across the Caribbean.
- The Global Environment Facility (GEF), which is committed to reducing marine plastics and plastic pollution in the Latin America and Caribbean region by facilitating circular actions at the city level to accelerate the transition towards a circular economy. Its initiatives align with government and business commitments to tackling marine plastics, with concrete interventions implemented, for example, in Guyana, Peru and Uruguay.

This highlights the presence of numerous international institutions and organisations involved in circular-economy projects across Latin America and the Caribbean. The overview presented here is not exhaustive but rather illustrative of the main international actors currently engaged in the region. Additional organisations — such as the KfW Development Bank, or TechSoup — likewise contribute to supporting and promoting the circular transition in the region.

Part II: Selected Case Studies on Circular Economy for SMEs in LAC

3. Dataset on CE in SMEs

We now turn to the empirical part of the handbook. This second section is devoted to the presentation of an innovative dataset constructed from a selection of case studies of SMEs operating in the LAC region that apply CE initiatives. To ensure a sample that is both heterogeneous and representative of the existing landscape (in terms of geography, sectors, business models and CE initiatives), two different sources and methodologies were employed in building this dataset — namely, a review of the literature and the selection and identification of case studies within the HEADCET project, as will be discussed in the following two sections. The case studies will be presented using the same structure in both the sections, namely: 1. References and sources; 2. Basic information; 3. Description of SMEs; 4. Circular economy strategy applied; 5. Co-creation innovation and partnership; 6. Outcomes and impacts; 7. Challenges and barriers; 8. Drivers and enablers; 9. Lessons learned/policy suggestions.

3.1 Database of Selected Cases from the literature review

We begin by presenting the cases identified through a review of the existing literature. Specifically, a screening was conducted across three distinct databases (Scopus, One Search UNIFI and Google Scholar) using the following keywords: “Circular Economy”, “Latin America”, “Small and Medium Enterprises”, “Case Studies”, and “Social Innovation”, with no temporal restrictions. Starting from an initial screening of the abstracts, the contributions classified as relevant were subsequently examined in depth. Their relevance was determined by their capacity to provide information on case studies of SMEs in the LAC region that had implemented—successfully or not—specific environmental and socio-economic sustainability practices falling under the broader umbrella of the circular economy.

Moreover, to ensure the broadest possible coverage, we also kept open the possibility of including cases that, although not directly identified through the literature screening, were suggested by project partners. For these cases, it was not possible to administer any questionnaire; however, the information available on their official websites was considered sufficiently relevant to cover the elements under investigation. This is the case study L15, which is presented below.

In this way, a total of 15 case studies were identified. We now proceed to present them following a thematic representation of circular-economy dimensions, in line with the conceptual framework outlined above. As one might expect, many of these cases display more than one CE-related dimension. However, for the purpose of this analysis, each case has been classified according to its most preponderant CE feature. The case studies are now presented for each thematic area of the circular-economy dimensions, with the designation **Lx**.

3.1.1. CE business model, innovation and value chains

Case Study L1

1. **Reference and Sources:** Valencia, M., Garzón, A. (2024). Huella Verde: reusar es más circular. In Henríquez-Aravena, A. y Martínez-Cerna, L. (2024). América Latina Circular: avanzando hacia el desarrollo sostenible, CircularTec, CIEC, CORFO.
2. **Basic Information**
    a. **Country**: Equador (Quito)
    b. **Sector**: Services related to the food service sector
    c. **Date of implementation:** since 2018 (year of establishment). The first implementation took place at Paseo San Francisco (PSF), a shopping centre that also hosts part of the facilities of the Universidad San Francisco de Quito, in the parish of Cumbayá.
    d. **Status:** ongoing
3. **Description of SMEs**
    a. **Type of Enterprise:** SME.
    b. **Core business activity:** services for restaurants and catering/food service businesses.
    c. **Main products/services:** Rental service of reusable dishware at a cost comparable to what food service providers typically pay to purchase disposable items, combined with an industrial washing service. Over time, the service portfolio has expanded to include:
        i. Organic waste management for conversion into animal feed;
        ii. collection and rental service of reusable containers for supermarkets;
        iii. rental service of reusable dishware for home delivery systems.
4. **CE strategy applied:** The initiative is based on a reusable product rental model applied to the food service sector in shopping centres, large-scale retail, and, more recently, private consumers. The approach is grounded in *servitisation*, which refers to promoting access to the use of a product without transferring its ownership. Specifically, the initiative replaces

disposable tableware with reusable tableware in food courts, offering a full service that includes provision, logistics, collection and industrial washing. The initiative also integrates activities of process and design innovation, through customised collection and washing stations designed to maximise operational efficiency within each specific costumer. These tailor-made units for waste pick up improve material flows and hygiene conditions and enable enhanced waste management, including up-cycling of organic waste toward alternative uses (e.g., animal feed). Over time, the initiative has developed circular economy innovations both through business model diversification—expanding into tailored services for supermarkets and home-delivery systems—and through digital innovation, by developing software applications for tracking, monitoring, and reporting circular performance.

5. **Co-creation innovation and partnership:** The CE business activity has progressively developed collaborations with other local organisations in order to raise consumer awareness about reusable products and alternatives to single-use items, demonstrating the positive impact of reuse through initiatives such as Reusa.ec. At the same time, technological innovation has also advanced thanks to collaborations with start-ups, through which it was possible to develop a reporting system for the management of reusable tableware and waste in each shopping centre. The application generates daily reports, enabling greater transparency and accountability, as well as providing the basis for conducting impact assessments. Moreover, the expansion and diversification of the business towards supermarkets led the firm to establish strategic partnerships, in order to use other facilities dedicated to the collection of recyclable materials, thereby increasing the capacity to receive returnable containers and optimising space and human resources. In parallel, the service targeting private consumers is based on the use of reusable delivery containers, developed in collaboration with another company, which will also provide its software platform as operational support.
6. **Outcomes and Impacts:** Environmental benefits include a reduction in the waste generated by the shopping centre and a more efficient system for managing organic waste, which is redirected towards alternative uses. The lifespan of products used in food service operations is extended through reuse, while water consumption decreases thanks to an efficient industrial washing system. The initiative also contributes to lower greenhouse gas emissions.

   Socio-cultural benefits emerge through increased consumer awareness and the strengthened green reputation and credibility of shopping centres. Hygiene and sanitary conditions in waste-handling areas have improved, with positive implications for the health and well-being

of workers and shopping-centre staff. For food service workers, the initiative has reduced the workload associated with inventory management and improved service delivery thanks to higher-performance tableware. The enhanced presentation of dishes has also increased their appeal on social media, generating viral communication across local and national media and attracting more customers. Economic benefits include the expansion of business lines, with growth in its activities and presence across different markets. For its environmental commitment, the company was certified as a B Corporation in 2020 and recognised in 2022 as the best circular practice among small and medium-sized enterprises in Ecuador. Governance-related impacts were also observed: municipalities reduced the volume of waste requiring disposal, thereby extending the lifespan of landfill sites and reducing public expenditure.

7. **Challenges and Barriers:**
   - Economic and organisational barriers: Convincing and securing the buy-in from international food-service chains. In addition, each shopping centre operates under its own internal rules and decision-making systems, requiring bespoke and tailored negotiations and contractual arrangements with each of them.
   - Institutional barriers: Although national legislation required full transparency of the costs associated with single-use plastic products — thereby increasing consumer awareness and improving the competitive position of the reusable offer — the enforcement of the law has not yet produced tangible results, even three years after its approval.
   - Knowledge barriers: Final consumers often lack the skills, knowledge, or awareness needed to distinguish between the environmental and health benefits of reusable products versus single-use plastics, reducing willingness to adopt or demand reusable solutions.
   - Technical-institutional barriers: Biopolymer or biodegradable alternatives are insufficient because the conditions required for their biodegradation are not fulfilled by current municipal waste-management systems in Ecuador. As a consequence, the environmental burden is not eliminated but merely shifted, meaning that material demand is displaced rather than reduced, which does not align with circular-economy principles.
8. **Drivers and Enablers:** Sustainable entrepreneurial mindset of founder, inspired by established return-systems in countries such as Germany.
9. **Lesson learned/Policy suggestions:**
   - Supportive regulatory framework inspired by the firm's experience, such as the Single-Use Plastics Law in Chile (Law 21.368, 2021).

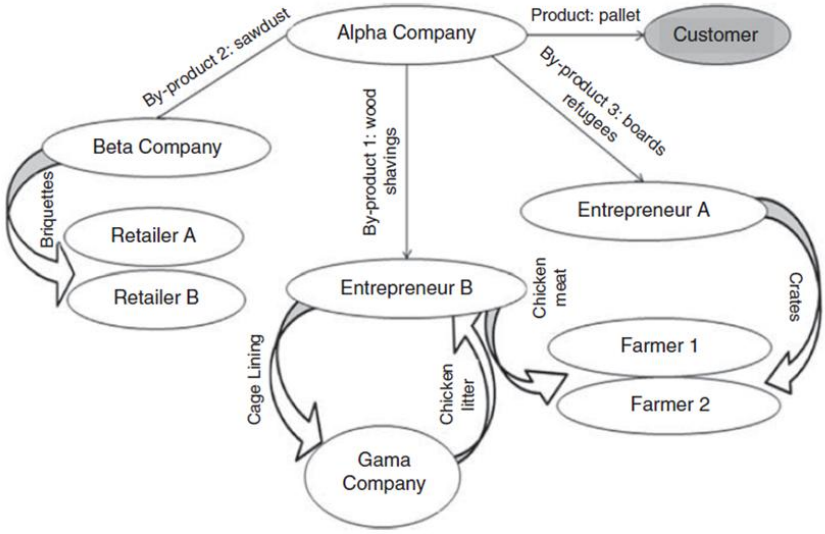
- Innovative circular business model, based on scaling and diversification across CE strategies and market segments.
- Untapped economic opportunity: current revenues do not yet reflect the public savings generated in municipal waste management, nor the real waste-related costs that shopping centres would incur if fees were proportional to actual waste generation. This gap represents a potential financing mechanism to support sustainable waste-management systems and to stimulate further circular innovation by enterprises such as the one under analysis.
- Replicability potential: the case study model under analysis can be adapted and transferred to different contexts and industries where reusable solutions can become the most circular option once products are already on the market.

Case Study L2

1. **Reference and Sources**: Silva, F. C., Shibao, F. Y., Kruglianskas, I., Barbieri, J. C., & Sinisgalli, P. A. A. (2019). Circular economy: analysis of the implementation of practices in the Brazilian network. Revista de Gestão, 26(1), 39-60.
2. **Basic Information:**
    a. **Country:** Brazil
    b. **Sector:** Multiple (involve wood manufacturing, breeding and slaughter of poultry, agriculture, transportation, recycling and food retailing)
    c. **Date of Implementation:** Not found.
    d. **Status:** Not found.
3. **Description of SMEs:**
    a. **Type of Enterprises:** SMEs enterprise, individual entrepreneurs and cooperative of farmers
    b. **Core business activity**: Starting from a company whose core business is centred on pallet manufacturing (Alpha Company in Figure 1), a specific flow involving the transformation of products, by-products and various actors is intercepted along the value chains.
    c. **Main products/services:** The main company produces pellets that are sold directly to final consumers. The process simultaneously generates three other by-products: sawdust, which is supplied to a briquette-producing company; wood shavings, which

are used as chicken litter in a poultry breeding and slaughtering company; and rejected boards used to produce crates for farms, which also intersect with the chicken-meat value chain (see Figure 2).

Figure 2: *Map of the flow of products and by-products among chains*



Source: Silva et al., 2019

4. **CE strategy applie**d: The various actors involved implement different circular-economy strategies depending on their own business model. For example, farms produce organic vegetables while limiting the use of pesticides and chemical fertilisers, and they also optimise water and energy use in line with principles of ecology and sustainability. The Alpha Company, in addition to produce by-product, incorporates the environmental aspects in its training on health and safety at work. At the same time, environmental labelling is not widely used among the players in the network, but pollution prevention actions (e.g. use of biodiesel), under a perspective or cleaner production practices are highlighted among rural producers. This is also reinforced by practice of energy efficiency by the replacement of machine parts, the use of economical lamps or solar energy. All players in this network interconnect them in the flow of the reuse, recycling and/or recovery of Alpha Company's by-products.
5. **Co-creation innovation and partnership:** The players are integrated in a network in which individual entities become engaged in transactions for resource exchanges of materials, energy or by-products at the inter-firm or same level.
6. **Outcomes and Impacts:** The company producing pellets fosters the economy by marketing its by-products rather than processing them. This helps recover investments and reduce losses,

allows optimisation of the production process, and enables one to remain focused on the main product. Moreover, Rural cooperatives act as centres of knowledge diffusion and produce empowerment in ecologically based agriculture.

7. **Challenges and Barriers:** The lack of awareness of society regarding the consequences of current development standards is one of the obstacles to sustainability. Indeed, the pressure of customers is a driver for CE transition. The lack of tax incentives to reuse materials and increase the shelf life of products, as well as the price of some recycled raw materials, which are generally uncompetitive or even more costly than virgin raw materials.
8. **Drivers and Enablers:** Not specified.
9. **Lesson learned/Policy suggestions:** The resistance to change and the short-sightedness observed among stakeholders are considered the main causes of failure. For this reason, CE practices would be more easily implemented if organisations shared the knowledge they acquire. Institutionalization of the CE models with the creation of funds and credit lines for the execution of CE projects and the development of new markets for alternative materials. Measures to improve internal environmental management, such as the continuous evaluation of environmental performance metrics, risk management, the alignment of policy, mission, vision and values with corporate environmental responsibility, the creation of a common platform of knowledge and information, investments in the ongoing training of employees and the dissemination of knowledge to stakeholders.

Case Study L3

1. **Reference and Sources:** Torres-Guevara, L. E., Prieto-Sandoval, V., & Mejia-Villa, A. (2021). Success drivers for implementing circular economy: a case study from the building sector in Colombia. Sustainability, 13(3), 1350.
2. **Basic Information:**
    a. **Country:** Colombia (Cota)
    b. **Sector**: Construction sector
    c. **Date of Implementation:** in 2019 diagnosis of CE opportunities and definition of action plan to implement CE strategies
    d. **Status:** concluded in 2021
3. **Description of SMEs:**
    a. **Type of Enterprises:** Medium enterprise.

b. **Core business activity:** manufacture and installation of steel and aluminium structures for small and large building and infrastructure projects. Its business is based on three specific pillars, which are design, innovation and talent.

c. **Main products/services:** it offers engineering, manufacturing, and assembly services and has modernized computer-aided design and drawing systems. In particular, it allows for different types of analysis (elastic, inelastic, non-linear, static, and dynamic) of all types of structures.

4. **CE strategy applied**

   a. Making use of valuable raw material waste: waste recovery based on sustainable design: designing the products, developing prototypes, defining the product, defining the cost/benefit relationship, feasibility study and business opportunity in the manufacture and sale of by-products, and commercializing the products, and evaluation and feedback based on profitability. Eco-innovation was reflected in reducing the production of raw materials and increasing the degree of efficiency in raw materials.

   b. Availability of sustainable suppliers: develop a "*green procurement handbook*", that is a protocol to buy sustainable products and services, regarding the diversity of supplies and the experience of the company. Sustainable materials have replaced more than ten items.

   c. A green marketing strategy based on updating the web site with information about environmental management and sustainability awards. The firm wrote its first sustainability report to provide information for its stakeholders about its economic, environmental, and social contributions in the sector and the region.

5. **Co-creation innovation and partnership:** It brings together a team of experts dedicated to developing projects for builders, architects, and investors. But the main contribution to the implementation of CE strategies arrived from partnership with researchers (Universidad de La Sabana).

6. **Outcomes and Impacts:**

   a. Economic: CE strategy (a) increases the productivity of the employees and the company and the reduction of costs when manufacturing washers and gears that can be integrated into the main activity. Moreover, generate value using waste and transform it into a product that any market could buy. Some goods produced had been sold as artwork, cheese cutters, local sports courts and garden benches.

b. Environmental: The CE strategy (b) contributes to reducing the generation of polluting, non-biodegradable waste.
c. Socio-cultural: The initiative supports the circular economy by raising staff awareness about resource use and reducing waste disposal. The sustainability report provides information on the companies' intangibles such as the culture and the management philosophy, which satisfies the demand by the stakeholders towards socially environmentally responsible behaviour and creates reputation and trust.

7. **Challenges and Barriers:** general barriers identified in the literature for construction sector the perceived risk in specifying reused materials; cost: reuse could be more expensive; lack of reuse markets and supply chains; time constraints which favour demolition over deconstruction
8. **Drivers and Enablers:** The project and partnership with university, the assessment and definition of action plan. Specifically, five drivers were identified for implementing CE: fertile ecosystem, management commitment, identification of valuable materials, green teams, and CE Intermediaries.
9. **Lesson learned/Policy suggestions:** Importance of fertile ecosystem that is associated with the region, sector, and regulation and policies that may influence and motivate consumers' and suppliers' environmental practices by supporting eliminating significant political CE barriers; The manager commitment is one of the most critical success factors in implementing CE strategies; CE's implementation requires eco-innovation in which public and private intermediaries cooperate

Case Study L4

1. **Reference and Sources**: Brenes, K. C., (2024). Cuando China cerrò la puerta, debimos abrir las ventanas in in Henríquez-Aravena, A. y Martínez-Cerna L. (2024). América latina circular, avanzando hacia el desarrollo sostenible, CircularTec, CIEC, CORFO.
2. **Basic Information:**
    a. **Country:** Costa Rica, Nicaragua, Guatemala, Peru, Colombia, and Argentina; and since 2023 in Honduras and El Salvador.
    b. **Sector:** waste recycle
    c. **Date of Implementation:** 2018
    d. **Status:** ongoing.
3. **Description of SMEs:**

a. **Type of Enterprises:** social enterprise (number of employees not specified)
b. **Core business activity:** Digital platforms that engage a broad network of distinct actors (final consumers, professional and grassroots recyclers, environmentally responsible companies, and industrial transformation units) and promote waste recycling through a system of positive incentives.
c. **Main products/services:** A digital platform that acts as an intermediary between consumers, recyclers, businesses and public institutions, incentivising recycling through a practical, innovative, frugal and sustainable technological and operational system tailored to the Latin American context.

4. **CE strategy applied:** waste management and recycling. Specifically, users receive Ecoins® when they clean, dry and separate recyclable waste and deliver it to an authorised collection centre or to their local municipality. Ecoins® are not money, but a points-based system that can be exchanged for vouchers, discounts or entries into prize draws, offered by partner companies through a membership scheme. Over time, the CE business model has evolved involving also an increasing focus on data generation and traceability through blockchain technology, without abandoning the organisation's core pillars: education, awareness-raising, and incentive creation for all its stakeholders. After an initial downstream strategy, attention has moved upstream, addressing the stage where materials begin their lifecycle and eventually become waste.
5. **Co-creation innovation and partnership**: It represents a circular model based on multisectoral partnerships. It brings together multiple actors, enabling the creation of alliances, synergies and resource mobilisation through win–win relationships. Waste management is approached as an economic opportunity, made possible through the combination of digital communication platforms, social media and active citizen participation. A strategic alliance has been signed with GS1 Costa Rica, a member of GS1 International (present in more than 112 countries), with the aim of introducing innovation, efficiency, visibility and security throughout the entire value chain — from product manufacturing to final consumption — through the use of standard identification systems, such as barcodes.
6. **Outcomes and Impacts:** Strategy based on triple value — environmental, social, and economic benefits — which can accelerate the achievement of the Sustainable Development Goals (SDGs). Efficient waste management has reduced operational and management costs related to recycling activities and enabled the implementation of Extended Producer

Responsibility (EPR) policies, by contributing to a more structured recyclable-waste industry and creating new job opportunities, while also supporting entrepreneurial initiatives. It has improved sanitary and working conditions, reducing the long working hours to which people involved in waste collection and sorting are often exposed. From a social perspective, it has also increased awareness and behavioural change around recycling, targeting ecofans, local governments, and private companies.

7. **Challenges and Barriers:** Not explicitly stated, but identifiable through the weakness of public action and in the scarcity of reliable data. Without data, it is impossible to improve performance, interpret trends, or identify new opportunities.
8. **Drivers and Enablers:** In 2018, China closed its doors to the global import of waste, acting as a driver that pushed countries/organisations to rethink their waste-management system.
9. **Lesson learned/Policy suggestions:** The platform has already been implemented in six different countries — Costa Rica, Nicaragua, Guatemala, Peru, Colombia and Argentina — and, starting in 2023, it is expected to be launched also in Honduras and El Salvador (Replicability). It represents an alternative approach to the traditional recycling systems commonly implemented in many Latin American countries, which are often characterised by low efficiency, high environmental impact, and a lack of long-term strategic vision. The project adopts an anthropocentric and place-based approach, respecting territorial specificities and placing collaboration at its core, thereby representing a valuable reference for circular-economy policy design. Moreover, its flexibility and user-friendly design make the service accessible and close to communities (Alternative Model).

3.1.2. R-Principles, upcycling and energy efficiency

Case Study L5

1. **Reference and Sources:** Ostermann, C. M., Nascimento, L. D. S., Steinbruch, F. K., & Callegaro-de-Menezes, D. (2021). Drivers to implement the circular economy in born-sustainable business models: a case study in the fashion industry. Revista de Gestão, 28(3), 223-240.
2. **Basic Information:**
    a. **Country:** Brazil
    b. **Sector:** Fashion
    c. **Date of Implementation**: 2010

   d. **Status:** Not found

3. **Description of SMEs:**
   a. **Type of Enterprises:** a small company
   b. **Core business activity:** It is a born-sustainable enterprise that uses innovation to combine fashion and sustainability and align environmental, social and economic value within the women's clothing market.
   c. **Main products/services:** clothes
4. **CE strategy applied**: The main sustainability strategies are focused on the circular economy principles: designing out waste and pollution, keeping products and materials in use by reduction, reuse, recycle and regenerating natural systems design. The garments' designs are timeless, seeking the extension of clothing lifetime. The production is without residues by using recycled post-consumer textile fibres and utilizing production wastes as supplies for other pieces, accessories or art pieces (designing out waste and pollution). The use of material residues generates new goods of equal or greater value, usefulness or quality of the original material (reduction, reuse and recycle). The company uses a nontoxic printing technique, which does not require water for the process, and develops new uses of materials (regenerating natural systems design). The company defines itself as an ethical fashion company with a slow fashion philosophy and the processes are designed sustainable from the beginning of the company.
5. **Co-creation innovation and partnership:** The value creation proposition and the alignment of social, economic and environmental values differentiate this from a traditional enterprise.
6. **Outcomes and Impacts:** Given its activity, socioeconomic and environmental benefits are expected, including a contribution to reducing pollution associated with fashion production.
7. **Challenges and Barriers:** The industry's current business model, influenced by the fast fashion model, seems to be a limiting factor and a barrier to the adoption of circular practices.
8. **Drivers and Enablers:** Internal factors as business, organizational, operational and technical available technologies. Importing countries' requirements as external drivers. The network was described as a strategy for exchanging information but without influencing the decision to implement circular practices.
9. **Lesson learned/Policy suggestions:** Beyond the dominant business logic, the activities of small and medium-sized enterprises are typically shaped by the large firms they supply. Implementing circular practices in the fashion industry requires changes in technology and across the entire supply chain to enable smaller-scale, higher-value production. However,

such a shift demands a transformation of the industry's business model and significant changes in production structures and consumption habits. Both the supply chain and consumers still follow linear patterns of production and purchasing. As a result, born-sustainable business models challenge consumers by educating them about product value and conveying environmental and social principles throughout the chain, while also requiring the involvement of other stakeholders due to the nature of circular systems.

Case Study L6

1. **Reference and Sources:** Schneider, F., Aanestad, A & Carvalho, T. C. (2024). Exploring barriers in the transition toward an established e-waste management system in Brazil: a multiple-case study of the formal sector. Environment, Development and Sustainability, 1-21. CASE B
2. **Basic Information:**
    a. **Country:** Brazil (American, São Paulo; Guarulhos, São Paulo; and Manaus, Amazonas)
    b. **Sector:** materials technology and recycling
    c. **Date of Implementation:** 2003
    d. **Status:** Not found
3. **Description of SMEs:**
    a. **Type of Enterprises:** a branch (satellite unit) of a multinational company known for having the largest e-waste recycling capacity worldwide.
    b. **Core business activity:** collection and recycling of e-waste, extraction of precious material
    c. **Main products/services:** service for collecting and upcycling recycled products
4. **CE strategy applied:** electrical and electronic e-waste management. The facility in Americana receives pre-dismantled electronic waste containing precious metals from suppliers across different regions of the country. It accepts only selected components—such as mobile phones without batteries or printed circuit boards from desktop computers—while pre-sorted batteries of various types are forwarded directly to the company's headquarters in Belgium for recycling. At the Americana site, the core activity is the sampling and analysis of incoming materials. The waste is first shredded into fine pieces, from which representative samples are taken and subjected to different treatments, such as burning or smelting. These samples are then analysed in the company's laboratory to determine the content of precious

metals, which serves as the basis for establishing supplier payments. Once the analytical process is completed, all remaining material is shipped to the headquarters in Belgium for final processing.

5. **Co-creation innovation and partnership:** cooperation/subordination with leading firm in the group
6. **Outcomes and Impacts:** Although not explicitly stated, environmental benefits are evident in terms of reduced/recycled waste.
7. **Challenges and Barriers:** (same of previous case) Lack of data on statistics related to e-waste activities, and scarce governmental information on the topic. High recycling cost for certain e-waste types in terms of technology and infrastructure. Instead from socio-cultural elements, lack of environmental awareness for disposal, concern with data security and cultural resistance to acquiring repaired and recycled products. Finally, from political barriers the lack of standardisation and proper labelling of appliances.
8. **Drivers and Enablers:** the sampling processes performed in the country before exporting the material for the end-processing counter data security barrier.
9. **Lesson learned/Policy suggestions:** (same of previous case) Although not explicitly stated, some policy suggestions can be inferred from the identified barriers, such as the importance of collecting and analysing data to better understand current socio-economic and environmental dynamics, as well as the need for an updated policy framework capable of supporting such changes.

Case Study L7

1. **Reference and Sources:** Schneider, F., Aanestad, A & Carvalho, T. C. (2024). Exploring barriers in the transition toward an established e-waste management system in Brazil: a multiple-case study of the formal sector. Environment, Development and Sustainability, 1-21. CASE C
2. **Basic Information:**
    a. **Country:** Brazil, (Mauà, São Paulo state)
    b. **Sector**: e-waste dismantling and processing
    c. **Date of Implementation:** 2009
    d. **Status:** Not found
3. **Description of SMEs:**
    a. **Type of Enterprises:** private company

   b. **Core business activity:** e-waste dismantling and processing in the corporate sectors, receiving appliances from companies in several states in Brazil.
   c. **Main products/services:** different types of alloys from e-waste recycling

4. **CE strategy applied:** innovative process for recovering minerals from electrical and electronic waste (e-waste). The initial process consists of a manual sorting of appliances, followed by manual dismantling to separate the main components (e.g., batteries, cables, and computer chassis). Some devices require more detailed and time-consuming dismantling than others. In the case of mobile phones, the manual process only separates the batteries, which are recycled by specialised companies in the country. The firm then processes the phones without their batteries using a shredder. The shredder applies sieves of different thicknesses depending on the component type (e.g., cables, PCBs) and produces granulated material of various sizes. The resulting mix is sent to foundries in the country, which produce different types of alloys as the final product.
5. **Co-creation innovation and partnership:** Not specified.
6. **Outcomes and Impacts:** Although not explicitly stated, environmental benefits are evident in terms of reduced/recycled waste.
7. **Challenges and Barriers**: (same of previous case) Lack of data on statistics related to e-waste activities, and scarce governmental information on the topic. High recycling cost for certain e-waste types in terms of technology and infrastructure. Instead from socio-cultural elements, lack of environmental awareness for disposal, concern with data security and cultural resistance to acquiring repaired and recycled products. Finally, from political barriers the lack of standardisation and proper labelling of appliances.
8. **Drivers and Enablers:** innovative approach that tackles the lack of infrastructure by implementing complete e-waste processing in the country. The end-processing performed by this organization does not separate all the metals but results in alloys of different kinds used for several purposes
9. **Lesson learned/Policy suggestions:** (same of previous case) Although not explicitly stated, some policy suggestions can be inferred from the identified barriers, such as the importance of collecting and analysing data to better understand current socio-economic and environmental dynamics, as well as the need for an updated policy framework capable of supporting such changes.

Case Study L8

1. **Reference and Sources:** Cea-Valencia, J., Villegas-Huencho, A., & Sion-Sierra, R. (2020). Barriers and opportunities for the transition to a circular economy. A case study of Chilean cooperatives. Journal of Business, Universidad del Pacífico (Lima, Peru), 12(1), 63-81. Cooperative A
2. **Basic Information:**
    a. **Country:** Chile
    b. **Sector:** waste prevention and recovery
    c. **Date of Implementation:** 2014 (year of establishment).
    d. **Status:** Not found
3. **Description of SMEs:**
    a. **Type of Enterprises:** small worker cooperative
    b. **Core business activity:** waste prevention and recovery: a collection and recycling waste-management service aimed at customers, primarily consisting of its members and the companies that use the material collected and processed.
    c. **Main products/services:** It provides services related to the management and recovery of used cooking oil for biofuel production; management and recovery of organic waste for vermicompost production; management of recoverable inorganic household waste; and environmental education projects.
4. **CE strategy applied:** waste management and recycling, upcycling, and the trade of recycled by-products
5. **Co-creation innovation and partnership:** network of member organisations and beneficiary companies
6. **Outcomes and Impacts:** Although not explicitly stated, environmental benefits are evident in terms of reduced/recycled waste.
7. **Challenges and Barriers:** Not found
8. **Drivers and Enablers:** Not found
9. **Lesson learned/Policy suggestions:** Not found

Case Study L9

1. **Reference and Sources:** Cea-Valencia, J., Villegas-Huencho, A., & Sion-Sierra, R. (2020). Barriers and opportunities for the transition to a circular economy. A case study of Chilean

cooperatives. Journal of Business, Universidad del Pacífico (Lima, Peru), 12(1), 63-81. Cooperative B

2. **Basic Information:**
    a. **Country:** Chile
    b. **Sector**: Agroecology
    c. **Date of Implementation:** 2016
    d. **Status:** Not specified
3. **Description of SMEs:**
    a. **Type of Enterprises:** worker cooperative
    b. **Core business activity:** activities aimed at enhancing agroecology services and good practices
    c. **Main products/services:** agroecology services and advisory on cooperative formation
4. **CE strategy applied:** set up a house as a sustainable demonstration centre—featuring solar panels and recycled water providing drip irrigation to an orchard—which it also uses as a base for its agroecology services and its advisory on cooperative formation.
5. **Co-creation innovation and partnership:** Not reported.
6. **Outcomes and Impacts:** Although not explicitly defined, they are linked to socio-cultural and environmental benefits arising from the provision of agroecology services and training courses.
7. **Challenges and Barriers:** Not found
8. **Drivers and Enablers**: Not found
9. **Lesson learned/Policy suggestions:** Not found

3.1.3. Social inclusion, training and education, and safe working conditions

Case Study L10

1. **Reference and Sources:** Ellen MacArthur Foundation (EMF) (2017). A circular economy in Brazil: Case study appendix. A product of the collective expertise of members of the CE100 Brasil Network, CE100 Brasil.
2. **Basic Information:**
    a. **Country**: Brazil
    a. **Sector:** Recycling of Waste Electrical and Electronic Equipment (WEEE)

b. **Date of Implementation:** 2012
c. **Status:** Not specified

3. **Description of SMEs**
   a. **Type of Enterprises:** small company
   a. **Core business activity:** electrical and electronic waste management in the B2B market. It found a balanced business model that is both profitable and helps maintain social inclusion, while enabling the business to develop and grow.
   b. **Main products/services:** it offers companies and organisations a certified end-of-life telecommunications and IT product service, in compliance with Brazil's National Policy for Waste Disposal. Indeed, it offers a certified service for safe and secure electronic asset retirement and disassembly for recycling, offering clients full compliance with relevant regulations on repairs, data protection and environmental compliance. Moreover, it offers a recovery and repair service and sells used and remanufactured parts and refurbished equipment to customers through third party websites.
4. **CE strategy applied**: electrical and electronic waste management. It evolved from the resale of parts to their remanufacture and to the refurbishment of products. The company aims to maximise the value extracted from all items it collects.
5. **Co-creation innovation and partnership:** the firm works in the B2B market helping NGOs, small businesses and individuals dispose of unwanted electronic equipment. The company establishes contracts with clients to collect their unwanted IT equipment. In addition, the firm prepares some items for donation to social inclusion projects through partnership with the Centre for Digital Inclusion (CDI).
6. **Outcomes and Impacts:** Environmentally, the company collected more than 400 tons of equipment between 2013 and 2015. Socially, during the same period, more than 250 items of equipment supported social impact projects, reaching over 2,200 vulnerable people.
7. **Challenges and Barriers:** Not found.
8. **Drivers and Enablers:** Not found.
9. **Lesson learned/Policy suggestions:** Not found.

Case Study L11

1. **Reference and Sources:** Becerra, L., Carenzo, S., & Juarez, P. (2020). When circular economy meets inclusive development. Insights from urban recycling and rural water access in Argentina. Sustainability, 12(23), 9809.
2. **Basic Information:**
    a. **Country:** Argentina
    b. **Sector:** Recycling and waste management
    c. **Date of Implementation:** 2015
    d. **Status:** finished in 2018
3. **Description of SMEs**
    a. **Type of Enterprises:** waste picker cooperative
    b. **Core business activity:** management of industrial waste
    c. **Main products/services:** Services related to waste management and recycling, offered to both industrial clients
4. **CE strategy applied**: In the ordinary management of industrial waste, the dominant rationale within the industrial sector is shaped by a linear "take–make–dispose" model. According to this logic, waste is addressed exclusively at the final stage (disposal), with a focus on the logistics of transporting waste to treatment facilities or final disposal sites. The case examined shows how the implementation of the programme — and the integration of services provided by the cooperative — leads to improved environmental recycling strategies within industrial settings. For instance, for one company (a transnational Argentinian company) is reported that its previous private waste manager was primarily concerned with the profitability of the waste business rather than with exploring recycling opportunities. The implementation of the programme, however, prompted a reorganisation of the plant's waste-management system towards waste circular-economy (WCE) strategies by shifting the management of recyclable materials from the private provider to the cooperative, while also incorporating social-inclusion objectives. This involved supporting the integration of the cooperative as a service provider, organising inclusive recycling training workshops for plant staff, and co-designing and implementing clean collection circuits across the plant based on the assessment results and employees' feedback during training.
5. **Co-creation innovation and partnership:** initiatives involving a transnational corporation located in Argentina. In particular, the programme reorganised waste management within the large company through a reallocation based on the service provider: the private provider no

longer holds a monopoly over the service. It is now responsible only for special and hazardous waste flows and, within the household-like waste stream, for those materials that cannot currently be recycled (mainly the organic waste produced by the cafeteria). The cooperative, instead, becomes the service provider in charge of all recyclable materials.

6. **Outcomes and Impacts:** Positive environmental benefits are also demonstrated by the monitoring system that tracks the type and volume of materials sold to the recycling industry. This was useful to establish a reliable monitoring of its recyclability rates of large transnational companies and also endorse their performance according to the ISO 14000 standards.
7. **Challenges and Barriers:** The absence of well-integrated public recycling policies results in a very low recycling rate (between 1–20%), meaning that roughly 90% of municipal waste ends up in landfills. The contributions of waste pickers are poorly recognised both socially and economically, as waste-management systems are oriented towards final disposal rather than material recovery, and are therefore organised around private firms that provide logistics and landfilling services to municipal governments. Although Argentina has a large workforce dedicated to recovering materials from waste, this workforce is not formally recognised within public waste-management policies.
8. **Drivers and Enablers**: In the past, waste-picker activity was focused exclusively on households. Then, in 2013 the environmental authority of the Province of Buenos Aires (OPDS) started a process to reshape the regulatory framework of waste management, especially for large generators of waste. This process opened a window of opportunity for the formalized waste picker cooperatives to be certified by the OPDS as sustainable destinations, and therefore possibly able to provide professional services to the large industrial generators, managing their recyclable waste streams.
9. **Lesson learned/Policy suggestions:** Reconfiguration of the problem through a co-designed solution within a multi-stakeholder team (problem's co-design). Bottom-up dynamics between researchers and the cooperative. The collaborative work was oriented towards changing the common sense about legal partners (private companies working through contracts) and about good circular economy narratives. Development of innovative knowledge, artifacts, processes and organizational methods in order to deliver technological solutions: the introduction of waste pickers' knowledge in terms of reconfiguring the daily waste management by workers of the Company and the improvements in the sorting system.

Case Study L12

1. **Reference and Sources:** Cea-Valencia, J., Villegas-Huencho, A., & Sion-Sierra, R. (2020). Barriers and opportunities for the transition to a circular economy. A case study of Chilean cooperatives. Journal of Business, Universidad del Pacífico (Lima, Peru), 12(1), 63-81. Cooperative C
2. **Basic Information:**
    a. **Country:** Chile
    b. **Sector:** Agriculture
    c. **Date of Implementation:** 2016
    d. **Status**: Not reported
3. **Description of SMEs:**
    a. **Type of Enterprises:** agricultural cooperative
    b. **Core business activity:** activities aimed at reducing the negative impacts of agricultural production
    c. **Main products/services:** provides sustainable agricultural waste management services, specialized advisory on microbiological compost, and workshops
4. **CE strategy applied:** waste management and awareness-raising services on CE practices in agriculture
5. **Co-creation innovation and partnership:** Not specified.
6. **Outcomes and Impacts:** Although not explicitly defined, they are linked to socio-cultural and environmental benefits arising from the provision of agricultural waste management services and training courses.
7. **Challenges and Barriers:** Not found
8. **Drivers and Enablers:** Not found
9. **Lesson learned/Policy suggestions:** Not found

3.1.4. Multi-actors and multi-level forms of CE governance

Case Study L13

1. **Reference and Sources**: Muñoz, L., (2024). Desempeño Ambiental, una fase de la ruta técnica para que las empresas logren la aplicación de la Economía Circular in Henríquez-Aravena, A. y Martínez-Cerna L. (2024). América latina circular, avanzando hacia el desarrollo sostenible, CircularTec, CIEC, CORFO.

2. **Basic Information:**
    a. **Country:** Guatemala
    b. **Sector:** Services and consulting
    c. **Date of Implementation:** Project implemented between 2018 and 2022, although the foundation has several decades of experience
    d. **Status**: completed.
3. **Description of SMEs:**
    a. **Type of Enterprises**: Foundation
    b. **Core business activity:** It contributes to the technical and environmental strengthening of companies and organisations in Guatemala, basing its work on the promotion of cleaner production strategies.
    c. Main products/services: Consulting services
4. **CE strategy applied:** In 2018, the Environmental Performance Programme was launched with the aim of providing tools and methodologies that enable companies to practically identify their progress and opportunities in terms of resource efficiency and circular economy. The first tool made available to companies was the Environmental Performance Diagnostic (DDA), which allows the creation of technical assessment modules and offers the possibility to carry out such evaluations free of charge. The collected information has been analysed to generate evidence on organisational behaviour regarding environmental performance and to provide feedback to different stakeholders involved in corporate environmental governance. The environmental performance self-assessment is structured around seven thematic areas: environmental planning, environmental legal compliance, environmental legal risk, information management, resource use, emissions management, and life-cycle perspective (the latter focused on circular economy principles). In addition to the thematic structure, the tool includes a scoring and performance classification system, with scores ranging from 0 to 100 points, and performance levels assigned according to a colour-coded scale.
5. **Co-creation innovation and partnership:** Collaboration with different stakeholders in evaluate their green performance such as government institutions, business associations, academia, and companies themselves
6. **Outcomes and Impacts:** The initiative has generated benefits for companies by providing a free technical self-assessment tool, based on international systems with over 25 years of application and on 23 years of local expertise developed by CGP+L. Within the project, 296 self-assessments were carried out in Guatemala: 64.19% from MSMEs (micro, small and

medium enterprises) and 35.81% from large companies (with more than 251 employees). The average performance score, however, has not shown significant changes over time, indicating a stable trend in environmental performance levels. Regarding the section-based results, the best-performing areas were Environmental Legal Compliance (green ranking) and Emissions Management (yellow ranking). The lowest scores were observed in Information Management (yellow) and Life Cycle Perspective (orange). The remaining areas — Environmental Planning, Environmental Legal Risk, and Resource Use — were classified within the yellow ranking, close to the upper threshold, suggesting that notable improvements could realistically be achieved in the short term.

7. **Challenges and Barriers**: not found.
8. **Drivers and Enablers:** not found.
9. **Lesson learned/Policy suggestions:** The initiative demonstrates replicability and sustainability, offering free public self-assessment tools across multiple environmental dimensions (water, electricity, thermal energy, solid waste, green offices, occupational health and safety, and overall environmental performance). Results show a strong tendency among companies to focus mainly on legal compliance and end-of-pipe waste and emission management, reflecting a corrective and reactive approach rather than a preventive or circular one. However, economic benefits remain limited, reducing business incentives for deeper transformation. There is therefore a need for targeted initiatives, programmes and public policies that support companies in advancing toward circular economy practices, particularly in areas such as green procurement, sustainable logistics, end-of-life management, eco-design and sustainable supply chains.

Case Study L14

1. **Reference and Sources:** Schneider, F., Aanestad, A & Carvalho, T. C. (2024). Exploring barriers in the transition toward an established e-waste management system in Brazil: a multiple-case study of the formal sector. Environment, Development and Sustainability, 1-21. CASE A
2. **Basic Information:**
    a. **Country:** Brazil (Palhoça, Santa Catarina State)
    b. **Sector:** waste management and logistics of electronic appliances
    c. **Date of Implementation:** 2016
    d. **Status:** Not found.

3. **Description of SMEs:**
    a. **Type of Enterprises:** company
    b. **Core business activity:** e-waste management and recycle
    c. **Main products/services:** service of collecting e-waste from companies in different locations, primarily within the South Region.
4. **CE strategy applied:** established structure for electrical and electronic waste (e-waste) collection primarily from companies. It also has more than 100 voluntary delivery points for the community installed in several locations. Weee.do sorts the non-repaired electronics for recycling. The company performs a manual dismantling that separates different components. Dismantling mobile phones separates only the batteries from the devices. These components are sent to recycling companies abroad or in the country for end-processing.
5. **Co-creation innovation and partnership:** It works in cooperation with a non-governmental organisation (NGO), a non-profit organisation CPDI, which aims to refurbish and reuse computers.
6. **Outcomes and Impacts:** Although not explicitly stated, environmental benefits are evident in terms of reduced waste.
7. **Challenges and Barriers:** Lack of data on statistics related to e-waste activities, and scarce governmental information on the topic. High recycling cost for certain e-waste types in terms of technology and infrastructure. Instead from socio-cultural elements, lack of environmental awareness for disposal, concern with data security and cultural resistance to acquiring repaired and recycled products. Finally, from political barriers the lack of standardisation and proper labelling of appliances.
8. **Drivers and Enablers:** Despite its inconsistencies the National Policy on Solid Waste, (PNRS) constitutes a milestone for improving e-waste management in Brazil. The various collection points reduce the reverse logistics cost by picking up large amounts of e-waste each time. In addition, there is a possibility to optimize the collection through planning for the most efficient routes for pick-up from several locations
9. **Lesson learned/Policy suggestions:** Although not explicitly stated, some policy suggestions can be inferred from the identified barriers, such as the importance of collecting and analysing data to better understand current socio-economic and environmental dynamics, as well as the need for an updated policy framework capable of supporting such changes.

Case Study L15

1. **Reference:** Information provided by the website after suggestions from the HEADCET partners
2. **Basic Information:**
    e. **Country:** Buenos Aires, Argentina
    f. **Sector:** Circular economy
    g. **Date of Implementation**: Not reported
    h. **Status:** Ongoing

3. **Description of SMEs:**
    a. **Type of Enterprises:** It is a platform that connects the community leading the circular economy in the country.
    b. **Core business activity:** It leads circular economy activities in the country
    c. **Main products/services:** It recognizes projects that integrate circular economy principles.

4. CE strategy applied: awareness-raising services on CE practices. They implement a strategy based on four lines of action that articulate the different actors in the territory. They connect sectors, strengthen capacities, promote environmental and social impact, and make best practices visible to accelerate an inclusive and collaborative circular economy.

- They create collaboration networks through a digital platform that brings together public, private, and social actors.
- They train governments, companies, and organizations to lead circular processes with concrete tools.
- They promote green jobs, sustainable enterprises, and tools to measure and improve impact.
- They certify those who do things right, to scale and replicate their practices.

5. Co-creation innovation and partnership: It builds a common vision of the circular economy among diverse actors.

- Local governments: The platform drives their leadership through tools and strategies for the design and implementation of innovative and effective environmental policies.
- Companies and entrepreneurs: The platform promotes the leading role of the private sector by raising awareness, promoting innovation, and fostering green jobs that add economic and environmental value.

- Cooperatives and NGOs: The platform enhances the capabilities of social organizations by adding value to their services and opening new development opportunities.

6. **Outcomes and Impacts:** socio-cultural, economic and environmental benefits arising from the provision of awareness services and training courses. Indeed, the specific goals are:

- Improve the efficiency of waste management by local governments, cooperatives, civil society, and private actors in the AMBA (Buenos Aires Metropolitan Area).
- Develop cross-sectoral cooperation synergies (among local governments, cooperatives, civil society, and private actors) in the management and implementation of circular economy projects and enterprises in the AMBA.

7. **Challenges and Barriers:** Not found

8. **Drivers and Enablers:** These four pillars form the operational strategy of the platform to accelerate an inclusive and collaborative circular economy in the territory. They work together to connect sectors, strengthen capacities, promote environmental and social impact, and make best practices visible.

9. Lesson learned/Policy suggestions: Not found.

3.2 Database of selected cases related to HEADCET LAC HEIs

This database of selected cases related to HEADCET LAC HEIs was developed by the UNIFI team. Specifically, we asked each COLL university team to identify at least 3 business organizations (preferably SMEs, whether involved in COLLs or not), and to send contact information to the organizers. This enabled the development of case studies based on multiple sources: websites and two questionnaires.

The first and second questionnaires were created in Google Forms and validated by the COLL universities before distribution.

The first questionnaire, more general in nature, included a brief overview of the HEADCET project and profiling questions aimed at understanding:

- Legal form of the company
- Number of employees (company size)
- Activity sector
- Typical products/services
- Age of the company

Furthermore, the questionnaire included questions for SMEs (social enterprises and other business organizations) aimed at identifying the type of CE practices in which they are already involved, which CE practices they are implementing, their goals, and the barriers they are encountering (appendix 1). The first questionnaire consisted of six questions, of which two were closed-ended questions (specifically, the question regarding barriers and the question regarding the legal form of the company), while the remaining four were open-ended questions.

Following the responses to the first questionnaire, a second questionnaire was sent to the business organizations with more in-depth questions to understand the specific CE practices (appendix 2). These queries were tailored to the type of business organization involved, focusing on sector-specific CE activities and utilizing the framework of CE indicators. In particular, the second questionnaire contained three general questions that were the same for all firms, addressing policy suggestions, collaboration with universities, and positive impacts along with possible difficulties and drivers that motivate firms to implement CE practices. Additionally, two other questions that varied between firms were included in the questionnaire. These questions were customized based on the responses given in the first questionnaire: one aimed to understand CE practices in greater detail, and the second sought to better understand the barriers the company was facing (for example, knowledge-related, technological, or financial barriers). All questions in the second questionnaire were open-ended. This second questionnaire was also conducted using Google Forms.

At the end of this work, 22 case studies of companies were obtained, according three different mixes of the sources recalled above:

- **Case Type A** (website information only): 5 case studies
- **Case Type B** (website information and questionnaire 1): 7 case studies
- **Case Type C** (website information and questionnaires 1 and 2): 10 case studies, which also correspond to the analysis of good practices (see Section 4)

In both the first and second questionnaires, confidentiality was guaranteed. In the questionnaire, we stated that the information would be anonymized and that both contact details and company references would remain anonymous. Indeed, in the first part of the questionnaires, the following statement was included:

"Confidentiality: All information provided will be treated with the utmost confidentiality and your privacy is completely protected. Please complete this brief questionnaire as soon as possible. If you have any questions, please do not hesitate to contact us. Thank you for your valuable contribution to this important initiative."

In the text, names of projects and products are replaced with XXXX.

The case studies are now presented for each university and will be reported under each of the six universities with the designation **Hx**. For each case study, the following will be provided: references sources, basic information, company description, circular economy strategy, co-creation innovation and partnerships, outcomes and impacts, challenges and barriers, drivers and enablers, and where possible, lessons learned/policy suggestions.

3.2.1 UNQ

Case study H1

1. Reference sources: case study C, integrated by Sapollnik, L., (2025). Transición circular en la industria textil: el caso de una PyME (pequeña y mediana empresa) argentina. Trabajo Final de Máster (TFM), Área de Estudios Internacionales Máster en Desarrollo Sostenible. Istituto Seneca.

2. Basic Information

Case Title: Circular Model for Textile Waste Valorization and Inclusive Production

Location: Metropolitan Area (AMBA), Argentina

Sector: Textile and Home products industry

Status: Ongoing (since 2022)

3. Description of the enterprise (SMEs or others)

Type of firm: H1 is a medium–sized Argentinian company (approx. 600 employees)

Core Business activity: H1 is focused on the design, production, and commercialization of home textile products

Products: Bath textiles, kitchen textiles, small furniture, and decorative accessories. Since 2022, the company has become a central stakeholder of a broader circular initiative that engages over 800 participating organisations, including universities, cooperatives, public institutions, and social organisations, aimed at transforming textile waste into new productive cycles.

4. Circular Economy Strategy Applied

Type of approaches implemented: Waste reduction, Recycling and upcycling, Industrial symbiosis, Resource efficiency, Social innovation and inclusive employment, Circular design education and certification

Main Circular Solutions Developed: H1 launched the program "XXXX", structured in three pillars:

a) Waste Valorization & Traceability

- Optimization of cutting processes to reduce residues

- Waste classification by colour, fibre, and dimension
- Baling and digital stock monitoring
- Monthly diversion of approx. 20 tons of textile waste
- 100% of waste diverted from landfill

Waste generated mainly consists of:

- Textile strips (2–6 cm) from sheet production
- Patch pieces (~30×30 cm) from fitted sheet manufacturing. Fibres include cotton, polyester, and cotton/polyester blends.

b) Product Redesign & New Circular Lines

Development of new circular product families:

Colección Orillos: Products made from textile edges (orillos) integrated into iron structures: Lamps, Armchairs

Colección Circular: Developed with recycling company XXXX:

- Creation of Panama-style recycled fabric, used for tablecloths, aprons, tote bags, curtains, home textiles
- Use of textile waste in construction

In partnership with Recycle and Denim:

- Production of construction panels from textile scraps
- Applied in redesign of H1 stores
- Displayed at Emitex 2023 Fair

c) Circular Education, Inclusion & Impact Programs

Flagship program: **Social Weaving Workshop – Taller de Tejido Social** aimed at training CSOs—particularly women in vulnerable contexts—to produce textile products derived entirely from waste.

Additional social activities:

- Donation of textile remnants to community sewing workshops
- Capacity-building seminars
- Local entrepreneurship support

5. Co-creation Model & Stakeholder Engagement

The circular ecosystem around H1 includes strategic recycling partners:

- Cooperativa XXXX
- XXXX (textile recycling)
- Recycle and Denim (construction materials)

Institutional partnerships:

- XXXX Recycling Center, Ministry of Education
- Architectural and production teams inside H1

Network of over 20 social organisations, among them:

- Justicia Restaurativa
- Fundación XXXX and XXXX

The collaboration enabled:

- New products
- Reuse pipelines
- Skill-building projects
- Local circular supply chains

6. Outcomes and Impacts

Environment

- 100% of textile waste diverted from landfill
- Reduction in raw material consumption
- Decrease in energy and water use associated with virgin textile production
- Reduction in transport and disposal costs

Economic

- New circular product lines
- Diversification into furniture and construction materials
- Reduced disposal cost
- Creation of new revenue streams
- Increased supply chain resilience

Social

- Job creation within recycling cooperatives
- Economic empowerment of vulnerable groups
- New training pathways and professionalisation opportunities
- Increased autonomy for community-based producers

7. Drivers and Enablers

- Internal culture shift toward circularity
- Clear environmental mission combined with social objectives
- Engagement of external knowledge provider

- Internal cross-department collaboration (production, architecture, logistics)
- Systematic waste audit and measurement

8. Challenges and Barriers

- Lack of public funding and limited financial support mechanisms
- High informality of textile waste market in Argentina
- Technical complexity of fibre sorting and residue variability
- Need for new machinery and redesign of logistics processes
- Limited existing knowledge in large-scale waste transformation

9. Policy Recommendations

- Circularity is profitable when linked to product innovation
- Partnerships accelerate innovation and reduce experimentation risk
- Circular initiatives should include measurable indicators
- Public policy could create enabling conditions through fiscal incentives access to technology and training connection between companies, universities, and social actors certification and standardization mechanisms

Case study H2

1. **References sources:** case study type C

2. Basic Information

Case Title: WEEE Recovery and Social Inclusion Program

Location: Argentina

Sector: Waste Electrical and Electronic Equipment (WEEE) recovery, environmental care

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (11 registered operators + 2 part-time advisors)

Core business activity: Treatment of WEEE, recovery and repair of electronic equipment

Main products or services:

a. WEEE collection and treatment
b. Monitor recycling and repair

c. Computer recycling and recovery
d. Component recovery (copper, plastics, cables, motherboards)
e. Refurbished equipment donations

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Recycling / upcycling, Resource efficiency, Repair, social inclusion

Description of the CE solution adopted: H2 operates as a non-profit specialized in WEEE treatment, providing environmental solutions while creating employment opportunities. They recover and refurbish electronic equipment for donation to underserved communities, reducing the digital divide. Services include complete WEEE recycling with component recovery and certified environmental management with data destruction guarantees

Description of how they carry out the process of recycling and recovery of WEE: The Recycling Plant receives Electrical and Electronic Equipment in disuse (AEEDS) and recovers more than 90% as inputs for new industrial processes. Therefore, it is constituted as a generator of hazardous waste, according to Argentine environmental regulations, such as electronic circuit boards, activated glass, batteries and cells. It has all the necessary permits and authorizations (National, provincial and municipal) to operate with electronic waste and carry out the committed reconditioning and dismantling tasks; and, where applicable, carry them out with authorized entities. Likewise, the final disposal of those products that cannot be reused or recovered is carried out through authorized operators.

The destination of the elements in general will be their reconditioning, total and/or partial recycling, seeking the repair of some components for donation and/or commercialization.

Once the material is collected or received at the Plant, they proceed to:

- Determine the total gross weight received
- Determine entry to the plant and storage location prior to treatment
- Separation by type of equipment, by processes or streams to be treated
- Verification and Re-Manufacturing of used equipment that can be reconditioned and repaired for sale as Used Electrical or Electronic Appliances (AEEDs)
- Storage of conditioned AEEDs, sale as used and donations
- Management of AEEDs; non-functional equipment or without commercial value as used: dismantling or disassembly of casings, cables, parts, pieces or assemblies, sales to industries or workshop owners

- Separation and storage of plastics for classification, grinding and conditioning for sale to industries
- Classification and weighing of ferrous and/or non-ferrous metals destined for recycling
- Classification and storage of hazardous waste: electronic circuit boards, batteries and cells to be sent to Authorized Operator for Treatment and Final Disposal
- Traceable computer monitoring of each waste stream
- The load registration and identification procedure is carried out at the plant

In case reconditioning is not possible, they will be scrapped with the following destinations:

- PLASTICS: Washed, freed from additives, remains of aluminium marks, rubber, etc., classified by reverse label and sold to various companies to produce pellets for the manufacture of containers, electrical supplies, plastics for export, etc.
- GLASS: Stripped of scrap and other elements, unbroken, sold to operators with final destination to industries.
- SCRAP: Sold to operators with final destination to industries.
- CIRCUIT BOARDS: Commercialized by kilo according to category to intermediaries/wholesalers with final destination for export for Treatment.
- CABLES: Without burning them, they are classified and sold to traders and workshop owners.

The activities (donations, refurbishment, training) contribute to social inclusion and the reduction of the digital divide. The goal, indeed, is to promote and disseminate among the community awareness of the necessary reasonableness of use of electrical and electronic items, affected by programmed obsolescence from the manufacturing point and perceived obsolescence, due to fashions and advertising.

They recycle units that are left out of the system, avoiding environmental contamination, water and energy consumption, which allows for reuse, and specifically in electronics, the reduction of the digital divide.

They are an operative agent within the Circular Economy, where in addition to working on the environmental axis, they generate genuine employment, carry out training activities and deliver recovered units that facilitate integration of less favoured sectors.

The drivers that motivate the company to reach CE goals: The firm tries to create or strengthen consumer awareness, with a commitment focused on environmental care, then the generation of genuine employment, training and reduction of the digital divide (equal opportunities). They

understand that the aspirations of conscious consumers are the second objective, fulfilling those who philosophically trust us as committed to environmental care. Regulations and incentives serve as a basic framework for their activities but are considered as a consequence and not as an end.

5. Co-creation Model & Stakeholder Engagement: not found

6**. Main Outcomes and Impacts**

Environment:

- R-principles (Recycle, Reuse, Repair), Compliance with environmental regulations
- Waste management
- Preserve and enhance natural capital, WEEE diverted from landfills
- Efficiency Material recovery and return to productive circuit

Economy:

- Creating value from CE business models,
- Value recovery from components
- Revenue from environmental service
- Employment

Social:

- Digital divide reduction through equipment donations
- Services to deprived populations
- Stakeholder involvement
- Training and education. They collaborate with universities in order to promote training, education, information exchange, and dissemination of their tasks.

The gap encountered is the gap between the more academic proposals and the reality of grassroots operators and workshop owners.

7**. Drivers**

Non-profit association enabling social mission, comprehensive WEE, social inclusion integration, digital divide focus

8**. Challenges and Barriers**

Technological restrictions. Specifically, the high cost of intermediate technology, and unattainable in innovative technology. Their own infrastructures are inelastic but adapt to current needs; thinking about adequate or planned infrastructures is even more unattainable in cost and preparation than innovative technology. The country's socio-economic reality is an absolutely limiting element, considering that they are organized as a non-profit entity.

9**. Policy suggestions**

In Argentina, there is no national legislation; regulatory frameworks are provincial and/or municipal, depending on the awareness and will of the respective communities and their political leadership. It often happens that the bureaucratic framework operates as an inconvenience.

There is a large community of civil associations that fulfil, in various ways, circular economy initiatives.

Case study H3

1. References sources: case study type C

2**. Basic Information**

Case Title: Clothing manufacture

Location Argentina

Sector: Manufacture and sale of clothing

Status: Ongoing

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Small (30 Employees)

Core business activity: Clothing and uniform sale

Main products or services: Clothes

4**. Circular Economy Strategy Applied**

Type of CE approach: Waste reduction, Recycling / upcycling, Resource efficiency, social inclusion

Description of the CE solution adopted: Donation of textile waste. The textile waste is integrated as raw material. They donate plastic cones to nursery schools. They only have training related to environmental contamination from products they used, such as dyeing inks.

The main drivers to applied CE practices: Cost optimization and productive efficiency. The circular economy reduces waste, makes better use of raw materials and decreases energy use. This improves efficiency and allows reduction of operational costs in the medium and long term.

5. Co-creation Model & Stakeholder Engagement: They collaborate with universities on topics of production processes, textile sustainability and innovative materials. The main difficulties are lack of time and resources, and the different work rhythms between the company and the university.

6**. Main Outcomes and Impacts**

Environment:

- R-principles (Recycle, Reuse, Repair),

- Waste management,
- Preserve and enhance natural capital.

Economy

- Creating value from CE business models.

Social

- Stakeholder involvement (universities).

7. Drivers: Family business values enabling community and environment focus

8**. Challenges and Barriers**: Knowledge barriers. In particular, many companies don't know which fabrics, fibres or inputs are truly recyclable, biodegradable or regenerative. There is also often a lack of knowledge about how these materials behave in production (resistance, durability, cost, availability). The lack of information creates limitations.

9. Policy suggestions

There is increasingly more support for the circular economy from public agencies. At both municipal and national levels there are recycling programs, training and waste management that accompany this type of initiative. Although support is still limited, they believe that in the coming years it is very likely that these policies will be strengthened, as there is growing interest from the State in promoting sustainable practices in sectors such as textiles.

3.2.2 UNCUYO

Case study H4

1. References sources: case study type B, integrated by Nallim, A., (2024). H11 Barreras y oportunidades en el camino del reciclaje. In Henríquez-Aravena, A. y Martínez-Cerna L. (2024). América latina circular, avanzando hacia el desarrollo sostenible, CircularTec, CIEC, CORFO.

2. Basic Information:

Country: Argentina

Sector: Recycling of Waste Electrical and Electronic Equipment (WEEE)

Date of implementation: since 2010 (year of establishment).

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of Enterprises: Micro**,** 8

Core business activity: WEEE management

Main products/services: The company provides waste collection services, designs new products with longer useful life, develops upcycling solutions, including applications in the fashion sector – and offers advisory and consultancy services.

4. CE strategy applied:

Circular Economy actions are grounded in a triple-impact principle, namely: resource austerity through the recovery and reintroduction of WEEE-derived materials into the production cycle; resource efficiency; and ecosystem regeneration. CE activities are delivered through integrated services, including waste collection, disassembly, material valorisation, re-assembly aimed at extending product lifespan, and redistribution — including to more vulnerable social groups. In 2014, the company also developed a new business line through its upcycling initiatives, the sustainable design unit, and the collaboration with XXXX sub-brand — dedicated to circular fashion and jewellery — to reuse materials that, at the time, could not be reintroduced into industrial cycles.

5. Co-creation innovation and partnership

Collaboration with public and private partners is central to the business model. Value creation focuses on re-using and upgrading discarded materials into long-life products, as well as on reducing the digital divide by offering products at lower prices. This initiative implemented with XXXX sub-brand in the fashion industry generates additional value not only for the materials but also for the people who transform them, by supporting designers and producers from vulnerable backgrounds and thereby creating a broader positive impact within the community.

Moreover, the company provides consultancy and training services on sustainability, triple impact, and circular economy. In 2020 and 2021, it supported seven municipalities in Argentina in developing circular roadmaps across various sectors, including textiles, gastronomy, the wine industry, mobility, and construction**.**

6. Outcomes and Impacts

Positive environmental impacts include the reduction of waste and avoidance of contamination caused by electronic waste; the extension of product life cycles; the reduction of carbon footprint and contribution to climate impact mitigation. Social benefits stem from the reduction of digital divided through increased access to low-cost refurbished devices.

7**. Challenges and Barriers**

Economic and organisational barriers: in the start-up phase, after winning a public-policy scholarship, the founders had to organise and self-fund travel from Mendoza to Buenos Aires (1,050 km away) to access the training programme, since the scholarship only covered participation fees (which were high due to the prestige of the university).

Knowledge barriers: At the time, there was no environmental awareness regarding sustainability, making the initial phase particularly challenging. Moreover, electronic-waste recycling was perceived merely as a donation-related practice, not as a responsibility for correct end-of-life management or material circularity. Only recently has it become recognised as a necessary operational cost and included in company budgets.

Techno-institutional barriers: The need to design operating processes in which customers were also suppliers (circular flow). Electronic waste was classified as hazardous, but there was no regulatory framework supporting reuse. In addition, the national context was characterised by economic and regulatory instability, including recurring inflation and frequent policy changes. Environmental regulation remained insufficient, and the Extended Producer Responsibility (EPR/REP) law—already adopted in the EU—had not yet been introduced.

Financial barriers: Until a few years ago, investments were not directed towards social and environmental impact companies. Only recently have such initiatives begun to receive support through dedicated funds, financing instruments, and the development of sustainable and impact-investment approaches.

8. Drivers and Enablers

The development of the initiative was facilitated by the Argentine entrepreneurial ecosystem, which launched dedicated business competitions for new start-ups and local innovators. The founders took part in one of these competitions, achieving second place and obtaining a scholarship that enabled them to develop their business plan with the support of Universidad Austral and the IAE Entrepreneurship Centre. This mentoring and training process allowed them to formalise and strengthen their business vision, ultimately defining a Circular Economy–based business model and plan.

9. Lesson learned/Policy suggestions:

There is a clear need for an adequate policy framework and dedicated financial support mechanisms to enable the scaling and long-term viability of circular business models.

Case study H5

1. References sources: case study type C

2**. Basic Information**

Case Title: Agricultural Waste to Biodegradable Bio textiles

Location: Argentina (operating in Mendoza, Salta, Jujuy, Corrientes)

Sector: Bio textiles, sustainable materials

Status: Ongoing

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Micro (5 employees, informal activity)

Core business activity: Transformation of organic waste into biodegradable bio textiles

Main products or services:

1. Biodegradable and compostable bio textiles
2. Labels
3. Packaging
4. Fashion items
5. Textile applications from agro and wine industry waste

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Recycling / upcycling, Eco-design, Resource efficiency, Biomaterial innovation

Description of the CE solution adopted: H5, transforms organic waste from agriculture and wine industries (fruit remains, coffee waste, wine by-products) into biodegradable bio textiles. Materials are designed to be compostable and reintegrate into natural cycles at end of life. The process achieves zero waste production, minimal energy consumption, and significantly less water use than conventional textiles. Products serve multiple sectors (packaging, fashion, labels) demonstrating versatility of biomaterials. They implement a comprehensive circular economy model based on the valorisation of organic and industrial waste.

The main measures include:

- Collection and classification of agro-industrial and wine-making discards (peels, bagasse, lees, natural fibres, etc.) from wineries, producers and local companies.
- Transformation of these wastes into biomaterials and bio textiles, through biotechnology processes and regenerative design.
- Continuous reuse of materials within prototypes and product lines, ensuring that each waste has more than one life cycle.
- Circular experimental laboratories, where we test new formulations that allow us to further reduce waste generation and increase its reinsertion into new products.
- Traceability and impact measurement, to ensure that each transformed material reduces environmental burden and avoids final disposal in landfills.

They actively work with communities, suppliers and organizations in different provinces, promoting sustainable and collaborative practices. Among these initiatives they highlight:

- Multi-sector partnership programs with municipalities, wineries, cooperatives and indigenous communities and women weavers, to transform waste into local productive opportunities.
- Training and educational workshops on waste management, source separation, waste valorisation and biomaterial creation.
- Technical support to organizations that wish to incorporate circular practices within their production processes.
- Participatory projects where communities are directly involved in waste collection and transformation, generating employment and strengthening the local economy.
- Awareness actions on networks and events, disseminating the importance of eco-design, bioeconomy and regeneration as tools to face environmental challenges.
- Cooperative models that encourage co-responsibility in waste management and the generation of new resources from them.

5**. Co-creation and Innovation Process**

Innovation in biomaterial development from agricultural waste streams and Strategic collaborations with agro and wine industries across multiple provinces

6. Main Outcomes and Impacts

Environment:

- Organic waste diverted from landfills, Zero waste production- Waste reduction
- Reduced pollution and plastic use, GHG emissions reduction- Preserve and enhance natural capital
- Minimal virgin raw material extraction- Resource efficiency
- Biodegradable products returning to natural cycles

Economy:

- New value from agricultural waste
- Local economy strengthening through regional partnerships
- Preparation for future environmental regulations
- Business resilience through sustainability

Social:

- Consumer and company education on circular economy

- Promotion of responsible consumption
- Regional economic collaboration

Innovation:

- Sustainable Design
- Encourage creation of innovative, sustainable products
- Meet current market demands without compromising the environment
- Product Innovation

Areas of interest and benefits obtained from relationships with the university. H5 maintains links with universities and research institutions in various areas, especially related to:

- Biomaterials and bio fabrication: Scientific exchange to optimize formulations, drying processes, stabilization and bio textile development.
- Sustainability and circular economy: Validation of impact methodologies, traceability and territorial regeneration.
- Design and innovation: Interdisciplinary projects for the development of new prototypes and biomaterial applications.
- Training and education: Participation of students, interns and professionals who contribute new technical and creative perspectives.

Additionally, H5 has established strategic territorial alliances with the provinces of Mendoza, Salta and Corrientes, working alongside municipalities, communities and local organizations to enhance applied research, biomaterial development and waste valorisation from a regional approach.

Key benefits obtained:

- Transfer of scientific knowledge that strengthens the laboratory and innovation.
- Access to academic infrastructure and equipment difficult to obtain for an emerging venture.
- Technical support and academic validation of processes and methodologies.
- Expansion of research and development networks through inter-provincial alliances.
- Participation in innovation ecosystems, accelerating the maturation of new materials and applications.

7. Challenges and Barriers

Lack of financing. Currently, H5 does not have active public financing to promote its circular economy practices. Although they have managed to validate the project and obtain small financing through a business incubator, accessing more significant public funds continues to be a challenge.

Although there are programs and support lines for the circular economy, they encounter several obstacles that hinder access:

- Lack of clarity and dissemination about specific calls for biomaterials and bioeconomy.
- Complex administrative processes and long evaluation times.
- High technical and budgetary requirements, difficult to meet for ventures that are still in the consolidation stage.
- Shortage of specialized personnel in project formulation and public fund monitoring.
- Focus of financing lines more oriented towards traditional industries and not so much towards biotechnological innovation applied to design.

To continue advancing despite the limited availability of public funds, H5 has implemented various strategies, including:

- Participation in incubators and private programs, where they obtained validation, mentoring and a small initial contribution for research and development.
- Their investment and reinvestment of income, prioritizing the areas of greatest impact: laboratory, materials and prototype development.
- Strategic alliances with companies, wineries, municipalities and communities that contribute inputs, spaces or operational resources.
- Collaborative model that allows sharing technical capabilities and reducing costs.
- Management of scalable projects, where developments are adapted to stages according to resource availability.

8**. Enablers and drivers**

The main drivers that push H5 to implement circular economy practices are:

- Environmental and regenerative commitment: They were born to respond to urgent problems related to waste management and the environmental impact of the textile industry. Their purpose is to transform discards into valuable resources, reducing pressure on ecosystems and regenerating territories.
- Market demand for sustainable solutions: Consumers, companies and organizations seek materials with lower environmental footprint, traceable and aligned with the bioeconomy. The circular economy becomes a competitive advantage and a key value attribute.
- Opportunity for innovation and differentiation: Circularity drives research and development of new biomaterials, fosters creativity and positions us as pioneers in bio textiles in Argentina.

- Positive social impact: Working with communities, cooperatives and women's groups motivates them to create inclusive value chains that generate employment, training and economic autonomy from waste.
- Efficiency and economic resilience: Revaluing local discards allows them to reduce input costs, strengthen short chains and decrease dependence on traditional materials.
- Alignment with public policies and global trends: The transition towards circular models is part of national and international agendas. Adopting these practices allows them to accompany and enhance these transformations.

9. Lessons learned and Policy suggestions

In the current context, H5 recognizes that there are political actors and public agencies that are beginning to show interest and support towards circular economy practices, especially at regional and municipal levels. Among them:

- Municipalities and local governments of provinces such as Mendoza, Salta and Corrientes, with whom we already work on initiatives related to waste valorization and biomaterial development.
- Provincial innovation and environment agencies, which promote programs related to bioeconomy, waste management and green employment.
- National institutions that promote sustainability and energy transition, although still with limited lines for biomaterial projects.

While these advances are positive, they consider that it is still necessary to strengthen and expand public support so that circular economy initiatives have a deeper and more scalable impact.

Recommendations and policy suggestions to improve the implementation of circular economy strategies:

1. Greater dissemination and clarity about public funds and programs for innovative projects in bioeconomy and biomaterials.
2. Specific financing lines for ventures working with organic discards, biotechnology and new material development.
3. Simplification of administrative processes for calls and agreements, especially for early-stage projects.
4. Stronger articulation between public sector, academia and companies, to create innovation ecosystems that support applied research.
5. Technical and training support programs to strengthen circular capacity within communities and production chains.

Openness to international collaborations:

H5 is fully willing to establish alliances, connections and joint projects with international universities, especially with the university of Italy. It would be an honour to advance in applied research lines, biomaterial development and circular economy strategies in academic and scientific collaboration. They remain completely available to coordinate meetings, share technical information and build joint projects that enhance the regional and international impact of the bioeconomy.

Case study H6

1.References sources: case study type A

2**. Basic Information**

Case Title: Wine company

Location: Argentina, Mendoza. H6, along with its vineyards, is located at 950 meters above sea level (3116 ft) in Ugarteche, Luján de Cuyo, in the province of Mendoza. It is a completely biodynamic terroir of 35 hectares (86 acres) in an arid climate with 340 days of sunshine a year. The irrigation system is drip and supplied by pure water from the melting ice of the Andes.

Status: Ongoing

Start date: 2005

3. Description of the enterprise (SMEs or others)

Type of enterprise: NS

Core business activity: biodynamic wine

Main products or services: Production of biodynamic wines, H6 is committed to sustainable practices that promote both environmental and social well-being (Biodynamic organic viticulture).

4. Circular Economy Strategy Applied

Type of CE approach: Resource efficiency

Description of the CE solution adopted: Biodynamics is the fundamental principle of the project, respecting the natural privileges of terroir in order to make high-end quality wines, in a harmonious relationship between the ecosystem and its people. H6 wines are made from certified organic grapes with biodynamic techniques. They employ the latest technology in order to use winemaking techniques that minimize the use of oenological supplies. They make a special focus on the materials used for bottling and labelling to fully respect the environment.

5. Co- creation and Innovation Process

- Collaboration with certification bodies and audit institutions

- Engagement with wine tourism visitors as ambassadors of sustainability
- Partnerships with global biodynamic agriculture networks

6. Main outcomes and impacts

Environment

- Preserve and enhance natural capital (Soil, Biodiversity, Natural Capital- Biodynamic agriculture, soil regeneration, green coverage, ecosystem balance)
- Efficiency (Water Efficiency-Drip irrigation, 100% water recycling)
- Energy (Energy renewables- 250 solar panels generating 50% of energy)
- R-Principles (Compost, material recycling, reuse of organic waste, waste valorisation)

Governance

- International sustainability certifications (ECOCERT, DEMETER, etc.)

Innovation

- Biodynamic preparations, astronomical calendar, regenerative agriculture

Social

- Biodynamic farm ecosystem involving animals, orchard, tourism engagement

7. Drivers

- Strong Governance and Certifications
- Soil, Water and Ecosystem Stewardship
- Technological and Process Innovation

8. Challenges and drivers: not found

9. Policy suggestions: not found

3.2.3 PUC

Case study H7

1.Reference sources: case study type B

2.Basic information

Case title: Agroecological cooperative

Location: Metropolitan Region, Chile

Sector: Sustainable agriculture, organic foods. It is a consumer cooperative.

Date of Implementation: Founded 2011, officially registered as cooperative October 22, 2016

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro, only two people receive remuneration, but there is a large team of people who work on different tasks as part of their obligations as cooperative members. The Board of Directors cannot be remunerated

Core business activity: Agroecological consumer cooperative connecting members with organic food producers. The members place biweekly orders for organic vegetables and fruits, eggs, and other sustainable products from a network of producers, certified or not. H7 "purchases" from the producers. The members "place orders" through the cooperative.

Main products or services:

1. Biweekly supply of organic vegetables, fruits, eggs
2. Sustainable products from network of producers
3. Direct producer-consumer connection
4. Fair and transparent trade framework

4. Circular Economy Strategy applied

Type of CE Approach: Waste reduction, Recycling, Resource Efficiency, Sharing Economy, Organic waste composting, reusable containers

Description of CE solution adopted: The mission is to make the consumption of sustainable foods more accessible, within the framework of Fair and Transparent Trade networks. Members bring their bags and containers—egg cartons and clamshell-type containers—every two weeks when they pick up their products. Previously, members brought their organic waste to the product pickup location, and one of the producers would take it and compost it on their land. Collaborative work on producers' farms strengthens community ties. They provide healthy foods for all people who are willing to commit to their nutrition through cooperative work.

5. Co-creation and Innovation Process

- Description of how the solution was developed: Direct producer-consumer relationships, no intermediaries.
- Evidence of co-creation: Fair and transparent trade network. Direct collaboration between consumers and producers, shared decision-making through cooperative structure
- Main methods used: Citizen certification instead of formal certification.

Cooperative members, Producer network, Municipality and community organizations.

6**. Main outcomes and Impacts**

Environment:

- Preserve and enhance natural capital, organic waste diverted from landfills
- Promotion of seasonal, sustainable agriculture

Economy:

- Creating value from CE business models
- Fair price for producers,
- Accessible organic food for members,
- 30% surcharge covers administrative costs

Social:

- Stakeholder involvement,
- Community building through cooperative work,
- Direct producer-consumer relationships,
- Environmental awareness raising

7**. Challenges and Barriers**

Lack of guaranteed operating space, Ongoing uncertainty about access to public square, Municipal pressure for "more profitable" use of space

8**. Success Factors and Enablers**

- Strong member commitment and environmental consciousness
- Direct producer-consumer relationships
- Flexible, resilient operational model
- Fair and transparent trade principles
- Community engagement and volunteer participation

9. Policy suggestions: not found

Case Study H8

1. **References sources**: case study type C

2**.Basic Information**

Case Title: Zero-Waste Projects in Buildings and Communities

Location: Chile

Sector: Waste management, circular economy. They are specialists in designing, implementing and operating zero-waste projects in buildings and communities, applying a "polluter pays" model that aligns incentives and promotes reduction, segregation at source and material recovery.

Status: Ongoing

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Small (21 employees)

Core business activity: Designing, implementing and operating zero-waste projects in buildings and communities

Main products or services:

1. Waste management coordination and operations
2. Digital platform (XXX) for waste traceability
3. IoT equipment (intelligent trucks with integrated scales)
4. Segregation infrastructure
5. Training programs and sustainable culture development
6. Regulatory compliance advisory
7. First urban anaerobic biodigester in Latin America (at Mercado Urbano XXX)

4. Circular Economy Strategy

Type of CE approach: Waste reduction, recycling / upcycling, Resource efficiency, Composting, digitization, education

Description of the CE solution adopted: H8 applies a "polluter pays" model that aligns incentives to promote waste reduction, source segregation, and material recovery. Their comprehensive approach includes specialized equipment for waste collection, coordination with various waste managers, digital traceability through the digital platform XXXX, community education programs, and innovative on-site organic waste treatment (urban anaerobic biodigester that transforms organic waste into energy). In addition, they have developed equipment with IoT technology, such as an intelligent truck with integrated balance, which sends information directly to the platform, strengthening the management and transparency of processes. Additionally, they promote in-situ organic waste treatment technologies, highlighting the first urban anaerobic biodigester in Latin America, installed at the Mercado Urbano XXXX, which transforms organic waste into energy for the building.

At H8, they work with authorized and formalized waste managers, ensuring traceability and regulatory compliance throughout the entire valorisation chain. Measurement is carried out through their digital platform XXXX, which records in real-time the quantities generated at each point. While their model prioritizes partnerships with formal managers, they have had specific collaborations with

municipal programs in particular projects where the client requires it or when the local authority offers adequate valorisation services for certain fractions.

The collected waste is valorised through recycling, composting, and anaerobic biodigester, depending on the client and contracted programs. The most emblematic case is the urban anaerobic biodigester at Mercado Urbano XXXX, where organic waste is transformed into energy for the building. In addition to treatment, they actively promote reduction, reuse, and the use of reusable products within organizations.

Through their "Road to XXXX" program, they combine segregation infrastructure, cultural interventions, and training programs to avoid single-use materials, encourage reuse practices, and reduce the amount of waste sent to landfills. They also support reuse initiatives and life extension when local chains allow it. An example of this is the transformation of out-of-use bank cards into planters and pipes, an initiative that allows reincorporating a complex material into a production cycle with added value.

The data is integrated into XXXX, their traceability platform, which offers interactive graphics, eco-equivalencies, automatic reports, and performance rankings among buildings or branches. This information allows clients to evaluate their performance, make informed decisions, and improve their circularity indicators. H8 uses this data to advise improvements, design interventions, and develop environmental education and culture strategies through their Culture and Communities team. In terms of external visibility, they are increasingly enhancing the use of data as a communication and awareness tool, especially in the context of their growth and the opening of a subsidiary in Spain. This will allow them to strengthen marketing, demonstrate real impacts, and contribute to raising public awareness about the importance of the circular economy.

The main drivers to allow them to implement Ce practices: Their mission is to accelerate the transformation to a sustainable world without waste. The company was founded with this objective and is motivated by:

- Reducing the amount of waste that ends up in landfills, advancing toward more efficient and sustainable material management systems.
- Promoting an environmental culture within organizations, strengthening education, participation, and behavioural changes that enable circularity to be sustained over time.
- Aligning incentives through their "polluter pays" model, which encourages individual and collective responsibility and guides users toward reduction, separation, and reuse practices.

- Supporting their clients in compliance with current regulations, especially given the advancement of regulations linked to the REP Law, organic waste management, and corporate sustainability standards.
- Responding to the growing market demand for traceability services, valorisation, and Zero Waste strategies that allow organizations to improve their environmental and reputational performance.
- Contributing to decarbonization and reduction of environmental impacts through regenerative solutions such as composting, organic biodigester, and replacement of disposable materials with reusable alternatives.

5**. Stakeholder involvement**

Regarding the areas of interest and benefits obtained from their relationships (for example, knowledge transfer, training, or technological collaboration) with universities, and whether there are difficulties in developing broader partnerships. They have developed collaborations with two Chilean universities, one with a course that worked on marketing topics and another on strategic design topics. The relationship has been a contribution in terms of innovation, reflection, diagnosis, creativity, and project revitalization. The main benefits have been:

- New and young perspective on company challenges: Student teams contribute fresh perspective, creative approaches, and analysis methodologies different from those used in daily work. This helps them question internal assumptions and rethink critical processes.
- Deep and systematic diagnoses: Thanks to their time and dedication, academic teams can develop more complete diagnoses, which they usually cannot address with the same depth in daily operations.
- Reactivation of stalled or postponed projects: Often the initiatives delivered to students are projects that have been "shelved" due to lack of resources or operational capacity. The collaboration allows them to resume, deepen, or unblock projects that were stalled.
- Internal motivation and team support: Interaction with students and professors generates interest and motivation in their team, contributing energy and new ideas.

The main barriers that make it difficult for these collaborations to become applied or scalable projects are:

- Lack of connection with business reality: Students develop high-level diagnoses and research but often fail to ground their proposals in realistic business models, with clear costs, risks, impacts, and timelines. This limits the practical utility of their recommendations.

- Proposals without operational feasibility: Ideas tend to be creative and conceptual, but do not consider restrictions such as implementation times, human resources, cost structure, or regulatory compliance—elements that are critical for companies.
- Asymmetry between academic and business approaches: Universities prioritize research, analysis, and conceptual design; companies require fast, actionable, and economically justified solutions. This difference in approaches generates gaps that are difficult to close in an academic semester.
- Continuity limitation: Projects depend on the academic calendar. There is no stable mechanism to give continuity to the work, which makes it difficult to convert proposals into implemented projects.

Developed internally with focus on technology integration (IoT, digital platforms). Collaboration with waste managers, building communities, and regulatory bodies

6. Main Outcomes and Impacts

Environment:

- Waste prevention and reduction, through the redesign of processes and technical support to minimize generation at source.
- Reuse and repair, by identifying opportunities for life extension of materials and assets.

Economy:

- Optimization of separation at source, traceability and strengthening of recovery chains,
- Support in circular regulatory compliance, including REP, organic management and sector requirements.
- Optimize operational costs associated with waste management.

Innovation:

- Material recovery, promoting recycling, composting and circularity solutions for different fractions,
- Digitization of waste flows, allowing data-based management and continuous improvement,
- Impact measurement and development of indicators, supporting informed decision-making to close cycles and evaluate circularity results.

Social:

- Education and awareness-raising, promoting circular practices in communities, companies and collaborators.

- Train and educate collaborators and communities, fostering an environmental culture that promotes sustainable behavioural changes.

Governance:

- Establish collaborative partnerships between companies, managers, academia and communities to jointly advance the reduction of business impact.

7. Challenges and Barriers

Regarding the specific type of financing that is lacking (initial investment in infrastructure, working capital, operational subsidies), the limitations in knowledge related to the circular economy, and the specific incentives that waste generators would need to improve segregation and reduction:

a) Financial barrier: In their sector, the main financing gap is not so much related to a specific type of subsidy or fund, but rather to how the waste economy is structured within different business models. The reality is that in Chile, for most industries, investing in higher-standard waste management implies a direct cost that affects their margin, especially in sectors where waste significantly impacts the cost structure (construction, industry, shopping centres). In those cases, companies are only willing to invest up to a certain point and will hardly finance higher-quality solutions if their competition is not obligated to do so as well.

Therefore, what is really lacking is not massive subsidies, but financing mechanisms that allow levelling the competitive playing field. When there are no clear regulation or restrictions on the availability of landfills, companies will always tend to choose the cheapest option, even if it is environmentally inferior. In contrast, when the market is forced—by regulation, lack of landfill capacity, or territorial requirements—to operate with higher standards, then the industry does internalize those costs and management improves. In that context, transitional financing or targeted support can be key to enabling change.

There is also a lack of initial investment in infrastructure and technology to properly segregate, valorise, and trace materials, but more than an absence of capital, the problem is that very few sectors are willing to finance this voluntarily, except in special cases like banking, where waste generation is low and resources are high. For the rest, any cost increase can leave them out of the market, so there is no economic incentive to assume it.

In summary, the lack of financing is not an isolated problem, but the result of a system where:

- The cheapest option is always to throw everything away
- There are no economic incentives to segregate properly
- Companies cannot invest more if the competition is not obligated to do so

- Regulation does not yet establish standards that force everyone to internalize the real costs

What is needed, therefore, is not permanent subsidies, but transitional financing and regulatory mechanisms that align incentives, so that companies that want to move forward are not at a disadvantage and the industry can build economically viable circular economy models.

b) Limited knowledge: The limitations are not in the available technical knowledge, there are good professionals and sufficient information, but in how it is applied and how the real complexity of the waste system is understood. There is no lack of information: what is lacking is applied, systemic, and practical knowledge. Three gaps stand out:

- Partial vision of the problem: Many actors only know their "niche": recycling a material, composting, running campaigns, etc. But the reality of waste is multidimensional: territorial logistics, composition, final markets, infrastructure restrictions, increasing marginal costs, sectoral regulations, negative externalities. This generates simplistic solutions that do not consider the real sophistication of the system.
- Operational ignorance among authorities and generators: Those who design public policy or push initiatives (Congress, municipalities, NGOs) often have not been involved in real operations. This creates laws or programs with good intentions but without operational feasibility (e.g., Single-Use Plastics, initial implementation of EPR).
- Poor understanding of economic impact: Companies and clients do not understand that the circular economy can generate savings when there is good segregation and valorisation chains. Without understanding the economic benefits, many continue prioritizing minimum cost.

In their experience, the economic/regulatory combination is what really changes behaviour. The most effective incentives are:

Economic

- Differentiated rates according to segregation quality
- "Polluter pays": higher cost for mixed waste
- Bonuses or discounts for waste reduction and increased valorisation

Regulatory

- Mandatory segregation requirements at source, accompanied by real enforcement
- Certifications with on-site audits, not just documentary
- Minimum standards for construction, industry, and large generators

Social

- Public recognition, performance rankings, dissemination of achievements
- Internal recognition programs for teams or areas with best performance

Practical

- Immediate feedback to users (sensors, IoT, screens, notifications)
- Gamification within buildings or communities
- Continuous training accompanied by cultural changes

8. Success Factors and Enablers

- Digital technology (XXXX platform, IoT equipment)
- Comprehensive service offering (equipment, logistics, education, reporting)
- Transparent traceability systems
- Innovative infrastructure (biodigester)

9. Policy suggestions

Regarding whether there is notable support from political actors or agents for circular economy practices, or if such initiatives are likely to receive support (Examples: regional agencies, municipalities, local or national government agencies), and general suggestions or comments to improve collaboration and implementation of CE strategies.

At the policy support level, there are actors with good intentions and ongoing programs, municipalities, agencies like the Ministry of Environment, foundations, NGOs, but most initiatives only partially impact because they address an extremely complex problem from simplified visions.

There are many initiatives with partial impact, but a deep transformation requires state leadership, solid regulation, adequate incentives, and multisectoral collaboration. Their recommendations are:

Create a strong state circular economy agency

- Technical, stable, and with budget
- That coordinates public policy, enforcement, data, and standards
- Depoliticized and with technical continuity

Regulate with clarity and realistic implementation

- Equal rules for everyone to avoid unfair competition through minimum cost
- Mandatory standards in construction, retail, industry
- Avoid improvised regulations or those without technical feasibility

Invest in territorial infrastructure

- Valorisation, composting, biodigester plants, and decentralized logistics
- Reduce dependence on landfills

Well-designed incentives (not indiscriminate subsidies)

- Economic incentives for good segregation of waste
- Penalties for delivering mixed waste
- "Polluter pays" rates

Public-private collaboration and knowledge development

- Pilot projects with universities, municipalities, and companies
- Technical talent training
- Applied research based on real operational data

Environmental education and culture

- Sustained programs, not isolated campaigns
- Behavioural changes supported by data and monitoring

Improve certification systems

- Real audits and on-site verifications
- Avoid institutionalized greenwashing
- Establish serious, verifiable, and comparable standards

Case study H9

1.Reference sources: case study type C

2. Basic Information

Case Title: Triple Impact Circular Economy Waste Management

Location: Chile

Date of Implementation: Founded 2012

Status: Ongoing

Sector: Recycling and waste management in the circular economy (CE)

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Medium (220 employees and/or collaborators)

Core business activity: Integral and sustainable waste management

Main products or services:

1. Waste management for businesses, municipalities, schools, agricultural fields
2. Recycling services (tires, textiles, general waste)
3. Education and awareness programs
4. Sustainability consulting

4**. Circular Economy Strategy Applied**

Type of CE approach: Waste reduction, Recycling / upcycling, Resource efficiency, Education, composting

Description of the CE solution adopted: H9 applies a triple impact approach (economic, social, environmental) to waste management. Services include recovery of specialized waste streams (tires, textiles), composting programs, and comprehensive education to promote recycling culture among stakeholders. Model designed to improve costs, efficiency, and environmental/social impact for clients across diverse sectors. Indicators used for identifying the waste are tons. Actually, they are working with municipalities, firms and schools. In all cases they measure the tonnage of recycling and they transform those numbers into their respective equivalents (CO2, H2O, trees, kWh, etc.)

Reasons that foster the application of ce practices: To bring companies to an operational economic model more aligned with the ecosystem

5. Co-creation and Innovation Process

Recovery of specialized waste streams (tires, textiles), Multi-stakeholder approach: businesses, municipalities, schools, agricultural sector, community. Educational programs for stakeholder engagement

6. Main Outcomes and Impacts

Environment:

- R-principles,
- Waste, efficiency,
- Energy, resource recovery (tires)
- Preserve and enhance natural capital (reduced landfill disposal)

Economy:

- Creating value from CE business models (reduction of production costs through waste),
- Employment (fair job relations)

Social:

- Stakeholder involvement,
- Training and Education (Community education and awareness, Recycling culture development). They do not have much relation with universities because in Chile there is not much development in materials science, so there are not many universities dedicated to these topics.

7. Challenges and Barriers

Financial barriers. The firm has no public funds to adopt CE practices, and they compensated the lack of public funds through a "win-win strategy". With win-win business models use materials science and available technology to valorise waste

8**. Success Factors and Enablers**

- Triple impact business model
- Diverse client base across sectors
- Strong education and awareness component
- Founder's expertise in circular economy
- Long-term commitment (12+ years)

9**. Policy suggestions**

There is not much support from political actors; in fact, if that existed more markedly, the CE would be deeper in Chile, but they have not yet reached that point.

Case study H10

1. Reference sources: case study type B

2. Basic Information

Case Title: Sustainability Consulting Transforming Environmental Responsibility into Business Value

Location: Chile

Sector: Business sustainability consulting

Status: Ongoing

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Micro (4 employees)

Core business activity: Business sustainability consulting with focus on circular economy

Main products or services:

1. Circular economy strategy development and implementation
2. GHG emissions quantification (GHG Protocol standards)
3. Carbon footprint baseline establishment
4. Regulatory and market compliance support
5. Sustainability roadmap design

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, recycling / upcycling, Eco-design, Resource efficiency, Carbon accounting, sustainability strategy

Description of the CE solution adopted: H10 helps companies integrate sustainability as a competitive advantage by transforming environmental responsibility into strategic business value. They develop and implement comprehensive CE strategies focused on efficient resource management across client operations. Key approaches include quantifying organizational emissions using recognized standards, establishing clear baselines, identifying reduction opportunities, and ensuring compliance with regulatory and market requirements. Goal is to add tangible value and generate direct economic returns from sustainability initiatives

5. Co-creation and Innovation Process

They work with Universities, Businesses, Companies across Chile and Regulatory bodies

6. Main Outcomes and Impacts

Environment

- Preserve and enhance natural capital
- Efficient resource management (Efficient resource management across client operations).

Economy

- Creating value from CE business models,
- Fiscal and normative issues,
- Direct economic returns from sustainability,
- Competitive advantage through sustainability integration,
- Reputation strengthening,
- Tangible value added to companies.

Social

- Capacity building in sustainability,
- Stakeholder involvement

7. Challenges and Barriers

Communication challenge, benefits of circular economy not easily communicated to potential clients.

8. **Drivers:** not found

9. policy suggestions: not found

Case study H11

1. Reference sources: case study type C

2.**Basic Information**

Case Title: Food upcycling

Location: Chile

Sector: Food

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Small (28)

Core business activity: Sustainable nutrition

Main products or services: Food supplements and cereals.

4. Circular Economy Strategy Applied

Type of CE approach: Food waste/Recycle/Recover

Description of the CE solution adopted: They rescue the nutritional potential hidden in food waste to design unique healthy foods that nourish people in their daily lives in a more complete, conscious and sustainable way. They created an upcycling process to recover these nutrients, putting an end to waste and transforming them into food that's good for people and the planet. They collaborate with others using foods such as pulps, peels and imperfect fruits with high nutritional potential. Actually, they are implementing upcycling of agrifood industrial by-products. The goal of this practice is recovering nutrients from agro-industrial by-products to create new food products with a special nutritional profile. They primarily collaborate with concentrated juice and fruit puree companies. These are large-scale processing companies, which allows them to obtain a homogeneous raw material with better traceability. The pomace is rescued from juice companies and processed in their own plant, where through a dehydration and grinding process, it is transformed into fruit powders rich in fibre and antioxidants that are then incorporated into new products.

How they work:

- They rescue nutrients: They recover the fibre, vitamins, antioxidants and other nutrients hidden in these foods
- They do upcycling: They transform rescued food into products that improve people's nutrition and are good for planet

Milestone - 2018 XXXX: Their first product. They launched Chile's first upcycled product: XXXX, a fibre supplement made from apple fibre recovered from juice-making processes.

The main drivers that motivate companies to implement circular economy practice: Market opportunity. The growing demand for functional foods creates an opportunity to rescue nutrients that are concentrated in raw materials that used to be considered low-value waste. Taking advantage of these pomaces allows them to obtain unique ingredients, which in turn is reflected in the final product and its performance. For example, one of their main products is an apple fibre supplement obtained from apple pomace, a waste product from the juice industry that concentrates more than 90% of the original fibre of the fruit. Without this raw material it would be virtually impossible to achieve such a product.

5. Co-creation and innovative process

They work with concentrated juice and fruit puree companies, and they had research connections, joint projects, and outsourced services with universities and research centres. New upcycled products.

6. Main Outcomes and Impacts

Environment

- Waste (waste reduction through the process of recover fibres and nutrients)
- Preserve and enhance natural capital (minimise the extraction of virgin material)

Economy

- Creating value from CE business models
- Creating new green business opportunities
- Investments

Innovation

- process of upcycling, expand product lifespan and its parts
- Technology
- upcycled product "XXXX"

Social

- Stakeholder involvement: They had research connections, joint projects, and outsourced services with universities and research centres. The main difficulty they have encountered is

the slowness, in general, of research centres, as well as the high cost they charge for their services, which makes it practically unfeasible to work without a public fund mediating, which makes the process even slower.

7**. Challenges and barriers**

Financial barrier. They had various state support programs. The main obstacle is that they are general funds, meaning they don't have a clear focus on CE or food, which makes the competition higher and often results in finding evaluators with little specialization. Despite this, the company has been able to secure sufficient financing through public funds.

Additionally, they have conducted crowdfunding rounds. Although they have tried to approach the private equity and venture capital world, upcycling is still an emerging and uncommon industry for these types of funds.

8. Drivers

They had research connections, joint projects, and outsourced services with universities and research centres. Nutritional value creation: Ability to create products with special nutritional profiles that improve people's nutrition

9**. Policy suggestions**

They believe there should be support through specific subsidies for the transition to a circular economy by industry. Currently, the existing funds are very general and fall under very broad themes such as "Sustainability" or "Circular Economy," with virtually infinite applications. The implementation of CE strategies in the food industry, requires quite specific efforts, knowledge, and research, which would greatly benefit from concrete initiatives anchored in the industry.

In Chile, contributions to this transition are provided by CORFO, through subsidies, and Transforma Alimentos, a public program applied specifically to the food industry.

Case study H12

1. Reference sources: case study type B

2. Basic Information

Case Title: Social Innovation and Territorial Development Services Across Latin America

Location: Chile (operating in Argentina, Chile, Mexico)

Sector: Social innovation, territorial development

Status: Ongoing

3**. Description of the enterprise (SMEs or others)**

Type of enterprise: Small (48 employees)

Core business activity: Empowering people and communities through entrepreneurship and social innovation and consultancy across the territory

Main products or services:

- Territorial intelligence services (socio-territorial data management)
- Social capital strengthening (bonding and trust building)
- Collective action facilitation
- Social innovation solution design
- Community empowerment programs
- Social leader formation

4**. Circular Economy Strategy Applied**

Type of CE approach: Social innovation, territorial development, community resilience

Description of the CE solution adopted: H12 works from a systemic perspective to build resilient communities capable of collectively facing future challenges with greater autonomy toward sustainable development. They strengthen social capital by understanding local context, needs, and challenges, playing a coordinating role that brings together stakeholders to design participatory, relevant, lasting solutions. Focus on collective social innovation processes making communities protagonists of their own development, considering local reality, cultural and geographical considerations, and productive development possibilities. They promote education programmes in rural territories with the aim that rural entrepreneurship could incorporate circular economy practices through the projects implemented.

5. co-creation value: not found

6**. Main Outcomes and Impacts**

Environment:

- Sustainable development contributions
- Natural capital preservation through community actions

Economy:

- Productive development in territories
- Shared value generation

Social:

- Strengthened social capital
- Empowered social leaders and change agents

- Resilient communities with greater autonomy
- Greater well-being

7. Barriers faced: Financial barrier

8. Drivers: not found.

9. Policy suggestions: not found.

3.2.4 UNAB

Case study H13

1. References sources: case study type C

2**. Basic Information**

Case Title: services for the collection, management, recycling, and recovery of electronic waste.

Location: Chile

Sector: Electronic waste

Status: Ongoing

Main products or services: Services for the collection, management, recycling, and recovery of electronic waste.

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (13 employees, informal activity)

Core business activity: recovery electronic waste

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Recycling / upcycling

CE Practices implemented: Recycling and recovery of ferrous and non-ferrous fractions, Waste separation is carried out, final disposal management in appropriate sites and recycling of fractions of cans, glass and others. The fraction of organic solid waste goes to composting.

5. Co creation and Innovation Process

Collaboration with private companies

6. Driver

Decrease the operational carbon footprint.

7. Barriers

Financial barriers. They do not have funds for energy transition or improvement in waste management. There are competitive funds but only 1 focused call per year, so there is always an over-application, decreasing the possibility of award.

8. Main outcomes

Environment

- Preserve and enhance natural capital
- Recycle and recover
- Waste reduction

Social

- Stakeholder involvement: they have received advice and new tools for classification and energy efficiency. There are difficulties since the Municipality has a reduced management of waste fractions, only cans and glass.

9. Policy suggestions

There is greater concern about this problem, but the funds are still very limited, which generates over-application and low probability of award. Local chambers of commerce are fundamental for a correct implementation of policies and subsidies

Case study H14

1.Reference sources: case study type B

2. Basic Information

Case Title: Comprehensive Tire Management System under EPR Framework

Location: Chile

Sector: Tire management, circular economy

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (9 employees)

Core business activity: Comprehensive used and end-of-life tire management

Main products or services:

- Used tire collection services
- Tire logistics management
- Tire valorisation and recycling
- EPR (Extended Producer Responsibility) compliance support

- Certified tire management under Chilean regulations

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Recycling / upcycling, Resource efficiency, Tire retreading (reuse), regulatory compliance

Description of the CE solution adopted: H14 operates a comprehensive circular economy system for tires covering full lifecycle: collection, logistics, and valorisation. H14 System operates under Chile's Extended Producer Responsibility (EPR) law framework (Supreme Decree N°8), providing certified services to help producer partners meet regulatory valorisation targets. Includes tire retreading for reuse and recycling processes.

5. Co- creation and Innovation Process

Multi-level governance under EPR framework. Value chain integration (producers, logistics)

6. Main Outcomes and Impacts

Environment:

- Used and end-of-life tires diverted from landfills and illegal dumping
- Tire material valorisation and recycling
- Reduced environmental impacts from tire waste

Economy:

- Compliance services for producers
- Value recovery from tire materials
- Efficient logistics system

Social:

- Regulatory compliance support for tire industry
- Formalized tire waste management

7**. Challenges and Barriers**:

- Technological restrictions

8. Main drivers: EPR legal framework providing structure/demand, certified process credibility, comprehensive system (collection + logistics + valorisation), retreading capacity extending tire life, partner network model

9. Policy suggestions: not found.

Case study H15

1. References sources: case study type B

2. Basic Information

Case Title: Natural Cereal-Based Compostable Straws

Location: Colchagua Valley, Chile

Sector: Non-metallic manufacturing, sustainable food service products

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (3 employees)

Core business activity: Industrial manufacturing of 100% natural straws

Main products or services:

- Biodegradable straws made from cereal-derived raw materials
- Temperature-resistant (low and high) natural straws
- Compostable food service products

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Eco-design, Resource efficiency, Composting, agricultural application of waste

Description of the CE solution adopted: H15 manufactures straws from natural cereal-derived materials that are fully compostable and return to earth naturally as organic material. Production process includes composting of waste generated, with process water used to irrigate olive crops. The company actively promotes composting of their straws after use through education and awareness campaigns, creating a complete circular loop from agricultural materials back to agricultural soil.

5**. Co-creation and Innovation Process**

- Description of how the solution was developed: Product innovation to replace single-use plastics
- Evidence of co-creation: Customer education campaigns, agricultural integration
- Main methods used: Education campaigns, awareness raising, agricultural partnerships

6**. Main Outcomes and Impacts**

Environment:

- Reduction of single-use plastic straws
- Waste returned to soil through composting
- Water reuse in agricultural irrigation
- Natural resource preservation through biodegradable materials

Economy:

- Sustainable alternative product market
- Resource efficiency through waste valorisation

Social:

- Consumer education on sustainable alternatives
- Circular economy culture promotion

7**. Challenges and Barriers:** Limited knowledge

8**. Success Factors and Enablers**

- Natural material innovation (cereal-based)
- Complete circularity (agricultural input to agricultural output)
- Temperature resistance functionality
- Integrated waste management (composting, water reuse)
- Consumer education focus

9. Policy suggestions: not found.

Case study H16

1.References sources: case study type B

2. Basic Information

Case Title: Environment consulting

Location: Chile

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Small (19 employees)

Core business activity: Consultancy

Main products or services:

Consultancies, detailed studies, professional advice on sustainability, climate change, environmental topics. Research and advisory projects.

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Resource efficiency, Sustainability consultancy

Description of the CE solution adopted: With an integrative approach, H16 addresses challenges related to sustainability, climate change and a variety of topics associated with this field. Its

commitment extends to conducting in-depth research and executing consulting and advisory projects, with the aim of promoting sustainable and responsible practices in the corporate and social sphere.

5. Co- creation and Innovation Process

Value chain stakeholder engagement, promoting practices throughout client value chains

6. Main Outcomes and Impacts

Environment:

- Preserve and enhance natural capital (reducing environmental impact)

Economy:

- Creating value from CE business models (promote sustainable and responsible practices)

Social:

- Stakeholder involvement

7. Main drivers

Digital-first model (90% online) reducing environmental impact, integrated sustainability approach, value chain perspective, climate change focus, research capacity

8. Challenges and barriers: not found

9. policy suggestions: not found

3.2.5 UNI

Case study H17

1. Reference sources: case study type C

2. Basic Information

Case Title: WEEE Recycling for Environmental Protection and Social Support

Country: Paraguay

Sector: WEEE recycling (Waste Electrical and Electronic Equipment)

Date of Implementation: Agreement with National University of Itapúa signed August 4, 2025

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (6 employees)

Core business activity: Responsible WEEE recycling

Main products or services:

- Computer equipment recycling (monitors, printers, screens, tablets, keyboards, etc.)

- Electronics recycling (appliances, cell phones, batteries)
- Used supplies recycling (ink cartridges, toner)
- Refurbished computer assembly for donations
- Environmental education

4. Circular Economy Strategy Applied

Type of CE approach: Waste reduction, Recycling / upcycling, Resource efficiency, Equipment refurbishment, social support

Description of the CE solution adopted: Philosophy of "recreating and transforming" old computers through recovery and reuse of components. Equipment is refurbished using parts from multiple devices and donated to people in need. The process protects the environment by saving raw materials, energy, water, and fuel. Funds generated from recycling management support social cooperation activities with institutions, implementing the 3Rs principle: reduce, reuse, recycle. The main suppliers are private companies, as well as public entities that work in agreement. Recovered components can be reused at least 3 times as part of other reassembled equipment. Employees and collaborators receive training and instruction for better performance of their functions.

The reasons that motivate companies to apply CE practices: The main motivation for working in WEEE recycling management and with the circular economy is related to both the market and consumers. It is about establishing a position, raising awareness about WEEE management and the use and conservation of raw materials.

5**. Main Outcomes and Impacts**

Environment:

- Waste reduction and management “WEEE diverted from environment”
- Resource efficiency Reduced need for virgin raw materials
- Preserve and enhance natural capital Energy, water, and fuel saving, Prevention of pollution from obsolete equipment

Economy:

- Resources generated for social causes
- Value recovery from components

Social:

- Computer access for people in need
- Support for social institutions

- Environmental education. Working with universities is very important for the firm. Indeed, it is a constant learning process where they exchange ideas and knowledge that help the firm continue to improve the service they offer. With the university they only see openness and an environment of cooperation to explore other areas of interest.

6**. Co-creation and Innovation Process**

Academic-private sector partnership: Agreement signed with National University of Itapúa (UNI) August 2024 for good environmental practices and WEEE management. Collaboration with institutions, private companies HEADCET Project event: 'Circular Economy and Electronic Waste: Challenges and Opportunities'.

Connection between this company with HEADCET through the event "Circular Economy and Electronic Waste: Challenges and Opportunities"

It is good to remark that 4 August 2025, Within the framework of the HEADCET Project (Higher Education Partnerships for Sustainable Local Development through Circular Economy and Social Innovation) funded by the European Union through the ERASMUS+CBHE Program, the event "Circular Economy and Electronic Waste: Challenges and Opportunities" was held today, in the National University of Itapúa (UNI).

The event aims to create spaces for reflection, learning, and institutional coordination around the issue of e-waste and the opportunities presented by the circular economy, promoting sustainable and innovative actions at the university level.

During this initiative, an agreement was signed between the UNI, represented by Professor Dr. Hermenegildo Cohene Velázquez, Rector of the UNI and President of the Association of Public Universities of Paraguay (AUPP), and the organization H17 de Paraguay Insumos SA. This agreement represents an important step toward the coordination between academia and the private sector in the implementation of good environmental management practices, particularly in the responsible treatment of Waste Electrical and Electronic Equipment (WEEE).

7**. Challenges and Barriers**

Challenges faced: Knowledge barriers. The main barrier is the limited knowledge or lack of interest from some sectors that still persist, thus ignoring the impact that the circular economy could have on communities.

8**. Drivers**

University partnership (formal agreement), HEADCET Project involvement, social mission integration, three-pillar approach (reduce/reuse/recycle), institutional cooperation model, donation program

9**. Policy suggestions**

They currently work with some municipal and departmental agencies in the management and handling of WEEE. They would like to continue growing in these cooperations and agreements to be able to fulfil their objectives.

Case study H18

1. References sources: case study type C

2. Basic Information

Case Title: Circular Economy Business Consulting Services

Location: Paraguay

Sector: Business consulting services, circular economy advisory

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: Micro (4 employees)

Core business activity: Strategic consulting and circular economy advisory

Main products or services:

1. Business strategy and growth consulting
2. Marketing and positioning services
3. Finance and administrative management advisory
4. Human resources and organizational development
5. Innovation management
6. Circular economy consulting and implementation support

4. Circular Economy Strategy Applied

Type of CE approach: Eco-design, Resource efficiency, Advisory services, capacity building, business model transformation

Description of the CE solution adopted: H18 provides specialized consulting to help companies, cooperatives, and public institutions develop products and services based on circular economy principles. Services integrate economic viability with environmental and social responsibility, offering customized solutions for sustainable business growth. Focus on practical implementation of CE principles across diverse organizational types, building value while reducing. They collaborate with micro, small and medium-sized enterprises. They have a signed alliance with the Faculty of Economic and Administrative Sciences of UNI and the HEADCET-UNI project.

How they measure the economic value generated for their clients: They have developed some circular economy project prototypes with their clients: such as circular craft beer and pyroligneous extract for a sausage factory.

The reasons that motivate companies to apply CE practices: The interest arises from knowledge about the circular economy and innovation topic. In Paraguay there are some incentives that companies can apply for to benefit from funds to develop circular projects.

5. Co-creation and Innovation Process

- Develop circular economy project prototypes together with clients (e.g., circular craft beer, pyroligneous extract for a sausage factory)
- Business Modeling workshops with a circular economy approach (example: with the HEADCET-UNI university project in November 2025)
- Strategic alliances with academic institutions (Faculty of Economic and Administrative Sciences of UNI)
- Customized consulting that integrates client company knowledge with H18 CE expertise

6**. Main Outcomes and Impacts**

Environment:

- Environmental protection through client CE implementation
- Reduced environmental footprint of client operations

Economy:

- Cost reduction for clients
- Sustainable business growth
- Increased results for clients
- Value building

Social:

- Capacity building in CE principles
- Positive community impact
- Sustainable development promotion. They are conducting a Business Modeling workshop with a circular economy approach with the HEADCET-UNI project in November 2025, as part of the alliance they have with the university. Generally, university is always open to new projects.

7**. Challenges and Barriers**

Limited knowledge. The issue is that companies show interest, but still have limited knowledge of the impact that circular economy projects have

8**. Drivers**

Institutional cooperation model, university partnership

9**. Policy suggestions:**

As the effects of climate change are increasingly felt, municipalities, governorships, and others seek to promote these topics on the activity agenda

Case study H19

1. References sources: case study type A

2. Basic Information

Case Title: Brewery company

Location: Paraguay, Ypanè

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: NS

Core business activity: Company

Main products or services: Production of beers. They commercialize more than 20 brands, both local and imported. They produce and package beverages from both local and international brands, which are then transported to their Distribution Centres across the country.

4. Circular Economy Strategy Applied

Type of CE approach: Resource efficiency/ Glass Recycling

Description of the CE solution adopted: H19 has implemented a comprehensive Circular Economy (CE) strategy rooted in social, environmental, and governance excellence. As the first large industry in Paraguay to become a Certified B Corporation, the company demonstrates high standards of transparency, environmental stewardship, social responsibility, and ethical governance. The certification, granted by the global nonprofit B Lab, assesses five key areas: Governance, Workers, Customers, Community, and Environment, ensuring continuous improvement and alignment with CE principles.

From an environmental perspective, H19 promotes circularity through large-scale glass recycling, incorporating on average more than 80% recycled glass in its bottles. Its Fábrica Paraguaya XXX operates with one of the world's largest industrial furnaces powered by 80% renewable electric

energy, enabling the sustainable production of new containers and reducing dependence on virgin materials. Across operations, the company advances energy efficiency through renewable energy sources, solar panels, electric vehicles and forklifts, natural lighting in logistics centres, and optimized industrial systems, contributing to a steady reduction of CO_2 emissions and increased resource efficiency.

On the social dimension, H19 strengthens local development through its Industrial Training Program, which enhances the employability of young people in Ypané and nearby communities. The initiative offers technical training—such as electricity with PLC specialization and welding—and soft skills development through theoretical–practical modules aligned with industry demands. More than 300 young people have been trained as of 2024, contributing to skilled job creation and community empowerment, with the next call scheduled for 2025.

5**. Co- creation and Innovation Process**

- Collaboration with NGOs and institutions on social programs
- Sustainability and awareness campaigns involving citizens
- Community-based initiatives supporting environmental progress

6. Main Outcomes and Impacts

Environment

- Energy efficiency
- Reduction of GHG emissions
- Recycle
- Making value of non-virgin resources
- Extend natural resource lifetime

Social

- Community involvement
- CE-related education and training
- Qualification / requalification of workers
- Involvement of different stakeholders
- Income opportunities for local communities

Governance

- Collaboration with stakeholders
- Participation in CE networks
- Governance aligned with sustainability

7. Main Drivers

Certified B-Corporation, Energy efficiency and reduction of GHG emissions. Strong involvement in local communities

8. Challenges and barriers: not found

9. policy suggestions: not found

3.2.6 USC

Case study H20

1. References sources: case study type A

2. Basic Information

Case Title: Recycling Company

Location: Paraguay

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: NS

Core business activity: Recycling

Main products or services: The company is a recycling industry that produces plastic resins and derived products from recycled materials and markets them locally and regionally.

4. Circular Economy Strategy Applied

Type of CE approach: Recycle, Resource Efficiency.

Description of the CE solution adopted: They aim to be global leaders in the recycling and circular economy industry, producing various types of recycled plastic resins and their derived products, with excellent standards in operational processes, technological resources, and a high level of competencies, to provide the market with the best products at highly competitive prices.

The Values are:

- Integrity
- Teamwork
- Customer focus and attention to requirements
- Compliance with legal and regulatory requirements
- Focus on safety and hygiene
- Obsession with quality

- Innovation and continuous improvement
- Social and environmental responsibility

5**. Co-creation and innovation Process**

Strategic partnerships with local recycling communities, Customer-driven development of quality standards

6**. Main outcomes and impacts**

Environment:

- Waste reduction by diverting PET, HDPE, and polypropylene from landfills
- Resource conservation through reduced virgin plastic consumption
- Energy savings (recycled PET uses only 30% of virgin PET energy requirements)
- Lower carbon footprint and greenhouse gas emissions
- Reduced transportation impact due to lightweight materials

Social:

- Community engagement through multi-city material sourcing
- Job creation across recycling, production, and logistics operations
- Promotion of sustainable practices and recycling awareness

Economy:

- Cost efficiency from lower raw material expenses versus virgin resins
- Competitive pricing enabled by efficient processes
- Market leadership positioning in high-quality recycled products
- Diversified revenue streams across multiple sectors (packaging, industrial, textiles)

7**. Drivers**

Significant reduction of plastic landfilling, Diversification into multiple markets (packaging, textiles, industrial inputs)

8. Challenges and barriers: not found

9. policy suggestions: not found

Case study H21

1. References sources: case study type A

2. Basic Information

Case Title: Wholesale metals and minerals

Location: Paraguay

Status: Ongoing

3. Description of the enterprise (SMEs or others)

Type of enterprise: NS

Core business activity: H21 is a company dedicated to the purchase, classification, and compaction of metals for subsequent export.

Main products or services: Metals and minerals

4. Circular Economy Strategy Applied

Type of CE approach: recycling

Description of the CE solution adopted: With recycling, they contribute to the cleaning of the environment and help reduce the overload of landfills, supported by a solid waste management plan for both ferrous and non-ferrous materials.

It is the first and only collecting company certified under the ISO 9001 Quality Management System, a credential that strengthens existing internal processes, ensuring transparency in operations and in dealings with suppliers and customers. They are a company that generates business based on recycling, seeking the growth of our suppliers, employees, and shareholders, committed to the country and the environment. Their management is based on the following principles:

- Quality in products and in the processes of collection, storage, selection, and compaction of waste.
- Quality in people, by selecting, training, and motivating top-level professionals.
- Environmental commitment: recognizing that recycling
- Continuous improvement: promoting employee participation in the improvement of processes, performance, and the effectiveness of the Quality Management System.
- Corporate Social Responsibility.

5. Co-creation and Innovation process

Supplier partnerships including households and small recyclers.

6. Main outcome and impacts

Environment

- Waste reduction. By purchasing, classifying, and compacting ferrous and non-ferrous metals, the company diverts large quantities of waste from landfills, reducing pollution and extending landfill lifespan.

- Recycling metals reduces the need for mining and extraction of virgin raw materials, significantly lowering environmental impact, energy consumption, and emissions.
- Cleaner and safer environments: Their solid waste management plan ensures proper handling of recyclable materials, preventing environmental contamination.
- Active environmental protection initiatives: Projects like the "Dengue Plan" help eliminate mosquito breeding sites, contributing to public health and environmental sanitation.

Economy

- Generate employment and professional development: The company invests heavily in staff training, education, and continuous improvement, raising the skills and opportunities of its workforce.
- Promote transparency and good corporate practices

Social

- Contribution to community well-being
- The company aims to build citizen awareness about recycling and environmental conservation.

7**. Drivers**

ISO 9001 Certification ensuring quality and transparency, Reduction of pollution and landfill overload

8. Challenges and barriers: not found

9. policy suggestions: not found

Case study H22

1. References sources: case study type A

2. Basic Information

Case Title: Production and export of high-quality meat

Location: Paraguay

Status: Ongoing

Date of implementation. 2000

3. Description of the enterprise (SMEs or others)

Type of enterprise: NS

Core business activity: production of meat

Main products or services: meat, pork cuts

4. Circular Economy Strategy Applied

Type of CE approach: HACCP, Paraguay Country Brand certification

Description of the CE solution adopted: H22 is dedicated to ensuring food safety through the implementation of advanced technologies and strict quality controls. The company is proud to be the only meat processing plant in the country authorized to export pork cuts and has the HACCP and Paraguay Country Brand certification. H22 offers a wide range of cold cuts and sausages, representing the quality and sustainability of Paraguayan production in the world. Country Brand is an international competitiveness strategy to capitalize on a country's reputation in international markets. It has three dimensions: tourism, exports and foreign direct investment. It is a value proposition of what a country offers to the world, to its visitors, to its potential investors and in terms of goods and services. The term is born from the need of the business sectors and governments to generate their own identity in the face of international markets.

5. Co-creation and Innovation Process

- Collaboration with inspection bodies and certification agencies
- Coordination with livestock producers to improve raw material quality
- Training partnerships with technical and educational institutions

6**. Main impact and outcomes**

Environment

- Sustainable production standards
- Efficient use of raw materials
- Promotion of local sustainable livestock practices
- By working with regional producers, H22 indirectly encourages better livestock management, animal health, and traceability, contributing to a more sustainable agricultural system.

Social

- Skills training and workforce development: The company invests in training employees in safety, hygiene, and modern production techniques, improving local human capital.
- Contribution to food safety. Through HACCP and strict controls, H22 provides safe and high-quality food products to the population, protecting public health.

Economy

- Export-driven economic growth.
- Value-added production

- Supply chain strengthening

7.Drivers: Implementation of HACCP and high-standard food safety systems, Support for sustainable livestock practices

8. Challenges and barriers: not found

9. policy suggestions: not found

4 Good Practices

This chapter presents ten good practices of Circular Economy (CE) implementation by SMEs in the Latin American and Caribbean (LAC) context. These good practices derive from a further in-depth analysis of ten case studies identified and examined within the HEADCET project, namely cases **H1, H2, H3, H5, H8, H9, H11, H13, H17, and H18.**

The selection of these cases was guided by the richness and diversity of the information they provide, as they cover the key elements emerging from the comprehensive conceptual framework and allow for capturing the multiple, well-established CE dimensions as they relate to SMEs' activities in the LAC region.

The good practices are presented thematically, following the conceptual framework introduced in the opening section of the handbook. This approach ensures coherence with the analytical "red thread" underpinning the overall research and knowledge-building activities of this work. In doing so, the chapter closes the analytical loop by translating the conceptual framework into concrete, practice-based evidence drawn from real-world SME experiences.

These good practices, which—as will be shown—are strongly interconnected with one another, provide actionable insights not only for policy design and implementation, but also for Higher Education Institutions (HEIs), supporting them in strengthening their engagement with sustainable development and in coherently aligning their educational, research, and outreach activities with SMEs' circular economy (CE) and social innovation (SI) strategies.

4.1 Tailored product, process, and business model innovations

The implementation of a circular philosophy within SMEs' activities proves effective when firms—and the actors collaborating with them—can design new products, often starting from production by-products, and to develop innovative processes capable of upcycling these residual materials into products with higher environmental value added. These innovations should be embedded within specific circular business models, based on strategies of diversification and differentiation. In particular, diversification can be achieved through the introduction of new production lines, while differentiation relies on enhancing the quality of products offered to the market—where quality, as discussed, may also be understood in terms of environmental performance. Such processes must be tailored to the specific characteristics and resources of firms, as well as to the sectors in which they operate (or may potentially operate), the technologies available, and the partners involved—thus reflecting broader local contextual conditions. Moreover, different strategies are required depending on whether the aim is to transform an existing business model or to establish a newly created, CE-

born enterprise. The ability to support effective upscaling towards circular business models depends therefore on the capacity to implement targeted and differentiated product innovations that contribute to closing production cycles, through innovative and integrated production processes, which may also be distributed across multiple and coordinated firms. All these elements are also closely interconnected with the subsequent dimensions, including, for instance, a growing attention to the social sphere and to the social objectives underlying this transition in productive organisation.

Cases: H1, H2, H3, H5, H8, H11, H13, H17, H18

4.2 Research and development and tacit, incremental innovation

Circular productive models are strongly dependent on the ability to generate not only product but also process and technological innovations aimed at reducing environmental impacts. A primary example is the reuse of industrial by-products, which helps limit both the consumption of new raw materials and the use of energy resources. To support product and process CE innovation, research and development (R&D) activities play a crucial role. Dedicated R&D units can provide experimental laboratory spaces, as well as hubs for the exchange and transmission of scientific and technological knowledge. Given the characteristics of the firms under analysis, such functions may also be effectively embedded within Higher Education Institutions (HEIs). Indeed, SMEs are widely recognised in the literature as business organisations that are less vertically integrated than large enterprises and typically lack clearly defined and internalised R&D departments, as is instead the case for large firms. This reflects not only organisational differences, but also the high costs associated with maintaining formal R&D structures, which are often unsustainable for smaller firms. Nevertheless, SMEs frequently act as centres of innovation, particularly incremental innovation, which is largely supported by tacit rather than explicit knowledge. From this perspective, the importance of experimenting with and creatively redefining alternative circular economy business models and solutions for SMEs at the intersection between spaces of explicit scientific knowledge—such as universities and research laboratories—and small productive realities rich in tacit knowledge.

Cases: H1, H3, H5, H8, H11, H17

4.3 Interconnections with digital technologies, traceability, and data

Circular economy (CE) innovation for SMEs and digital technologies is strongly interconnected. Although, as noted before, the transition towards sustainable development cannot rely solely on technological innovation, the role of digital technologies as enabling and supporting factors is nevertheless crucial. In this regard, the Industry 4.0 paradigm—particularly through the development

of digital twins of physical production systems—allows firms to significantly optimise production processes and resource use, reducing costs and waste while improving alternative waste management strategies. Beyond process optimisation, digital technologies facilitate the creation and strengthening of relationships with both existing and new partners along value chains, also at the international level. In doing so, they enable SMEs to access broader CE value chains beyond local and national contexts. Moreover, digital technologies play a key role in establishing material traceability systems, allowing firms to monitor the use, flows, and movements of resources throughout production processes and along value chains. The resulting data constitute a valuable input for further optimisation of production processes and for identifying additional opportunities for product upcycling. At the same time, from the consumer perspective, traceability systems support transparency and credibility, helping to prevent misleading practices such as greenwashing. However, for these technologies to be effective, they must be appropriately adapted to the specific characteristics, capacities, and constraints of SMEs.

Cases: H5, H8, H11

4.4 Green competitive advantages

Building on the previous discussion and on the evidence emerging from the cases studies, a crucial point emerges in addressing circular economy (CE) strategies for SMEs and for other types of business organizations as well. CE—and green strategies more generally—can represent a source of competitive advantage that firms need to recognise and strategically leverage. In a rapidly changing world, particularly from a climatic and environmental perspective, the ability to anticipate, respond to, and capitalise on these transformations through coherent business strategies allows firms not only to enhance their profitability, but also to position themselves at the frontier of emerging sustainability-oriented markets. While such issues may still be underestimated by some consumers and policymakers, environmental and climate pressures are likely to translate into tangible economic and regulatory costs over time. In this sense, firms that proactively integrate CE principles into their business models are better prepared to face future constraints and uncertainties, turning environmental challenges into strategic opportunities. This holds if firms are able to design and implement tailored circular business models, adapted to their specific characteristics, resources, and operating contexts, and conceived as multidimensional frameworks grounded in a triple approach—economic, social, and environmental—supported by collaboration and partnership networks.

Cases: H1, H2, H3, H5, H8, H9, H11, H13, H17, H18

4.5 Human resources and skills upgrading

A further fundamental dimension concerns the human and cultural aspects underpinning the processes through which circular economy (CE) strategies are defined and implemented within SMEs. The transition towards circular and sustainable business models requires the development of an organisational culture oriented towards social, environmental, and economic sustainability, alongside the capacity to integrate and develop human resources equipped with skills relevant to CE-related product and process innovations. In this respect, specific training activities focused on circular economy principles and practices within firms play a crucial role, as they enable the continuous upgrading of workers' skills and competencies. Such training not only supports the effective implementation of CE strategies but also facilitates the internal diffusion of sustainability-oriented mindsets and practices across different organisational levels. Moreover, the adoption of CE strategies is often associated with improvements in working conditions, both in terms of occupational safety and health and in relation to hygiene and environmental standards within production processes. At the same time, CE-oriented transitions can generate new employment opportunities. In this sense, investments in human capital and skills development emerge not only as a prerequisite for CE innovation, but also as a driver of broader social benefits at the local level, as further explored below.

Cases: H1, H2, H5, H17

4.6 Tailored, place-based, multi-actor and multilevel governance

The adoption of effective circular economy (CE) strategies by SMEs needs to be embedded within broader sustainable development pathways, coordinated through tailored and place-based forms of multi-actor and multilevel governance. Such governance arrangements recognise that CE transitions cannot follow a one-size-fits-all approach, but must instead be adapted to the specific socio-economic, institutional, and territorial characteristics of local contexts. These alliance-based governance models often draw on quadruple and quintuple helix frameworks, involving the interaction of local and supra-local public authorities, universities and research institutions, businesses organizations, civil society actors, and environmental agencies and activists. Within these configurations, the role of public institutions extends beyond regulation, encompassing facilitation, coordination, and the creation of enabling environments for CE innovation. Crucially, these governance mechanisms need to be actively participatory, co-designed and continuously shaped by the actors involved, including local communities themselves. This participatory dimension is essential, as both CE projects and CE-oriented business models increasingly generate economic, social, and environmental effects at the local level. Ensuring the active involvement of local

communities therefore enhances the legitimacy, effectiveness, and long-term sustainability of CE strategies within SMEs.

Cases: H1, H5, H8, H9, H11, H18

4.7 Coherent and updated regulatory framework

In line with the discussion above and drawing on the insights from the case studies, the need emerges to support effective circular economy (CE) innovation for SMEs through a clear, well-structured, and coherent regulatory framework. The absence of regulation in certain areas, as well as the fragmentation of existing rules—often left to regional discretion rather than being defined at the national level—constitutes a significant barrier to the efficient implementation of CE models by SMEs. It is therefore essential to ensure the presence of an updated regulatory framework, capable of keeping pace with scientific and technological developments as well as with global trends which, as highlighted, underpin innovation in both products and production processes. Such a framework should consistently support the multidimensional nature of CE strategies adopted by firms, integrating economic, environmental, and social objectives. In this sense, a coherent regulatory framework combining both sector-specific regulations and cross-sectoral provisions represents a key enabling factor and an important driver for the diffusion, scalability, and long-term stability of circular economy strategies, particularly within the SME context.

Cases: H1, H2, H3, H5, H8, H18

4.8 Incentive systems and financial support

Supporting circular economy (CE) innovation in SMEs requires not only a coherent regulatory framework, but also the availability of adequate public financial instruments, subsidies, and incentive schemes aimed at triggering and sustaining the adoption of circular practices within firms. The transition towards circular business models typically entails long-term investments that SMEs may struggle to undertake due to limited liquidity, insufficient awareness of available green opportunities, and the high levels of risk and uncertainty associated with innovative and transformative processes. In this context, public action plays a crucial role in designing and coordinating a system of financial support and economic incentives capable of lowering entry barriers and enabling firms to overcome the initial costs of transition. Importantly, these incentive systems should be tailored to specific sectors and local contexts, reflecting differences in productive structures, market conditions, and technological capacities. At the same time, they should avoid taking the form of permanent or purely compensatory support. Rather, financial incentives should be conceived as temporary and enabling

mechanisms, designed to catalyse change, reduce perceived risks, and activate self-sustaining circular business dynamics over time.

Case Studies: H1, H5, H8, H9, H11, H13

4.9 Awareness-raising actions

Barriers to circular economy (CE) transitions among SMEs are not limited to economic or regulatory constraints but also include knowledge and information gaps. Many SMEs lack access to information on circular solutions, available funding opportunities, and the potential returns on investment associated with CE strategies. As a result, firms may fail to fully recognise the competitive advantages embedded in innovative circular business models. At the same time, limited awareness also affects the demand side. Consumers may not fully perceive the broader value of CE-oriented products and services, which extends beyond improved environmental performance to include wider socio-economic and environmental benefits. These benefits often materialise within the very local communities in which SMEs are embedded, contributing to local development dynamics. In this context, awareness-raising actions and targeted communication initiatives play a crucial role in supporting CE transitions. Such actions should address both the supply side—by informing and guiding SMEs—and the demand side, by increasing consumer awareness of CE strategies and their multiple benefits, thereby reinforcing market demand for circular solutions.

Case studies: H3, H5, H8, H9, H18

4.10 Social sphere and local embeddedness of CE SMEs

The social aspect represents a key dimension of circular economy (CE) strategies for SMEs, particularly when considering the strong embeddedness of these businesses in local contexts and communities. The benefits of CE transitions extend beyond environmental and economic outcomes, generating direct positive effects within the local social sphere. These include the creation of new employment opportunities, often associated with improved working conditions, higher occupational safety standards, and increased income opportunities at the local level. Moreover, CE practices can contribute to enhancing quality of life by reducing pollution and waste, thereby improving environmental and hygiene-related conditions within local communities. Finally, CE-oriented business models can also foster social inclusion, providing opportunities for skill development and employment for vulnerable or underrepresented groups, such as women. In this sense, the embeddedness of CE SMEs within specific local contexts further reinforces the transformative potential of CE strategies, linking environmental innovation with broader and diversified socio-

economic development objectives. Moreover, by reinforcing the social dimension, it becomes possible to observe forms of social innovation that, in turn, foster more sustainable local socio-economic development and enhance the resilience and performance of SMEs' productive activities.

Case studies: H1, H2; H5, H11, H17

5. Concluding Remarks

The evidence that emerged from the dataset of case studies emphasizes first of all the central role of SMEs as key actors in the processes of transition towards circular economy models and, more generally, towards sustainable development paths. At the same time, the analysis shows how circular economy strategies can represent, even for SMEs in LAC (Latin America and the Caribbean) countries, a strategic added value for their production and organizational activity. However, these strategies need to be consistent with factors specific to individual companies and the contexts in which they operate. The circular economy does not act on a single dimension of the company and the context in which it operates but it is configured as a multidimensional framework in which a systematic and integrated implementation between the various dimensions is essential to succeed.

The analysis identifies a key role for four context actors:

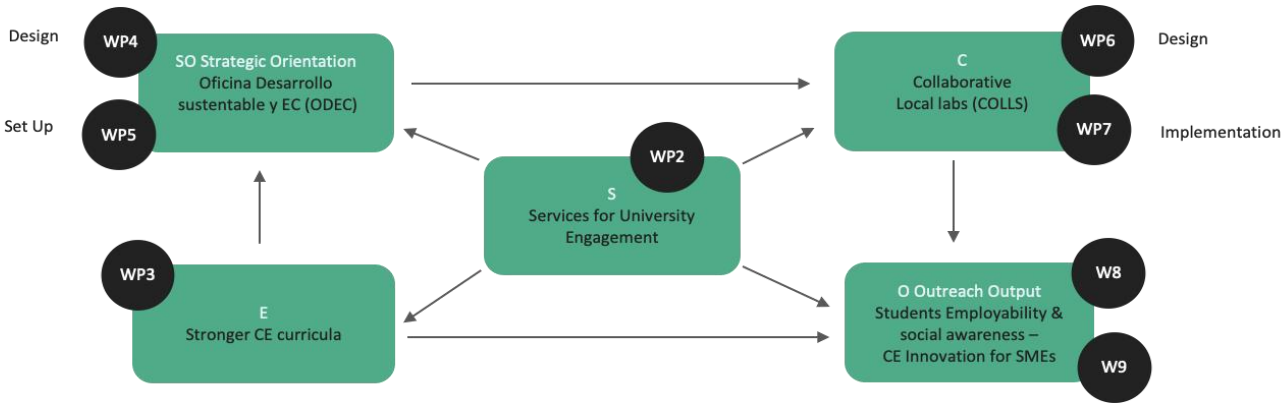
- Universities are key players in supporting SMEs. Their contribution is expressed both through the production of new knowledge and technological and scientific transfer (as illustrated in the good practices related to R&D and incremental innovation), and through their active involvement in multi-actor partnerships as a link between enterprises, public institutions and civil society.
- Public action and policies are essential to provide clear, consistent and up-to-date regulatory frameworks, and to promote sectoral and cross-sectoral interventions to ensure the availability of appropriate sets of specific public goods (as per EU experience). The absence or the fragmentation of public action represents a concrete barrier to the adoption and spread of circular economy practices by SMEs.
- This is accompanied by the importance of financial instruments, incentives and subsidies, also with the involvement of international financial actors, able to reduce initial risks and support long-term investments.
- In addition, to reduce the risks of greenwashing or vice versa green hushing, appropriate regulatory framework and incentive schemes play a central role in helping companies in developing credible narratives, supported by verifiable data and practices and related to a growing awareness of consumer associations and local communities.

With reference to the LAC context, one, often necessary, area of intervention concerns also the support from informality to economic relations protected by a formal legal and contractual basis, with repercussions on both economic and social aspects.

The above results, on top of HEADCET's WP9 tasks, leads to two concluding considerations.

First, the discussion of the case studies confirms the approach proposed by the HEADCET project, where its activities have been integrated in a coherent way, on the side of the partner universities in the LAC countries, with social innovation and sustainable development between companies and within the territorial actors. Remember that the HEADCET activities have concerned the strengthening of the educational offer and of the services of university engagement of the partner universities LAC (see WP2 and WP3), and the establishment of structures and projects dedicated to job placement and technological and social innovation in the field of circular economy and sustainable development, namely the ODEC (see WP4, WP5), the COLL (see WP6, W7) and the CADEC (see WP8).

***Figure 3**: The architecture of HEADCET work packages*



Source: HEADCET project

Secondly, there are also some implications for EU universities and institutions from the case studies in this handbook. We highlight two of them. One implication is that CE practices in an extended sense, that is multidimensional, multi-actor and combined with outcomes of social innovation and sustainable development, are not only present with significant and specific cases also in the LAC context, which is by itself not new or surprising, but also show the possibility of embedding such practices also with SMEs and in contexts that are generally less robust in terms of capital endowments. The key to these perspectives seems to be a more widespread awareness that strategies of this type are the basis for escaping predatory models upon the resources of the territories themselves. The other implication is that projects of collaboration on these fields between European and LAC partners may have solid support in experiences and approaches already present at various

territorial and institutional levels, as in a sense it is also demonstrated by the successful deployment of HEADCET activities.

References

Becerra, L., Carenzo, S., & Juarez, P. (2020). When circular economy meets inclusive development. Insights from urban recycling and rural water access in Argentina. *Sustainability*, *12*(23), 9809.

Bellanca, N., (forthcoming 2025). Reteirada sostenible y educaciòn para la adaptaciòn: una pedagogìa del decrescimento justo. ¿

Bellandi, M., Corpakis, D., Donati, L., (2023). Governing New and Traditional Partnerships for Innovation and Development in the Post-Pandemic World. *Triple Helix* 10.1 (2023): 1-11.

Bellandi, M., & De Propris, L. (2021). Local productive systems' transitions to industry 4.0+. *Sustainability*, *13*(23), 13052.

Bellandi, M., & Stark, E. (2025). SME clusters as the driving force behind the popularization of slow fashion. *European Planning Studies*, 33(6), 832-851.

Biggeri, M., Clark, D. A., Ferrannini, A., & Mauro, V. (2019). Tracking the SDGs in an 'integrated'manner: A proposal for a new index to capture synergies and trade-offs between and within goals. *World Development*, 122, 628-647.

Brenes, K. C., (2024). Cuando China cerrò la puerta, debimos abrir las ventanas. In Henríquez-Aravena, A. y Martínez-Cerna L. (2024*). América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies.* W. W. Norton & Company.

Cea-Valencia, J., Villegas-Huencho, A., & Sion-Sierra, R. (2020). Barriers and opportunities for the transition to a circular economy. A case study of Chilean cooperatives. *Journal of Business, Universidad del Pacífico (Lima, Peru)*, *12*(1), 63-81.

De Propris, L., & Bailey, D. eds. (2020). *Industry 4.0 and regional transformations*. Taylor & Francis.

Donati, L., Stefani, G., & Bellandi, M. (2023). The evolutionary emergence of quintuple helix coalitions: A case study of place-based sustainability transition. *Triple Helix*, 10(1), 125-155.

Ellen MacArthur Foundation (EMF) (2013). *Towards the Circular Economy,* vol. 1, Isle of Wight.

Ellen MacArthur Foundation (EMF) (2017). *A circular economy in Brazil: Case study appendix.* A product of the collective expertise of members of the CE100 Brasil Network,CE100 Brasil.

European Commission (2015). *Closing the loop- AN EU action plan for the Circular Economy* https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF.

European Commission (2020). *A new circular economy action plan for a cleaner and more competitive Europe*. European Commission. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN.

European Commission (2025a). *Circular economy: https://environment.ec.europa.eu/strategy/circular-economy_en* (accessed on 09 December 2025).

European Commission (2025b). Green claims: https://environment.ec.europa.eu/topics/circular-economy-topics/green-claims_en (accessed on 09 December 2025).

European Commission (2025c). EU EColabel: https://environment.ec.europa.eu/topics/circular-economy-topics/eu-ecolabel_en (accessed on 09 December 2025).

European Commission (2025d). Eco-Management and Audit Scheme (EMAS): https://green-forum.ec.europa.eu/green-business/emas_en (accessed on 09 December 2025).

European Parliament (2006). Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 Concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/ EEC, 93/105/EC and 2000/ 21/EC. https://eur-lex.europa.

European Parliament (2024a). Directive (EU) 2024/825 of the European Parliament and of the Council of 28 February 2024 amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better protection against unfair practices and through better information (Text with EEA relevance). https://eur-lex.europa.eu/eli/dir/2024/825/oj/eng

European Parliament (2024b). Directive (EU) 2024/1799 of the European Parliament and of the Council of 13 June 2024 on common rules promoting the repair of goods and amending Regulation (EU) 2017/2394 and Directives (EU) 2019/771 and (EU) 2020/1828 (Text with EEA relevance). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024L1799

Galatti, L. G., & Baruque-Ramos, J. (2022). Circular economy indicators for measuring social innovation in the Brazilian textile and fashion industry. *Journal of Cleaner Production*, *363*, 132485.

Henríquez-Aravena, A.; Cortés, A., Ulloa, V., (2024). Emprendimientos Circulares en América Latina y el Caribe: Recomendaciones y Desafíos in Henríquez-Aravena, A. y Martínez-Cerna L. (2024*). América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Henríquez-Aravena, A.; Martínez-Cerna, L., (2024). *América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Lehmann, L., (2024). Economía Circular: Un nuevo modelo económico con el ser humano en el centro in Henríquez-Aravena, A. y Martínez-Cerna L. (2024*). América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Losa, R., (2025). Public policies on circular economy: A systematic review. *Ecological Economics,* 228, 108452.

Muñoz, L., (2024). Desempeño Ambiental, una fase de la ruta técnica para que las empresas logren la aplicación de la Economía Circular. In Henríquez-Aravena, A. y Martínez-Cerna L. (2024*). América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Nallim, A., (2024). H11 Barreras y oportunidades en el camino del reciclaje. In Henríquez-Aravena, A. y Martínez-Cerna L. (2024). *América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Ostermann, C. M., Nascimento, L. D. S., Steinbruch, F. K., & Callegaro-de-Menezes, D. (2021). Drivers to implement the circular economy in born-sustainable business models: a case study in the fashion industry. *Revista de Gestão*, *28*(3), 223-240.

Prieto-Sandoval, V., Torres-Guevara, L. E., Ormazabal, M., & Jaca, C. (2021). Beyond the circular economy theory: Implementation methodology for industrial SMEs. *Journal of Industrial Engineering and Management (JIEM)*, *14*(3), 425-438.

Rezaie, S., Jokiaho, J., André, K., & Vanhuyse, F. (2025). *Advancing the circular economy in Latin American and Caribbean cities: Evaluation of Bogotá's circular economy strategy*. Stockholm Environment Institute. https://doi.org/10.51414/sei2025.012.

Sapollnik, L., (2025). *Transición circular en la industria textil: el caso de una PyME (pequeña y mediana empresa) argentina*. Trabajo Final de Máster (TFM), Área de Estudios Internacionales Máster en Desarrollo Sostenible. Istituto Seneca.

Schneider, F., Aanestad, A & Carvalho, T. C. (2024). Exploring barriers in the transition toward an established e-waste management system in Brazil: a multiple-case study of the formal sector. *Environment, Development and Sustainability*, 1-21.

Schröder, P., Albaladejo, M., Alonso Ribas, P., MacEwen, M., & Tilkanen, J. (2020). *The circular economy in Latin America and the Caribbean: Opportunities for building resilience.* London: Chatham House: Energy, Environment and Resources Programme.

Silva, F. C., Shibao, F. Y., Kruglianskas, I., Barbieri, J. C., & Sinisgalli, P. A. A. (2019). Circular economy: analysis of the implementation of practices in the Brazilian network. *Revista de Gestão*, *26*(1), 39-60.

Suchek, N., Ferreira, J. J., & Fernandes, P. O. (2022). A review of entrepreneurship and circular economy research: State of the art and future directions. *Business Strategy and the Environment*, *31*(5), 2256-2283.

Torres-Guevara, L. E., Prieto-Sandoval, V., & Mejia-Villa, A. (2021). Success drivers for implementing circular economy: a case study from the building sector in Colombia. *Sustainability*, *13*(3), 1350.

(UNEP) United Nations Environment Programme & (EMF) Ellen MacArthur Foundation (2022). *Circular Economy in Latin America and the Caribbean: A Shared Vision*. Available at: https://content.ellenmacarthurfoundation.org/web/a7feff421173399c/circular-economy-in-latin-america-and-the-caribbean---a-shared-vision/

UNESCO, (2015), *Incheon declaration and framework for action for the implementation of sustainable development goal 4*, Paris UNESCO.

Valencia, M., Garzón, A. (2024). *Huella Verde: reusar es más circular*. In Henríquez-Aravena, A. y Martínez-Cerna, L. (2024). *América Latina Circular: avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Victoriano,N. C., Da' Costa, D., Bomfim Alves, R., Meini, L., *Economic CirculAbility©®*. In Henríquez-Aravena, A. y Martínez-Cerna L. (2024*). América latina circular, avanzando hacia el desarrollo sostenible*, CircularTec, CIEC, CORFO.

Appendix 1- First questionnaire

Preguntas de perfil PYMES

Estimado participante: Gracias por dedicar su tiempo a contribuir al **Proyecto HEADCET**, https://www.HEADCET.eu/ una iniciativa financiada por la Unión Europea que reúne a universidades europeas y latinoamericanas para promover prácticas de economía circular (EC) y el desarrollo empresarial sostenible.Estamos investigando cómo las PYMES y organizaciones empresariales de su región implementan prácticas de EC. Sus comentarios son valiosos para comprender la adopción y los desafíos reales.**Este formulario contiene un primer conjunto de preguntas sobre su empresa.** Recibirá un segundo conjunto de preguntas más específicas en un correo electrónico aparte después de completar esta encuesta.**Confidencialidad:** Toda la información que proporcione se tratará con estricta confidencialidad. Su privacidad está totalmente protegida.Complete esta breve encuesta lo antes posible. Si tiene alguna pregunta, contáctenos.Gracias por su apoyo a esta importante iniciativa.

Adresse e-mail

*

1. ¿Cuál es la forma jurídica de su empresa?

* única respuesta posible

empresa unipersonal
asociación
cooperativa
sociedad de responsabilidad limitada
asociación / organización sin fines de lucro
actividad empresarial informal (no registrada oficialmente)
Otro :

2. ¿Cuál es el tamaño de su empresa en términos de empleados/colaboradores? (Indique el número aproximado de empleados/colaboradores)

_____

*

3. ¿Cuál es su principal sector de actividad y qué productos o servicios ofrece habitualmente su empresa?

_____

*

4. ¿Qué prácticas de economía circular (EC) implementa actualmente su empresa?

_____

*

.

5. ¿Cuáles son los principales objetivos de estas prácticas de economía circular?

*

_____

6. ¿Cuáles son los principales retos o barreras que ha enfrentado su empresa al implementar prácticas de economía circular?

* *única respuesta posible.*

- falta de financiación
- conocimiento limitado
- restricciones tecnológicas
- barreras regulatorias
- Otro :

Appendix 2- Second questionnaire

H11:

Estimado/a participante:
Gracias por dedicar su tiempo a contribuir **al proyecto HEADCET** (https://www.HEADCET.eu/), una iniciativa financiada por la Unión Europea que reúne a universidades europeas y latinoamericanas para promover las prácticas de la economía circular (EC) y el desarrollo sostenible de las empresas. Hemos analizado sus respuestas al cuestionario general inicial y ahora nos gustaría hacerle algunas **preguntas más específicas** para completar nuestra investigación.
Confidencialidad:
Toda la información proporcionada será tratada con la máxima confidencialidad y su privacidad está completamente protegida. Por favor, rellene este breve cuestionario lo antes posible. Si tiene alguna pregunta, no dude en ponerse en contacto con nosotros. Gracias por su valiosa contribución a esta importante iniciativa.

* Indique una pregunta obligatoria
1. Prácticas de economía circular en la empresa*
1.¿Con qué tipos de empresas colaboran para obtener los subproductos?(productores de jugos, procesadoras de frutas, agricultores)
2.¿Qué subproductos recuperan actualmente y cómo funciona su proceso de upcycling?

_____

2. ¿Cuáles son los principales motores que motivan a su empresa a implementar prácticas de economía circular**?***

Estamos interesados en entender las principales razones y motivaciones detrás de su compromiso con la economía circular. (Por ejemplo: exigencias del mercado o de los consumidores, cumplimiento de regulaciones o incentivos públicos)

_____

3. Limitaciones financieras y otros obstáculos*
1.¿Su organización no dispone de fondos o proyectos públicos que apoyen las prácticas de EC?
2.Si existen tales fondos, ¿hay obstáculos que impidan la participación (p.ej. falta de publicidad, conocimientos técnicos o personal especializado)?
3.¿Cómo ha compensado usted esta falta de financiación pública ? (p.e. inversiones privadas, estrategias de crowdfunding u otros mecanismos de financiación)

_____

4. Colaboración con universidades e instituciones de investigación*
1. Podría describir las áreas de interés y los beneficios que ha obtenido de sus relaciones (por ejemplo, transferencia de conocimientos, formación o colaboración tecnológica) con la universidad.
2. ¿Existen dificultades para desarrollar asociaciones más amplias con la universidad?

_____

5. Sugerencias y recomendaciones de políticas *
Por favor, indique si **hay apoyo destacado de actores o agentes políticos** a las prácticas de la economía circular, o si considera probable que tales iniciativas reciban apoyo. (Ejemplos: agencias regionales, municipalidades, organismos gubernamentales locales o nacionales).
También puede incluir sugerencias o comentarios generales para mejorar la colaboración y la aplicación de las estrategias de EC

_____