Challenges in the implementation of Extended Producer Responsibility policies:
The case of Packaging in Chile

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Abstract

Extended Producer Responsibility (EPR) policies have been widely adopted since the 1990’s, particularly in developed countries, as an effective instrument for sustainable waste management and for the transition to a circular economy. Chile is currently adopting EPR programs on six priority products. Whoever, EPR implementation is intrinsically complex, and there is little research on the challenges for its adoption in developing countries, even less on its early-stage implementation, and how to transpose the guidelines from developed countries to developing ones. This research identifies the most relevant challenges in the early-stage implementation of the Chilean packaging EPR law and studies the case to explore the distinctive challenges faced by developing countries. The research was carried out by an inductive analysis of fifteen interviews across six stakeholders groups of the Chilean packaging EPR landscape. Seven major challenges and four key aspects that remain to be defined were identified. The comparison with the EPR literature corroborated the relevance of four challenges and recommended to include the consideration of the development of the recycling industry, the geographical characteristics of a country and the relevance of the information system. Furthermore, the discussion warns of the risk of tackling issues with a short-term vision, supports the need to adopt a systemic approach and reflects on the dynamic nature of the challenges’ relevance.

Acknowledgements

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List of Contents

Abstract.................................................................................................................................2
Acknowledgements .................................................................................................................2
List of Contents ..........................................................................................................................3
List of Figures and Tables.........................................................................................................4
List of Acronyms.......................................................................................................................5
Glossary........................................................................................................................................5
1. Introduction .........................................................................................................................6
2. Literature Review ..................................................................................................................10
   2.1. Circular Economy and EPR Schemes ..............................................................................10
   2.2. EPR Landscape and Implementation Models .................................................................11
   2.3. Challenges in the Implementation of EPR Schemes .........................................................14
   2.4. Waste Management in Chile ..........................................................................................17
   2.5. EPR Stakeholders ...........................................................................................................18
3. Methodology .......................................................................................................................20
   3.1. Stakeholder Mapping and Sampling ..............................................................................22
   3.2. Data Collection: Interviews ............................................................................................25
   3.3. Data Analysis: Coding ....................................................................................................26
   3.4. Ethical Considerations ....................................................................................................26
4. Findings ..................................................................................................................................26
   4.1. Immature recycling industry ............................................................................................28
   4.2. Stakeholders coordination and communication ...............................................................29
   4.3. Citizen education and participation .................................................................................29
   4.4. Information management ................................................................................................30
   4.5. Social inclusion ...............................................................................................................30
   4.6. Geographical challenge ..................................................................................................31
   4.7. Impact on waste market competition ..............................................................................31
   4.8. Key aspects to be defined ................................................................................................32
   4.9. Additional Challenges ....................................................................................................33
5. Discussion ............................................................................................................................................. 34
   5.1. Challenges Relationship Map ........................................................................................................... 34
   5.2. Challenges for developing countries ................................................................................................. 35
   5.3. Future challenges ............................................................................................................................... 37
6. Conclusion .............................................................................................................................................. 38
   6.1. Summary and contributions .............................................................................................................. 38
   6.2. Study limitations .............................................................................................................................. 40
   6.3. Recommendations for further research ............................................................................................ 40
7. References .............................................................................................................................................. 41
8. Annexes ................................................................................................................................................. 45
   Annex 1: EPR policy instruments ............................................................................................................. 45
   Annex 3: Model of interview questionnaire used for Producers. .......................................................... 48
   Annex 4: Extract from interview with Producer 4 .................................................................................. 49
   Annex 5: Example of coding process ...................................................................................................... 51
   Annex 6: Information and Consent Form. ............................................................................................... 52

List of Figures and Tables

Figure 1: Municipal waste disposal and recovery shares by OECD country ............................................ 7
Figure 2: Cumulative EPR adoption .......................................................................................................... 11
Figure 3: EPR by product type .................................................................................................................. 11
Figure 4: Trends in municipal solid waste management in the OECD ...................................................... 13
Figure 5: Cost-effectiveness of EPR schemes for packaging ..................................................................... 14
Figure 6: Municipal waste generation per capita between OECD countries ........................................... 17
Figure 7: Simplified structure of Chile packaging EPR scheme ............................................................... 20
Figure 8: EPR law landscape stakeholder map ......................................................................................... 22
Figure 9: Challenges relationships map .................................................................................................... 34
Figure 10: EPR policy instruments ............................................................................................................ 45
Figure 11: Categories of stakeholders according to their attributes ....................................................... 47

Table 1: Major challenges identified by relevant literature ........................................................................ 16
Table 2: Packaging recycling rates in Chile and EU27 .............................................................................. 18
Table 3: Research stages description ........................................................................................................ 21
Table 4: Interview distribution by stakeholder group ............................................................................... 24
Table 5: Issues emphasized as important by different stakeholder groups ........................................... 27
List of Acronyms

ADF: Advance-disposal-fees
CE: Circular Economy
C&I: Commercial and Industrial
CONAMA: National Environment Corporation
DfE: Design for Environment
EPR: Extended Producer Responsibility
GDP: Gross Domestic Product
HH: Households
LAC: Latin-America and the Caribbean
MMA: Ministry of the Environment
NGO: Non-governmental organization
OECD: Organization for Economic Co-operation and Development
PRO: Producer Responsibility Organization
SMEs: Small and medium-size enterprises
UCTS: Upstream combined tax/subsidy
WEEE: Waste Electrical and Electronic Equipment

Glossary

Eco-design: “Systematic integration of environmental considerations into the design process across the product lifecycle” (Bhamra, 2004, p. 557)

Free-riders: Producers that enjoy the benefits of the EPR system without paying the corresponding fees, including producers that under-declare their volumes.

Sustainable Development: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987)

Stakeholder: In this research, it refers to any group that affects or is affected by the EPR law, aligned with Freeman’s (1984) definition.

Orphan products: Products that are on the market but whose producer cannot be identified.
1. Introduction

Chile has steadily increased the pressure on its natural environment. On one hand, its economy has been based on the extraction of natural resources, becoming the biggest exporter of copper in the world, and a key player of the agricultural, fishing and forestry industries globally (OECD, 2016a, p. 62). This has resulted in a sustained economic growth over the last fifteen years\(^1\), which has brought a significant rise in the wellbeing of its citizens\(^2\) (ibid, p. 66), but has been accompanied with a similar rise in the level of waste production\(^3\), mostly absorbed by sanitary landfills\(^4\) (ibid, p. 78). Chile has one of the lowest rates in Environment Quality from the OECD countries (OECD, 2018b), a recycling rate of only 4%\(^5\) (OECD, 2016a, p. 78) and that the last National Environment Survey (MMA, 2018a) revealed that the second biggest environmental problem in Chile is waste, only after air contamination. To illustrate these issues see Figure 1 for a comparison between OECD countries.

The environmental situation has not been overlooked by the government, and the country has committed to improve it, particularly since 2010, the year of the creation of the Minister of Environment (Ministerio del Medio Ambiente (MMA)). A long-awaited waste management law entered the congress in 2013 and was officially published in 2016 as the Waste Management, Extended Producer Responsibility and Recycling Incentives Bill (Ley N°20.920, 2016), which includes an Extended Producer Responsibility (EPR) scheme for six priority product categories. These categories are packaging, electrical and electronic equipment waste (WEEE), tyres, lubricant oils, automotive batteries and portable batteries. This law will gradually start to come into effect, as the specific regulations and targets are defined and published in the present and coming years.

An EPR system is a regulatory instrument that aims to increase the reuse and recycling rates of products, stimulate the development of the recycling industry, prevent and reduce the amount of waste, reduce the use of virgin resources and stimulate the eco-design of products (OECD, 2001, 2016b; European Commission, 2014; Kunz, Mayers and Van Wassenhove, 2018). This mainly aims to incentivise the transition to a Circular Economy (Ghisellini, Cialani and Ulgiati, 2016, p. 6). To achieve its objectives

\(^1\) GDP growth of 4.2% between 2000 and 2014, considerably higher than the growth of Latin-America or the OECD average (OECD, 2016a)
\(^2\) OECD Better Life Index rise from 42% to 55% between 2007 and 2012, higher than the OECD average (OECD, 2018a)
\(^3\) Waste production growth of 3% between 2000 and 2011 (OECD, 2016a).
\(^4\) 96% of Chile’s waste production of the year 2010-2011 was directed to sanitary landfills (OECD, 2016a).
\(^5\) According to (CONAMA, 2010) the recycling rate is 10%.
the regulation requires producers to take responsibility for the collection and recycling of their products after the end of the lifespan, transferring the costs from local councils to the private sphere of the economy (European Commission, 2014; OECD, 2016b; Kunz, Mayers and Van Wassenhove, 2018). EPR regulations were introduced in Sweden and Germany more than 20 years ago, and today there are at least 395 EPR programs in the world (Kaffine and O’Reilly, 2015). However, these programs vary widely in their implementation models, e.g. in the products considered, the roles and responsibilities of the different stakeholders, or the different instruments and organization mechanisms (OECD, 2001). The different schemes also vary in their technical and economic performance (European Commission, 2014), as they are influenced by national and industry characteristics.

Various studies have explored the challenges in the implementation of EPR schemes (e.g. OECD, 2001, 2014, 2016b; European Commission, 2014; Kunz et al., 2014; Kunz, Mayers and Van Wassenhove, 2018), aiming to learn from past experiences and to develop guiding principles to design efficient and effective EPR schemes. For example, the 2001 OECD Guidance Manual for Governments and its 2016 update (OECD, 2001, 2016b), which are arguably the most influential documents in the development of EPR schemes. Nevertheless, best practices need to be carefully transposed to developing economies, as these commonly lack well-established waste management systems (Akenji et al., 2011). Furthermore, the cost and environmental effectiveness of EPRs depends on external factors (European Commission, 2014, p. 76), particularly:
- Country demographics and geography
- Development of waste management infrastructure
- Value of secondary material on the national market
- Awareness and willingness of citizen to participate
- The existence of complementary waste policy instruments

These considerations need to be carefully transposed to Chile, a developing economy with an incipient recycling industry (OECD, 2016a, p. 26), immersed in a challenging geography that stretches over 4,300 kilometres of length, and a history of economic and political centralization (Boisier, 1993).

The EPR literature has been heavily tilted towards the experience of developed countries, particularly Europe, USA and Japan, with comparably less research on the challenges particular to developing countries. Good examples of the later can be found in the literature on electronics in Asia (Kojima, Yoshida and Sasaki, 2009; Akenji et al., 2011; Tong and Yan, 2013) and in end-of-life tyres in Colombia (Park, Díaz-Posada and Mejía-Dugand, 2018). Existing literature is largely theoretical and conceptual, lacking more research done via specific case studies (Kaffine and O’Reilly, 2015, p. 6), and most studies have collected data with EPR schemes already in place, while little is known about the early-stages of implementation.

This research will contribute to the EPR literature through two main aims: First, to identify the most relevant challenges in the early-stage implementation of the packaging EPR law in Chile; and second, to use the Chile case-study to explore the distinctive challenges of developing economies in the implementation of EPR schemes. Furthermore, the objectives of this research are:

- Review the literature on challenges for the implementation of EPR schemes, with a focus on developing countries
- Identify stakeholders of the packaging EPR landscape in Chile and map them according to their salience
- Identify and classify the most relevant challenges in the early-stage implementation of the packaging EPR law in Chile
- Explore relationships between the challenges, in order to address them appropriately
- Contrast findings from the Chile case-study with relevant literature, highlighting the differences between developed and developing economies in the implementation of EPR schemes
Out of the six priority products of the Chilean EPR law, packaging has been chosen because it is one of the two most advanced regulations, next to tyres. Packaging is arguably the most complex of the six legislated products\textsuperscript{6} - which means it can provide richer insights-, and requires a more participative role of consumers and municipalities, two aspects this research explores.

The study focusses on the early-stage implementation of the packaging EPR law, right before the definition of the recollection and recycling targets for packaging, as is the current situation in Chile. This phase demands special attention, as the multi-sectorial political discussion being developed can affect the legislative design and will impact the effectivity and efficiency of the initiative.

The study will contribute by informing policymakers and the key stakeholders of the most relevant challenges in the present stage of implementation of the packaging EPR law, allowing an early management of the challenges and an increase in the initiative efficiency and effectivity. It will also complement the literature on waste management and EPR schemes, by exploring the distinctive challenges of developing countries in implementing EPR laws and the difficulties in transposing best practices from developed countries, specifically the OECD guidelines (OECD, 2001, 2016b).

The dissertation is structured as follows: after this introductory chapter, a comprehensive review of the literature on EPR schemes is summed up, analysing its relationship to the Circular Economy, the development of the schemes and the most relevant challenges identified for their implementation. It further describes the Chilean EPR law, the various stakeholder groups affected by it, their roles and how the system will work according to the law and the theory. The third chapter describes the research methodology proceeded in the data collection and analysis, whose core aspect is the qualitative analysis of fifteen interviews across the six most relevant stakeholder groups. Chapter four presents the results and main findings, describing the most relevant challenges in the early-stage implementation of the packaging EPR law in Chile. The fifth chapter discusses the findings, analysing the relationship between the main challenges, exploring the potential future challenges and contrasting the findings with the literature in order to identify the distinctive challenges of developing economies. Finally, chapter six summarizes this study, offering concluding remarks, limitations encountered and recommendations for future research.

\textsuperscript{6} Out of the six priority products packaging is the most sub-categories and more players involved.
2. Literature Review

When implemented in an efficient and effective manner, EPR schemes have the potential to radically increase recycling rates, reduce the amount of waste generated and deposited into landfills, incentivize eco-design, reduce citizens health risks and impact consumer behaviour (OECD, 2001, 2014, 2016b; Kaffine and O’Reilly, 2015; Kunz, Mayers and Van Wassenhove, 2018). In order to ensure the correct implementation of the law in Chile and contribute to the literature, this research will start by exploring the connection of EPR schemes to the Circular Economy (CE). This will be followed by a review of the overall EPR landscape worldwide, including an analysis of the main challenges identified by literature. After this, the waste management context in Chile will be explored, along with the actual development of the Chilean packaging EPR law and how the law works in theory, identifying the major stakeholders and their relations.

2.1. Circular Economy and EPR Schemes

The modern world economy is based on a resource-intensive linear economy of “take, make, dispose”, that has resulted in an increasing pressure on the natural environment, stepping over the limits of natural restoration and risking the development potential of future generations (Esposito, Tse and Soufani, 2018, p. 1). The concept of an alternative CE has gained popularity in the last decade, as a powerful framework to guide humanity towards Sustainable Development (Geissdoerfer et al., 2018, p. 1). The CE intends to maximize material efficiency and decouple resource extraction from economic growth (Esposito, Tse and Soufani, 2018, p. 6). This is to be achieved by keeping resources in loops in biological or technical cycles, reducing waste and pollution, and regenerating natural systems (Ellen MacArthur Foundation, 2018). It is a framework that promotes the reduction, reuse, repair, remanufacture and recycle of products –in that order of priorities- in the economy, avoiding the extraction of virgin materials and deposition into landfills (Ellen MacArthur Foundation, 2014). CE implementation worldwide is still in its early stages, mainly focused on recycling rather than reuse, even though recycling is the least sustainable solution of the CE activities in terms of resource efficiency and profitability (Stahel, 2014). Nevertheless, great development has happened in the last decades in waste management and recycling in selected countries (Ghisellini, Cialani and Ulgiati, 2016, p. 1), thanks in part to the various EPR schemes that have been put into place.
2.2. EPR Landscape and Implementation Models

EPR programs appeared in several European countries in the early 1990’s and their adoption has been increasing since Over 72% of existing schemes have been implemented since 2001, the year of the release of the OECD Guidance Manual for Governments (See Figure 2), which now accounts for over 395 EPR policies around the world (Kaffine and O’Reilly, 2015, p. 24). In terms of products covered under EPR schemes, the most frequent are small consumer electronics (35%), seconded by packaging and tyres (17% each), as displayed in Figure 3 (Kaffine and O’Reilly, 2015, p. 23). In terms of geographical distribution, Europe and North America account for 90% of the running EPR schemes worldwide, 48% and 42% respectively (OECD, 2016b, p. 20). However, legal initiatives are growing in numbers in developing countries in Asia, Oceania, Africa and Latin America and the Caribbean (LAC). In LAC, Chile, Mexico, Brazil, Argentina and Colombia are implementing their first EPR schemes, with the treatment for potentially hazardous electronic waste being the most common one (OECD, 2014, p. 5). The schemes worldwide vary in the mix of policy instruments they consider (See Annex 1 for EPR policy instruments descriptions), with various forms of take-back requirements being the most widely used (72%), followed by advance-disposal-fees (16%) and deposit/refund systems (11%) 7. Other policy instruments, i.e. upstream combined tax/subsidy, recycling content standards, and virgin material taxes, are rarely being implemented (Kaffine and O’Reilly, 2015, pp. 22–23).

Besides the policy instruments and range of products being targeted, EPRs vary in other factors. The most relevant are:

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7 Policy instruments being used for packaging are 48% take-back, 39% deposit-refund and 12% advance-deposit – fee (Kaffine and O’Reilly, 2015, p. 23)
• Whether if the scheme is mandatory, i.e. imposed by legislation, or voluntary, i.e. “product stewardship” programmes (OECD, 2016b, p. 22)

• Governance structure (OECD, 2016b, p. 57), which could be based on individual or collective Producer Responsibility Organizations (PROs) (See section 2.5 for the definition of PROs). These can be on Tradable Credits\(^8\), as handled in the UK packaging system, or government-run, as the Chinese scheme for WEEE.

• Type of responsibility assigned to producers, that could be financial or organizational, or both (European Commission, 2014, p. 81)

• Allocation of responsibilities among stakeholders (See section 2.5 for a description of stakeholder groups). Particularly relevant is the role of local councils, which regularly remain in control of some aspect of the waste management

• How the full cost of managing a product’s end of life is defined and calculated, and whether the producer bears the full costs or a portion is assumed by different stakeholders. Cost considers collection, treatment and recycling, and potentially the costs for public information and awareness campaigns, waste prevention actions, and the monitoring and surveillance of schemes

In terms of the impact of EPRs, acknowledging data limitations and methodological challenges, there is evidence of the increase in the collection and recycling rates of affected products (i.e. environmental effectiveness). For example, Japan increased the recycling of packaging by 27% between 1997 and 2000 (OECD, 2014, p. 8). There is also evidence supporting the reduction in waste disposal as an impact of EPR adoption (OECD, 2016b, p. 25), which can be seen in the general trend among OECD countries (See Figure 4). In other aspects, data suggests that EPR systems have reduced the financial burdens on public budget, for example, in 2012 in France, the total municipal spending on waste was around €9.7 billion, with €630 million obtained through “eco-contributions” and an additional expense of €230 million for treatment of used products that came from producer organizations (ibid, p. 29). Nevertheless, not all EPR objectives have been fulfilled as expected, as one of the main goals is preventing waste by impacting eco-design, and results on this have been less than originally hoped for (ibid, p. 27). Several studies have evaluated this last mentioned issue, and the general conclusion is that even though EPR schemes contribute to eco-design, other factors have a more relevant role (ibid). The evidence further suggests

\(^8\) In a Tradable Credit System the producer fulfills his obligations when he possess a determined number of credits, that are provided by accredited actors that collect and treat the subject product. (OECD, 2016, p.60)
that EPRs generate economic opportunities, such as an increase in technological and organizational innovation, diversification on resource supply and support to the creation of “green jobs” (ibid, p. 29).

One critical characteristic that is frequently explored in the literature is the cost-effectiveness of the different types of EPR schemes, though due to the lack of transparency and availability of reliable data and the many subtle differences in schemes, it is difficult to be measured and compared (European Commission, 2014, p. 20). A thorough study on this matter concluded that, even though there is no single model that emerges as the best performer in cost-effectiveness, the best-performing ones were not necessarily the most expensive ones (ibid.). As can be seen in Figure 5, the cost-effectiveness of selected European EPR packaging varies greatly. For example, the UK recycles 61% of the volume put on the market –considering households (HH) and commercial and industrial (C&I) waste– (Total of 167 kilograms per capita a year), charging 1.1 EUR per capita a year to producers; whilst Germany charges 11.5 EUR/cap./year and has a 75% rate of recycling (Total of 90 kg/cap./yr. of HH waste). The UK has a tradable credit system where the fees charged only represent 10% of total costs of the system, while in Germany producer fees represent 100% of collection and treatment costs of separately collected packaging (plus participation in communication and clean-up costs).
2.3. Challenges in the Implementation of EPR Schemes

The implementation of an EPR law typically goes through three stages (Gui et al., 2013, p. 2): First comes the identification of the EPR instruments to be used and the development of the legislative framework; later, this is translated into specific EPR programs with detailed operational rules –the current stage in the Chilean Packaging EPR law--; and finally, the EPR is executed into a working system, in a stage characterized by the interaction of multiple stakeholders with distinct perspectives.

To explore and address the challenges Chile is facing in the implementation of the packaging EPR law, it is relevant to review what issues have been identified by literature. Table 1 presents a summary of the key challenges identified in relevant EPR literature. Eight documents were selected to showcase what issues have been explored in international studies, most of them analysing cases in Europe and other OECD countries. These documents were selected because they addressed many challenges at once and were highly referred in peer-reviewed journals or in EPR regulations (Web of Science, 2018).

Implementation of EPR schemes is intrinsically complex (Gui et al., 2013), and challenges were found in governance and economic aspects, but also in environmental, social and legal facets of the system. The most explored challenge is the clear definition of roles and responsibilities of actors, primarily regarding producers and key stakeholders, but also on the role of the national and local governments and PROs.
Main aspects considered are loopholes or overlapping in roles, the financial or organizational nature of the responsibility, and the different alternatives of governance. Another widely mentioned challenge is the insufficient impact on eco-design and waste prevention, one of the main goals of the law, and how to incentivize them more (See Table 1). A third topic typically addressed are the implications in international trade and competition issues in four different markets: the product markets, the PROs market, the collection and sorting market, and the waste recovery and disposal market (See Table 1).

Table 1 also includes three documents of the grey literature that help identifying the challenges in the implementation of the Packaging EPR law in Chile: two diagnostics from consultancies under requirement of the MMA (CyV Medioambiente, 2010; Ecoing, 2012) and a report from the government on the opinion of various stakeholders obtained from consultation meetings (MMAb, 2018). Even though the main objectives of these three documents are different than the one of this research, and the government report has lack of methodological rigour, they are relevant in identifying potential challenges, as they consider the Chilean context.

The EPR literature from developed countries is relevant, but models developed in OECD countries are not necessarily suitable to other regions (OECD, 2014, p. 14), particularly considering that a common challenge faced in developing economies is the absence of proper waste management systems (Akenji et al., 2011). Other commonly acknowledged challenges of developing countries are limited recycling, heavier reliance on financial incentives and the existence of a competing large informal recycling sector (Park, Díaz-Posada and Mejía-Dugand, 2018, p. 2). Literature also suggests that, in order to thrive in non-OECD contexts, EPR programs need both internal and externals mechanisms to discourage noncompliance and encourage formalization (Manomaivibool and Vassanadumrongdee, 2011, p. 188). Little research has been done on EPR implementation in developing countries, compared to literature on developed ones; most of it has been on WEEE EPRs from Asia (Kojima, Yoshida and Sasaki, 2009; Manomaivibool, 2009; Akenji et al., 2011; Manomaivibool and Vassanadumrongdee, 2011; Tong and Yan, 2013), though some studies on WEEE in Argentina (Lindhqvist, Manomaivibool and Tojo, 2008) and end-of-life tyres in Colombia (Park, Díaz-Posada and Mejía-Dugand, 2018) were found. No peer-reviewed literature specifically on packaging EPRs in LAC was found, though Park et al. (2018, p.8) hypothesized that the complexity in monitoring, the promotion of eco-design and the integration of the informal sector are of great relevance in packaging.
<table>
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<th>Category</th>
<th>Challenge</th>
<th>International EPRs review</th>
<th>Chile EPR Packaging</th>
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<td>OECD, 2001</td>
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<td>Governance Issues</td>
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<td>Clear definition of targets, scope and products</td>
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<td>Communication and coordination between stakeholders</td>
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<td>Transparency and data management issues</td>
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<td>Weak monitoring and enforcement</td>
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<td>Issues with free-riders and orphan products</td>
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<td>Complexity in implementation (aim for simplicity)</td>
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<td>Economic Issues</td>
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<td>Leakage of waste from EPR system</td>
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<td>Special needs of SMEs</td>
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<td>Weak incentives on Eco-design and waste prevention</td>
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<tr>
<td>Social Issues</td>
<td>Consumer participation and weak environmental awareness</td>
<td>X X</td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td>The inclusion of informal sectors in developing countries</td>
<td>X X</td>
<td>X X</td>
</tr>
<tr>
<td>Legal Issues</td>
<td>Need for harmonized nat. and international legislation</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Legislative complexity</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Definition of recycling standards</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Major challenges identified by relevant literature (Author’s Own)
The only distinctive challenge of developing countries considered in OECD literature is the integration of the informal recycling sector (OECD, 2014, 2016b), as many livelihoods depend on the recycling. Indeed, positive economic and environmental impacts from this inclusion have been identified, as it entails a reduction in waste management costs and landfilling, providing an alternative collection service and lowering greenhouse gas emissions (Vergara, Damgaard and Gomez, 2016).

In most cases, the EPR systems analysed were already in place, evaluating environmental and economic impacts, thus leaving a gap in the study of early-stage implementations. The only identified specific mention on the topic describes four distinctive challenges of the “start-up” phase of EPRs: informal waste management sector and social issues, waste leakage (being collected out of the EPR system), the impact of orphan products and free-riders, and the absence of a business framework that is conducive to investment (due to the uncertainty in the volume of waste) (OECD, 2014, p. 15).

2.4. Waste Management in Chile

Chile waste management is expected to change with the implementation of the EPR law. Chilean households produce 417 kilograms of waste per year per capita, considerably lower than the OECD average of 522 kg./year, but significantly higher than other LAC countries (OECD, 2015) (See Figure 6 for comparison). Chile’s waste production grew by 17% between 2000-2013, as opposed to the OECD average decrease of 6% (OECD, 2015, p. 50). Chile produces 18.8 million tons of waste a year (MMA, 2017, p. 85), and estimations on the recycling rate range between 4% (OECD, 2016a, p. 78) and 10% (CONAMA, 2010), which is very low compared to OECD average of 34% (OECD, 2015, p. 50). Packaging makes up to 30.7% of municipal waste in Chile (CONAMA, 2010), offering a great potential for the impact
of a successfully implemented EPR law, in comparison to current recycling rates (See Table 2 for category comparison with Europe).

When joining the OECD group in 2010, the Chilean government signed a commitment to improving its environmental legislation (OECD, 2014, p. 5). As a result, the Waste Management, Extended Producer Responsibility and Recycling Incentives Bill entered the Congress in 2013 and was approved and published in 2016 (Ley N°20.920, 2016). This bill will come into force once the corresponding decrees and regulations that are presently being discussed are published. The decrees will determine the recollection and recycling targets, besides other general aspects of the law. Currently, multi-stakeholders consultation committees are being summoned, in order to provide feedback and relevant information to the leaders of the legislative initiative.

2.5. EPR Stakeholders

The EPR law in Chile will directly or indirectly affect a diverse group of stakeholders, each of them with distinct interests. In order to understand the implications of the bill and its implementation challenges, it is necessary to identify the stakeholder groups. Based on EPR literature (European Commission, 2014; Kunz et al., 2014; OECD, 2016b; Kunz, Mayers and Van Wassenhove, 2018) and definitions of the law (Ley N°20.920, 2016), the relevant stakeholder groups of the packaging EPR in Chile are:

1. **Producers**: Main stakeholders. Defined as whoever introduces a packaged product in the Chilean market for the first time (not necessarily the producer of the packaging itself), and are responsible the collection and treatment of the products’ waste, generally through Producer Responsibility Organizations (PROs) (Ley N°20.920, 2016). It might be differentiated between large producers and SMEs, as the regulatory decrees will define if the second group is also required to comply with the regulation.

<table>
<thead>
<tr>
<th>EU 27</th>
<th>Chile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass pack.</td>
<td>73%</td>
</tr>
<tr>
<td>Plastic pack.</td>
<td>40%</td>
</tr>
<tr>
<td>Paper and cardboard</td>
<td>83%</td>
</tr>
<tr>
<td>Metallic pack.</td>
<td>76%</td>
</tr>
<tr>
<td><strong>Total packaging</strong></td>
<td><strong>66%</strong></td>
</tr>
</tbody>
</table>

Table 2: Packaging recycling rates in Chile and EU27. Based on Conama (2010) and European Commission (2018)
2. **PROs:** Intermediaries that facilitate the fulfilment of producer’s targets, subscribing contracts with waste operators and municipalities (Ley N°20.920, 2016). They charge fees to the producer they represent in order to cover their costs. There is no established PRO in Chile to date.

3. **Waste Operators:** They collect, consolidate, transport and manage the recycling of waste for PROs.

4. **Informal Sector:** Chilean law considers the inclusion of the informal recycling sector, mainly waste pickers, as accredited waste operators, once they obtain the corresponding certification (Ley N°20.920, 2016).

5. **Government:** The Ministry of Environment (MMA) is the national authority that leads to the establishment of the legal EPR framework. They will further provide an information and registration service that supports the system.

6. **Municipalities:** Local government’s play a crucial role. They currently manage household waste streams. The interaction between municipalities and PROs still needs to be defined. They will also be a key player in the communication strategies to consumers.

7. **Other Governmental Bodies:** Additional institutions that have a particular interest in the EPR law are the Ministry of Health, interested in the health and safety risks related to waste management and regulator of the establishment of waste operations; the Ministry of Economy, interested in the economic implications of the law; and the National Economic Prosecutor, that will oversee the impacts on competitiveness.

8. **Consumers:** Generators of the waste after the use-phase. Required to return the waste back into the system. Can be households or industrial consumers, the later can treat waste directly with waste operators. Their awareness –and willingness to cooperate- is crucial for the effectiveness of the program.

9. **Retailers:** Required to facilitate the installation of waste collection points.

10. **Environmental NGOs:** Institutions whose role is to represent the interests of the natural environment. The law considers their participation in the consultation process.

11. **Communities:** People that live close to waste-treatment operations that are affected by the negative externalities of landfilling or waste incineration.
The relations of the stakeholders are synthesized in Figure 7. Green arrows represent resource flows and the orange arrows symbolize financial flows. Based on the OECD experience, the cost of the EPR system is allocated in the following way: PROs services account for 5 to 10%, collection and sorting an estimated 60 to 80% and recovery and disposal the remaining 10 to 40% (OECD, 2016b, p. 103).

Figure 7: Simplified structure of Chile packaging EPR scheme (Author’s Own)

3. Methodology

In order to explore the distinctive challenges of developing economies in the implementation of EPR schemes, a country case-study (Bryman, 2012, p. 66) was designed, doing a detailed analysis of the challenges in the early-stage implementation of the packaging EPR law in Chile, to be compared to EPR literature. To do so the author of this research project undertook an applied qualitative research with an inductive approach (ibid., pp. 36, 380), based on the data collected by 15 semi-structured interviews across 6 stakeholder groups of the Chilean packaging EPR landscape. Purposive sampling, coding and constant comparison for thematic analysis were used (ibid., p. 568), guided by some of the principles of grounded theory (Glaser and Strauss, 1967), an inductive approach that facilitates the development of concepts when there is no specific guiding theory yet.
The analysis of Chile’s case will offer an empiric study that will allow proving, refuting or complementing the EPR literature findings and hypothesis, and it was chosen to be combined with an inductive and flexible approach for the following reasons:

- Lack of rigorous research on implementation of the Chilean packaging EPR law
- Chile offers the right conditions for the research: developing economy with a low rate of recycling (OECD, 2016a, p. 26)
- Comparably less research on EPR implementation on emerging economies and little research on early-stage EPR implementation
- EPR literature is mostly theoretical and conceptual (Kaffine and O’Reilly, 2015, p. 6)
- Literature has also remarked how there is no EPR model that fits all contexts (European Commission, 2014) and the intrinsic complexity of EPR implementation (Gui et al., 2013)

The research is also designed as a Stakeholder Analysis (Brugha and Varvasovsky, 2000) to be developed in two phases: first, an exploratory stage, and later the main data collection stage. Table 3 describes the two research stages, their methodology, analysis and main outcomes.

<table>
<thead>
<tr>
<th>Research Stage</th>
<th>Method</th>
<th>Data Analysis</th>
<th>Main Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory Stage</td>
<td>Literature review and desktop study.</td>
<td>Notes, classification and summary.</td>
<td>-Understanding of EPR schemes and general challenges in its implementation worldwide (See Sections 2.2 and 2.3). -Stakeholders classifications (See sections 2.5 and 3.1).</td>
</tr>
<tr>
<td></td>
<td>Semi-structured Interview with 2 experts.</td>
<td>Summary of notes and highlights of recordings.</td>
<td>-Tentative identification of challenges in Chile (See section 3.2). -Overall understanding of Chile recycling industry (See sections 2.4 and 3.1). -Contacts with potential interviewees (See section 3.1).</td>
</tr>
<tr>
<td>Data Collection Stage</td>
<td>15 Semi-structured Interview with relevant stakeholders.</td>
<td>Manual coding process of simplified interview transcriptions.</td>
<td>-Main challenges identification (See Chapter 4).</td>
</tr>
</tbody>
</table>

Table 3: Research stages description (Author’s Own)
3.1. Stakeholder Mapping and Sampling

With the objective of understanding the relations between stakeholder groups and to guide the interview sampling process an analysis of the stakeholders’ salience was conducted through a mapping exercise\(^9\) (See Figure 8), based on the framework proposed by Mitchell, Agle and Wood (1997). This framework categorizes stakeholders based on their \textit{power}, \textit{legitimacy} and \textit{urgency} (For further explanation see Annex 2). Key Stakeholders possess all three attributes, Expectant Stakeholders have two of them, and Latent Stakeholders only one.

![Figure 8: EPR law landscape stakeholder map (Author’s own, based on Mitchell, Agle and Wood (1997))](image)

A brief explanation of each stakeholder position follows:

- **Government** \textit{power} and \textit{legitimacy} derive from the law they are working to implement, and the \textit{urgency} comes from the pressuring deadlines they have.

- **Large Producers** have \textit{power} over the EPR landscape because they drive the financial flows; the topic is \textit{urgent} to them as it impacts their operation and costs; they are \textit{legitimately} the key actors of the law.

\(^9\) The mapping exercise could potentially have different outcomes if conducted by a different researcher, and is based on the reflections obtained after the exploratory stage.
• PROs have power over the waste management process, legitimacy due to the key role assigned by the EPR law and urgency to be established, as no PROs exist in Chile this far.

• Municipalities hold the power to the waste flows today, and the definitions of the EPR law are critical to them, therefore their urgency.

• Waste Operators have normative power, as experts in waste management, and the definitions of the law are of critical importance to their operations, thus their urgency.

• Under the norms and values of Chilean society, and also because the EPR law considers them as legitimate players, it is fair to state that environmental NGOs, consumers, communities and the informal sector have legitimate concerns on the results of the EPR law implementation. The reason being, outcomes of EPR implementation are of critical importance to them, therefore their urgency. They do not possess factual power over the process, though this could change over time, as they become key stakeholders if their needs are not covered.

• SMEs Producers have been considered in the consultation process, and the outcomes of the law could potentially affect their competitiveness, which gives them legitimacy. Though as for today, the law does not specify obligations to them, thus not attributing urgency to them or any factual power.

• Retailers are a channel of resource collection, which gives them power, but as the law remains to be implemented they present no urgency.

• Other Governmental Bodies have the power to influence MMA decisions, but they are not leading the implementation or explicitly considered in the law, therefore the lack of legitimacy. And because the EPR law is not the priority in their agenda, urgency was not attributed to them.

Based on Mitchell et al (1997) (See Annex 2 for more details), key stakeholders (MMA and large producers) require the highest attention, followed by the dangerous stakeholders (Municipalities and waste operators), who could gain legitimacy through regulation or social consensus and become key stakeholders. Attention will also be put on dependant stakeholders (Environmental NGOs, consumers, communities and the informal sector), who have legitimate and urgent claims but depend on the legislation, though could potentially gain power through social movements. Latent Stakeholders (SMEs, retailers and other governmental bodies) require less attention and will not be considered in the sampling process.

Considering the analysis of the previous paragraphs a purposive sampling approach was used (Bryman, 2012, p. 422), which justified directing the interviewee contacting efforts to relevant representatives of the mentioned stakeholder groups. The goal was to have a high representation of key
stakeholders, less of expectant stakeholders and none of the latent stakeholders. The organizations sought to contact were those who, either were found to have the most knowledge of the challenges of EPR implementation, offered the highest representation of their stakeholder group, or were actively involved in the public discussion. The author of this research possessed a significant network in Chile, which complemented with the contacts provided by the two experts interviewed in the exploratory stage. This allowed to quickly identify and contact key representatives of determined organizations, and to experience a high rate of contact success. Out of 40 organizations contacted by email, 15 agreed to be interviewed (38%). Some institutions were initially hard to reach, but were later successfully contacted after the first set of interviews provided better quality contacts in these organizations, following a snow-balling sampling approach (Bryman, 2012, p. 424). The resulting distribution of interviews is detailed in Table 4 and largely adheres to the objectives of the purposive sampling.

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>Organizations Contacted</th>
<th>Organizations Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Producers (Large)</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Waste Operators</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Municipalities</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Environment ONGs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Consumer Associations</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Informal Sector</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

*Table 4: Interview distribution by stakeholder group (Author’s Own)*

When possible, organizations contacted and interviewed were associations that represented several members of a stakeholder group, which was expected to provide a better quality of data, compared to interviewing a single player with a potentially biased opinion. This was the case for producers, waste operators, municipalities and consumers. No PROs were contacted, as there is no established PRO in Chile to date. No stakeholder from the communities’ category was contacted, as no local community has recently raised their voice related to the impacts of new waste management infrastructure.

---

10 Ministry of the Environment, Circular Economy Office
Unfortunately, several attempts to contact the biggest association of waste pickers, who were the best representatives of the informal sector, remained unsuccessful.

3.2. Data Collection: Interviews

Previous research on EPR schemes has used various methods for data collection. For instance, the European Commission (2014) did a multi-case study analysis of 36 selected EPR programs to identify common rules, and Kaffine and O´Reilly (2015) did a survey with 395 stakeholders to inform the update of the guiding principles of the OECD EPR manual (2001). Although these methods have been effective in the past, this research will follow a comparable approach to the one used by Kunz et al. (2018), which considered 27 interviews with 6 stakeholder groups of the WEEE EPR landscape in Europe to explore the support of EPR schemes towards a CE.

With the objective of undertaking an inductive qualitative research, semi-structured interviews were used (Bryman, 2012, p. 212). They are flexible enough to provide insights on how the interviewee sees the world, but structured enough to be able to compare data from the full set of interviews and draw relevant conclusions (Denzin and Lincoln, 2018, p. 579). The 15 interviews were conducted in Spanish between the 11th of June and the 7th of July of 2018. Most of the interviews were done via Skype, 13 in total, lasting between 33 and 64 minutes. The remaining two interviews were done in writing via email, by request of the interviewees. The interview considered introductory questions on the role of the organization and its relation to the EPR law, after which came a core set of open questions about the challenges and opportunities in the implementation of the Packaging EPR law. The topics considered in this section were informed by the two interviews from the exploration stage and the most relevant issues considered in section 2.3. Finally, a set of additional question enquiring about particular topics was included. Extreme care was put to avoid bias based on the author’s opinion during interviews, using neutral prompts and probes to direct the conversation to the topics of interest. The semi-structured questionnaire was slightly adapted to the context of each stakeholder group. A copy of the questionnaire used for producers can be found in Annex 3, and an extract of a translated interview transcript can be found in Annex 4.
3.3. Data Analysis: Coding

After each interview, recordings were turned into simple transcriptions of the core phrases of the interview in Spanish. Following that, an open coding process was used to identify core ideas and concepts (Strauss and Corbin, 1990, p.61). The initial coding process of the 15 interviews resulted in 673 observations, categorized into 113 codes. Through a process of constant comparison (Bryman, 2012, p. 568) between codes, they were iteratively refined and renamed, split and combined into categories and core categories, resulting in 36 categories. Later, the relationship between categories was explored, with a focus on the agreements or disagreements between stakeholders groups. This analysis gave the foundations to the findings of Chapter 4 and the discussion of Chapter 5. Illustrative quotes (Verbatim transcriptions in Spanish) were selected and translated into English by the author to be used as supporting arguments for Chapter 4. See Annex 5 for a translated example of the coding process.

3.4. Ethical Considerations

Before every interview, an Information and Consent Form was sent to be signed by interviewees (See Annex 6). In order to maintain anonymity and avoid direct or indirect identification, the names of interviewees and organizations were omitted, and interviews were listed by the type of stakeholder group and a number, e.g. Government 1, Producer 1 to 6, and so on.

4. Findings

This chapter presents the key findings from the interviews. The analysis suggests seven major challenges in the effective implementation of the Chilean packaging EPR law:

- Immature recycling industry
- Stakeholders communication and coordination
- Citizenship education and participation
- Information management
- Social inclusion
- Geographical challenge
- Impact on waste market competition
Sections 4.1 to 4.7 will explore the meaning and the results for each one of them. The first three challenges were consistently mentioned as the most relevant issues.

Due to the early-stage of implementation of the packaging EPR law, many details and regulations are pending to be determined, by either the forthcoming decrees or the concerned stakeholder’s decisions. The analysis of the interviews allowed further identify the four most relevant aspects that remain to be defined, issues that will be explored in more detail in section 4.8. These are the definition of:

- Targets and gradualism
- Type of PROs
- Separation at source requirement
- End-of-waste criteria

Emphasis on the challenges varied between stakeholder groups, in accordance with their interests. A summary of the issues that were given more importance by each group is detailed in Table 5:

<table>
<thead>
<tr>
<th>Challenges for effective implementation</th>
<th>Government</th>
<th>Producers</th>
<th>Waste Operators</th>
<th>Municipalities</th>
<th>Environmental ONG</th>
<th>Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immature recycling industry</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stakeholders coordination and communication</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Citizenship education and participation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Information management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Social inclusion</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical challenge</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact on waste market competition</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key aspects to be defined</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Targets and gradualism</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Type of PROs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separation at source requirement</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>End-of-waste criteria</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Issues emphasized as important by different stakeholder groups. (Author’s Own)

When combining the results from Table 5 and the stakeholder map from section 3.1 it becomes apparent how key stakeholders (Government and Producers) and dangerous stakeholders (Waste Operators and Municipalities) are concerned by the majority of the challenges, even though they might
have different opinions on how to address them. *Dependant stakeholders* (Environmental NGO and Consumers) are worried about more specific issues.

One relevant aspect to be considered from the analysis of Table 5 and the stakeholder map is that the majority of stakeholders are located in the *urgency* circle, understanding urgency as “the degree to which stakeholder claims call for immediate attention” (Mitchell, Agle and Wood, 1997, p. 869). This implies that the confrontation of the challenges and the evolution of the EPR law could be driven by narrow views focusing on short-term solutions, rather than stable long-term measures that benefit the whole system. This aspect calls for careful attention.

### 4.1. Immature recycling industry

Most interviewees had some concern in regards to the immature state of the recycling industry in Chile, considering the little volume it processes compared to its potential and the lack in waste management infrastructure. They explained that some materials that could be recycled do not reach an economically viable volume (e.g. certain plastics), while for others the collecting capacity surpasses the transformation capacity (e.g. multilayer liquid containers). For those materials where there is capacity, it seems there is a very limited number of companies in the transformation stage (e.g. glass and cardboard), exposing the fragility of the system. The following quote provides good insight (Additional quotes on this issue can be found in Annex 5):

“The [recycling] market is very incipient, very defined to a certain type of materials. Currently, installed capacity is very limited to what the industry can deliver. There is not enough capacity developed to start receiving post-consumption material. To think about the implementation of the law, it is necessary to increase the capacity of reception and valorisation of the materials. (...) We realized that many plants are currently quite limited. If the law started tomorrow we would have a lot of waste that would have no place to be sent.”

(*Producer 4*)

This challenge also refers to the lack of a solid waste management infrastructure in Chile, posing a double challenge to the law. As a producer explains:

“In other countries, the EPR law is implemented when there is already an established waste management system. For us, in Chile, it is the other way round. We do not yet have a general waste law and we are correcting this lack by means of the implementation of the EPR law”.

(*Producer 4*)
4.2. Stakeholders coordination and communication

The majority of interviewees considered stakeholders coordination and communication a very relevant issue, some even stating it as the most complex and relevant of all. As explained by interviewees, this is challenging because the scheme demands coordination between organizations with very different interests that regularly do not communicate -particularly private and public organizations-. Demanding the “overcoming of certain mistrusts” (Municipality 2), the adaptation to new waste management models and the creation of needed partnerships. The alternatives of the best environmental and economically efficient models need to be discussed and refined, and it is through stakeholder coordination that the scheme will start to work in the practice, not only by the publication of the pending regulatory decrees. These aspects demand high levels of communication and participation of the main players of the system, including the competition, a sensitive topic in Chile, as the next quote describes:

“Producers will have to sit down with their competitors. At the moment you declare the materials you put on the market, you declare your production, your sales...In Chile there are much mistrusts, where the issue of collusion is right under the skin... people do not know how to meet with the competition to put together the management systems, without being told they are being colluded”.

(Producer 6)

4.3. Citizen education and participation

Most interviewees had some concern for the key role of citizens in the EPR scheme, because, independent of the method of waste collection, their awareness and willingness to cooperate holds the key to the volume and efficiency the system can achieve:

“We could have a great network of recycling points, or we could have an amazing waste management system in place, but if the citizens do not respond, this will not work, we will not reach the goals”.

(Government 1)

There is awareness that citizens’ convenience is a success factor for the system, but there are different views regarding the implementation models of the scheme. There are also discrepancies on who is responsible to educate consumers and how to do this.
Interesting insights from interviews are the consideration of the role of local neighbourhood associations that creates social pressure to adopt recycling habits, and the results from a pilot scheme directed by a municipalities association, that contradicts the prejudice that only in high-income councils citizens are willing to recycle.

4.4. Information management

The majority of interviewees expressed concerns regarding information management. The topic was divided into two main issues. The first was the concern over the quality of the information to be used to define the targets. The general opinion of producers, waste operators and municipalities is that there is only a partial knowledge of the capacities of the system, the actual volumes it manages, the origin, destinies and configuration of waste, as also on the behaviour of consumers and the costs to be incurred under the different implementation models of the law, particularly considering the different realities of the 346 municipalities of Chile:

“Not all industries and producers have the level of detail that allows them to guarantee a very clean baseline. [...] We have seen a lot of general information, assuming certain conditions [...]. The uncertainties that exist regarding real numbers must be seen as an opportunity...we must work this serenely, with gradualism and being careful in the numbers that are going to be considered in the law”.

(Producer 4)

The second related challenge is how to make better use of the information systems already in place, such as customs and the national tax service, which can provide valuable information on the baseline and the identification of free-riders. Few interviewees further commented on the management of sensitive information, which is an issue that could potentially impact market competition.

4.5. Social inclusion

The effective inclusion of the currently illegal recycling sector is a concern, particularly for Producers and Municipalities. There is consideration for waste pickers as an alternative collection system, particularly for house-to-house collection, but the informality and low association makes this a challenge. As a producer explains:
“Waste pickers are a function that emerges with underdevelopment, found at low socio-economic sectors, with a natural tendency to informality... there are very few who associate and seek to work cooperatively”

(Producer 1)

Another related challenge is the interest of waste pickers in specific materials with high value/weight ratio (e.g. metals and cardboard), leaving aside some problematic materials as plastic. The number of waste pickers and their collection volumes remains unclear, varying from accounts of 6,000 to 60,000 workers, depending on the interviewee.

4.6. Geographical challenge

The geography of Chile presents challenges for an efficient recycling industry. Interviewees explained how the recycling capacities are heavily concentrated in the central regions of the country, which implies large costs for the collection and pre-treatment stages, as the country extends over 4,300 kilometres in length. Each region of the country presents a different reality, and different solutions must be sought for each material for each region. A general view is summarized by the following quote:

“The installed capacity is concentrated in the central zone of the country, which is logical, as there is most of the generation [...] Instead of saying that there is a lack of capacity, I think we must develop intelligent and economically efficient ways to provide the possibility of delivering waste to the ends of our country...so that it can be compacted, valued and pre-treated in those places, to later be transferred to the plants that are in the centre of the country. And eventually, why not think that, if numbers allow, develop plants closer to these areas”.

(Government 1)

4.7. Impact on waste market competition

Only a few interviewed waste operators and producers expressed a concern on the impact of the EPR law on waste market competition, which is explained by the still early stage of implementation of the law. Nevertheless, they expressed the impact on competition on both the waste collection and treatment markets as a consequence of the law, also arguing the need to have different solutions for industrial and household markets.
Waste operators were particularly concerned about their participation in municipalities’ biddings for waste management, particularly if waste collection and pre-treatment would be allocated together or separately. If done together, it would negatively affect the pre-treatment-only companies.

“We must be alert to the impacts in competition, and include the National Economic Prosecutor. PROs, a figure that did not exist before, are put in between the pre-treatment plants and the waste generators. This could cause a concentration of power over the waste. We propose that PROs have a strong participation in the household area, but that the industrial area is perfected through regulation and control.”

(Waste Operators 4)

4.8. Key aspects to be defined

Identified in the interview analysis, a brief description of the four most relevant aspects of the law that remain to be defined as follows:

- **Targets and gradualism**: This topic is expected to be the focus of the discussion in the forthcoming months. Stakeholders are worried that targets reflect the installed capacity of the system, particularly in terms of transformation, as well as the different reality of municipalities along the country and the expected behaviour of citizens. Most stakeholders expected there will be a gradual increase of collection and valorisation, as gradual requirements along the country territory. Gradual adoption is also expected according to the size of the producer (Large vs SMEs), and in the terms of the scope of products and subcategories. Even though perspectives on the specific terms diverge, the general opinion is the need to begin with targets that allow the scheme to start fluently, encouraging the coordination of stakeholders and stimulating the development of the recycling industry. However, this needs to happen in a way that avoids exceeding the system capacity, encourage free-riders’ emergence or transfer inefficient costs to consumers. Once the scheme is operating, targets should be gradually and steadily be raised.

- **Type of PROs**: There are divergent opinions in regards to the collective or individual nature of PROs, with a tendency towards collectivity, because of the scale and economic efficiency in some types of packaging. Many stakeholders are worried that the regulatory decrees could establish the definition of a particular governance system that could negatively affect the competitively of the market.
• **Separation at source requirement:** The recycling collecting system\textsuperscript{11} to be chosen by PROs and municipalities will have a great impact on the volume and efficiency of the system. Though there is divergence in opinions regarding the best model to be adopted, the law indicates that the pending decrees could request the separation at source for every municipality, which would require the development of a door-to-door collecting system. A related opinion that was shared by most interviewees is that the same solution cannot be applied to the 364 municipalities of the country, as they present very different realities, and that the system needs to initially support the coexistence of multiple collecting models.

• **End-of-waste criteria:** The criterion that defines when waste becomes a valuable resource draws a line between collection and valorisation. It determines if the pre-treatment stage affects the compliance of collection or valorisation targets, facilitating the possibility to add pre-treated exported waste to the valorisation targets. It also gives an indication for the design of municipalities and PROs biddings, and if they bid collection and pre-treatment together or not, affecting the competitiveness of only-pre-treatment companies. The government representative informed that this issue would initially be solved case by case, although the development of a national end-of-waste framework is programmed.

4.9. Additional Challenges

Besides the already mentioned issues, the interview analysis allowed to identify five additional challenges that need to be addressed, but were given less emphasis or were only addressed by a particular group:

• How to improve waste management in municipalities with little financial resources, particularly as most municipalities in Chile do not charge citizens for waste management
• Sending waste to landfill is still very cheap in Chile, making more environmentally friendly alternatives unattractive
• Lack of harmonization between regulations of different governmental bodies (e.g. Health regulations that hinder the opening of new collection centres)
• Ineffective incentives to waste prevention and eco-design

\textsuperscript{11} The discussion of recycling collecting systems and their economic and environmental effectiveness is out of the reach of this research. The main alternatives are door-to-door collection (of waste separated at source in X number of categories), installation of recycling points (single material bins or larger multi materials points) and deposit-refund systems.
5. Discussion

5.1. Challenges Relationship Map

The first objective of this research was to identify the challenges in the early-stage implementation of the Chilean packaging EPR law, in order to allow an early consideration of them. In order to address the issues identified in Chapter 4, a relationships map is being proposed in Figure 9. The main seven challenges are in green boxes and the four key aspects to be defined are in the red boxes. Grey arrows represent the hypothesized direction of the impact, which can be in one or both directions, supported by the findings of the analysis of the interviews and the relevant EPR literature. Two examples of how the interrelations of challenges are to be understood follow:

(i) The geographical challenge of Chile has had an impact on the national level of competition in the waste market and in the immature state of recycling Industry, as it has a direct relation to the

Figure 9: Challenges relationships map (Author’s Own)
concentration of recycling infrastructure in the central regions of Chile. It will also affect the expected geographical gradualism of the targets. The targets definition will promote the development of the recycling industry, though the initial set of targets must, in turn, consider the initial capacity of the recycling industry.

(ii) The efficiency of stakeholders’ communication and coordination will impact the development of the recycling industry, and will also affect how effective information management happens throughout the system, affecting the target definition and its surveillance.

The map corroborates the critical relevance of the targets definition and the stage of development of the recycling industry, denoted by the central position of these two issues and the numerous impacts they have on the other challenges.

The relationships map allows exploring the first and second order relationships between the challenges that need to be addressed and the key aspects that remain to be defined. It is a tool that can aid stakeholders in the present stage of discussion of the packaging regulatory decrees in Chile, and can also guide the construction of relationship maps for each of the other five priority products or for the EPR schemes of other countries. A key feature of the map is that it is an exercise to adopt a systemic approach, recommended in the definition of policies that impact a diverse group of stakeholders as in the case of EPR legislations, especially in the analysis of sustainability-related regulations (Espinosa and Walker, 2011).

5.2. Challenges for developing countries

Another aim of this research was to identify the distinctive challenges that developing countries face in comparison to developed countries during the implementing of EPR policies. In doing so, the study further contributes to the understanding of transposing the guidelines of developed countries, as summarized in the OECD EPR policy guidelines (OECD, 2001, 2016b), into emerging economies. It is also providing data from a national case-study, that allows to prove, complement or refute the hypothesis of the largely theoretical EPR literature (Kaffine and O’Reilly, 2015, p. 5). To proceed with these goals, the main issues identified in the Chile case-study will be contrasted with extant literature.

The research identified seven challenges that need to be addressed (See Table 5 in Chapter 4). Three of them corroborate what has been explored in the EPR literature from developed countries (See Table 1 in Chapter 2), namely Stakeholder communication and coordination, Citizenship education and
participation and Impact on the waste market competition. Social Inclusion, as explored in chapter 2, even though it is the only issue particular developing countries addressed in the OECD literature (OECD, 2014, 2016b), it has also been addressed by developing countries EPR literature (Akenji et al., 2011; Vergara, Damgaard and Gomez, 2016; Park, Díaz-Posada and Mejía-Dugand, 2018).

Discussion on the difference in approach of the other three challenges follows:

- **Immature recycling industry**: OECD literature does mention the recycling system capacity as an aspect to consider when defining the collection and recycling targets (OECD, 2001, p. 34), but it does not consider the absence of a well-established waste management system. This issue has been identified as relevant in the implementation of WEEE EPR law in developing Asia (Akenji et al., 2011; Manomaivibool and Vassanadumrongdee, 2011) and in the end-of-life tyre EPR law in Colombia (Park, Díaz-Posada and Mejía-Dugand, 2018), but not for a packaging EPR, and not for Chile. In order to overcome this challenge, Akenji et al. (2011) propose a multiple stage phase-in model that considers the local context in its design.

- **Information Management**: Extant literature does not emphasize the relevance of having access to good quality information for the definition of targets, it rather assumes it is accessible, an issue that has worried Chilean stakeholders. This aspect suggests that in developed countries information was initially easier to access, and that developing countries should strengthen their information networks. Relevant in this aspect is to make better use of the existing governmental information systems (i.e. Customs and National Tax System), through standardization and harmonization.

- **Geographical challenge**: The particular geography of a country has not been explicitly identified in the literature as a relevant challenge in the implementation EPR schemes, though it is a country specific feature that indirectly impacts the system capacity and the development stage of the recycling industry. The main implication of a challenging geography as the one of Chile is an increase in logistical costs in the collection and pre-treatment stages of the recycling, as in Chile’s immature recycling industry the valorisation capacity is heavily concentrated in the central regions of the country.

The research also identified the four most relevant key aspects that remain to be defined, given the implications to the EPR landscape stakeholders. Two of them, Targets and gradualism and Type of PROs have been explored by EPR literature and mentioned as highly relevant aspects of the law (See Table 1 in Section 2.3). Separation at source is an aspect mentioned in the waste management literature as an effective way to increase the recycling volumes, successful in developed countries. However, it requires
the existence of a civic environmental awareness culture and publicly tested opportunity structures for participation to succeed, two factors not necessarily found in developing economies (Charuvichaipong and Sajor, 2006, p. 2), thus requiring assessment and ponderation. Separation at source is not an explicit requirement of effective EPR schemes in the EPR literature. Instead, the theory rather leaves the collecting and sorting model selection up to the coordination of PROs, local governments, producers and waste operators (OECD, 2001, 2016b). Finally, the end-of-waste criteria has not been explored in EPR literature as a key feature of the law that needs to be defined. However, as explored in the Chilean case, it does generate significant implications to target compliance and waste operation competition. Nonetheless, end-of-waste criteria are described in the wider literature as a useful tool for sustainable waste management and to promote recycling and the circular economy (Zorpas, 2016).

5.3. Future challenges

This research has the distinctive feature of being focused in the early-stage implementation of an EPR law, an aspect that allows it to be informed by a distinctive perspective and to contribute to closing identified gaps in existing EPR literature. In Chile, the regulatory decrees have not yet been defined and published, giving stakeholders a chance to express their opinions and potentially influence the design of the EPR law. This aspect also implies some limitations on data comparison, as section 6.2 will explore.

As mentioned in section 2.3, EPR implementation has three stages, being the final one the execution of the scheme into a working system. The final stage is characterized by the strong interaction of relevant stakeholders, whose actions help to shape the actual practice of waste collection and treatment (Gui et al., 2013, p. 2).

Given this, the research proposes a list of the most probable challenges that the Chilean packaging EPR landscape will face in their final stages of implementation, and that were not emphasised as the most relevant previously. The list aims to prepare stakeholders for the upcoming challenges, and it illustrates the dynamic nature of the challenges’ relevance over time:

- **Free-riding**: This aspect has been explored in the literature as a large challenge in the final stage of implementation (See Table 1 in Section 2.3), as it might impact PROs’ costs and producers’ fees. Strong monitoring and enforcement are recommended, as well as transparency of information (OECD, 2014; Kaffine and O’Reilly, 2015).
- **Weak monitoring and enforcement**: As the law is not in place, this has not been an issue to date in Chile. However, it is mentioned as one of the critical issues to assure target compliance,
prevent free-riders and assure recycling standards quality. The active participation and coordination of stakeholders in the early-stage implementation and the inclusion of their opinion in the practical design of the system is recommended to have an efficient system that requires little central government monitoring and where PROs, producers and local government perform a natural monitoring role (European Commission, 2014; Kunz, Mayers and Van Wassenhove, 2018).

- **Competition in PRO markets**: Once PROs are established, attention to the concentration of power over the waste flows should be kept (Kunz et al., 2014; OECD, 2016b; Kunz, Mayers and Van Wassenhove, 2018). Kaffine and O’Reilly (2015, p.4) propose the following guideline: “In concentrated industries, individual take-back requirements may be more appropriate than collective PROs. By contrast, in markets that are closer to the perfect competition ideal, collective PROs may provide economies of scale benefits and lower monitoring costs with less risk of market power concerns”.

- **Design for Environment (DfE)**: It is too soon to evaluate the impact of DfE of the Chilean EPR law, though this topic will probably be of interest in the coming stages. It is one of the main goals of EPR schemes, but the impact on DfE has been less than expected in OECD countries (Lifset, Atasu and Tojo, 2013; OECD, 2016b; Kunz, Mayers and Van Wassenhove, 2018). PROs’ fees based on materials weight or product characteristics, as recyclability, have been more effective than fees based on unit put on the market (i.e. Market Share) (Kaffine and O’Reilly, 2015, p. 4).

6. Conclusion

6.1. Summary and contributions

This research had two main aims: First, identifying the most relevant challenges in the early-stage implementation of the packaging EPR law in Chile, through an inductive analysis of fifteen interviews across the six most relevant stakeholder groups. Second, to use the Chile case-study to explore the distinctive challenges of developing economies in the implementation of EPR schemes.

The main three challenges for Chile are (See Table 5 in Chapter 4) (i) the immature state of its recycling industry and the limited system capacity, (ii) the required improvement in citizenship
environmental awareness and (iii) the challenge of achieving an efficient coordination and communication between the relevant stakeholders in order to have a working EPR system. An additional set of four challenges were identified, second in relevance, which are (iv) the improvement of the information system required to inform the targets definition and to allow system monitoring, (v) the inclusion of the informal waste collection sector, (vi) the consideration of the geographical and logistic challenges of the country, and (vii) the impact the EPR law will have on the waste market competition. In addition, the interview analysis allowed identifying the four key issues that remain to be defined in the Chilean packaging EPR law through its regulatory decrees, being the most relevant one the definition of its collection and recycling targets and their gradualism. The other three are the definition of the type of PROs, the inclusion of a separation at source requirement and the end-of-waste criteria by product. The in-depth analysis of these issues allowed proposing a relationships map that can aid policymakers and relevant stakeholders in EPR law design and implementation, and revealed the strong relationship between the different challenges, supporting the need to adopt a systemic approach when designing or analysing EPR policies. By complementing the challenges emphasised by each stakeholder with the stakeholder mapping exercise, it was concluded that care should be put to not drive the confrontation of the challenges by narrow short-term views, which could hinder the long-term efficacy of the EPR scheme. Later, the most probable future challenges were proposed, reflecting the dynamic relevance of challenges through the development stages of EPR schemes.

The contrast of the challenges identified by the EPR literature and the Chile case-study makes a contribution by corroborating several aspects and proposing the consideration of additional ones. The case study validates the relevance of tackling stakeholder’s communication and coordination, citizenship education and participation, and the impact on waste market competition identified in developed countries, and the consideration of the inclusion of the informal recycling sector, particular of developing countries. The case study also supports the relevance of considering the lack of a mature waste management and recycling industry, characteristic of many developing countries (Gui et al., 2013); the consideration of the particular geographical characteristics of a region and its consequences in the collection and pre-treatment costs; and the critical relevance of doing a comprehensive diagnostic that informs the target definition. In doing so, this research has contributed to understanding the particular challenges of developing countries in the implementation of EPR schemes and the difficulties in transposing the guidelines form developed to developing countries, particularly in the early-stage of implementation.
6.2. Study limitations

The findings of this research need to be carefully transferred to other priority products and to other countries, as it reflects the particularities of the packaging landscape in Chile. Furthermore, an additional limitation of the study was the limited number of interviews performed, due to time constraints and ineffective contact with the informal sector. It would have allowed better representation to have additional interviews with environmental NGOs, Government, Municipalities and Consumers, though the used sample is aligned with the stakeholder mapping performed.

Interviews represent self-reported data, which implies potential biases, in this case, relevant bias are selective memory, invested interests, attribution or exaggeration (Brutus et al., 2013).

An aspect that represents a strength of this research, but is also a limitation, is that interviews were done in the early-stage implementation of the EPR law, before stakeholders could potentially experience some of the challenges mentioned in literature, which mostly refers to EPR systems that are already in place. This limits the comparison of challenges between the Chile case and the literature, and it also suggests that findings might be biased by stakeholders’ assumptions and expectations, rather than objective facts.

6.3. Recommendations for further research

In order to complement the research findings and contribute to the EPR and waste management literature, future research could continue the case-study of the six Chile EPR laws through the next stages of implementation and development, exploring the environmental and economic efficiency and contrasting them with the EPR literature. Of particular interest would be to compare it with other developing countries, as to better understand how to adapt EPR and waste management policies to local contexts. We emphasize the need to perform more practical case-study research, as the EPR literature is still heavily tilted towards theory. More research is further needed on finding ways to integrate the informal sector, on policies and practices to increase citizens’ environmental awareness and willingness to participate in recycling activities, and on promoting efficient coordination and communication between public and private sector. Finally, more research is recommended on how the challenges’ relevance changes according to the implementation stage of the EPR scheme and the economic development of the country.
7. References


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8. Annexes

Annex 1: EPR policy instruments

*Combined and adapted from (OECD, 2014, pp. 6–7, 2016b, pp. 16–17; Kaffine and O’Reilly, 2015, p. 9)*

There are four broad categories of EPR instruments, which are typically used in combinations (See Figure 10):

A. **Product take-back requirements:** This tool involves assigning responsibility to “producers” to take-back products they introduce on the market at the end-of-life, and are usually accompanied with collection and recycling targets. This policy can take many forms.

B. **Economic and market-based instruments:**
   a. **Deposit-Refund:** An initial payment (deposit) is charged at the pot of sale, and refund totally or partially when the product is returned at a collection point for reuse or recycle.
   b. **Advance Disposal Fees (ADF):** A fee is charged by private or public organizations at the purchase of the product, to cover the costs of collection and treatment.

*Figure 10: EPR policy instruments (OECD, 2016b, p. 17)*
c. **Material Taxes:** These instruments involve a tax on virgin materials (or materials that are difficult to recycle, that contain certain toxics, etc.) to incentivize the use of secondary (recycled) or less toxic materials. This policy is implemented upstream in the production process.

d. **Upstream combination tax/subsidy (UCTS):** A tax paid by producers that is used to subsidize waste treatment (collection and treatment).

C. **Regulations and performance standards:** Instruments to encourage eco-design and recycling, such as a minimum recycled content standard. They are powerful tools when used in combinations with other instruments.

D. **Information based instruments:** Tools that aim to directly support EPR programs by raising public awareness. They include instruments as reporting requirements, labelling of products and components, communication to consumers about producer responsibility and waste separations, and informing recycles about materials used in products.

Mitchell, Agle and Wood (1997) proposed a stakeholder mapping framework that helps to categorize and prioritize stakeholders according to the possession of 3 attributes, defined as follows:

- **Power**: “A relationship among social actors in which one social actor, A, can get another social actor, B, to do something that B would not have otherwise done” (Pfeffer, 1981, p.3). Power can be Coercive (i.e. force, threat), Utilitarian (i.e. material / incentives) or Normative (i.e. symbolic influences) (Etzioni, 1964)

- **Legitimacy**: “A generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman 1995, p. 574)

- **Urgency**: “The degree to which stakeholder claims call for immediate attention” (Mitchell, Agle and Wood, 1997, p. 869). Urgency exist “(1) when a relationship or claim is of time-sensitive nature and (2) when the relationship or claim is important or critical to the stakeholder” (Mitchell, Agle and Wood, 1997, p. 867)

Depending on their attributes they would fall into one of the categories presented in Figure 11. The more attributes, the higher the salience of the group and the attention is recommended to them. “Key stakeholders” present the three attributes, “Expectant stakeholders” present two and “Latent stakeholders” only one of them.

Figure 11: Categories of stakeholders according to their attributes (Mitchell, Agle and Wood, 1997, p. 874)
Annex 3: Model of interview questionnaire used for Producers.

Questionnaire for EPR Law Interviews: Producers

Interviewee: 
Company: 
Date: 

Note: The present list is a scheme that will guide the conversation, not a fixed set of questions.

Introductory Questions:
1. What is your role in the company and how does it relate to the EPR Law?
2. What are the implications or requirements of the EPR Law for your organization, from the packaging point of view?

Main Questions:
3. What challenges does this new law presents or will present for your company and how are you getting prepared?
4. What do you consider are the main challenges in the implementation of the EPR Law for the packaging sector?
5. As a complement to the previous questions, the following are some of the main areas where challenges arise in the implementation of an EPR Law, based on international experience. Is there any area that has not been previously mentioned and you consider relevant for your organization or the packaging sector? Why and how is your company responding to this?
   a. Definition of roles, responsibilities, targets and/or costs
   b. Coordination between stakeholders
   c. Management of sensitive information
   d. System installed capacity
   e. Revalued materials market development
   f. Consumer education
   g. Traceability and recycling standards
   h. Inspection and sanction
   i. Competition in the valuation market
   j. Focus on recycling, but not on reducing, reusing or eco-design development
6. What opportunities do you think the EPR law offers? (For organization or packaging sector).

Additional Questions (if time allows):
7. What are your expectations regarding the law? (In the short and long term)
8. What instruments or initiatives do you think should be developed to complement the EPR law and help it achieve its objectives? Is there any modification to the law you would like to see?
9. Do you think your competition, suppliers or customers are prepared for this new law?
10. Are there disagreements in some aspects?
11. How does your company plan to carry out the management of packaging waste subject to the law? Through an individual or collective management system?
12. Is there clarity about the costs associated to your company once the law begins to operate?
13. Who else do you think should be interviewed? Do you have any contact that could provide?
Annex 4: Extract from interview with Producer 4

This extract is an English translation of a Spanish verbatim transcription (by the author) of the interview to Producer 4. The interview was made by Skype, lasted 47 mins and was held on June 28th, 2018.

[...]

Tomas: Which ones do you think are the most relevant challenges that the EPR law presents, or will present, to your company and the industry?

Interviewee: I think the biggest challenge will be to have this management system working in the practice. The law gives producers a very big responsibility. In other countries, the EPR law is implemented when there is already an established waste management system. For us, in Chile, it is the other way round. We do not yet have a general waste law and we are correcting this lack by means of the implementation of the EPR law. Finally, the REP law will be carried forward assuming a fairly large burden, which is to push the development of the market, defining such specific things as storage, how to separate the waste management operation, which waste will go and which will not go… things that should be already predefined. So, the biggest challenge is the actual implementation of the law, to ensure that all actors work around the achievement of the percentage of recovery and recycling of materials.

And in parallel, what has to do with the valorisation of materials is a great challenge. The market is very incipient, very defined to a certain type of materials. Currently installed capacity is very limited to what the industry can deliver; there is not enough capacity developed to start receiving post-consumption material. To think about the implementation of the law, it is necessary to increase the capacity of reception and valorisation of the materials. We did an exercise to determine the actual capacity of the system to manage each of our wastes streams, and we realized that many plants are currently quite limited. If the law started tomorrow we would have a lot of waste that would have no place to be sent.

In this same line, the law must capture these existing gaps, start with a goal that challenges the development of the market, the development of facilities, but not to exceed and go to the extreme, if not, it is going to generate a collapse of the system. This stage in which we are, determining how this goal is going to be built, how the percentages of recovery of the collection goals will be determined, will have to contemplate a characterization of what the current market is and the time
it takes a market to develop. If you dive deep and understand how long it takes for a recycling plant to be installed, bring machinery, get approval from the authority ... it's easy 2 years. This also has to be contemplated in terms of the gradualism, so that we can develop step by step... Challenge the market, but having a sense of reality in the implementation.

**T:** And is there enough information to define the targets?

**I:** We have done assessments of installed capacity, we have had consultants, and we have worked with what is already known at the industrial level. And we have an idea of what is the installed capacity in reality, how much of that is being used and what is the idle space that recycling plants have. But in terms of the baseline, of the amount that the producer is putting on the market, it has been very difficult to obtain. The ignorance of the industry and the novelty of how to do the survey has been super complex. Not all industries and producers have the level of detail that allows them to guarantee a very clean baseline. We have seen a lot of very general information, assuming certain conditions (...). The uncertainties that exist regarding real numbers must be seen as an opportunity...we must work this serenely, with gradualism and being careful in the numbers that are going to be considered in the law.

**T:** So, it seems that quality of the information is a key aspect, along with the installed capacity of the system. Is that right?

**I:** Yes, that is correct.

**T:** And, considering the information you manage what packaging materials have more issues regarding the valorisation capacity?

**I:** For all those plastics that are not the common ones. There is PET recycling and recycling of some polyethylenes. For the rest of the plastics there is very little capacity, and almost everything is sent abroad. In Chile, little is recycled.

[...]

50
## Annex 5: Example of coding process

<table>
<thead>
<tr>
<th>Raw Data</th>
<th>Code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Many times a material can be recycled, but it does not happen in practice. It can only be recycled at industrial levels or there are no installed capacities in the country. That is something that happens a lot in Chile&quot;. (Environmental ONG 1)</td>
<td>No capacity</td>
<td>Immature recycling industry</td>
</tr>
<tr>
<td>&quot;If we do not diversify the number of transformer companies, the risk is very high...the complete system is very fragile&quot;. (Waste Operator 1)</td>
<td>Fragility of the system</td>
<td></td>
</tr>
<tr>
<td>&quot;The capacity of material recovery exceeds, for several materials, the transformation capacity of these materials&quot;. (Waste Operator 1)</td>
<td>Recovery exceeds transformation</td>
<td></td>
</tr>
<tr>
<td>&quot;There are two problems. One is the demand for these products (re-valued materials), and the other is the supply of these products. There are some installed capacities that cannot achieve economic efficiencies because they do not have enough collected product. [...] The second is that there are indeed products that have the problem that there is nowhere to put them&quot;. (Waste Operator 4)</td>
<td>Small market</td>
<td></td>
</tr>
<tr>
<td>&quot;On the main challenges in this world, the organization of producers is a key issue. Another important challenge is how the different systems will be coordinated, if there is more than one management system, in terms of the collection. And how are they going to coordinate with the municipalities&quot;. (Government 1)</td>
<td>Stakeholder coordination</td>
<td></td>
</tr>
<tr>
<td>&quot;Another problem is [...] how we are going to overcome mistrust. The public-private collaboration is an essential principle in this type of instruments, [...] but the prejudice that the public and the private go in different roads is deeply rooted, and that is a maximum challenge of the EPR. The ministry must still find ways to generate instances of conversation and mutual knowledge and trust building between the different actors of the REP, who have very different natures.&quot; (Municipality 2)</td>
<td>Overcoming mistrust</td>
<td>Stakeholder communication and coordination</td>
</tr>
<tr>
<td>&quot;The biggest challenge is the implementation of the law, to ensure that all actors work around the achievement of the percentage of recovery and recycling of materials.&quot; (Producer 4)</td>
<td>Coordinated work</td>
<td></td>
</tr>
<tr>
<td>&quot;The waste management model of the priority product changes a bit [...] Who makes the decision of what happens with the waste is no longer the generator, but the producer, through his management system [...] There is a little reluctance of some waste operators regarding this change&quot;. (Government 1)</td>
<td>Change of operation models</td>
<td></td>
</tr>
</tbody>
</table>

51
Annex 6: Information and Consent Form.

School of Earth and Environment
University of Leeds
Leeds LS2 9JT, UK

Dear Sir/Madam,

Thank you for your interest in taking part of this research. This letter is to give you information about the project and includes a consent form that needs to be signed if you accept to be interviewed.

About the Research and the Interview

The interview will be used as part of a research on the “Challenges in the Implementation of the Extended Producer Responsibility Law for the packaging sector in Chile”, which is my final thesis to obtain the degree of MSc Sustainability and Business at University of Leeds. The expected end date of the project is August 30th, 2018.

The research considers interviews with key stakeholders from Chile’s packaging sector, including producers, waste management companies, government and experts, as well as a review of relevant literature on international experience. The final document will be made accessible to all participants for their use.

The interview is aimed to last between 30-50 min., will be conducted through Skype and will be voice recorded. The content will be later analysed together with the other interviews to obtain relevant conclusions. The material will be kept confidential and your name anonymized. For the final document you might be indirectly mentioned, for example as Representative of Recycling Company. Recordings and notes will be deleted one week after the thesis is reviewed and marked.

You have the right to withdraw consent and to not to answer to particular questions. The question list can be provided in advance if requested. Please do not hesitate to ask if you have any question or require clarification.

Consent Form

<table>
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<tr>
<th>I confirm that I have read and understood the information explaining the above research project and I agree to take part in it.</th>
<th>Initials</th>
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<th>Name of participant</th>
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<th>Participant’s signature</th>
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<tr>
<th>Name of researcher</th>
<th>Tomas Santa Maria</th>
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<th>Researcher’s signature</th>
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