

Circular economy in a recently transitioned high-income country in Latin America and the Caribbean: Barriers, drivers, strengths, opportunities, key stakeholders and priorities in Chile

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ABSTRACT

This study explores Chile's efforts to adopt a circular economy (CE) to enhance sustainability and economic resilience as a newly high-income country in Latin America and the Caribbean. Conducting 22 semi-structured interviews, the research identifies barriers, drivers, strengths, opportunities, key stakeholders, and priorities for transitioning to a CE. Through qualitative analysis, the study examines Chile's CE landscape from cultural, political, technological, and economic perspectives, uncovering significant isomorphic pressures from international norms and sector spillovers. Findings indicate that despite proactive initiatives like the Roadmap for Circular Chile, several challenges persist. These include cultural resistance, limited public awareness and professional training, increased consumerism, inadequate regulatory enforcement, insufficient data and technological infrastructure outside metropolitan areas, an economy still reliant on resource extraction, and a lack of financial support from both public and private sectors. Conversely, Chile's robust regulatory framework, commitment to international environmental agreements, and growing sustainability interest among younger populations drive CE progress. Additionally, traditional knowledge, local entrepreneurship, and the Extended Producer Responsibility law support localised circular models. Opportunities are particularly significant in the mining, agriculture, and tourism sectors, where CE principles can foster innovation, economic growth, and sustainable resource management. The study emphasises the essential roles of government agencies, institutions, and businesses as key stakeholders. It highlights the need to enhance public awareness, reform educational systems to include comprehensive environmental education, and train a skilled workforce to support the CE transition. By addressing these areas, Chile can effectively advance its circular economy initiatives and achieve greater sustainability and economic resilience.

1. Introduction

The circular economy (CE) is defined as an economic system of production and consumption (European Parliament, 2023) that seeks to expand the end-of-life concept by fostering “reducing, alternatively reusing, recycling and recovering materials in production/distribution and

consumption processes” (Kirchherr et al., 2017, p.13). This new economic paradigm is an approach that aims to foster sustainable development, by providing current and future generations with benefits through social equity, economic prosperity, and environmental quality (Leipold et al., 2023). Thus, a CE could be seen as a solution to reduce pressure on finite natural resources and (ideally) create sustainable growth opportunities

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and jobs (European Parliament, 2023; Heyes et al., 2018), thereby, counteract natural disasters (e.g., heatwaves, droughts, floods and wildfires) associated with climate change (RedCross, n.d.; Reuters, 2024; WHO, 2024).

The CE has received increased interest in Latin America and the Caribbean (LAC) (Schröder et al., 2020), as it represents a new opportunity for improving sustainability performance. LAC presents unique characteristics and opportunities due to its socio-economic and environmental context. The region has a high urbanisation rate, which fosters a community-based economy (Circle Economy Foundation, 2023). Through open and closed-loop systems that are at the core of the CE, LAC has an opportunity to harness new and innovative ways of production and consumption thereby championing local economies and protecting its biodiversity (*ibid*). Although these potential opportunities exist, the current scientific literature on local implementation of CE strategies largely focuses on findings from Europe, Asia, and North America, often overlooking an in-depth analysis of low- and middle-income countries (Calderón Márquez and Rutkowski, 2020; Chiappetta Jabbour et al., 2020; Ddiba et al., 2020). Some literature reviews have started to address the progress of the CE in LAC. For example, Betancourt Morales and Zartha Sossa (2020) compared conceptual trends in LAC with Europe, concluding that LAC focused mainly on implementation, while Europe focused on the concept of the CE. Despite LAC's strong interest, the region faces obstacles (e.g., cultural, political). Related to this, they identified significant barriers, including low awareness, insufficient supportive policies, and financial limitations. Additionally, Ospina-Mateus et al. (2023) conducted a bibliometric analysis of CE research in the region, which is still in its early stage of development, but demonstrates that research in this field has increased since 2017. Andrade Carrasco and Tonon Ordóñez (2023) focused on barriers related to waste management, recycling, cultural factors, and the dominance of linear economic models, thereby outlining job creation as a key benefit of circular practices. Soto-Ríos et al. (2023) analysed circular pathways in LAC, yet their focus was limited to the water and wastewater sectors. Finally, Gallego-Schmid et al. (2024) assessed for the first time drivers, opportunities, barriers, and strategies for the transition to a CE in LAC through a comprehensive systematic review. These authors concluded that the region is rich and diverse in natural resources and presents substantial opportunities for developing bio-industries and promoting circular practices that capitalise on local biodiversity. Even so, the path to a robust CE is fraught with barriers caused by limited governmental incentives and policy inconsistencies in a majority of the countries.

Thus far, it is apparent that in LAC, CE has predominantly been addressed from a specific perspective (e.g. barriers, conceptual trends or cultural factors) and focusing on specific sectors (e.g. agriculture). However, LAC is largely influenced by different cultures, economies, educational levels and regulations. In this sense, Chile has the highest gross domestic product (GDP) per capita in LAC and is a representative of the most powerful economies in the region, where increasing circularity can add value. The reason to centre this article on Chile is manifold: i) Chile transitioned to a high-income country in 2012 (The World Bank, 2024) and was admitted as a member of the Organisation for Economic Co-operation and Development (OECD) in 2010 (OECD, 2010); ii) Chile was the first LAC country to join the Plastics Pacts Network (EMF, 2021), which showcases its commitment to actively making changes and aligning with other supranational organisations (e.g., UNFCCC, EU); iii) Chile has an ambitious target to become net-zero by 2050, which has been legally enforced through the Climate Change Framework law in 2022, thereby continuing and enforcing its commitment to its climate change policy (Elliott et al., 2024); and iv) even though Chile's contribution to climate change is small, it is a highly vulnerable country (Pinto, 2019). Chile, as a representative of LAC, is greatly impacted by the climate change crisis through increased temperatures, droughts, coastal erosion, precipitation, and increased heat waves (NU CEPAL and Gobierno de Chile, 2012). In 2024, the country suffered one of the most devastating wildfires reported, which President

Gabriel Boric described as “*the worst catastrophe to hit the country since the earthquake of February 27, 2010*” (Buschschlütter, 2024). In this context, Chile is promoting the adoption of a CE by developing public policy instruments such as the Roadmap for a Circular Chile 2040 (MMA, 2021), the Plastics and Single-Use Products law (Law 21368) (BCN, 2018), the law 21100 that prohibits the distribution of plastic shopping bags (MMA, 2024), and Extended Producer Responsibility (EPR) (Law 20.920) (MMA, 2016). Therefore, taking in a typical high-income LAC country, where CE strategies are being implemented, the research questions addressed in this paper are as follows: i) Which are the main barriers to the development of the CE?; ii) What kind of drivers guide the development of CE?; iii) Which are the strengths of the CE?; iv) Which are the priorities for the CE development?; and v) Who are the key stakeholders for CE development? Each question will be holistically analysed from a culture, education and society, policy and regulation, technology and data, and economic perspectives, seeking to cover a wide range of views. This information will be gathered through semi-structured interviews with key actors, such as academics, policy-makers, businesses, non-governmental organisations (NGOs), and consumer representatives. Therefore this study aims to identify the main aspects of the development of a CE in Chile, enabling public and private actors to foster its development.

This article represents the first endeavour to examine Chile's potential transition to a CE from a holistic perspective, with a particular focus on isomorphic pressures that may foster spillover effects, thereby facilitating this circular transformation (see Section 2 for a comprehensive literature review). The qualitative methodology utilised is detailed in Section 3, and the results are subsequently presented and discussed in Section 4. Finally, the principal conclusions are summarised in Section 5.

2. Literature review

This section provides a summary of the literature on the Circular Economy (CE) in Chile and examines how the concepts of isomorphic pressures and spillover effects can be applied at country level.

2.1. Circular economy and isomorphic pressures

To the authors' knowledge, there are no articles in the scientific literature that holistically analyse Chile's transition towards a CE. Whilst instructive, research has predominantly focused on different specific aspects of the CE such as textile recycling (Jarpa et al., 2021; Espinoza-Pérez et al., 2024), construction demolition waste (Véliz et al., 2022; Cerdá-Suárez et al., 2023; Walters et al., 2024), efficiency analysis of municipal solid waste (Cayumil et al., 2021; Molinos-Senante et al., 2022) and the factors influencing municipal recycling (Valenzuela-Levi, 2019), wastewater treatment plants for recovering treated effluent, biosolids, biogas, and nitrogen removal (Furness et al., 2024), regional industrial symbiosis (Behzad et al., 2024), circular models in stressed environmental conditions (Cabrera-González et al., 2022) and their connection with institutional features (Levänen et al., 2018). Furthermore, Scapini and Berrios (2021) reviewed Chile's progress on CE legislation, highlighting two main initiatives: the EPR law and the development of a regulatory framework for CE transition. In a subsequent review, Scapini and Berrios (2022), examined the impacts of climate change in Chile (e.g., heat waves, droughts, coastal erosion) and Chile's strategic CE measures, including the EPR law, CE roadmap, recycling initiatives, grassroot waste picker inclusion, action plan against plastic pollution, and strategies for managing organic, and construction waste. Currently, there is only an initial insight on the legal advance of a CE in Chile, with research lacking to analyse barriers, drivers, strengths, opportunities, key stakeholders and/or priorities that could foster a transition towards a CE.

From a regional perspective, Schröder et al. (2020) believe that Industry 4.0 and the implementation of technology play a vital role in the

transition towards a CE in LAC countries. However, a question that emerges here is whether this is the case. Chile was only classified as a high-income country in 2012, and although one of the most powerful representatives of LAC, it may not have the same spending power as some of its Western counterparts that have also started to transition and/or have easier access to technologies. This bears the question of whether other factors could influence a transition towards a CE, such as isomorphic pressures, which can be split into *coercive*, *normative*, and *mimetic* pressures (e.g., Ingersoll et al., 2024). Isomorphic pressures are “*classified as external forces that shape and influence how an organisation operates within society but also can lead to changes in internal practices*” (Alblowi et al., 2022).

Isomorphic pressures are external factors that are predominantly discussed within the context of institutional theory, which seeks to provide explanations as to why organisations are increasingly acting similarly (Alblowi et al., 2022; Alqershy et al., 2024; DiMaggio and Powell, 1983). Authors (Calzolari et al., 2023; Castro-Lopez et al., 2023; Kahupi et al., 2024) outline that institutional theory and more specifically isomorphic pressures can support the transition in adopting circular practices in organisations. An explanation provided links to globalisation and the fact that organisations no longer just compete and/or produce within their country-of-origin, but rather have to competitively function on a global basis. As such, isomorphic pressures are often used to inform strategy that can either be reactive and thus respond to pressures once these become relevant or proactive, thereby acting ahead of time (e.g., Guarneri et al., 2023; Kauppi and Luzzini, 2021).

Although the present article focuses on a country context (Chile) rather than organisations, it is argued that within a market economy, organisations need to increasingly become similar, if they are to foster an environment that is supportive of change, which aligns with the core mission of institutional theory and more specifically isomorphic pressures (e.g., Berrone et al., 2013; Ingersoll et al., 2024; Nichols et al., 2023) further point out that isomorphic pressures at different levels (international, national, firm) still remain underexplored, which provides a further opportunity for this article to contribute to the theory.

Each of the stated isomorphic pressures operates at a different level and often at different times. *Coercive* pressures are linked to legislation and thus can influence a country's transition to a CE through formal or voluntary measures (DiMaggio and Powell, 1983; Kauppi and Luzzini, 2021). To explain, a formal measure is enacted through binding laws and regulations that must be adhered to, while legislation can at times serve as a recommendation rather than a mandate, making it voluntary. In such cases, countries are encouraged, rather than required, to follow suit. When discussing *coercive* pressures, these are often put forward through supranational organisations, such as the OECD, the United Nations, or the European Union (Ingersoll et al., 2024). Calzolari et al. (2023) indicate that these regulatory pressures can assist with the transition towards a CE, as these can force organisations to make changes and adopt CE practices as part of their operations. In turn, this will impact industry sectors through changing baselines and could ultimately mean that countries may transition towards a CE. *Normative* pressures are enacted on a national level and imply that there is a set of expectations given for an organisation to act upon within a specific network (Lin et al., 2020). For example, if there is a general agreement among members of a network to integrate CE practices (e.g., recycling) into their supply chain, this would be adopted throughout this network, thereby confirming an institutional norm (Bag et al., 2022; DiMaggio and Powell, 1983; Zhang et al., 2024). Within the context of small and medium-sized enterprises and CE capabilities Bag et al. (2022) argue that normative pressures have a direct impact on these institutions to transition and ultimately implement CE practices. As alluded to, the CE is receiving increased interest, which further implies that awareness surrounding CE practices are heightened and thus shared values are formed within organisations and across industries, thereby strengthening the influence of normative pressures (Ashworth et al., 2007;

Calzolari et al., 2023).

Lastly, *mimetic* pressures often occur when organisations are faced with uncertainty, whereby some organisations may imitate those that are seen to be successful in dealing with challenges (DiMaggio and Powell, 1983; Lee et al., 2020). Within this context, this would imply that organisations and/or sectors may learn from one another in how to deal with issues such as climate change and, therefore, implement CE practices that have proven to be successful. In the literature, the example of the food and fashion industry is often cited, where the fashion industry has adopted practices that have been successful in the food sector. For example, the food industry started with the ‘slow’ movement, which encouraged healthy choices as opposed to fast food. A similar movement has been seen within the fashion industry, whereby organisations emerged that promote the slowing of production cycles and thus stand at the opposite end of fast fashion retailers (e.g., Henninger et al., 2016; Provin et al., 2021). Here a further question emerges on whether spillover effects (see section 2.2) not only across organisations but also across sectors may play a role in transitioning towards a CE.

2.2. Circular economy and spillover effect

The term ‘spillover effect’ is commonly used within the marketing and consumer behaviour remit and describes a phenomenon, where behaviours from one context are adopted in another. For example, if an employee is exposed to recycling practices in an office environment, whereby they are required to separate paper, glass, and plastic, they may adopt the same behaviour within their home environment or may decide that too much time is spent on the task and boycott recycling (Manika et al., 2015; Verfuerth et al., 2019). This implies that spillover effects can be positive or negative in shaping behaviour.

Within this context, a spillover effect could occur (or not) in regard to CE practices from both a consumer and/or a company perspective and is often associated with economic benefits (Clark, 2013). To explain, past research has already investigated the impact of spillover effects on consumer behaviour and marketing (Manika et al., 2015; Medhurst et al., 2014), and although inconclusive on whether it is positive or negative, it outlines that behaviours can be shaped and transitioned from one environment to the next (Truelove et al., 2014). As alluded to, certain practices have also transitioned from one industry sector to another, for example, the waste hierarchy has in recent years seen a transformation into the 10R framework, which has been applied to the fashion context (e.g., Papamichael et al., 2023), thereby outlining different routes on re-looping textiles into the industry. What currently remains underexplored is whether isomorphic pressures could be fostering a spillover effect. Seeing as isomorphic pressures are external factors that have the potential to shape and influence organisations operating within an industry, as well as influence internal practices, there may be potential for one industry to influence another and thus, create a spillover. This could especially be the case if economic benefits are emerging, whether this may be due to cost savings in operations (e.g., effective recycling, reducing emissions) or in the form of profits (e.g., higher sales). This article will explore the link between isomorphic pressures and spillover effects by focusing on how this may impact a transition towards a CE.

3. Methodology

To address the aim and research questions of this article it was important to understand the ‘what’ and ‘why’ questions, and thus, gain an in-depth insight into the barriers, drivers, strengths, opportunities, key stakeholders, and priorities for transitioning to a CE. Thus, a qualitative design was deemed most appropriate, which also aligns with past research (e.g., Alblowi et al., 2022; Kahupi et al., 2024). To this end, semi-structured interviews were conducted to provide a holistic overview of the transition towards a CE in Chile. Semi-structured interviews were deemed appropriate as they allowed for a prearranged series of

open-ended questions to be asked whilst being flexible to probe for further information in a conversational style (Easterby-Smith et al., 2012; Flick, 2009). Thus, interviewees were given the opportunity to expand on their experiences and the challenges they encountered while working on CE initiatives in Chile.

Before collecting data, a research protocol was developed to conduct interviews. The topics for the research protocol (for the full question catalogue see the Supporting Information (SI)), were inspired by past research (Mendoza et al., 2017; Peña et al., 2021; Schröder et al., 2020) and checked for rigour by five CE experts. The interview questions broadly speaking followed five themes. The initial section functioned as an introduction to the topic, enabling respondents to define the term CE and assess their own knowledge and understanding of the subject. The second section addressed the barriers, opportunities, drivers, and benefits associated with a CE in Chile. The third section focused on specific topics, including policies, finance, technologies, international trade, education, business models, research, and key stakeholders, thereby allowing a comprehensive exploration of the multifaceted aspects of a CE. The fourth section concentrated on the implementation of a CE, examining the current level of implementation, successful examples and potential sectors that would have the highest benefits from the application strategies. The final section invited participants to share their final thoughts, providing an opportunity for additional insights and reflections pertinent to the questionnaire topics. A total of 22 semi-structured interviews were conducted during January–March 2024 with key stakeholders related to the CE and classified into five major groups (Henríquez-Aravena et al., 2021; Schröder et al., 2020): academics, policymakers, businesses, non-governmental organisations (NGOs), and consumer representatives (Table 1).

A combination of purposive and snowball sampling was implemented (Valerio et al., 2016). Initially, participants were identified based on their level of expertise surrounding knowledge of the CE in Chile. To gain a holistic picture, representatives from different ‘levels’ were recruited, for example, policymakers at state, regional, and municipal levels. Participants were also asked for recommendations of individuals, who could further support the research (snowballing). The interviews were conducted in Spanish either in-person or online and recorded. All interviews were transcribed verbatim and translated into

English and back again to ensure no meaning was lost. Ethical standards were followed, and approval was sought before data collection (Ref no.: 2024-18271-32729). To allow for open communication during the interviews, participants were assured of their anonymity. Participation was voluntary and informed consent obtained.

The analysis followed Easterby-Smith et al.’s (2012) seven-step guide of familiarisation, reflection, conceptualisation, cataloguing, re-coding, linking, and re-evaluation. This implied that *a priori* codes were established, and an initial coding structure was agreed upon. Although the initial coding process was guided by the themes identified in the question catalogue, it allowed for further themes to emerge, including, but not limited to education, cultural perspectives, technology, and priorities in general terms. Parts of the data set were independently coded by the researchers before being discussed; any discrepancies were carefully reviewed and re-coded, which allowed for intercoder reliability. This allowed to group *a priori* codes into *in vivo* codes and thus, cluster themes and patterns together (van de Vijver, 2010). Multiple coding cycles were conducted iteratively, whereby codes were categorised into themes and patterns that naturally emerged from the data set.

Through an iterative process, the final codes selected—due to their ability to comprehensively summarise all pertinent information—were: barriers; strengths; drivers; potential benefits and opportunities; stakeholders; and priorities. To ensure consistency, the lead author conducted most of the coding process. Data collection was concluded once theoretical saturation was achieved (Charmaz, 2006). To assess the relevance of stakeholders and priorities (actions required for transitioning to a CE), the frequency of mentions for each was counted. This approach aims to emphasise the relevance of specific stakeholders and priorities, which becomes clearer when they are frequently mentioned by multiple interviewees. Such repetition may signal a consensus or strong emphasis on certain issues within qualitative data, underscoring their significance in the study. While qualitative research does not primarily focus on quantifying data, counting code frequencies or using descriptive quantification (Vaismoradi et al., 2013) can effectively reveal how often particular topics, actors, or concepts appear in the interviews, highlighting their relative importance.

4. Results and discussion

With the aim of offering a holistic perspective of the CE in Chile, the main barriers, drivers, strengths, benefits and opportunities, key stakeholders and priorities for a CE transition derived from the semi-structured interviews are analysed and discussed in detail in the following subsections. Results are presented in this order with the codes created thereby providing a narrative that supports a roadmap for transitioning to a CE. The discussion begins with barriers to acknowledge the challenges encountered, followed by drivers that can facilitate the transition. Next, strengths and benefits are highlighted to demonstrate potential advantages, before addressing opportunities that can be leveraged. The inclusion of key stakeholders and priorities at the end is crucial for identifying individuals who can play pivotal roles in this transition and outlining actionable steps. Table 2 summarises the obtained results, which are discussed in the following subsections.

4.1. Barriers

This section focuses on the main barriers (culture, education and society; policy and regulation; technology and data; economy) identified for a transition to a CE in Chile.

4.1.1. Culture, education and society

Interviewees (A2; A4; B2; P5; P6) outlined that Chileans are familiar with the concept of a CE, yet have a narrow interpretation, predominantly focusing on end-of-life product management. This is further supported by the Chilean national survey (Circular, 2022), where over

Table 1
Profile of the interviewees and duration of the interviews.

| Group/Abbreviation | Duration |
|--------------------------|----------|
| Academics | |
| A1 | 58:58 |
| A2 | 48:12 |
| A3 | 1:25:09 |
| A4 | 44:27 |
| A5 | 1:47:48 |
| Policymakers | |
| P1 | 1:15:55 |
| P2 | 58:50 |
| P3 | 1:20:13 |
| P4 | 51:30 |
| P5 | 1:42:08 |
| P6 | 40:51 |
| Businesses | |
| B1 | 1:11:58 |
| B2 | 1:16:27 |
| B3 | 54:05 |
| B4 | 1:01:43 |
| B5 | 1:12:13 |
| NGOs | |
| N1 | 46:53 |
| N2 | 48:14 |
| N3 | 41:46 |
| N4 | 44:55 |
| Consumer representatives | |
| C1 | 1:14:13 |
| C2 | 1:02:08 |

Table 2

Summary of barriers, drivers, strengths, and opportunities for circular economy (CE) implementation in Chile.

| Category | Barriers | Drivers | Strengths | Opportunities |
|---------------------------------|---|--|---|--|
| Culture, Education, and Society | - Cultural resistance and limited training and awareness of CE practices. - Social inequalities impacting CE adoption. | - Growing interest in sustainability among younger generations. | - Traditional knowledge supports resource maximisation. - Strong entrepreneurial spirit. | - CE initiatives can create new collaborations, increase social justice, and boost dignity within the informal sector, fostering sustainable lifestyles through awareness and cultural shifts |
| Policy and Regulation | - Inadequate regulatory enforcement. - Predominant focus on end-of-life rather than other previous life cycle stages. - Regulatory support varies with political changes at the municipal level. - Bureaucracy and lack of technical and economic resources. | - Governmental support CE. Commitment to international environmental agreements. - Extended Producer Responsibility law. | - An existing regulatory CE framework. | - Policies may evolve towards production-focused CE, creating compliance opportunities for businesses, especially large and medium enterprises. |
| Technology and Data | - Insufficient data and indicators - Lack of technological and waste management infrastructure outside metropolitan areas | | - Accelerated digitalisation | - Industrial symbiosis, organic waste technologies, and CE-driven agri-food tech (e.g., precision agriculture) could reduce reliance on raw materials and foster new products like bio-fertilizers and renewable energy |
| Economy | - Economy still reliant on resource extraction - Influence of low-cost imports - Lack of financial support from the public and private sectors | - Economic benefits from resource efficiency - Marketing appeal of circular models for large companies. - Influence of international commerce on circularity | - Emergence of green financing strategies by private banks | - Bioeconomy growth in agriculture, lithium recycling projects, and urban mining present opportunities for CE - Green jobs, resource-efficient business models, and tourism sustainability initiatives could enhance economic and environmental performance |

84% of respondents claimed to be familiar with the concept of a CE, but less than 48% could identify specific practices related to it.

The average person ... often lacks a clear understanding of sustainability and its connection to a circular economy. Many people associate sustainability with recycling, but there is a lack of awareness about the broader concepts and principles of a circular economy (A2).

Limited vision, knowledge, and professional training influence all decisions. For instance, current business models focus more on managing existing waste (e.g., increasing recycling rates) rather than its prevention (e.g., promoting circular design). Producers and importers resist adopting a CE because it can disrupt their traditional linear (make-take-dispose) models, which have been standard until now (A3; B4; P2). Similarly, the public is reluctant to change daily routines and behaviours essential for environmental preservation. Consequently, limited awareness, expertise, resistance to change, urgency, and cost barriers affect consumer behaviour (“there is insufficient demand for circular products” (P5)), reducing pressure on businesses and diminishing political support for circular practices and economic incentives (N1; P5). This creates a vicious cycle: businesses may adopt circular practices when convenient but fear consumer reluctance and lack of demand. With few circular products available, consumers may remain unaware of their benefits or unwilling to pay premium prices, especially if products are not mass-produced and remain niche. This underscores *normative* pressures, as transformative change is difficult to achieve unless all businesses within a network implement CE practices (e.g., [Ingersoll et al., 2024](#)).

This vicious cycle is also evident in Chilean society, which can be described as individualistic and segmented and, thus, poses a significant cultural barrier to the adoption of CE practices, such as sharing, which requires cooperation and a systemic approach (A3; C1). The advancement of a CE in Chile is significantly hindered by a fragmented approach and limited collaboration across society, including various industrial sectors and levels of government (A2; P1). In this sense, companies often seek individual solutions to common challenges rather than pursuing collective approaches. Thus, short-term economic objectives often overshadow the long-term vision required for a CE (A3; C2; N2; P1; P5),

yet “*industrial symbiosis, like exchange of materials or energy from one industry to another, I have not seen it yet in Chile*” (N2).

The prevalent culture of consumption, influenced by global capitalism poses another significant barrier (A1; A2; B1; B4; N2). For example, Chileans “*have the concept that I want it now*” (C2), which aligns with a linear economy. Most of the interviewees agreed that this consumerist mindset underpins a low level of awareness of CE principles among the Chilean population and diminishes the traditional culture of repair and reuse (*second-hand products are associated with “being poor”* (B2)) and creativity to expand the use of resources. As this practice is not commonly enacted, spillover effects are also limited, in that consumers do not spread the practices across society (e.g., [Verfuerth et al., 2019](#)). Another cultural factor is that consumer purchasing decisions in Chile are predominantly driven by cost considerations, as evidenced by 17% of the population living below the poverty line ([OECD, 2022](#)), which limits purchasing power and prioritises cost over other factors (A1; B2; B3; B4; P5). Consequently, only consumers with higher socioeconomic status and access to education may be inclined to adopt CE practices (A1; B2; B3; P1; P5). Finally, other priorities (e.g., access to food, health, education) are considered more urgent compared to sustainability issues (B5; P3; P5).

4.1.2. Policy and regulation

Although Chile has policies and regulations promoting a CE, participants unanimously agreed that these measures are relatively recent and vague. Policy documents leave room for interpretations without clear standards and technical norms (A4; B1), potentially hindering implementation and limiting *coercive* pressures to rely mainly on voluntary adoption. For example, existing CE-related legislation such as the EPR law (MMA, 2016) has been criticised for its slow application, unreliable implementation control, lack of financial support, and poor adaptation to the local context, suggesting that *mimetic* and *coercive* pressures could influence improvements ([Aksom and Tymchenko, 2020](#); [DiMaggio and Powell, 1983](#)).

For Chile to gain international standing and partnerships, *coercive* pressures may force the country to copy standards already laid out by

the EU or the United Nations. However, these standards often lack local adaptation, making it difficult for companies to implement CE practices cost-effectively. Consequently, companies might seek strategies from those that have successfully implemented CE practices. Yet, such examples are limited within Chile and may not be relevant due to different socioeconomic backgrounds and infrastructures, indicating that even desired transitions may progress slowly. This implies that transitions, even if wanted, may be slow. What becomes apparent from the data is that Chile seems to be following a reactive approach to *coercive* pressures, which implies changes are only suggested/enforced if required rather than being preventative in nature. This could also explain why necessary adaptations to local CE practices (C2; N3; P1) are missing. N3 notes, “*the concept of circular economy comes from Europe, and Chile tends to copy European policies, especially Spanish.*” For instance, the EPR law (MMA, 2016) (*ley REP* in Spanish), influenced by European regulations, has disrupted the market and negatively affected local informal grassroots recyclers (uncommon in Europe) due to changes in pricing and market concentration from new official tenders (B3).

They [informal grassroots recyclers] understand and want to be part of it [CE] but it seems ridiculous to them that it is affecting what they are doing, which has to do only with the final part of the chain (A1).

Finally, the CE “*from a legal point of view ... there is still a view from recycling rather than from the circular economy*” (B4), which implies other life cycle stages are currently ignored and not reflected in legislation (A1; B1; B4; B5; C1; C2; N4).

There are several reasons for the lack of application of legislation. Firstly, a CE is seen to be “*very aspirational. It is like we want to look like Spain or Holland, but without being real*” (A1). This implies that there may be a lack of commitment to increase the actual levels of circularity and sustainability, whilst at the same time *coercive* pressures may dictate engagement. Secondly, there is a neoliberal model (A2; A3; A5; N3) (inherited from the dictatorship period) where “*the [intervention] role of the state today is subordinated to private desires to be regulated*” (A5). Therefore, there is a limit to the government’s ability to intervene in the economy, particularly in areas relevant to the CE (e.g., primary and secondary raw materials) (A5; N3; P5). Lastly, the orientation of municipal governments (left or right) influences policies, with the CE concept being predominantly associated with left-oriented parties (B4; N1; P1; P3). These factors combined with high levels of bureaucracy (N2), corruption (A1; A3; B4; P1), and a lack of technical and economic resources, and coordination between institutions (B2; B3; B4; C1; N1; N2; P3; P4), are responsible for a lack of implementation in municipalities (the final entities responsible for the application and oversight of circular policies and laws) and overall uneven implementation across different territories (A1).

4.1.3. Technology and data

Chile’s geography is very diverse and requires specific adaptations for local areas. Several interviewees highlight the centralisation of most technological resources and infrastructure in the capital (Santiago) and surrounding area as a barrier for an effective implementation of circular practices. This centralisation neglects the local needs, specific dynamics, and potential contributions of other regions, particularly in remote areas. For example, regarding landfilling infrastructure:

Almost 70% of waste, mainly generated in metropolitan areas, does reach landfills, which are in very good condition ... The other 30% of waste reaches garbage dumps in deplorable conditions, with no control or regulation; there is a very important asymmetry. The worst conditions that I have seen in landfills actually occur on Easter Island, Torres del Paine and the Atacama Desert (A5).

This problem also expands to the absence of recycling plants outside metropolitan areas. Small municipalities, due to a lack of scale, need to coordinate shared recycling facilities, but the political rivalries and the lesser cost of sending all waste to landfill, hinder the development of

these solutions (A3; P3). Another challenge is finding new waste disposal and treatment sites due to the country’s complex geography and regulatory restrictions, as well as resistance from the public (A3; P4). Finally, despite Chile having a moderate technological infrastructure, there is still a lack of connection between these technological advancements and businesses to facilitate a large-scale transition to a CE, particularly for small and medium enterprises (SMEs) (which represent 98% of Chile’s economy) (Cardemil, 2022) (A4; P1). Moreover, many technologies are developed abroad, which not only increases dependency but also complicates access due to patent barriers (N4). This is contrary to Schröder et al. (2020) suggestion that Industry 4.0 is already playing a key role in transitioning towards a CE in LAC.

Most interviewees identified a lack of comprehensive public data and indicators as a key barrier, hindering the identification of improvement opportunities and the measurement of progress toward circularity in Chile (B1; B5; P1; P3; P5; P6). Without detailed indicators, standards, and benchmarks, it is challenging to track environmental and social impacts of circular initiatives, scale successful projects, communicate progress, or adapt solutions to Chile’s diverse geographic and climatic conditions (B1; P1; P2). “*There are no common indicators that allow us to scale lessons learned*” (P1). These issues contribute to a vicious cycle of low CE awareness among consumers and insufficient incentives for businesses (see, section 4.1.1). While some researchers (P3; P2) have an initial understanding of potential indicators, others focus on niche aspects or areas not directly related to CE. Additionally, the knowledge generated is often confined to indexed publications, limiting its broader impact (A1; A2; C2; N1; P1; P2). Furthermore, there is a gap in translating research into real-world applications (N1; P5). “*For me, I wish we could research less and do more because we need less trash on the street right now and fewer studies of what trash we generate*” (N1). Other barriers include a lack of an integrated multidisciplinary approach due to segregated academic funding (A3) and insufficient robust information to make informed decisions regarding the implementation of CE systems (C1).

4.1.4. Economy

From a macroeconomic perspective, Chile’s role as a supplier of raw materials (particularly minerals), the lack of influence in the initial design and specialised industries to close cycles of products combined with the interests of powerful political and economic sectors, perpetuates the extraction of natural resources for foreign manufacturing (A1; B2; B4; C1; C2; N2; N3; P1).

We are not an industrialised country. The industry was cut off during the dictatorship ... All borders were opened, and we provided raw materials and labour. Under that model, it is very complex to be able to generate circular business models (P1).

Although some international markets (e.g., the EU) demand sustainable practices, the prioritisation of cost over sustainability in other markets challenges CE principles in Chile (B2; B4; N4; P1; P3). The surge of low-cost imports, especially from China, fuels the consumption of products with limited lifespan, hindering local circular initiatives and highlighting the need for a shift towards domestic production and consumption (A4; B4; N4; N1; P1). There is also a perception that Chile is a developing country that needs to keep growing its GDP (the CE is still seen as a radical change that can be applied once you achieve a certain economic level) and this extractive dependency makes it difficult to implement changes (N2; P1). “*EBITDA [Earnings Before Interest, Tax, Depreciation, and Amortisation] is the main barrier to the transition to a circular economy [in Chile]. It is the only parameter considered [for decision making] and social and environmental impacts are not taken into account*” (P1).

From a financial perspective, most respondents believe that funding is still low and that there is not enough financial support and/or incentives for CE projects, both from the public and private sectors. Even though, institutions like CORFO (Production Development Corporation,

in Spanish *Corporación de Fomento de la Producción*) have some CE funds (see section 4.3.4. of strengths). There is also a misconception that public funds available are primarily for entrepreneurs (P1), limiting the potential impact of available resources for all sizes of companies. The scarcity of public funding can be explained by the prioritisation of basic needs (e.g., health, education, food access) over CE and sustainability demands (A1; N1; P3).

The current level of investment in the circular economy is low, considering the upcoming challenges ... It is very difficult when a person does not have their basic needs resolved, for them to consider environmental issues as relevant issues (P3).

The banking sector's limited understanding of the risks and opportunities associated with CE projects makes it particularly challenging for SMEs and civil society organisations to secure the necessary investment for the initial stages and to scale up their circular initiatives (A2; B4; C2; N1; P4; P5). Additionally, the aforementioned lack of clear data and metrics to assess the performance and impact of circular projects can hinder the evaluation of their financial feasibility (P1; P4). The absence of reliable information on the economic and environmental benefits of circular projects can create uncertainty and make it challenging to secure financing. This further links to *mimetic* pressures with a reverse impact in that companies, if they cannot see successful examples, may shy away from engaging in CE practices, especially when financial capital is missing.

4.2. Drivers

The different main drivers (culture, education and society; policy and regulation; technology and data; economy) for promoting a CE in Chile are discussed in the following subsections.

4.2.1. Culture, education and society

The visible effects of the environmental crisis have raised public awareness, particularly among young people and university students (A4; B1; B5; N4). Middle to upper-middle-income groups are increasingly drawn to second-hand clothing for affordability and fashion, aligning with CE principles (A1). A1 also outlined that students educated in what a CE means, often become advocates within their companies, creating a spillover effect (e.g., Manika et al., 2015) by promoting circular practices in professional settings.

Chile is experiencing a cultural shift toward sustainability (C2), led by younger, wealthier consumers who demand eco-friendly products and support initiatives like recycling centres (C2; P3). Although this may seem contradictory to what was mentioned in section 4.1.1 (vicious cycle), it aligns with the idea that education and financial means facilitate CE practices. This is further supported by the role of media in disseminating the concept and raising awareness about circular principles (P2). Although the involvement of society is described as silent, some organisations and civil associations (e.g., Consumer Association, Zero Waste Alliance) actively advocate for a CE, exerting pressure on both companies and the government to take measures in this direction (C2; N1). This could be linked to a new kind of isomorphic pressure, whereby society could influence *mimetic* pressures through a bottom-up approach. C2 indicates that "*associations or civil institutions are promoting transparency a lot*" to avoid greenwashing practices. Additionally, citizen participation in environmental assessments ensures that public opinion plays a role in evaluating projects, reinforcing CE principles (P3): "*A project ... has to enter the environmental evaluation system and, therefore, has to have citizen participation, so everything that has to do with citizen participation ... somehow manages to qualify this non-incorporation of negative externalities on the part of the company*".

Chile's CE roadmap (MMA, 2021) includes a dedicated focus on the future role of education and dissemination, emphasising the importance of knowledge sharing and outreach (P6). By regulating industries, companies, and producers, through, for example, the EPR law (MMA,

2016), it becomes easier to drive circular practices than attempting to change the behaviour of an entire society (P3).

4.2.2. Policy and regulation

Chile's growing environmental concerns, such as pollution, water scarcity, waste, ecosystem degradation, and biodiversity loss, highlight the need for sustainable policies to reduce impacts and protect natural resources (B2; B4; N2): "*Chile has very diverse and very important ecosystems for biodiversity, for example, Patagonia in the South, ... and this encourages us to maintain these ecosystems, generating the adoption of sustainable initiatives*" (B2). Several interviewees highlighted the EPR law (MMA, 2016) as one of the main drivers, assigning clear producer responsibilities and promoting waste reduction, reuse, and recycling.

The CE has become a global trend and Chile seeks to align with international models and not lag behind (N2). According to the interviewees, the country is motivated to adopt new trends and innovations quickly, where the adoption of circular practices is seen to stay at the forefront, as Chile seeks to position itself as a pioneer in LAC (C2). The ambition of Chile to achieve a leadership role in the region motivates the improvement in weak areas of public management, such as, when "*Chile started a serious project to join the OECD [Organisation for Economic Co-operation and Development] and one of the things that came with it was to update its waste policy*" (A1). Furthermore, hosting the 25th Climate Change Conference of Parties (COP25) spurred CE commitments, thereby creating momentum for sustainable policies and reinforcing Chile's alignment with international standards (A3). This again can be seen as an isomorphic force to ensure membership of a specific network and/or community.

Various public institutions (e.g., Ministries of Environment, Agriculture, and Economy; CORFO) are advancing CE and climate change strategies: "*today all ministries are kind of obliged to make sectoral climate change plans for mining, fisheries, forestry*" (P2). Chile's adherence to global agreements such as the Paris Agreement (Ministerio de Relaciones Exteriores, 2017) and the UN Sustainable Development Goals (Gobierno de Chile, 2023) supports its CE strategy, aiming to lead in environmental matters in the LAC region (B5; C1). These agreements drive policies on transport electrification, green mining, decarbonisation of electricity generation, and thermoelectric plant closures, highlighting Chile's dedication to sustainability (A3).

4.2.3. Economy

A majority of interviewees list economic benefits (section 4.4.4) as drivers for implementing circular practices, due to the cost savings associated with resource efficiency and optimisation, and waste generation reduction (B4; P2; P5). "*There are several companies that are seeing that it is really profitable to be sustainable because the circular economy also generates economic efficiencies*" (B4). Furthermore, a CE fosters an economic dynamism that supports the transition:

The future job reconversion of a garbage collector to a recycler tomorrow ... will perhaps imply a different economic dynamism in terms of income for the person, as well as the benefits generated from their work (P4).

Aside from the CE roadmap (MMA, 2021) led by the public sector, the private sector is actively involved in creating circular strategies and roadmaps centred on the construction sector (C1; P6) and investing in CE initiatives. Simultaneously, the financial support (although scarce as mentioned in section 4.1.3.) demonstrates an interest in promoting innovation (B1; B5; N3), and is targeted at entrepreneurs who aim to implement circular models, strengthening the business ecosystem and accelerating the transition. This designated public funding allocated for a CE underscores the government's intention to advance this transition (A4; P1; P4). Some public-private funding mechanisms have also started to emerge, where companies participate in joint projects (B2). In those cases, the public sector acts as a regulator, facilitator, or administrator, while the private sector contributes funds through donations and gets tax exemptions (B2).

Large companies in Chile are also driving circular models because the concept is attractive from a marketing perspective, contributes to the business's social responsibility and enhances the company's reputation (B4; P6). There is an opportunity for companies to promote themselves as sustainable and environmentally committed through the implementation of circular practices (A2; N1). Companies in Chile are showing willingness to make changes and adopt sustainable practices, but some of them may be at risk of greenwashing. The latter is counteracted by companies making themselves available and participating in discussions and actions related to CE (C2).

International commerce is another key driver, as Chilean industries are subject to circularity requirements and sustainable norms set by external markets, particularly Europe and China (B5). Thus, the Chilean export market is reactive to developments of policies concerning a CE (N4). In the case of copper, for instance, "*it was a bit mandated by all the demand for green copper in mining and I think that gave us a tremendous leap, it gave us a good push*" (P1). Therefore, the external pressure to transition to a CE is expected to be more important than the internal one (A5). As a country committed to international (and environmental) agreements, Chile has felt the pressure to adopt circular practices and align with international standards in the export market (B2). Nevertheless, import regulations are perceived as lax, as "*Chile is a raw material supplier and we are left with pollution, environmental and social impacts*" (N3), or, for example, in the specific case of mining, because foreign companies will leave or not come, as Chile is a small market (C2). It becomes apparent that enacting circular practices is vital here as, for instance, Europe and China, can be seen as *coercive* pressures that are pushing for legislative requirements to be fulfilled.

Chile's resource scarcity (e.g., water) is an important environmental and economic driver, as "*resources are becoming more and more difficult to extract, they are increasingly scarce and it is increasingly expensive to extract them, and that implies that solutions must be sought to reduce costs*" (C1). Maximising resource efficiency and reducing reliance on imports are key motivations (A4; B2), particularly in the construction sector, where traceability and legality of materials are scrutinised (A4). Furthermore, the scarcity of aggregates for construction is also affecting this sector: "*we want to build social housing and grow to do more things, but without aggregates, we have no way to do it, and here the circular economy has a very important role in how to use secondary materials to replace natural aggregates*" (P2). Thus, there is a belief in the industrial sector that the pressure imposed by reality makes it necessary to reduce consumption and generate less waste in a planned way, or even greater challenges will be faced in the future (A5). Additionally, attempts to extend the life of a product as much as possible are even more relevant in extreme zones, such as the desert, where much of the industry and impoverished areas of the country are located.

4.3. Strengths

The following subsections discuss the main strengths of a CE in Chile from different perspectives (culture, education and society; policy and regulation; technology and data; economy).

4.3.1. Culture, education and society

In Chile, similarly to other Global South countries, rural, indigenous, and deprived communities have learned to make the most out of what they have by using minimal energy and finding ways to extend the lifetime of products to avoid creating waste (C1; N3). According to C1, "*people do not know what a circular economy is as a concept, but when you start explaining it a little bit, they say they have been doing it their whole life*". This is exemplified by practices such as the construction of "*ruka mapuche*" (a type of house constructed with plant-based materials), shared transport, recycling, repairing, and refurbishing practices for different products (e.g., shoes, cars, household appliances, clothes). There is a recognition of the value of traditional knowledge and local economies which could provide a foundation for developing more localised CE

models. The integration of traditional and local knowledge into those more localised models can be seen as an example of emerging *normative* pressure. As these practices become more embedded in society and education, they create a cultural norm that drives other communities to adopt similar practices, reinforcing conformity through *normative* pressure. Here it could be argued again that there is a new isomorphic pressure emerging that fosters a bottom-up approach inspired by indigenous knowledge.

Moreover, Chileans are known for their entrepreneurial spirit (N1; N4) as reflected in the belief that "*Chile is rich in human talent and has a vibrant entrepreneurial spirit. This context encourages entrepreneurship or connects you with many organisations and wonderful people doing self-managed projects without any resources from the state or private entities, and that is very inspiring*" (N1). Furthermore, there is some willingness to change, which is observed in the adoption of measures such as the ban on disposable plastic bags and straws (A1; B2) and "*regarding recycling, there is also very rapid adoption, especially when you implement clean points in communities. People appreciate this and start using them*" (B2).

There are also some initial attempts to improve CE education. Universities are starting to offer related courses, investing in the future workforce about sustainable practices (A4): "*nowadays, universities are incorporating these topics [CE] into their professional curricula. Programs teaching mining engineering or any other mining-related career, as well as agronomy or forestry, include these topics in their curriculum*" (P5).

4.3.2. Policy and regulation

Contrary to what happens with municipal governments (section 4.1.2.), there is a willingness and commitment from the national Chilean government to drive the transition, independently of party ideologies (right and left) (*normative* pressure).

There is an important appetite from the State, at different levels, of the need to be able to advance [CE] regulation ... to establish regulations, to set goals. There is an important impetus here, and I mention the State because this responds to an organisational culture that is independent of the government in power (A5).

Chile has several regulatory strengths that make it well-suited for transitioning towards a CE, although this regulatory body is still quite new (section 4.1.2.). In 2021, the country published the "Roadmap for a Circular Chile by 2040" (MMA, 2021) as part of the Nationally Determined Contribution (NDC) commitments (P2). A structure and vision were established by the Chilean government with clear goals, actions, and objectives, driving the implementation of a circular model (N2; P6). In addition, several interviewees mentioned the enactment of the EPR law (MMA, 2016) as an advantage. Other instruments are contributing, like the framework law on Climate Change (MMA, 2022) (A3; B5), and the National Strategy for Organic Waste Chile 2040; (MMA, 2020) (P2; P3; P4) showcasing a proactive approach towards sustainability. "*We have been working on a national solid waste policy since 2005, aiming to close landfills and build appropriate waste management facilities*" (P4). The implementation of regulations like the Roadmap and the EPR law represents *coercive* pressures, as companies and organisations are compelled to comply with government-established standards. This drives uniform adoption of CE practices across the country.

From a policymaker perspective, the Chilean government has demonstrated support and commitment to a CE agenda by, for example, creating the Circular Economy Office, within the Ministry of the Environment (B2; B5; C2; P2), which is considered a "*milestone in fostering a more systematic conversation*" (B5). Additionally, the Ministry of Economy has implemented measures and policies to promote circular practices. For instance, this ministry has recently approved an update of the public procurement law (Law 21.634) (Ministerio de Hacienda, 2023) that incorporates the topic of circularity in the goods purchased. This law is expected to boost the acquisition of products and services that comply with the principles of CE (P2). The efforts to include CE criteria in these legal instruments can have a spillover effect across other sectors

and countries in the region. By demonstrating the success of these policies, similar measures could be encouraged in other contexts.

Finally, collaborative efforts among various stakeholders, including mayors and businesses, further enhance knowledge sharing and engagement in legislative projects aimed at advancing a CE agenda. Despite facing social and political challenges (see sections 4.1.1. and 4.1.2.), Chile maintains institutional stability, contributing to policy implementation and economic security. “*Chile is a country where, despite recent challenges, the institutions generally function, providing some macroeconomic stability*” (P2). Overall, Chile’s regulatory landscape, coupled with government support, sectoral policies, and collaborative initiatives, positions the country as a leader in the transition towards a CE in LAC.

4.3.3. Technology and data

Chile has some technological strengths that position it well for a transition. Firstly, small companies and start-ups are driving the shift towards sustainability by integrating CE principles from the start. This allows them to adapt to their unique contexts, embedding circularity into their core practices rather than transitioning from traditional models (A2; B4; N1). This emerging trend is evident in various sectors such as clothing and small-scale agricultural ventures, indicating a diversification of industries embracing circularity (A2). For example, “*it is really inspiring to see creativity at work in small ventures like Ciclo.3R, which repurposes unused glass*” (A2). Small companies and start-ups that integrate CE principles from the outset can create *mimetic* pressures. Other companies, observing the success of these innovations, may feel pressured to imitate their practices to stay competitive.

Large companies also count with some technological strengths. For example, the accelerated digitalisation, partly driven by the pandemic, has contributed to the dematerialisation of certain business processes, reducing the physical resources required for operations (B5). In the case of mining, it is a heavily automated and robotized sector that allows remote operations. “*Today you can manage a mine in the North, but the operator is in Santiago in a control room*” (P5). A majority of operations are based in Santiago, which has a readily set up infrastructure that can support digitalisation processes, and thus can support the industry in managing different operations remotely. Although this approach can increase efficiency and productivity, whilst at the same time reducing waste and environmental impact, as no new buildings need to be built to manage operations, there could also be drawbacks (see section 4.1.3).

4.3.4. Economy

The public and private sectors play key roles in providing the necessary funding for the CE transition. CORFO, which is considered a “*great public ally of all sustainable entrepreneurship*” (B4), has adjusted its objectives and calls for proposals to include elements of sustainability and CE (B5). The engagement of institutions such as *Banco Estado* (National Bank), initially unfamiliar with CE projects, signifies progress and a growing recognition of the importance of financing circular initiatives (P2). Some private banks are starting to implement green financing strategies, contributing to the financial backing of CE initiatives. In addition, the collaboration between institutions is pivotal. For example, “*the Ministry of Environment has recently introduced the Green Taxonomy to help financial institutions identify what qualifies as green when offering loans with better rates*” (P2). Additionally, private foundations and institutions including the Agricultural Research Institute (INIA from the spanish *Instituto de Investigaciones Agropecuarias*) and Agricultural Development Institute (INDAP from the spanish *Instituto de Desarrollo Agropecuario*) provide contributions and lines of financing for sustainable projects, albeit on a smaller scale (B3).

4.4. Benefits and opportunities

This section focuses on the potential benefits and opportunities of a CE implementation across a range of sectors and dimensions.

4.4.1. Culture, education and society

From a social perspective, the emergence of new productive sectors and services with a CE approach can facilitate the formation of novel social relations, collaborations, and cooperations (A5). This has also the potential to enhance social justice by fostering a fairer and more sustainable lifestyle (B4), preventing socio-environmental crises, and boosting dignity, particularly within the informal sector (e.g., the recycling industry) (A1; B1). Furthermore, the transition towards a CE requires a cultural transformation. Individuals must adopt sustainable practices within their domestic environments and communities. This cultural shift can facilitate a broader awareness of the significance of sustainability and can foster more environmentally friendly lifestyles (B1).

4.4.2. Policy and regulation

There is hope for the current Chilean government (Gabriel Boric presidential term) to boost circular development (B1), by increasing the requirements for companies and establishing new agencies. For instance, B2 mentioned that “*the current government is in favour of the adoption of the circular economy, companies will have this as a requirement to be able to market their products in the country*” (B2).

On the other hand, current CE legislation is predominantly focused on waste management but is expected to move towards a production-focused approach. B5 highlights that in Chile the “[CE] emphasis is starting to be much more focused on production.” Thus, there is likely to be increased demands and opportunities for businesses to comply with CE legislation, particularly large and medium-sized enterprises (B1), where regulatory bodies can play a key role in executing *normative* pressures. However, this could change depending on changes in future governments making *normative* pressures relatively weak, as they are reliant on the commitment of institutional bodies involved.

4.4.3. Technology and data

A CE enables the utilisation of existing resources through reuse and recycling, avoiding the extraction of resources. “*Chile has a very beautiful wealth in terms of tourism, the natural ecosystems of both the desert and Patagonia*” (B1). Currently, Chile has mainly focused on the extraction industry, and a CE could offer an opportunity by fostering industrial symbiosis, leveraging materials and technology development, reducing reliance on virgin raw materials and promoting utilisation at a national level (N2). A4 mentioned that “*if you have a resource that can be used, why throw it away?*”

A CE provides a new way to manage waste, as Chile has “*important opportunities in everything associated with waste management, which is an enormous problem and which, although shared in many territories, it also generates opportunities [in waste management]*” (A5). Additionally, a significant percentage of waste in Chile is organic, offering opportunities to incorporate technologies that facilitate composting and biodigestion for reducing landfill use and for the development of new products such as biofertilizers and renewable energy (P4). Furthermore, most landfills and dumps are over their capacity (section 4.1.3) and boosting CE could help to at least extend their life cycle.

From a sector-specific perspective, technology supports the principles of CE in the Chilean agri-food sector through precision agriculture and remote monitoring (P5). “*There is a lot of precision agriculture in Chile, increasingly merging the use of satellite images, for example, for irrigation issues, prediction for casting, agricultural issues, agriculture 4.0 is an important issue*” (P5). These technologies allow efficient water use, better control management, and reduce environmental impacts, aligning with the principles of the CE by minimising waste and enhancing the sustainability of agricultural operations (P5).

4.4.4. Economy

The Chilean economy is mainly based on mining and agricultural products. Particularly, the agricultural sector, combined with rich biodiversity, provides a solid foundation for bioeconomy initiatives that

can replace fossil-based materials and processes (B3). The generation of these new bioproducts and bioprocesses can lead also to more efficient business operations and optimised resource use, such as water. "In the North of Chile, there is a total drought We have to set up desalination plants and this can be a very big challenge ... We have opportunities to move forward and manage these developments in the right way" (A3). Furthermore, Chile presents a unique opportunity for urban mining due to the current knowledge and capabilities on mineral management, which could boost recycling and material recovery (A1). Additionally, Chile, as a key lithium producer, has an opportunity to develop CE projects related to lithium extraction and battery recycling (A3), driving the development of circular practices and business models in this sector. Finally, the third key economic sector that can benefit from a CE is tourism:

Incorporating the circular economy in the field of tourism will generate opportunities to improve the environmental performance of the companies that participate in this industry, but also the possibility of generating better financial and economic performance due to the savings that are generated, especially in areas such as inbound tourism and hotel tourism, where there is significant expenditure (B5).

The development of "green" employment is another opportunity, mainly associated with recycling, repair, and remanufacturing activities (A1; B5; N2): "There would be many local and decentralised jobs ... linked to everything that has to happen for waste to be managed" (N2). This could strengthen local economic growth, enhance the industrial framework from the current extractive system to a more industrialised system, and boost technical capacities and technological innovation (B5; N3). Thus, innovation plays a key role and represents an opportunity for the transition, by rethinking products, business models, and production systems (P4). For example, "in agriculture ... there is a world of space to be able to generate product innovation and to be able to diversify the matrix of supply

that we have today associated with the best use of resources" (B5). These innovations could imply patents, sustainable solutions for product design, production processes, and better waste management (B2; N4).

4.5. Key stakeholders

A wide range of Chilean stakeholders play pivotal roles in the development and adoption of a CE. According to the interviewees, there are four main stakeholder groups which are aligned with the themes mentioned in previous sections, i.e., culture, education and society (civil society), policy and regulation (policy), technology and data (academia), and economy (economy) (Fig. 1).

In the policy and regulation sector (policy in Fig. 1), the government, through its national and regional institutions, has been identified as the main stakeholder by most of the interviewees. In this group, CORFO is highly mentioned mainly because it provides funding to projects that incorporate a CE as a core component and supports small projects at different stages. The Ministry of the Environment is also highlighted due to its role in boosting a CE in Chile (B4), with other ministries also being mentioned, such as the Ministries of Interior (P4), Economy (A5; C1; P2), Health (C1), Education (C1), and Agriculture (P2), showing how interdisciplinary and systemic the change needed is for a CE transition. Another type of stakeholders frequently mentioned are government agencies and departments. In particular, the Circular Economy Office belonging to the Ministry of the Environment is the specific actor at the national level focused on CE (C2; P2). For instance, C2 mentioned that "*the circular economy office was created to promote public policies that had been stalled there since 2012 and 2016*". Other specific government agencies mentioned include the Cleaner Production Council (CPL from the Spanish *Consejo de Producción Limpia*) (B1), the Chilean Agency for Sustainability and Climate Change (ASCC from the Spanish *Agencia Chilena de Sustentabilidad y Cambio Climático*), (B1) and the National

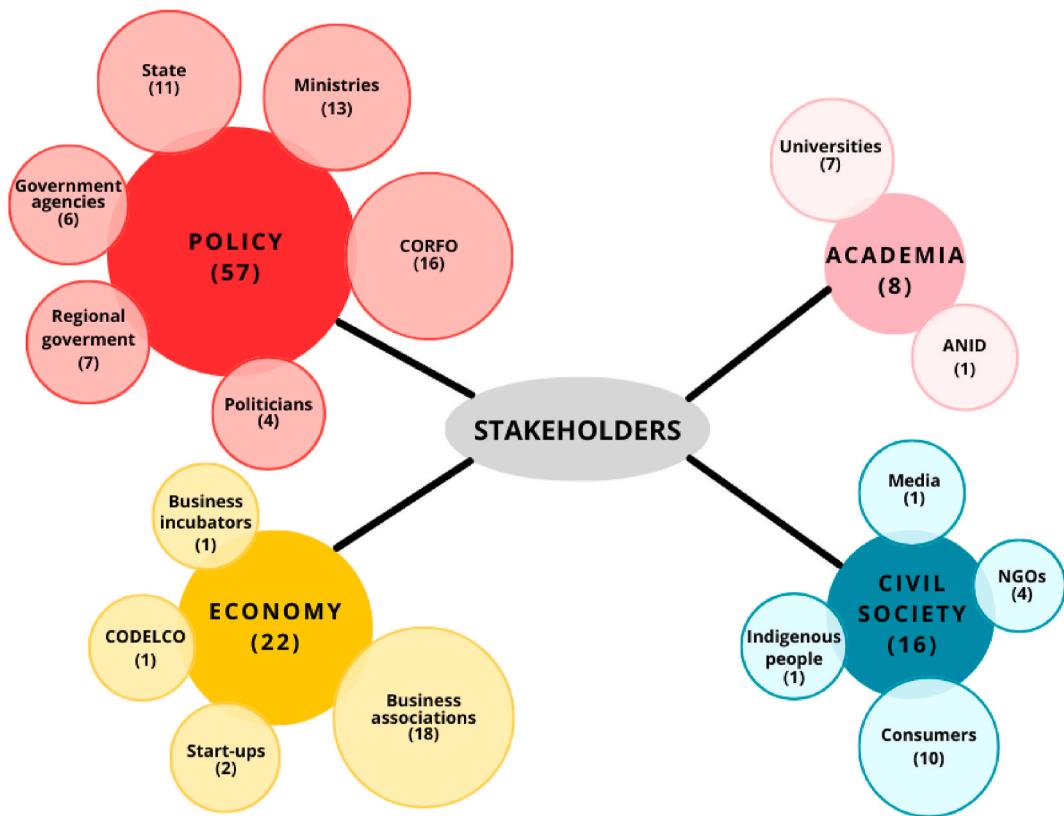


Fig. 1. Main stakeholders identified during the interviews. The number next to each stakeholder indicates the frequency with which they were mentioned by the interviewees and the size of the circles is proportional to this frequency. ANID: National Agency for Research and Development, CODELCO: National Copper Corporation, CORFO: Production Development Corporation, NGO: Non-governmental organisation.

Consumer Service (SERNAC from the Spanish *Servicio Nacional del Consumidor*), which is the main organisation focused on the protection of consumer rights (B1; C4). At the regional level, interviewers identified the importance of municipalities, because, despite their limited economic resources, they are closer to the citizen's needs and are used to pilot and validate small projects (A1). Additionally, the Undersecretariat for Regional Development (SUBDERE from the Spanish *Subsecretaría de Desarrollo Regional*) and the Regional Ministerial Secretariat (SEREMI from the Spanish *Secretaría Regional Ministerial*) of Health and Environment were also mentioned (P4). Finally, some interviewees identified other government stakeholders more generally, such as the State (A4; A5; B1; B2; C1; C2; N1; N4; P3; P5; P6) and politicians (A3; N2; N3; P4).

In the economic sector (economy in Fig. 1), private companies are the second main stakeholder for a CE comprising business associations, start-ups, business incubators, and specific enterprises such as the National Copper Corporation (CODELCO from the Spanish *Corporación Nacional del Cobre*) (P1; P2; P5). Large enterprises can accelerate structural changes for the adoption of circular practices across various sectors and SMEs, with their flexibility and adaptability, hold unique positions to capitalise on local knowledge and traditions to foster CE models. However, particularly small enterprises face different challenges in capturing and managing financial and technological resources resulting in several consequences beyond financial one, such as work safety and stability in the market (B5). On a lower scale, start-ups are taking advantage of artificial intelligence as a key tool for boosting their operations and creating new CE solutions. Furthermore, business associations such as the Industrial Development Society (SOFOFA from the Spanish *Sociedad de Fomento Fabril*) (B1), and the National Mining Society (SONAMI from the Spanish *Sociedad Nacional de Minería*) (B1) can boost a CE because they "have the power to convene, promote research and also seminars and courses and liaise with the state on major agreements" (B1). Other actors, including *Fundación Chile*, have played a role in disseminating a CE and have supported several SMEs through funding (B1; N2; P1). Despite the limited availability of public funding for investment (section 4.1.4), there are avenues for public-private collaboration.

Stakeholders associated with culture, education and society (civil society in Fig. 1) are the third group more frequently mentioned. Inside this group, consumers are repeatedly highlighted by interviewees "because they are ultimately affected by or benefit from such regulations" (N4) and they "are increasingly demanding concrete, real and relevant action" (C2). But they also "have a great responsibility from the point of view of the product they purchase and, then, whether or not they take responsibility for the waste they are generating" (P6). Non-governmental organisations need to take a more active role: "since the dictatorship, the first thing that was eliminated was all the social organisations, so all the cooperatives were eliminated, a few remained but they have not been reactivated, and from an economic point of view, cooperatives are extremely important" (B5). Finally, indigenous people and media are only mentioned by one interviewee in each case.

In academia (Fig. 1), universities drive the CE agenda in Chile through education, research, development of new technologies, and fostering innovation ecosystems, crucial for sustaining long-term CE strategies (A2; A3; B1; B5; P1; P3; P5). However, some interviewees highlight there "*is a brutal disconnection between academia and the market and civil society, because academia moves very slowly and the market moves very fast*" (C1). Funding in academia is provided predominantly by the Ministry of Science, more specifically the National Agency for Research and Development (ANID from the Spanish *Agencia Nacional de Investigación y Desarrollo*) through various programmes (P1).

4.6. Priorities

Priorities identified by the interviewees encompass socio-cultural, political, technological, and economic aspects. The percentages (based on the frequency the priorities were mentioned in interviews) and the most relevant priorities are presented in Table 3 (all the mentioned priorities can be seen in Table S1 in SI).

4.6.1. Culture, education and society

Throughout the interviews, the need to instigate cultural change towards sustainable consumption and circular patterns in society was identified as a priority. Without this shift in values and norms, neither political nor technological efforts can effectively impact society. Therefore, all initiatives need to be accompanied by sensitization and awareness campaigns (A4). Public knowledge about the CE varies widely, with many individuals limited to understanding it solely as recycling (section 4.1.1). Awareness campaigns about the broader aspects of CE are needed to garner increased public participation and support (A4; B1; B4; B5; P2). Furthermore, the role of companies in promoting circular consumption habits based on information is vital. Through educational campaigns based on robust data, businesses can educate consumers about the principles of CE and encourage the adoption of sustainable consumption practices for their products. "*This [educational campaign] can help raise awareness and promote the necessary mindset and behaviours among the general public*" (C2). Consumers play a pivotal role in advancing to a CE, as "*their demand acts as a driving force for businesses to transition*" (C2), necessitating education and awareness efforts that transcend only recycling efforts (P6). Similarly, emphasising the social benefits can contribute to the progress of CE as "*what we are telling people is that, by recycling, your efforts are not only benefiting the environment but also helping an individual with a face [informal waste collector] to lift themselves out of poverty, to support their family. We have found that this message is much more powerful than simply saying we need to recycle to prevent a 1.5-degree Celsius increase*" (P3).

There is a consensus among interviewees that more environmental education is needed, particularly among younger generations (P4), to foster a culture of sustainability. This transformation should introduce comprehensive and transversal educational initiatives on CE into formal education plans from an early age and throughout different levels of

Table 3

Main priorities identified by the interviewees and categorised by key aspects. Each letter represents one sector. A: Academia, B: Business, C: Consumers, N: Non-governmental Organisations, P: Policymakers.

| Aspect | Percentage | Main priorities | ID |
|--------------------------------|------------|---|--|
| Culture, education and society | 41% | To increase circular economy awareness to drive cultural change and shift consumer behaviour To change the educational system and increase environmental education To train a knowledgeable and skilled workforce | A1; A2; A3; A4; A5; B1; B2; B3; B4; B5; C1; C2; N2; P2; P5 A1; A2; B2; B4; B5; C1; C2; P2; P4; P5 A1; A4; B1; B2; B5; N2; P4; P5 |
| Policy and regulation | 22% | To strengthen the regulatory and institutional framework, develop policies and improve oversight To address waste treatment problems, particularly landfills | A2; A4; B1; B5; C1; N1; N2; N4; P4; P5; P6 A1; N1; P2; P5 |
| Technology and data | 22% | To collect and provide specific data for decision-makers, industry and consumers To increase technical advancements (through research and innovation) | B2; B5; C1; C2; P6 A3; A4; B2; B5 |
| Economy | 15% | To provide financial support and economic incentives, particularly for local initiatives | A1; A4; B1; B3; B4; B5; C2; N2; N3; P4; P6 |

schooling (C2). Moreover, making environmental education mandatory and ensuring its inclusion in the curriculum are paramount, emphasising the significance of addressing environmental topics and promoting responsible consumption (C1). At the university level, there is a recognized need to integrate CE concepts into curricula to prepare a more knowledgeable workforce. This involves significant investment in educational programs and the development of human capital specialised in the CE (P5). Additionally, university projects focused on environmental and CE education can effectively engage educators and students as agents of change (C1) and drive sustainable economic growth (P5). Such efforts not only create opportunities for skilled employment but also contribute to reducing unemployment and promoting economic growth across different regions, thereby mitigating centralization issues (B2) (section 4.1.3). The quote from B1 serves as an excellent wrap-up: “*a general need for greater awareness and understanding of circular economy concepts among businesses and the wider community is evident. This includes the need for education, training, and knowledge transfer to embed circular principles deeply into business strategies and public consciousness*”.

4.6.2. Policy and regulation

Regarding regulation priorities, “*the most urgent barrier to address is the regulatory framework*” (A4; B5; P5; P6). This entails bolstering existing regulations and crafting new policies that foster circular practices (A4). It requires rigorous enforcement mechanisms to ensure compliance and the establishment of a robust legal framework conducive to circular endeavours (P6). Active engagement in shaping public policies and facilitating private sector initiatives, such as clean production agreements, are also essential (C1). Furthermore, ensuring effective oversight (N2), especially of extractive industries is crucial, given their significant environmental footprint. Collaborating with non-governmental organisations like the *Fundación Basura* to address deceptive environmental claims (e.g., greenwashing) (C1) and implementing rigorous product scrutiny measures are vital steps toward environmental stewardship (N4). Moreover, addressing the waste crisis is vital due to its significant environmental and health implications (N1). “*In Chile, there is a problem with landfills as many regions are reaching their capacity, and there is a lack of solutions. Some regions are even transporting their waste to other areas*” (P2). Effective waste management strategies, including energy recovery and soil enhancement practices, are essential. Furthermore, stringent regulations are needed to manage organic waste, particularly in those regions facing urgent landfill capacity challenges (A1).

4.6.3. Technology and data

Transitioning to a CE in Chile also requires robust information systems to guide decision-making processes. Dedicated units must be formed to generate high-quality data, ensuring that decision-makers, industries, and consumers have access to accurate information (B2; B5; C1; P3). Additionally, to effectively measure progress towards circularity, it is imperative to establish metrics that assess the circularity of products and processes. These metrics will provide valuable insights into resource efficiency, waste reduction, and the promotion of reuse and recycling initiatives (P6). Standardising cross-cutting indicators across government-funded projects is necessary to evaluate their environmental and social impacts consistently. By implementing standardised metrics, policymakers can gain a comprehensive understanding of the effectiveness of various initiatives (e.g., the Chilean Circular Economy Roadmap ([MMA, 2021](#))) in driving this transition (P1). Furthermore, it is crucial to empower scientific and technological companies across regions (A3) and promote innovation by providing adequate support, training, and resources to implement circular processes effectively (A4).

4.6.4. Economy

Considering the economic and financial environment, it is necessary to provide a comprehensive suite of economic incentives to encourage

widespread participation and investment in circular projects. This includes not only providing direct financial support from the public or private sector, which is important (A4; B1; P6), but also facilitating subsidies and incentives tailored to the needs of circular projects, entrepreneurs, and technological advancements (A4); “*while there is some public financial support for sustainable initiatives ... there is a need for more substantial and accessible funding to drive innovation and adoption of circular economy models*” (B4). By making these opportunities readily available and accessible, individuals and businesses are incentivized to embrace circularity, recognizing the economic advantages CE offers (B5).

Furthermore, allocating dedicated funds to finance initiatives aimed at bolstering local economies is paramount. Prioritising local economic development involves strategically investing in initiatives that promote the circulation of resources within communities, thereby, reducing external dependencies and fostering self-reliance (C2). This is extremely important for Chile due to its particular geography, which has motivated historically significant economic disparities between regions, with some areas, like Santiago, more developed than others (section 4.1.3). These funds can be channelled towards various projects, including supporting the establishment of circular business models, enhancing local infrastructure for resource recovery and recycling, and facilitating the development of sustainable supply chains (B5; N2; N3).

Additionally, diversification of industries in Chile is fundamental, aiming to move beyond reliance on natural resources by generating higher value in products and services through knowledge enhancement, innovation, and improvement of the quality of existing products (B2). Thus, there is a priority for promoting new markets supported by the public sector: “*enabling markets of secondary raw materials and the power of purchasing by the public sector are fundamental, and for that, we need to generate competition in the institutions so that this public purchase can be carried out*” (P5). Thus, the industry can feel reassured to take risks or make technological and infrastructural investments to advance in the circular transformation process (B5). This strategic approach not only fosters the creation of new industries and employment opportunities but also enhances the overall value proposition of Chilean products in the global market.

4.7. Discussion

Previous literature identified barriers in LAC, including the lack of government policies and regulations ([Ospina-Mateus et al., 2023](#)), a low education level and limited awareness ([Betancourt Morales and Zartha Sossa, 2020](#)), financial constraints ([Betancourt Morales and Zartha Sossa, 2020; Salvador et al., 2022](#)), and insufficient support for the informal waste management sector ([Gallego-Schmid et al., 2024](#)). A majority of these barriers are also identified in the present study in the Chilean context. Similarly, the cultural barrier is particularly critical in LAC ([Andrade Carrasco and Tonon Ordóñez, 2023; Ospina-Mateus et al., 2023; Betancourt Morales and Zartha Sossa, 2020](#)), with the main concerns in Chile being the impact of social inequalities on CE adoption, cultural resistance and excessive consumerism. In contrast, this research identified barriers not previously reported in the literature in the LAC context such as: i) the variability of political support at the municipal level; ii) a predominant focus on the end-of-life phase; iii) the lack of technological and waste management infrastructure outside metropolitan areas; and iv) the role of low-cost imports from Asia.

Regarding policy drivers in LAC, [Gallego-Schmid et al. \(2024\)](#) reported that governmental support and political influence are crucial for advancing recycling and waste management technologies. As stated in the present study, the transition in Chile is supported and promoted as a State vision (which will not change even if the government is changing in the future) and the country is committed to international environmental agreements, a CE roadmap, national strategies (e.g., organic waste by 2040 ([MMA, 2020](#))), and CE-related laws such as the EPR law ([MMA, 2016](#)), the Law 20879 penalising the transport of waste to

clandestine dumps (BCN, 2015), and the Law 21100 prohibiting plastic bags in commerce (BCN, 2018), among others. This regulatory development contrasts, for instance, with the lack of regulatory frameworks observed in other countries of LAC, which hampers CE initiatives, particularly in solid waste management (Ospina-Mateus et al., 2023; Gallego-Schmid et al., 2024). For example, in Chile, the integration of waste collectors into the waste management system through legislation has been crucial for advancing the implementation of CE-related actions and is a step still missing in most of the LAC countries. In addition, the Chilean economy based on resource exports reflects that one of the main drivers of a CE is international trade, which is not mentioned in other related studies in LAC, nor is the role of marketing in enhancing the reputation of large companies when implementing CE strategies. Furthermore, although one of the main drivers in the region is the potential economic benefits of increasing circularity in the bioeconomy (Weber et al., 2020), resource efficiency is the main economic driver in Chile, and bio-based models are still only emerging opportunities. From the Global South perspective, drivers such as resource efficiency, natural resource scarcity, and climate change crisis have been also identified in specific sectors, like food production (Purnomo et al., 2024), or the e-waste urban mining (Erdiaw-Kwasie et al., 2024). Finally, the communication of CE benefits linked to living conditions improvements (and environmental impact reduction) has also been identified as a driver towards a circular model in Argentina's agricultural sector (Rótolo et al., 2022).

Regarding opportunities in LAC, business innovation in waste management and the development of product-service systems (Andrade Carrasco and Tonon Ordóñez, 2023) and investment in technology transfer (Soto-Ríos et al., 2023) have been identified as significant opportunities in LAC. Moreover, diversifying economic sectors, the development of sustainable business and employment, production efficiency, and new sustainable products have also been identified as opportunities in LAC (Gallego-Schmid et al., 2024). In the case of Chile, besides the development of "green" employment, opportunities were related to specific sectors such as lithium recycling projects, urban mining, and sustainability initiatives in tourism. In terms of technological opportunities, digitisation can facilitate access to research resources, enable product-service systems, and optimise material flow processes in LAC (Tonon Ordóñez and Andrade Carrasco, 2023). According to the findings of the present study, Chile excels in this area with an accelerated digitalisation of business processes.

The findings outlined are relevant for LAC, as this region has shown an increased interest in the CE, driven by commitments such as the Paris Agreement and the 2030 Agenda for Sustainable Development (Ospina-Mateus et al., 2023). Chile is recognised as a leading country in promoting a CE, for its international engagement (e.g. leading COP25), and its progress in renewable energy generation (e.g., solar electricity and green hydrogen), serving as a benchmark for countries in a region facing environmental challenges like deforestation, health crises, biodiversity loss, sanitation issues, high waste generation, and energy supply difficulties (Ospina-Mateus et al., 2023; Gallego-Schmid et al., 2024). Additionally, while Europe is addressing conceptual issues of a CE, LAC aims to implement this model (Betancourt Morales and Zártha Sossa (2020)), and the Chilean transition is backed by a robust political framework (still in progress), based on a roadmap operated by the CE office (the first in LAC), which has led to new CE-related laws, sectoral strategies, and targets to support the transition in a context of accelerated digitalisation, strong entrepreneurial spirit, and environmental awareness young population in the country. This research provides further evidence of the importance of governance (i.e., policy and regulatory frameworks, finance structures) of CE, which is still emerging in LAC (Aguilar et al., 2022), and which is needed in a region where external pressure towards transition is expected to play a determining role.

5. Conclusions

This study is the first to examine Chile's transition to a circular economy from a holistic perspective, identifying key barriers, drivers, strengths, opportunities, benefits, stakeholders, and priorities essential for this transformation. A novel contribution of this research is the exploration of the relationship between isomorphic pressures and spillover effects within the national context. Among the three isomorphic pressures—*coercive*, *normative*, and *mimetic*—*normative* pressures are perceived as the least influential, largely due to their dependence on institutional commitment. This study emphasises that isomorphic pressures should be viewed as part of an integrated system rather than isolated external factors. For instance, indigenous knowledge can enhance the effectiveness of these pressures by fostering a bottom-up approach that supports circular practices. Additionally, isomorphic pressures in one sector often influence others through economic benefits and increased societal pressure, facilitating a broader adoption of circular economy principles.

The transition to a circular economy in Chile faces cultural, educational, and societal challenges, including limited understanding of circular principles and resistance to altering established linear business models. Policy and regulatory barriers persist, characterised by vague and poorly enforced legislation. Technological constraints, such as the centralization of resources in the capital, and economic dependencies on extractive industries further hinder progress.

Despite these obstacles, several significant drivers are promoting change. Increased environmental awareness, particularly among younger generations, supportive public policies, and international pressures to meet global sustainability standards are key catalysts. Economic incentives, including cost savings and enhanced competitiveness, also encourage stakeholders to adopt circular practices. Chile's strengths include a strong entrepreneurial spirit, a growing sustainability movement, and an existing regulatory framework that, although imperfect, supports circular economy development. Opportunities for Chile involve leveraging natural resources, advancing waste management technologies, and promoting industrial symbiosis in sectors like mining, agriculture, and tourism.

Key stakeholders in Chile's circular economy transition include government bodies, businesses, academia, and civil society. These groups are crucial for driving the circular economy agenda through policy formulation, technological innovation, and public engagement. The study highlights several priorities: increasing public awareness, enhancing environmental education, strengthening the regulatory framework, improving data collection for decision-making, and providing economic incentives to support circular initiatives.

This research is limited by its focus on Chile, which may affect the generalizability of the findings to other regions. However, many results may be applicable to other high-income and Latin American and Caribbean countries undergoing similar transitions. Additionally, the use of semi-structured interviews might introduce biases based on the selected stakeholders' perspectives, though this was mitigated by including interviewees from diverse sectors and backgrounds. Future research should conduct longitudinal studies to evaluate the long-term impact of isomorphic pressures and spillover effects on circular economy adoption. Comparative studies between Chile and other Latin American countries could also offer deeper insights into the regional dynamics of circular economy transitions.

CRediT authorship contribution statement

Alejandro Gallego-Schmid: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Leonardo Vásquez-Ibarra: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Investigation, Formal analysis, Data curation. **Ana Belén Guerrero:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Investigation, Formal analysis, Data curation. **Claudia E. Henninger:** Writing – review & editing, Writing – original draft, Formal analysis. **Ricardo Rebollo-Leiva:** Writing – review & editing, Writing – original draft, Validation, Software, Resources, Investigation, Formal analysis, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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Data availability

Data will be made available on request.

References

- Aksom, H., Tymchenko, I., 2020. How institutional theories explain and fail to explain organizations. *J. Organ. Change Manag.* 33. <https://doi.org/10.1108/JOCM-05-2019-0130>.
- Alblowi, R., Brydges, T., Henninger, C.E., Heinze, L., Retamal, M., Parker-Strak, R., Blazquez, M., 2022. Exploring supply chain sustainability drivers during COVID-19-Tale of 2 cities. *J. Clean. Prod.* 373. <https://doi.org/10.1016/j.jclepro.2022.133956>.
- Alqershy, M.T., Shi, Q., Anbar, D.R., 2024. Analysing the interplay of isomorphic pressures, perceived benefits and top management support on social responsibility performance of Belt and Road megaprojects. *Eng. Construct. Architect. Manag.* <https://doi.org/10.1108/ECAM-11-2023-1169>.
- Andrade Carrasco, M.E., Tonon Ordóñez, L.B., 2023. The path to circularity: a literature review of its application in Latin America. *Economía & Negocios* 5. <https://doi.org/10.3326/27086062.2023.1.1547>.
- Ashworth, R., Boyne, G., Delbridge, R., 2007. Escape from the iron cage? Organizational change and isomorphic pressures in the public sector. *J. Publ. Adm. Res. Theor.* 19 (1), 165–187. <https://doi.org/10.1093/jopart/mum038>.
- Bag, S., Dhamija, P., Bryde, D.J., Singh, R.K., 2022. Effect of eco-innovation on green supply chain management, circular economy capability, and performance of small and medium enterprises. *J. Bus. Res.* 141, 60–72. <https://doi.org/10.1016/j.jbusres.2021.12.011>.
- BCN, 2018. Ley Chile prohíbe LA ENTREGA DE BOLSAS plásticas DE COMERCIO EN TODO EL TERRITORIO NACIONAL. [Www.bcn.cl/Leychile](http://www.bcn.cl/Leychile). <https://www.bcn.cl/leychile/navegar?idNorma=1121380>.
- BCN, 2015. Ley de Chile SANCIÓN CLANDESTINOS. [Www.bcn.cl/Leychile](http://www.bcn.cl/Leychile). <https://www.bcn.cl/leychile/navegar?idNorma=1084262>.
- Behzad, M., Abello-Passteni, V., Videla Labayru, J.T., Martínez Ramírez, P., 2024. Developing an assessment model for uncovering potential synergies of regional industrial symbiosis: a case study of Valparaíso region, Chile. *J. Clean. Prod.* 444, 141245. <https://doi.org/10.1016/j.jclepro.2024.141245>.
- Berrone, P., Fosfuri, A., Gelabert, L., Gomez-Mejia, L.R., 2013. Necessity as the mother of “green” inventions: institutional pressures and environmental innovations. *Strat. Manag. J.* 34. <https://doi.org/10.1002/smj.2041>.
- Betancourt Morales, C.M., Zartha Sossa, J.W., 2020. Circular economy in Latin America: a systematic literature review. *Bus. Strat. Environ.* 29, 2479–2497. <https://doi.org/10.1002/bse.2515>.
- Buschschlöter, V., 2024. Chile wildfires: hundreds missing as thousands of homes burn. BBC [WWW Document]. <https://www.bbc.com/news/world-latin-america-68215354>. accessed 8.28.24.
- Cabrera-González, M., Ramonet, F., Harasek, M., 2022. Development of a model for the implementation of the circular economy in desert coastal regions. *Land* 11, 1506. <https://doi.org/10.3390/land11091506>.
- Calderón Márquez, A.J., Rutkowski, E.W., 2020. Waste management drivers towards a circular economy in the global south – the Colombian case. *Waste Manag.* 110, 53–65. <https://doi.org/10.1016/J.WASMAN.2020.05.016>.
- Calzolari, T., Bimpizas-Pinis, M., Genovese, A., Brint, A., 2023. Understanding the relationship between institutional pressures, supply chain integration and the adoption of circular economy practices. *J. Clean. Prod.* 432, 139686. <https://doi.org/10.1016/j.jclepro.2023.139686>.
- Cardemil, M., 2022. Las mipymes chilenas en el 2022 Serie Minutas N° 25-22, 16/05/2022 [WWW Document]. URL. https://obtienearchivo.bcn.cl/obtienearchivo?id=repositorio/10221/3318/1/N_25_22_Las_mipymes_chilenas_en_el_2022.pdf. accessed 8.28.24.
- Castro-Lopez, A., Iglesias, V., Santos-Vijande, M.L., 2023. Organizational capabilities and institutional pressures in the adoption of circular economy. *J. Bus. Res.* 161, 113823. <https://doi.org/10.1016/j.jbusres.2023.113823>.
- Cayumil, R., Khanna, R., Konyukhov, Y., Burmistrov, I., Kargin, J.B., Mukherjee, P.S., 2021. An overview on solid waste generation and management: current status in Chile. *Sustainability* 13 (21), 11644. <https://doi.org/10.3390/su132111644>.
- Cerdá-Suárez, L.M., Espinosa-Cristiá, J.F., Núñez-Valdés, K., Núñez-Valdés, G., 2023. Detecting circular economy strategies in the fourth sector: overview of the Chilean construction sector as evidence of a sustainable business model. *Sustainability* 15 (11), 8559. <https://doi.org/10.3390/su15118559>.
- Charmaz, K., 2006. *Constructing grounded theory: a practical guide through qualitative analysis (introducing qualitative methods series)*. SAGE Publications: London.
- Chiappetta Jabbour, C.J., Seuring, S., Lopes de Sousa Jabbour, A.B., Jugend, D., De Camargo Fiorini, P., Latan, H., Izeppi, W.C., 2020. Stakeholders, innovative business models for the circular economy and sustainable performance of firms in an emerging economy facing institutional voids. *J. Environ. Manag.* 264, 110416. <https://doi.org/10.1016/j.jenvman.2020.110416>.
- Circle Economy Foundation, 2023. The circularity gap report [WWW Document]. URL. <https://www.circularity-gap.world/2023#download>. accessed 6.10.24.
- Circular, 2022. Rol del consumidor para un Chile circular [WWW Document]. URL. https://drive.google.com/file/d/1L2pCT5yTHdJGjZXbVM3FrUNKNEy6_CY1/view. accessed 8.29.24.
- Clark, C.W., 2013. Commons, concept and theory of. In: Encyclopedia of Biodiversity. Elsevier, pp. 149–154. <https://doi.org/10.1016/B978-0-12-384719-5.00026-5>.
- Ddiba, D., Andersson, K., Koop, S.H.A., Ekener, E., Finnveden, G., Dickin, S., 2020. Governing the circular economy: assessing the capacity to implement resource-oriented sanitation and waste management systems in low- and middle-income countries. *Earth System Governance* 4, 100063. <https://doi.org/10.1016/j.esg.2020.100063>.
- DiMaggio, P.J., Powell, W.W., 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *Am. Socio. Rev.* 48. <https://doi.org/10.2307/2095101>.
- Easterby-Smith, M., Thorpe, R., Jackson, P.R., 2012. *Management Research*, fourth ed. SAGE.
- Elliott, C., Schumer, C., Gasper, R., Ross, K., Singh, N., 2024. Chile's new governance structures are streamlining net-zero implementation. Project Update. <https://www.wri.org/update/chiles-new-governance-structures-are-streamlining-net-zero-implementation>. accessed 8.30.24.
- EMF, 2021. Latin America and the circular economy. Regions. URL. <https://www.ellenmacarthurfoundation.org/regions/latin-america>. accessed 8.30.24.
- Erdiaw-Kwasie, M.O., Abunyaweh, M., Baah, C., 2024. A systematic review of the factors – barriers, drivers, and technologies – affecting e-waste urban mining: on the circular economy future of developing countries. *J. Clean. Prod.* 436, 140645. <https://doi.org/10.1016/j.jclepro.2024.140645>.
- Espinosa-Pérez, L.A., Espinosa-Pérez, A.T., Vásquez, Ó.C., 2024. Life cycle assessment of alternatives for industrial textile recycling. *Sci. Total Environ.* 927, 172161. <https://doi.org/10.1016/j.scitotenv.2024.172161>.
- European Parliament, 2023. Circular economy: definition, importance and benefits [WWW Document]. URL. <https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits>. accessed 9.1.24.
- Flick, U., 2009. *An Introduction to Qualitative Research*, fourth ed. SAGE Publications: Sage.
- Furness, M.F., Bello-Mendoza, R., Güereca, L.P., Chamy Maggi, R., 2024. The biofactories: quantifying environmental benefits of the wastewater circular economy in Chile using life cycle assessment. *Circular Economy* 3 (3), 100091. <https://doi.org/10.1016/j.cec.2024.100091>.
- Gallego-Schmid, A., López-Eccher, C., Muñoz, E., Salvador, R., Cano-Londono, N.A., Vetroni Barros, M., Choconta Bernal, D., Mendoza, J.M., Nadal, A., Guerrero, A.B., 2024. Circular economy in Latin America and the Caribbean: drivers, opportunities,

- barriers and strategies. *Sustain. Prod. Consum.* <https://doi.org/10.1016/j.spc.2024.09.006>.
- Gobierno de Chile, 2023. Informes nacionales. Tercer Informe Nacional Voluntario, 2030 [WWW Document]. URL https://www.chileagenda2030.gob.cl/Informes/recurso_s/informenacionalvoluntario/1. accessed 8.30.24.
- Guarnieri, P., Bianchini, A., Rossi, J., Câmara e Silva, L., Trojan, F., Lizot, M., de Oliveira Vieira, B., 2023. Transitioning towards a circular economy under a multicriteria and the new institutional theory perspective: a comparison between Italy and Brazil. *J. Clean. Prod.* 409, 137094. <https://doi.org/10.1016/j.jclepro.2023.137094>.
- Henninger, C.E., Alevizou, P.J., Oates, C.J., 2016. What is sustainable fashion? *J. Fash. Mark. Manag.* 20, <https://doi.org/10.1108/JFMM-07-2015-0052>.
- Henríquez-Aravena, A., Martínez-Cerna, L., Venegas-Cifuentes, A., 2021. *Transitioning towards a Circular Economy: Opportunities and Steps for Latin America*.
- Heyes, G., Sharmina, M., Mendoza, J.M.F., Gallego-Schmid, A., Azapagic, A., 2018. Developing and implementing circular economy business models in service-oriented technology companies. *J. Clean. Prod.* 177. <https://doi.org/10.1016/j.jclepro.2017.12.168>.
- Ingersoll, A.R., Glass, C., Cook, A., 2024. Institutional isomorphic pressures: the impact for women on boards. *Corp. Govern.* 24. <https://doi.org/10.1108/CG-01-2023-0008>.
- Jarpa, S.G., Halog, A., Guerrero, L., 2021. Circular economy implementation in Chilean retail industry. In: Muthu, S.S. (Ed.), *Circular Economy. Environmental Footprints and Eco-Design of Products and Processes*. Springer, Singapore. https://doi.org/10.1007/978-981-16-3698-1_5.
- Kahupi, I., Yakovleva, N., Okorie, O., Eirikur Hull, C., 2024. Implementation of circular economy in a developing economy's mining industry using institutional theory: the case of Namibia. *J. Environ. Manag.* 368. <https://doi.org/10.1016/j.jenvman.2024.122145>, 122145–122145.
- Kauppi, K., Luzzini, D., 2021. Measuring institutional pressures in a supply chain context: scale development and testing. *Supply Chain Manag.: Int. J.* <https://doi.org/10.1108/scm-04-2021-0169> ahead-of-print(ahead-of-print).
- Kirchherr, J., Reike, D., Hekkert, M., 2017. Conceptualizing the circular economy: an analysis of 114 definitions. *Resour. Conserv. Recycl.* <https://doi.org/10.1016/j.resconrec.2017.09.005>.
- Lee, H., Shin, K., Lee, J.-D., 2020. Demand-side policy for emergence and diffusion of eco-innovation: the mediating role of production. *J. Clean. Prod.* 259, 120839. <https://doi.org/10.1016/j.jclepro.2020.120839>.
- Leipold, S., Petit-Boix, A., Luo, A., Helander, H., Simoens, M., Ashton, W.S., Babbitt, C. W., Bala, A., Bening, C.R., Birkved, M., Blomsma, F., Boks, C., Boldrin, A., Deutz, P., Domenech, T., Ferronato, N., Gallego-Schmid, A., Giurco, D., Hobson, K., Husgafvel, R., Isenhour, C., Kriipsalu, M., Masi, D., Mendoza, J.M.F., Milios, L., Niero, M., Pant, D., Parajuly, K., Pauliuk, S., Pieroni, M.P.P., Richter, J.L., Saidani, M., Smol, M., Peiró, L.T., van Ewijk, S., Vermeulen, W.J.V., Wiedenhofer, D., Xue, B., 2023. Lessons, narratives, and research directions for a sustainable circular economy. *J. Ind. Ecol.* 27. <https://doi.org/10.1111/jiec.13346>.
- Levänen, J., Lyttinen, T., Gatica, S., 2018. Modelling the interplay between institutions and circular economy business models: a case study of battery recycling in Finland and Chile. *Ecol. Econ.* 154, 373–382. <https://doi.org/10.1016/j.ecolecon.2018.08.018>.
- Lin, J., Luo, Z., Luo, X., 2020. Understanding the roles of institutional pressures and organizational innovativeness in contextualized transformation toward e-business: evidence from agricultural firms. *Int. J. Inf. Manage.* 51. <https://doi.org/10.1016/j.ijinfomgt.2019.10.010>.
- Manika, D., Gregory-Smith, D., Wells, V., Graham, S., 2015. Home vs. Workplace energy saving attitudes and behaviors: the moderating role of satisfaction with current environmental behaviors, gender, age, and job duration. *AMA Winter Educators' Conf. - Proc.* 26.
- Medhurst, J., Marsden, J., Jugnauth, A., Peacock, M., Lonsdale, J., 2014. An economic analysis of spillovers from programmes of technological innovation support [WWW Document]. URL <https://assets.publishing.service.gov.uk/media/5a7c1c5a40f0b645ba3c6c21/bis-14-653-economic-analysis-of-spillovers-from-programmes-of-technological-innovation-support.pdf>. accessed 9.1.24.
- Mendoza, J.M.F., Sharmina, M., Gallego-Schmid, A., Heyes, G., Azapagic, A., 2017. Integrating backcasting and eco-design for the circular economy: the BECE framework. *J. Ind. Ecol.* 21. <https://doi.org/10.1111/jiec.12590>.
- Ministerio de hacienda, 2023. Ley núm. 21.634 [WWW Document]. URL <https://www.bcn.cl/leychile/navegar?idNorma=1198903>. accessed 9.1.24.
- Ministerio de Relaciones Exteriores, 2017. Decreto 30 promulga el Acuerdo de París, adoptado en la vigésima primera reunión de la Conferencia de las Partes de la Convención Marco de las Naciones Unidas sobre el Cambio Climático [WWW Document]. URL <https://www.bcn.cl/leychile/navegar?i=1103158>. accessed 9.1.24.
- MMA, 2024. Ley de Plásticos y Productos de un Solo Uso [WWW Document]. URL <http://economiacircular.mma.gob.cl/plasticos/>. accessed 8.27.24.
- MMA, 2022. Ley 21.455 Ley Marco de cambio climático [WWW Document]. URL <https://www.bcn.cl/leychile/navegar?idNorma=1177286>. accessed 9.1.24.
- MMA, 2021. Economía circular. Hoja de ruta [WWW Document]. URL <https://economiacircular.mma.gob.cl/hoja-de-ruta/>. accessed 8.30.24.
- MMA, 2020. Estrategia Nacional de Residuos Orgánicos Chile 2040 [WWW Document]. URL <https://faolex.fao.org/docs/pdf/chi205614.pdf>. accessed 8.30.24.
- MMA, 2016. Ley 20.920 establece un marco para la gestión de residuos. la responsabilidad extendida del productor y el fomento al reciclaje [WWW Document]. URL <https://www.bcn.cl/leychile/navegar?idNorma=1090894>. accessed 9.1.24.
- Molinos-Senante, M., Maziotis, A., Sala-Garrido, R., Mocholi-Arce, M., 2022. How much does it cost to collect recyclable and residual waste in medium-income countries? A case study in the Chilean waste sector. *J. Air Waste Manag. Assoc.* 72 (10), 1–12. <https://doi.org/10.1080/10962247.2022.2083722>.
- Nichols, B.S., Kirchoff, J.F., Confente, I., Stolze, H., 2023. When brands behave badly: signaling and spillover effects of unethical behavior in the context of triple bottom line sustainability. *J. Prod. Brand Manag.* 32. <https://doi.org/10.1108/JPBM-07-2021-3569>.
- NU CEPAL, Gobierno de Chile, 2012. La economía del cambio climático en Chile [WWW Document]. La economía del cambio climático en Chile. URL <https://www.cepal.org/es/publicaciones/35372-la-economia-cambio-climatico-chile>. accessed 8.30.24.
- OECD, 2022. OECD Economic Surveys: Chile 2022. OECD, Paris. <https://doi.org/10.1787/311ec37e-en>.
- OECD, 2010. Agreement on the terms of accession of the republic of Chile [WWW Document]. URL <https://policycommons.net/artifacts/3828515/agreement-on-the-terms-of-accession-of-the-republic-of-chile/4634431>. accessed 8.30.24.
- Ospina-Mateus, H., Marrugo-Salas, L., Castilla Castilla, L., Castellón, L., Cantillo, A., Bolívar, L.M., Salas-Navarro, K., Zamora-Musa, R., 2023. Analysis in circular economy research in Latin America: a bibliometric review. *Heliyon* 9, e19999. <https://doi.org/10.1016/j.heliyon.2023.e19999>.
- Papamichael, I., Chatziparaskeva, G., Voukkali, I., Navarro Pedreno, J., Jeguirim, M., Zorpas, A.A., 2023. The perception of circular economy in the framework of fashion industry. *Waste Manag. Res.* 41. <https://doi.org/10.1177/0734242X21126435>.
- Peña, C., Civit, B., Gallego-Schmid, A., Druckman, A., Caldeira-Pires, A., Weidema, B., Mieras, E., Wang, F., Fava, J., Canals, L.M.i., Cordella, M., Arbuckle, P., Valdivia, S., Fallaha, S., Motta, W., 2021. Using life cycle assessment to achieve a circular economy. *Int. J. Life Cycle Assess.* 26. <https://doi.org/10.1007/s11367-020-01856-z>.
- Pinto, F., 2019. Cambio climático en Chile: del desafío global a la oportunidad local [WWW Document]. URL <https://library.fes.de/pdf-files/buros/chile/15512.pdf>. accessed 9.1.24.
- Provin, A.P., Dutra, A.R. de A., de Sousa e Silva Gouveia, I.C.A., Cubas, e.A.L.V., 2021. Circular economy for fashion industry: use of waste from the food industry for the production of biotextiles. *Technol. Forecast. Soc. Change* 169. <https://doi.org/10.1016/j.techfore.2021.120858>.
- Purnomo, H., Aminuddin, A., Sarl, A.D., Firduus, F., 2024. Global circular economy practice: drivers, barriers and strategies for food system in Indonesia. *Int. J. Sustain. Dev. Plann.* 19 (9), 3465–3483. <https://doi.org/10.18280/ijspd.190916>.
- RedCross, n.d. Climate change: we're here [WWW Document]. URL https://www.redcross.org.uk/about-us/what-we-do/climate-change#:~:text=Recent_20h_eatwines_20in_20Pakistan_20and_people_20and_20communities_20at_20risk (accessed 8.30.24).
- Reuters, 2024. How climate change made Chile's wildfires so deadly [WWW Document]. URL <https://www.reuters.com/business/environment/how-climate-change-made-chiles-wildfires-so-deadly-2024-02-06/>. accessed 8.30.24.
- Rótolo, G.C., Vassillo, C., Rodriguez, A.A., Magnano, L., Milo Vaccaro, M., Civit, B.M., Covacevich, M.S., Arena, A.P., Ugliati, S., 2022. Perception and awareness of circular economy options within sectors related to agriculture in Argentina. *J. Clean. Prod.* 373, 133805. <https://doi.org/10.1016/j.jclepro.2022.133805>.
- Scapini, V., Berrios, P., 2022. Climate change in Chile, strategic plan and circular economy. *International Journal of Environmental Impacts: Management, Mitigation and Recovery* 5 (4), 306–315. <https://doi.org/10.2495/ei-v5-n4-306-315>.
- Salvador, R., Barros, M.V., Donner, M., Brito, P., Halog, A., De Francisco, A.C., 2022. How to advance regional circular bioeconomy systems? Identifying barriers, challenges, drivers, and opportunities. *Sustain. Prod. Consum.* <https://doi.org/10.1016/j.spc.2022.04.025>.
- Scapini, V., Berrios, P., 2021. Circular economy in Chile: background, law and opportunities. *WIT Trans. Ecol. Environ.* 253. <https://doi.org/10.2495/sc210161>.
- Schröder, P., Albaladejo, M., Ribas, A., Macewen, M., Tilkkanen, J., 2020. The circular economy in Latin America and the Caribbean Opportunities for building resilience [WWW Document]. URL <https://www.chathamhouse.org/2020/09/circular-economy-latin-america-and-caribbean/01-introduction>. accessed 8.30.24.
- Soto-Rios, P.C., Nagabhatla, N., Acevedo-Jáurez, B., 2023. Circulatory pathways in the water and wastewater sector in the Latin American region. *Water (Switzerland)* 15. <https://doi.org/10.3390/w15061092>.
- The World Bank, 2024. World Bank Country and Lending Groups. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>. accessed 8.30.24.
- Truelove, H.B., Carrico, A.R., Weber, E.U., Raimi, K.T., Vandenberg, M.P., 2014. Positive and negative spillovers of pro-environmental behavior: an integrative review and theoretical framework. *Global Environ. Change* 29, 127–138. <https://doi.org/10.1016/j.gloenvcha.2014.09.004>.
- Vaismoradi, M., Turunen, H., Bondas, T., 2013. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nurs. Health Sci.* 15 (3), 398–405. <https://doi.org/10.1111/nhs.12048> wiley.

- Valenzuela-Levi, N., 2019. Factors influencing municipal recycling in the Global South: the case of Chile. *Resour. Conserv. Recycl.* 150, 104441. <https://doi.org/10.1016/j.resconrec.2019.104441>.
- Valerio, M.A., Rodriguez, N., Winkler, P., Lopez, J., Dennison, M., Liang, Y., Turner, B.J., 2016. Comparing two sampling methods to engage hard-to-reach communities in research priority setting. *BMC Med. Res. Methodol.* 16. <https://doi.org/10.1186/s12874-016-0242-z>.
- van de Vijver, F., 2010. Emic–etic distinction. In: Encyclopedia of Cross-Cultural School Psychology. Springer US, Boston, MA, pp. 422–423. https://doi.org/10.1007/978-0-387-71799-9_158.
- Véliz, K.D., Ramírez-Rodríguez, G., Ossio, F., 2022. Willingness to pay for construction and demolition waste from buildings in Chile. *Waste Manag.* 137, 222–230. <https://doi.org/10.1016/j.wasman.2021.11.008>.
- Verfuerth, C., Jones, C.R., Gregory-Smith, D., Oates, C., 2019. Understanding contextual spillover: using identity process theory as a lens for analyzing behavioral responses to a workplace dietary choice intervention. *Front. Psychol.* 10. <https://doi.org/10.3389/fpsyg.2019.00345>.
- Walters, J.P., Véliz, K., Vargas, M., Busco, C., 2024. A systems-focused assessment of policies for circular economy in construction demolition waste management in the Aysén region of Chile. *Sustainable Futures* 7, 100186. <https://doi.org/10.1016/j.sfr.2024.100186>.
- Weber, C.T., Trierweiler, L.F., Trierweiler, J.O., 2020. Food waste biorefinery advocating circular economy: bioethanol and distilled beverage from sweet potato. *J. Clean. Prod.* 268, 121788. <https://doi.org/10.1016/j.jclepro.2020.121788>.
- WHO, 2024. Climate crisis: extreme weather [WWW Document]. Emergencies. URL <https://www.who.int/europe/emergencies/situations/climate-crisis-extreme-weather>. accessed 8.30.24.
- Zhang, Q., Oo, B.L., Lim, B.T.-H., 2024. Modeling influence mechanism of factors on corporate social responsibility implementation: evidence from Chinese construction firms. *Eng. Construct. Architect. Manag.* 31, 324–362. <https://doi.org/10.1108/ECAM-07-2021-0603>.