Article

Waste Management. The Disconnection between Normative and SMEs Reality

Francisco Javier Villegas Pinuer [1,*], **Joan Llonch Andreu** [1], **Pilar López Belbeze** [1] and **Leslier Valenzuela-Fernández** [2]

1   Department of Business, Autonomous University of Barcelona, 08193 Bellaterra, Spain;
    Joan.Llonch@uab.cat (J.L.A.); Pilar.Lopez@uab.cat (P.L.B.)
2   Department of Administration, School of Economics and Business, University of Chile,
    Santiago 8330015, Chile; lvalenzu@fen.uchile.cl
*   Correspondence: franciscojavier.villegas@e-campus.uab.cat; Tel.: +34-609-310-247

Abstract: Waste generation is a critical factor in global environmental degradation, where SMEs have been historically relevant yet underestimated. This study covers the issue of the disconnection between the normative and SMEs reality. Therefore, this research aims to investigate the relationship between waste management norms and their application in Chilean SMEs. For context, Chile is the nation that generates the most amount of waste per capita in the region. Nevertheless, the country also has one of the most rigorous waste frameworks in the region, by means of the Extended Responsibility Producer (ERP) law, which has been gradually implemented since 2016. Data for the study were collected through in-depth interviews with 25 SMEs. The results show the practical limitations of SMEs in complying with the waste law, the lack of traceability in the waste management system, and the need for economic support and technical assistance to improve the use and management of sustainable raw materials. Therefore, this study contributes to the limited knowledge of how SMEs implement waste management norms and their importance in diminishing waste generation and promoting waste hierarchy.

Keywords: waste generation; waste management system; waste legislation; small and medium enterprises; raw materials

1. Introduction

The situation of rampant environmental degradation and climate change has generated great concern in society's present and future development, affecting industrial advancement worldwide. The 17 Sustainable Development Goals (SDGs) established by the United Nations to preserve and protect the planet is a prime example of this growing preoccupation [1].

In the economy's acts of excessive environmental depredation, companies have direct and relevant responsibility. The actual production patterns and system based on the taking, throwing, and disposal of resources and products are no longer viable. Hence, the circular economy (CE) comes as a response to the current linear economy. It bases itself on restorative intentions, thus promoting the circularity and preservation of finite natural resources [2]. To achieve this sustainable development in the long-term, companies need to adapt to the market's changing conditions by balancing the economic, social, and environmental aspects of their activities [3]. Yet, many companies struggle to harmonise their growth with the responsible use of resources and their respective waste management, which are crucial aspects of CE public policies [4] and their application [5].

At a worldwide level, the situation of large companies has been widely studied in different areas such as reporting and practices [6], innovation on the business model [7], investment, and environmental strategies [8], justified due to the higher level of the economic impact on the environment and society [9]. In contrast, SMEs' situation has limited

coverage, where the impact of their waste stream is often overlooked [10]. However, although their impact is low, their overall effect is higher in pollution, waste, and overall emissions [11]. Moreover, It must also be considered that SMEs represent more than 90% of all companies worldwide [12].

The case of South America is no exception, where SMEs make up 99.5% of all companies in the region, generating more than 60% of formal productive employment [13]. Based on an exhaustive literature review performed on waste management, SMEs, and South America—in Scopus and WOS databases—in the last 5 years, only 10 articles have been found to analyse the subject: six from WOS and four from SCOPUS. These articles from Brazil (5), Colombia (2), Ecuador (2), and Perú (1) focus primarily on the SMEs' production processes (fabrication, inventory control, distribution, materials, reverse logistics), cleaner production, and environmental management practices. Only the research of [14] approaches SMEs' limitations and barriers to reduce waste generation and review its association with public policies. These examples evidence the limited knowledge about SMEs' waste management, a fundamental issue for sustainable cities development [15]. A similar outlook can be seen regarding environmental norms, as the region does not have common normative structures. Instead, South American nations each establish their institutionality and goals, generating different levels of advancement and concern on the subject [16]. For example, Brazil works on the shared responsibility principle for proper waste management [17], whereas Peru simultaneously addresses several of their difficulties in waste collection and disposal [18]. In retrospect, Argentina has problems with its waste characterisation information and final disposal [19]. These experiences showcase the problem of waste management in the region. In this sense, a company's supply chain is relevant in managing and using raw materials [20].

In this context, this research analyses waste management in Chilean SMEs, and their effects on production process sustainability. Therefore, this study contributes to waste management literature in the region, critical to achieving a cleaner and sustainable production [21], with empirical evidence and insights about these companies' types. Besides, Chile is considered a prominent country, with the second most important economy in South America in terms of GDP (14,896.5 USD per capita), and only behind Uruguay (16,190.1 USD per capita) according to 2019 data [22]. In the environmental aspect, Chile has been developing an environmental framework in recent years through the Extended Responsibility of Producer (ERP) law on waste management [23] and is the pioneer country in the region on forbidding the distribution and use of plastic bags [24].

Regarding those mentioned above, and to achieve this research's purpose, 29 in-depth interviews were performed in 25 SMEs from different economic sectors to understand Chilean SMEs' situation. Consequently, a thematic analysis was undertaken to analyse the insights and obtained factors of the study.

2. Theoretical Background

2.1. Waste in South America

Waste generation has become a global issue that affects every region in the world. In South America, its waste generation levels of 326.67 kg/capita/year have far surpassed the world average of 270.1 kg/capita/year. When ranked by countries, Chile (419.75), Argentina (416.1), and Brazil (379.6) are the nations that generate most waste in the region based on 2016 statistics [25] (see Table 1 for the South American countries' detail). This situation is even more concerning considering that the region's countries have fast-growing cities with increasing waste generation rates. Besides, their management practices have not yet evolved to catch-up with this new developing reality [26].

Table 1. Waste generation by country in South America.

Country	Waste Generation kg/Capita/Year
Argentina	416.1
Bolivia	208.05
Brazil	379.6
Chile	419.75
Paraguay	277.4
Perú	273.75
Colombia	277.4
Ecuador	324.85
Venezuela	321.2
Uruguay	368.65
Regional average	326.67
Global average	270.1

Source: [25].

The data table clearly showcases how waste generation is a real and current problem. According to the [27], waste in the region is segmented in the following major groups; organic waste (52%), paper and cardboard (13%), and plastic (12%). Although the organic waste rate is similar to the levels found in the Middle East and North Africa (58%) and East-Asia and the Pacific (53%) regions, it is higher than those found in Europe and Central Asia (36%) and North American (28%) regions. Furthermore, the importance of organic waste generation highlights the relevance of waste management at the country level in South America.

2.2. Waste Management in South America: The Legislation Characteristics and SMEs Role

In South America, environmental concerns have been mostly associated with waste management and waste disposal (economic value) instead of focusing on legislation to prevent waste generation [28]. Waste management considers collection, transportation, sorting, treatment, final disposal of waste, and monitoring [29]. In this context, waste hierarchy (prevention, reuse, recycle, recovery, and—in case of the last option—disposal) is crucial to conserve natural resources and protect the environment [30]. However, considering that 90% of South American waste is not utilised (hence mostly ending in landfills [31], waste management has become a critical challenge within the region. This demonstrates the importance of the new laws which take a fundamental role in the issue.

Furthermore, South American countries develop their waste management legislation based on their different economic and social realities; meaning that there is no common entity that regulates the overall sector in the region. This heterogeneity is a stark contrast to the European Union situation, which has common goals and considers the circular economy and waste hierarchy as strong principles [32]. Hence, the South American regional pressure—regarding waste legislation—depends exclusively on a country's relevant and workable priorities.

The experiences in South America shows it to be a case of heterogeneity. Countries such as Bolivia, Ecuador, Peru, and Venezuela have a structural problem on the final disposal of waste (open-air dumps), and their challenge is on regulating the situation. Table 2 summarises the waste norms of these countries.

In retrospect, Argentina is a particular case that does not directly have the Extended Responsibility of the Producer and has problems with its goals to reduce waste generation. Brazil, Uruguay, and Paraguay show shared and extended responsibility principles in their waste management legislation. Each nation has its own internal set of particular challenges (see more details in Table 3). In the latter case, the main problems correspond to their informal recyclers' open-air dumps and labour conditions.

Table 2. Waste norms in countries with structural problems.

Country	Norm	Year	Description
Bolivia	Law N° 755 Integrated management of waste [33]	2015	Establish the shared responsibility between producers and society, with public and private statements. The ERP considers PET bottles, tires, cells, batteries, and pesticide containers. Close-lid uncontrolled garbage cans and implementation of sanitary landfills.
Ecuador	National Programme of integrating waste management [34]	2010	To ensure that 70% of the population disposes of their waste in a landfill (technically correct). The plan was updated to 2017 to eliminate open-air dumps. There is no waste management law to standardise at the national level.
Perú	The law of integrated waste management solids [35]	2017	Emphasises the recovery of resources and waste valorisation. Establish the ERP, the shared responsibility concept, and the active role of municipalities. Delimit the municipalities' role regarding domiciliary waste.
Venezuela	Law of integrated management of the waste [36]	2010	States the creation of the National Council for Integral Management of Residues and Waste. The principal characteristics are the co-responsibility of natural and legal persons. Establishes the responsibility of producers, and facilitates the information to the consumers. Regulate the open-air dumps and transforms them into landfills.

Source: Self-elaboration, based on [33–36].

Table 3. Waste norms in countries with specific challenges.

Country	Norm	Year	Description
Argentina	Law N° 13,592 Integrate management of urban solid waste law. [37]	2006	Defines the stages of the waste management process. Generate aid programs to promote the treatment and recovery of materials. Establish a reduction of 30% of the waste destined to landfill disposal. Does not establish an Extended Responsibility Producer norm.
Brazil	The national policy of solid waste and its regulation. [38]	2010	Establishes the principles of "polluter pays" and shared responsibility (producer, suppliers, consumers). Emphasise waste hierarchy, separate waste collection, and reverse logistics. Considers financial-aids, fiscal incentives, and credits. Emphasise the industry's role (information, use of materials, facilities for reuse and recycling).
Paraguay	Law N° 3956 Integral management of solid waste law [39]	2009	Promotes waste reduction, access to information for citizens. Establishes the co-responsibility principle (producers and local authorities). The municipalities are responsible for the final disposal of waste.

Source: Self-elaboration, based on [37–39].

In comparison, Uruguay has a system that emphasises food surplus management and specific taxes on certain products (principaly those composed of plastic). This system has allowed its capital (Montevideo) to have a recycling rate close to 15% [25]. In retrospect, Brazil has adopted a voluntary scheme in its ERP system, which did not have the expected results regarding the overall recycling rate (1.4%) [25]. Interestingly, the country with the most developed and functioning laws about waste management is Colombia (dating since 2013), heavily influencing its present recycling rates: between 15–17%, the highest in the region [25]. Table 4 presents the characteristics of the norms.

Table 4. Waste norms in countries with more effective legislation.

Country	Norm	Year	Description
Colombia	Law N° 1672 The public policy of integrated waste management and electronic devices. [40]	2013	Establishes the bases for Electrical and Electronic Devices Waste, based on the EU policy (2011), also determining the producer's responsibilities (communication, characteristics, devolution scheme).
	Resolution N° 1.407 [41]	2018	Establish the ERP in packages (glass, metal, aluminium, paper, and cardboard). Establish a goal for waste recovery/reuse (10% in 2020, to achieve 30% in 2030).
Uruguay	Law N° 19,829 Integral waste management law [42]	2019	Establish the waste hierarchy, the importance of organic waste, and separate waste collection. Diminish the number of landfills, streamlining waste collection and final disposal. Avoid the food surpluses of the companies with landfill disposal. Define a specific fee for disposable trays, plastic film, disposable utensils, and plastic bags. Tax credit for the returnability of packaging and collection and recycling schemes.

Source: Self-elaboration, based on [40–42].

A common factor in the South American legislation is the scarce or null mention of SMEs in waste management legislation, which leaves these companies without any established specific plan that considers their characteristics to tackle the issue. The existing empirical research is mostly limited and focused on municipalities and the recycling sector. Such examples can be seen in [43] study on the Bolivian case, which analyses the informal recycling sector and the municipal waste system's financial sustainability. In Brazil's case, [44] analyses the national waste management policy and companies' obligation to adopt reverse logistics activities on companies' supply chain management. Analysing Ecuador's situation, [45] investigates the recycling sector and the necessity of improving the recyclers' precarious job conditions and its effect on waste management. These cases show the need to generate further studies and obtain more empirical evidence in the region.

2.3. Waste Management in Chile

In Chile's case, waste management legislation dates from 2016 with the enactment of the EPR (Extended Producer Responsibility) law N° 20,920 [23]. This law is in the same line with nations such as Colombia, Brazil, and Uruguay. The focus is to implement the concept and practice of waste hierarchy, producer responsibility, and separate waste collection in the country. Table 5 shows the main aspects of the Chilean legislation.

**Table 5.** Chilean waste norms and their characteristics.

Country	Norm	Year	Description
Chile	Law N° 20,920 Framework for waste management, extended producer responsibility, and recycling [23].	2016	Establish the extended responsibility of the producer by integrated waste management systems and operational conditions. Gradually establish waste generation prevention, and promote waste reuse, recycling, and valorisation. Generate the basis to gradually implement principles such as eco-design, certifications, and deposit-return schemes. Promote the waste hierarchy process to companies Define a set-list of priority products (lubricant oils, electronic and electric devices, batteries, packages, and tires). Define the role of the Ministry of Environmental and municipalities in environmental education.

Source: Self-elaboration. Based on [23].

The law was updated in 2019, establishing specific goals for the tires category, with a 90% collection and valorisation rate projected for 2028 in a gradual form (see [23]). In May 2020, a decree project established specific goals (with gradual implementation) for 2030 on waste collection and valorisation for domiciliary containers and packages: paperboard for liquids (60%), metal (55%), paper and paperboard (70%), plastic (45%) and glass (65%), and industrial containers and packages (70%) (see [23]). This decree establishes a delay of 30 months for the goals due to the COVID-19 pandemic and begins in 2023. This law is in continuous development, establishing priority products according to their environmental effects. Furthermore, Chile launched a pioneer law in 2018 on the prohibition of plastic bags in local commerce (which heavily used polymer -produced from oil-) [24]. The compliance of this law for SMEs was initially set to begin in the second semester of 2020. These measures highlight the importance of analysing the SMEs' perspectives as a relevant actor in waste generation.

2.4. The Municipal Waste Management Situation in Santiago

The situation of waste generation and management in Chile brings up many preoccupations when analysing the country's data. Chile produces 23,023,088.92 tons of waste per year, where 35.28% corresponds to municipal waste (8,121,992.08 tons). From this amount of municipal waste, 72.85% has secured final disposal in a landfill, and only 1.5% of municipal waste is valorised (recycle, reuse, among others) [46]. The situation exposes the pending challenges and concerns regarding regularising the waste situation in the country. Figure 1 describes the Chilean situation by region.
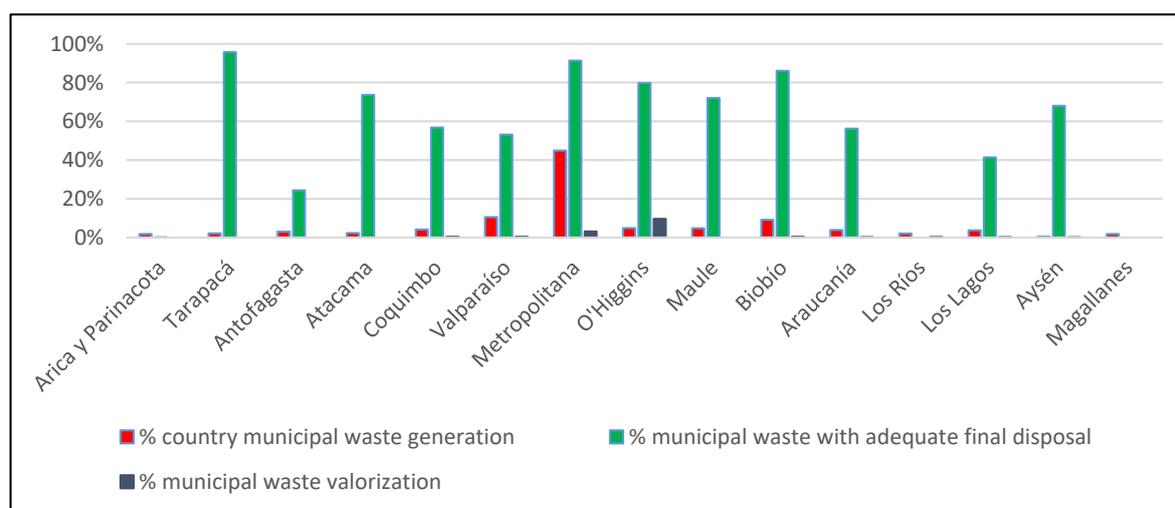
Figure 1. Municipal waste generation, valorisation, and final disposal (%) by region in Chile. Source: Self-elaboration. Based on [46].

When focusing on Santiago's case, the municipal waste generation corresponds to 44.9% of the country's total waste (3,647,137.55 tons), where 91.31% of the municipal waste is regularly collected and has final disposal [46]. These numbers show a concerning situation regarding waste in the country.

Waste management in communes is the responsibility of the local municipalities, where each independently manages their system. The current waste collection system in these municipalities consists of a door-to-door collection, using a truck transportation system [47]. The cost of the waste management system and clean public services in Santiago is approximately 208,967,339 M€, representing 7.28% of the total municipal budget [48]. This system has income from two sources: (1) The first source corresponds to an annual amount that companies pay for cleaning services (when paying the commercial permit to operate); this amount is determined by every municipality, taking into consideration their

cost structure for this service, (2) The second source is an amount within the territorial tax that household owners annually pay (households whose tax assessment is less than 225 MTU (Monthly Tax Units), equivalent to approximately €12,888, are exempt from this rate) [49]. These funds amount to 99,130,804.62 M€, where 40.38% comes from companies and 59.62% from households. Therefore, the income allows the municipalities to cover 47.4% of Santiago's waste management systems costs. Said municipalities fully assume the remaining 108 M€ (see Table S1 in Supplementary Materials) for the municipalities' detailed situation that compose the Santiago region for 2019).

These numbers align with the region's actual reality, where municipalities cannot establish a financially self-sustaining service; an obstacle that needs to be addressed for adequate waste treatment [26]. Moreover, the statistics show inequality in expenditure: although the region mean is €26.72/inhabitant, the expenditure varies between €3.48 in Alhué to €84.33 in Vitacura, a difference of 24.26 times. The problem is that the valorisation of municipal waste in Santiago is (approximately) 3.11% [46]. This problem generates concern, and it is necessary to analyse the SMEs' role in this problem regarding their great responsibility in environmental pollution [50].

3. Method

This research aims to enlighten and deepen knowledge about the factors influencing SMEs' waste management situation in Santiago, Chile, through a qualitative approach. This empirical research is based on multiple case studies to better examine the topic in-depth. This method is convenient for approaching extensive phenomenons with multi-dimensional characteristics and offers flexibility to explore broader themes [51]. Moreover, providing reliable and robust evidence rather than single case studies [52]. Hence, this method is appropriate, considering this research's characteristics.

3.1. Criteria Selection

The selected companies comply with the Chilean definition of a SME. It is important to note that in Chile, a company is considered an SME if; (1) it has up to 200 employees, and (2) its annual income is less than 3.21 million EUR (according to [53]). Moreover, the selected SMEs must have their operation in the Chilean capital. Santiago's region is the most relevant in employment generation, representing 44.4% of the country's labour force (3.62M workers) [54], and concentrates approximately 43% of total SMEs nationwide [55]. Additionally, to comply with the mentioned above, the criteria selection consider companies that (1) have more than five employees, (2) belong to the productive and service sectors (which manipulate waste in any stage of the production process on their supply chain), and (3) have more than 3 years of activities in the market. These criteria ensure that participating SMEs are not micro-enterprises, hence ensuring a degree of company maturity in the market and in their operations, particularly their waste management.

3.2. Participants

To select the participating SMEs of this research, a database provided by the University of Chile which contains SMEs from different economic sectors was employed. 30 SMEs complied with the criteria selection and were contacted to participate, through an email invitation. From these companies, 25 SMEs agreed to participate. A total of 29 managers from these 25 SMEs were interviewed. Table 6 shows the general information of the participating SMEs.

The sample has different Chilean economic sectors (retail 32%, food-services 28%, consulting services 16%, industrial 12%, textile 8% and financial 4%). These companies do not have data regarding their amount of waste generation, as the local waste regulations does not force them to have this information. This limitation shows the practical difficulties in quantifying the effect of SMEs on waste management in Chile.

Table 6. Characteristics of participating SMEs.

N°	Economic Sector	Firms Tenure	Employees	Annual Incomes (EUR)
1	Textile	5	9	0.252 M
2	Retail	3	7	0.454 M
3	Retail	9	5	0.0257 M
4	Food-service	5	12	0.757 M
5	Retail	3	85	5.04 M
6	Industrial	6	6	0.121 M
7	Textile	10	6	0.151 M
8	Food-service	3	5	0.083 M
9	Retail	2	9	0.288 M
10	Healthcare	6	15	0.504 M
11	Food-service	55	22	0.757 M
12	Food-service	4	15	0.454 M
13	Retail	20	5	0.015 M
14	Food-service	10	25	0.757 M
15	Retail	11	6	0.303 M
16	Food-service	3	8	0.121 M
17	Consulting	3	10	0.126 M
18	Consulting	7	32	0.898 M
19	Industrial	29	8	0.189 M
20	Financial	14	60	26.95 M
21	Consulting	3	8	0.29 M
22	Food-service	7	14	0.084 M
23	Consulting	10	6	0.189 M
24	Industrial	28	21	0.898 M
25	Retail	8	16	0.442 M

3.3. Data Collection

The research data were collected through in-depth interviews with 29 Chilean SME managers between July and September 2019. The interviews were conducted face-to-face. Before beginning the interview, a detailed explanation of the research purpose and objectives was given. Written consent was signed to participate voluntarily, to record the interviews and to maintain the participant's anonymity for publication purposes. These interviews were semi-structured with questions determined before the interview to guide the discussion and provide freedom to explore and engage emerging topics in the conversation. The use of semi-structured in-depth interviews guarantees the flexibility to find new or specific topics and issues that can emerge [56]. This approach also allows showcasing the managerial experiences and implementations of environmental policies along the supply chain [57], sustainable business practices, resources [58], and innovation in sustainability [59]. The interviews have two clear sections; (1) Information about the company, the origin and development of the business, (2) Environmental sustainability and Circular Economy aspects such as adoption, regulation, norms, waste management, and raw materials. The interviews lasted between 60–70 min.

3.4. Data Analysis

The data analysis of the SMEs interviews was performed by thematic analysis. This framework is considered the most appropriate for any study that seeks to discover using the interpretation approach and the characteristics of semi-structured interviews [60]. This study employed the methodology described by [61], beginning with identifying meaning units from the interviewees (considering the previously defined and emerging topics) using NVIVO 11 software. The following step was to codify the meaning units, and to store them in a container (node) representing the interviewees' themes, concepts, and ideas. Subsequently, the nodes are organised in a hierarchical structure to establish the connection between the ideas. Lastly, clustering analysis of the nodes was undertaken to identify and

visualise the nodes' patterns and relationships. The research design steps and procedures are summarised in Table 7.

Table 7. Research design process.

Research Steps	Description
Selection of SMEs	1.1 Contact 30 different SMEs. 25 SMEs agreed to participate in the research
Data collection	2.1 Establish contact with the participating SMEs and schedule the interview dates. The final list corresponds to 29 managers and/or owners of 25 SMEs 2.2 Face-to-face interviews on-site at each relevant company (in different communes of Santiago), each lasting approximately 60–90 min. 2.3 Signing the research confidentiality agreement 2.4 Application of the interviews 2.5 Transcription of the interviews
Data analysis	3.1 Identify the meaning units (predefined and emerging) 3.2 Codification of the meaning units and store in nodes 3.3 Develop the nodes' hierarchy of the themes and subthemes. 3.4 Clustering the nodes to observe the emerged patterns

Source: Self-elaboration. Based on [61,62].

4. Results

4.1. The Waste Regulation and Its Impact on SMEs

SMEs had a clear appreciation of environmental regulations, indicating that the laws focused on the aspects of a company's operation, affecting public health and security. In their view, environmental laws were not prioritised by the local authorities, and local norms or municipal ordinances' were inexistent in this matter. Moreover, the historical lack of inspections about business norms regarding environmental issues strengthened this belief. This situation extended itself to waste legislation (ERP law), where companies evidently had—at best—a general notion about the law. Yet, they did not know the practical effects that it has for them as SMEs.

Considering their experience over the business years, managers did not feel afraid regarding law-compliance failure. The thought process (in the perspective of SMEs), is that this type of law was to be practised (and is for) large companies. This premise was further sustained in their beliefs about their (assumed) minor environmental effects as they were companies with low volume when compared than large companies; a concerning misunderstanding based on the public perception of SMEs.

Regarding the practical experience with waste norms, SME managers had a different and positive experience with law N° 21.100: 'the prohibition of plastic bags and reduction of their use'. The general result was a reduction of single-use plastic bags/packaging. Nonetheless, the general criticism of the law was that it focused on prohibition instead of behaviour modification. SMEs did not conceive that the solution was to punish each environmental problem's behaviour since it did not contribute to long-term environmental sustainability. In this way, developing specific plans and educational campaigns with straightforward information could improve the engagement of different and relevant social actors.

The interviewees also pointed out the governments' and public institutions' failure to approach the SMEs' waste situation on waste normative aspects. They felt a desire to comply with their legal obligations as a corporate citizen, but local and government institutions did not take charge of their active role and responsibility in contributing to the SMEs' reality. Table 8 summarises the interviews quotations about waste legislation.

Table 8. Waste legislation aspects and interviewees' quotes.

Themes	Aspects	Selected Quotations
Waste legislation	Normative absences	"No institution regulates us with waste management or disposal" Manager of a retail company.
	Normative focus	"The REP law is focused on the big companies who are the generators. However, waste is not just from the big companies, maybe SMEs generate much more in volume. Moreover, you enact a REP law without recycling plants" Manager of a consulting company.
	Normative scope	"If these types of regulations begin to come out, they are positive, but we do not prohibit everything. More than prohibitions, we generate things that favour environmental actions." Manager of a consulting company.
	Government role	"Governmental institutions must assume their responsibility in waste. After all, we pay patents, permits, and taxes" Manager of a food-service company.
	Incentives plan	"If your country is not giving you the information or precautionary measures around a global topic, it is the most sophisticated markets that will tell you 'you can enter, but as long as you have this'. So economic incentives are required, such as tax cuts" Manager of a textile company.

However, not everything was criticism. SMEs managers did consider establishing different initiatives and incentives to reduce the waste generation in their activities, based on their daily interaction with their stakeholders. Firstly, economic incentives through tax reductions and/or financial aid to invest in the cleaner production process. This type of subsidy can encourage the sustainability of environmental activitites. Second, the development of collaboration networks between SMEs and public institutions in the matter. For SME managers, waste was a multi-dimensional problem, where the environmental aspects were part of the problem and not a result. In this sense, if norms could be more adaptative and flexible, SMEs could generate competitive advantages and generate sustainable benefits.

4.2. SMEs and Waste Management System: Difficulties and Deficiencies.

Waste management represented the cornerstone of the waste situation in SMEs. The interviewed managers explained that they were subject to the municipal waste management system, where they must pay an amount (specified independently by every municipality) to use the system with their operation permit. The interviewees explained that the municipalities had not implemented separate waste collection methods, which meant that the waste from companies had final disposal in a landfill, precisely the same as in a household's situation. This point establishes the importance of having a separate collection of waste, by having different channels and flows for homes and SMEs, to thus maximise waste use.

A related aspect is the waste system operation. Regarding the interviewees' responses, municipalities did count with separate waste collection points, limited to specific zones in the city with adequate infrastructure to separate waste collection. Each commune had a different quantity of these points (from public and private initiatives), leaving many SMEs far from being in a serviceable range. In addition, although everyone (companies and citizens alike) could bring their waste to these sites, SMEs explained that the packages of different materials (glass, plastic, cardboard, paper) must be brought completely clean (at the company' or citizen's own expense) to these points. This condition generated some

degree of annoyance in various interviewees as there was a sensation of "*working for others*" who benefited from this condition (having taxpayers clean waste for them) while receiving all the recycling process earnings. This perspective establishes the relevance of public perception and operation conditions of a waste management system.

A derivated issue was the waste cycle in the market. SMEs did not have a clear notion, or reliable data, regarding what percentage of the waste was recycled and returned to the market. For example, it did not have a quantification on the percentage of products that contained recycled materials. Hence, this expresses their concern regarding waste traceability problems. In response, SME managers had an alternative solution; formal private collectors. However, this option implies a cost to retrieve said waste, and this is something that SMEs could not always assume in their operational costs. Besides, this alternative also does not provide a solution to the problem of traceability. Hence, the system does not have a standard registration of the collected materials. This problem implies that SMEs do not know what percentage of their waste re-enters the market.

The lack of trust and clear financial costs led SMEs to prefer collaborating with informal collectors (persons dedicated to the waste collection, selling it to private entities that would reuse or recycle, hence obtaining an economic benefit from this activity). This tendency was motivated by a practical issue that affected their waste management—as mentioned by various interviewees—being physical space. SMEs state that most of them did not possess an area to store waste, and that they had the immediate need to quickly reduce the amount of waste in their company. Table 9 presents the interviews quotations about the waste management system. Although the companies had the intention to recycle, this crude reality diminished the possibilities of recycling or reusing waste as a resource. In practical terms, SMEs stated that they did not have any incentives (economic, environmental, or social) to recycle. This operative condition of the system went against the progressional direction of recycling and reuse in an economy. In this sense, this situation affected the implementation of waste hierarchy.

Table 9. Waste management aspects and interviewees' quotes.

Themes	Aspect	Selected Quotations
Waste management system	Separate waste collection	"On Tuesdays and Thursdays, the garbage truck passes and takes everything. We do not know what they do with the waste. The same thing happens with companies and people. There are some clean points, but they do not accept all kinds of materials" Manager of a textile company.
	System operation	"You have the feeling that you are going to the clean point and putting it together again (for them). Also, people say the guy who is recycling is earning money" Manager of a retail company.
	Waste traceability	"The creation of products from waste does not have quantification. There is no traceability. Waste managers generate an entry document, where they say they receive so many kilograms of waste, and I keep that document that is my finding and (my) part of the work that was done" Manager of a consultancy company.
	Practical limitations	"Because of our lack of storage, sometimes we have to throw things that we could use because we have nowhere to store them" Manager of a retail company.

4.3. Sustainable Raw Materials in the SMEs' Reality: Challenges and Obstacles

Although the use of sustainable raw materials—in their supply chain—was considered relevant, it was not a priority for SMEs, as the most primordial topic for SMEs managers was the essentiality of raw materials management. This stems from the fact that SMEs had limited resources with forced them to be cautious with their production inputs. This concern not only had a financial effect on SMEs, but also in overall management of waste generation. In addition, this clashed with their principal priority; customer satisfaction. This compromise, on various occasions, affected the environment. An example of this was the overprotection of the product's packaging, using materials such as plastic, polystyrene, and metal to enhance product safety. This result was a concern that reinforced the need to developing sustainable materials, where the effective waste management could be a potential solution in the country.

Nonetheless, an aspect that triggers the situation of sustainable materials was their availability. These type of materials wer limited due to the lack of suppliers. This restricted supply affected its price, making it a strong barrier and deterrent factor, affecting their adoption by SMEs. Furthermore, SMEs considered that the business margin was not enough to invest in changes in the supply chain's raw materials. Thus, the companies were aware of the environmental situation, yet their difficult economic position prevented them from continuing with these necessary changes. These results reinforce the importance of waste management and their potential effect on increasing sustainable raw materials options.

Furthermore, SMEs considered that knowledge was another critical aspect to extend the use of materials and increase their reuse. In this line, the managers recognised that when they had a surplus of materials, they had greater difficulties in giving correct and final disposal procedures when separating waste. Hence, truly understanding the components was key to give raw materials a second life in the economy. This situation indicates the lack of know-how and subsequent technology; it is necessary. Table 10 shows the interview quotations regarding raw materials. This finding has a direct consequence on waste management. Developing an effective system is only enough with a proper economic incentives plan; the aid needs to consider training plans to increase knowledge management.

Table 10. Raw materials aspects and interviewees quotes.

Themes	Aspect	Selected Quotations
Raw materials	Raw Materials Stock control	"When we have stock, there is more risk, and you have to keep control, so we have to implement ways to know the product inventory. Because if we have a surplus, we need to make decisions, we need to try to reduce waste" Manager of a food-service company.
	Raw Materials use	"There are some aluminium containers, some boxes of featherweight and some products in a paper bag. Finally, all that comes together in a plastic bag we deliver to the customer, to product protection" Manager of a food-service company.
	Raw materials management	"The problem with raw materials such as plastic is that people and companies do not take care of extending their useful life. Plastic is an excellent alternative if you know how to use it" Manager of a retail company
	Sustainable materials price	"To be honest, the truth is that we have not changed suppliers even if the product comes in a plastic box or cardboard. Unfortunately, today we are making provider decisions based on cost-benefit" Manager of a health-care company.
	Sustainable materials scarcity	"I have quoted for materials, but the providers are few, and they do not come too close (in terms of price-efficiency). There are lack of a greater supply and accessibility to these materials" Manager of a food-service company.

The relationship between the emerged concepts is shown in Figure 2. In this sense, the waste extension took into consideration different aspects; waste legislation, waste management system and their activities (from waste generation to their traceability), The limitations of SMEs were physical space, ease for collaboration, and the relevance of stakeholders: government and municipalities. In the case of raw materials, management, knowledge, availability and barriers were crucial. However, the most relevant aspect was the bi-directional relationship between waste and raw materials. The modification of waste management or conditions affected the situation of raw materials, principally from the recycled materials, and vice versa. The modification on the situation of raw materials could provide benefits to waste management such as: reduce generation and ease their treatment. In essence, modifying an aspect could have positive or negative effects on the entire chain of relationships.
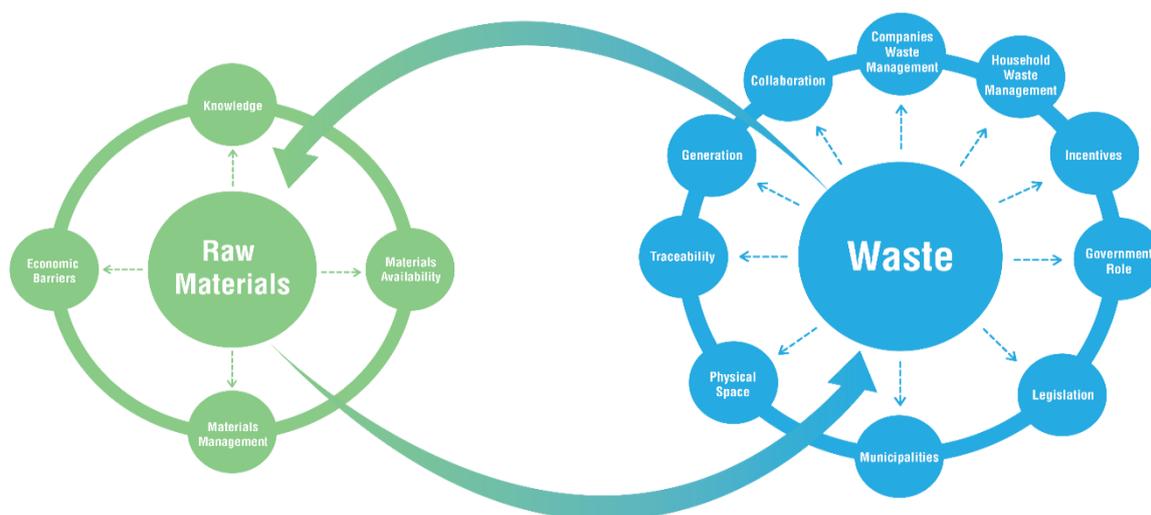
Figure 2. The relationship scheme between waste and raw materials nodes. Source: Self-elaboration.

4.4. Clusterisation of Nodes

To analyse the relationship between the identified nodes (themes identified in the interviewees and codified by the researcher), the study employed NVIVO 11 to perform nodes clusterisation by word similarity (See Figure 3). This figure shows the patterns and distance between themes, independently of their node origin. In this sense, giving a peripherical vision that allows visualising opportunities to joint-management topics, greatly optimising efforts. To determine the statistical significance, the Pearson correlation was used as a measurement index in the cluster conformation. Table S2 (in Supplementary Materials) shows the correlation matrix.

The analysis showed the first cluster between waste generation, household waste management, companies' waste management, materials management, and traceability. This relationship highlighted the central aspects of the waste situation in Santiago. The similarity between households and SMEs exposeed the system's traceability problem, where the waste material management of companies in the supply chain was relevant and, subsequently, in the city's waste generation problem.

The second identified cluster corresponded to legislation and material availability. This relationship was sustained, considering that the norm strongly focused on waste in the final stage of the process. The problem was the weaker approach in the initial stage of the production process, which required preventive strategies.

The rest of the concepts showed different connotations, (1) the physical space as a limitation to store materials and waste, (2) the knowledge limitation regarding materials and their effects in waste generation, (3) the scarce role of government institutions in supporting/aiding the situation of SMEs, (4) the economic barriers to investing in reduction,

recycling or reuse of waste, and (5) the lack of incentives to SMEs. The last two concepts represent a major issue, as the municipalities that executed their functions had scarce collaboration with SMEs, who in turn, had scarce collaboration with public institutions.
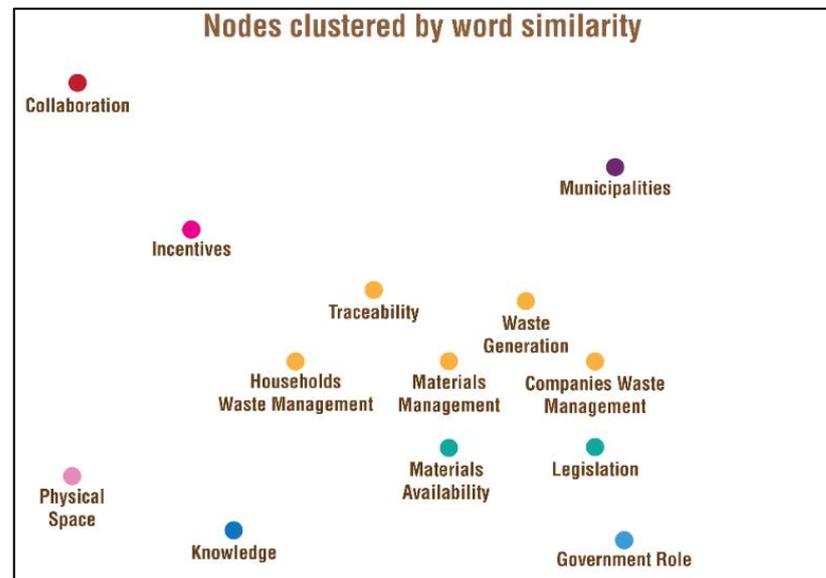
Figure 3. Clusterisation nodes by word similarity on waste and raw materials. (Symbology: Cluster 1 (waste generation, household waste management, companies waste management, materials management, and traceability), cluster 2 (legislation and material availability). Source: Own elaboration).

5. Discussion

Based on the qualitative thematic analysis, the SMEs' situation unveils different factors identified and organised through the nodes clusterisation in Figure 3. From this, three main aspects that influence Santiago's waste situation were identified: (1) waste legislation, (2) waste management system, and (3) raw materials management and availability.

5.1. Waste Legislation: An Application Problem

Waste legislation affects SMEs environmental development. According to the SME managers' perspective, the waste legislation—applied through ERP law—does not consider the reality, characteristics, conditions, and limitations of SMEs in their application. These findings are consistent with [63], about waste management policy deficiencies in Latin America. Moreover, waste legislation application is a global problem with specific nuances. In Europe, SMEs illustrate the lack of incentives in waste legislation to stimulate environmental behaviour [64]. In India, it is recognised as a barrier that needs unified criteria with SMEs struggling to comprehend regulatory norms [65]. The regulatory approach is essential to enhance the circular economy's shift towards SMEs and adopt waste hierarchy [66]

In Chile, the N° 20.416 law considers (technically) a proportionality principle for these companies [67], for environmental and waste themes. However, this implies a minimising view of the problem without addressing the underlying situation, on how approach and how to support SMEs. Thus, international evidence suggests the relevance of flexible regulations and the need to support SMEs supply chains [68]. When the regulations are flexible, and adapted to the SMEs characteristics (thus supported and encouraged by government actions), competitive advantages and differentiation through environmental actions can be obtained [69]. Unfortunately, Latin American studies on environmental issues have focused mainly on waste generation, composition analysis, and decision-making approaches [70]. The latter is a pending topic for effectively assuming the country's environmental challenges.

5.2. Waste Management System: A Separation Waste Problem

The municipal waste management system's role is another edge to consider in the situation of SMEs. In Santiago, the non-separate collection of waste has generated a detrimental effect on the environmental situation. As the SMEs' condition greatly shares the municipal and household systems' difficulties regarding waste traceability, valorisation of waste becomes a critical and unresolved issue; traceability is a crucial step towards waste reduction and information flow for material recovery and reuse [71]. A well-managed collection system directly affects the entire waste management system, and one of their benefits; material recycling [72]. Moreover, adding to this situation, the SMEs' physical space limitation in their operations is an issue, as declared by their managers. This aspect complicates the possibility to store material and incentivises quick final disposal.

Furthermore, other structural conditions aggravate this current waste separation problem. The system's payment directly affects the SMEs' situation. According to European evidence, the effective design of 'waste-fee' contributes to the waste hierarchy implementation of a territory [73]. In the Chilean case, SMEs pay a waste-fee, added to their municipal operating permits. The problem stems that this fee is a fixed amount, independent of the amount of waste generated, making little sense for SMEs. Waste from SMEs is treated equally as waste from households (which have exemptions to non-payment based on socio-economic criteria defined by every municipality) [74]. This point is important as basically it means that SMEs share the households' situation and do not have an economic incentive in reducing waste generation. In the case of developing countries, the municipal waste management system is a multi-dimensional issue that needs to consider environmental aspects and include social, cultural, legal, economic, and institutional conditions [75].

The aforementioned highlights that SMEs should look for other payment options when searching for a more efficient way to treat waste. Nonetheless, SMEs cannot always assume these additional costs in their business structure. An effective and integrative waste management system that consider all their stakeholders (society, companies and public institutions) [76], can approach this issue. In this sense, the Chilean ERP law and its gradual implementation represents an opportunity to approach the topic from the SMEs' situation. Separate waste collection, a payment structure according to waste generation, and clear traceability are the challenges of the Chilean waste management system.

5.3. Recycled Raw Materials Management and Availability: A Multi-Dimensional Issue

The raw materials are another aspect that affects the SMEs waste management situation. The findings in the study suggest practical difficulties for SMEs regarding raw material management, as they have a severe lack of technical knowledge on the subject. The scarcity of knowledge is considered to be one of the main factors that obstructs collaboration between companies to achieve environmental benefits [77]. In Chilean SMEs, the absence of training plans within the companies, and the lack of adequate accomplishments from respective government institutions, significantly impact the management of raw materials. The evidence also demonstrates the relevance for knowledge transfer and support to SMEs in environmental aspects [78]. However, the specific knowledge about raw materials is a topic still in development.

The problems on knowledge mentioned above affects the availability of recycled raw materials. When considering the valorisation rate (3.11%) of Santiago [46], although recycled raw materials are limited, their availability is not the problem, it is their low-level demand. Nevertheless, it can become a problem in the mid-term if the usage volume (demand) increases.

The ERP law is a changing factor in this equation. As consequence of the norm, the separate waste collection points in Santiago have (and continue) to be increased in the following years, independent of the delay generated by the COVID-19 pandemic. However, this process must be accomplished through a robust traceability process that can ensure that separate waste can be transformed into recycled materials. Nonetheless, the evidence in EU countries—with more advanced waste legislation and experience—reveals that

recycled raw material is an unresolved problem [79]. Therefore, the situation is not simple for developing countries like Chile. The adequate implementation of ERP law in Chile is not a definitive solution, but it is a first step to increase the availability of recycled raw materials for SMEs.

Hence, SMEs need a series of inputs and a strong driving force to see environmental management benefits [80]. The integration of the aforementioned measures requires participation from government institutions, companies, and the general community (which has a role as a change agent) [20]. Furthermore, educational campaigns and plans can encourage commitment from SMEs [26]. Lastly, the selection of raw materials, the possibilities of the shift toward a CE (tools as reduce, reuse, recover, recycle, among others), and the collaboration between SMEs can improve the country's waste management situation.

5.4. General Implications

In Chile, the waste management legislation, reflected in the ERP law, provides a rigorous framework to assume the overall waste situation's challenge. However, their implementation requires the flexibility to address the situation. Moreover, the actual conditions of the waste management system in Chile must take into account: (1) low separation rate, (2) that companies and households use the same waste management system, and that (3) that the fixed rate for households and companies do not support incentive-waste-hierarchy in SMEs. Thus, these companies do not feel pressure from the law, hence acting according to their practical experience over the years. Law compliance is relatively weak due to a lack of enforcement from inspectors.

These adverse conditions diminish the possibilities of adopting waste hierarchy in the different stages in the SMEs' supply chain. Therefore, if the government and policy-making authorities do not develop a specific action plan for SMEs, more waste can be generated by these companies, producing further (and major) environmental degradation in the country.

The implications for government and policy-makers is that SMEs need to be accompanied (technically and financially) to be more sustainable and generate less waste in the transformation process, an actual failure of the normative and support systems. Understanding the SMEs' reality and the city's condition is a key component towards reducing waste generation in Santiago and improving the overall system's effectiveness. A holistic sense is necessary to address Santiago's waste management problem effectively. Therefore, this research contributes to filling the literature gap regarding waste management and SMEs, enriching the limited knowledge on these aspects. It must be noted that -previously- very few empirical studies have been done on this subject in the region.

6. Conclusions

This study examines the factors that affect the waste management situation from the SME's perspective, based on 29 in-depth interviews conducted with SME managers. The research findings highlight: (1) an absence of a flexible and adequate waste norm for SMEs that considers their characteristics and practical limitations, (2) difficulties with the management and availability of sustainable raw materials, (3) a need for direct support for SMEs, reflected in tools such as subsidies, financial aid, and technical assistance to approach their waste management. SMEs can minimise their waste generation if they adopt a sustainable approach with clear and specific norms and proper government support (critical to improving the city waste situation). Therefore, a holistic sense is necessary to effectively address the waste management situation of SMEs.

Despite these contributions, this research has some limitations to consider. This study performed a rigorous codification and categorisation process by taking all the considerations for qualitative research. However, there will always be some degree of subjectivity in the results. Secondly, this study considers different industrial sectors to obtain a wide range of SMEs perspectives, thus it could be interesting for future research to focus on specific economic sectors to extend these findings. It could also be beneficially to adopt an international perspective, where comparing different Latin American countries could

provide useful insights, especially when considering their structural differences. Lastly, this research considers a specific period. Therefore it would be enriching to adopt a longitudinal study with periods to verify and extend the findings.

References

1.   United Nations. *The 2030 Agenda and the Sustainable Development Goals An opportunity for Latin America and the Caribbean*; ECLAC Publications: Santiago, Chile, 2018.
2.   Ellen MacArthur Foundation. *Towards the Circular Economy*; Ellen MacArthur Foundation: Cowes, UK, 2013; Volume 1.
3.   Ozbekler, T.M.; Ozturkoglu, Y. Analysing the importance of sustainability-oriented service quality in competition environment. *Bus. Strategy Environ.* **2020**, *29*, 1504–1516. [CrossRef]
4.   Zorpas, A.A. Strategy development in the framework of waste management. *Sci. Total Environ.* **2020**, *716*, 137088. [CrossRef]
5.   Haupt, M.; Vadenbo, C.; Hellweg, S. Do We Have the Right Performance Indicators for the Circular Economy?: Insight into the Swiss Waste Management System. *J. Ind. Ecol.* **2017**, *21*, 615–627. [CrossRef]
6.   Ehnert, I.; Parsa, S.; Roper, I.; Wagner, M.; Muller-Camen, M. Reporting on sustainability and HRM: A comparative study of sustainability reporting practices by the world's largest companies. *Int. J. Hum. Resour. Manag.* **2016**, *27*, 88–108. [CrossRef]
7.   Pedersen, E.R.G.; Gwozdz, W.; Hvass, K.K. Exploring the Relationship Between Business Model Innovation, Corporate Sustainability, and Organisational Values within the Fashion Industry. *J. Bus. Ethics* **2018**, *149*, 267–284. [CrossRef]
8.   De Mendonca, T.; Zhou, Y. When companies improve the sustainability of the natural environment: A study of large U.S. companies. *Bus. Strategy Environ.* **2020**, *29*, 801–811. [CrossRef]
9.   Hörisch, J.; Johnson, M.P.; Schaltegger, S. Implementation of Sustainability Management and Company Size: A Knowledge-Based View. *Bus. Strategy Environ.* **2015**, *24*, 765–779. [CrossRef]
10.   Woodard, R. Waste Management in Small and Medium Enterprises (SMEs): Compliance with Duty of Care and implications for the Circular Economy. *J. Clean. Prod.* **2021**, *278*, 123770. [CrossRef]
11.   Szilagyi, A.; Mocan, M. Scaling up Resource Efficiency and Cleaner Production for an Sustainable Industrial Development. *Procedia Soc. Behav. Sci.* **2018**, *238*, 466–474. [CrossRef]
12.   World Bank World Bank SME Finance. Available online: https://www.worldbank.org/en/topic/smefinance (accessed on 28 July 2020).
13.   OECD. *SME Policy Index: Latin America and the Caribbean 2019. Policies for Competitive SMEs in the Pacific Alliance and Participating South American Countries*; OECD Publishing: Paris, France, 2019.
14.   Nunes, J.R.R.; da Silva, J.E.A.R.; da SilvaMoris, V.A.; Giannetti, B.F. Cleaner Production in small companies: Proposal of a management methodology. *J. Clean. Prod.* **2019**, *218*, 357–366. [CrossRef]
15.   Zhang, A.; Venkatesh, V.G.; Liu, Y.; Wan, M.; Qu, T.; Huisingh, D. Barriers to smart waste management for a circular economy in China. *J. Clean. Prod.* **2019**, *240*, 118198. [CrossRef]

16. CEPAL. Access to Information, Participation and Justice in Environmental Matters in Latin America and the Caribbean: Situation, Outlook and Examples of Good Practice. Available online: https://www.cepal.org/en/publications/21758-access-information-participation-and-justice-environmental-matters-latin-america (accessed on 29 July 2020).

17. Da Silva Alcântara Fratta, K.D.; de Campos Leite Toneli, J.T.; Antonio, G.C. Diagnosis of the management of solid urban waste of the municipalities of ABC Paulista of Brasil through the application of sustainability indicators. *Waste Manag.* **2019**, *85*, 11–17. [CrossRef] [PubMed]

18. Ziegler-Rodriguez, K.; Margallo, M.; Aldaco, R.; Irabien, A.; Vazque-Rowe, I.; Kahhat, R. Environmental performance of peruvian waste management systems under a life cycle approach. *Chem. Eng. Trans.* **2018**, *70*, 1753–1758. [CrossRef]

19. Villalba, L.; Donalisio, R.S.; Cisneros Basualdo, N.E.; Noriega, R.B. Household solid waste characterization in Tandil (Argentina): Socioeconomic, institutional, temporal and cultural aspects influencing waste quantity and composition. *Resour. Conserv. Recycl.* **2020**, *152*, 104530. [CrossRef]

20. Seadon, J.K. Integrated waste management—Looking beyond the solid waste horizon. *Waste Manag.* **2006**, *26*, 1327–1336. [CrossRef] [PubMed]

21. Schroeder, P.; Anggraeni, K.; Weber, U. The Relevance of Circular Economy Practices to the Sustainable Development Goals. *J. Ind. Ecol.* **2019**, *23*, 77–95. [CrossRef]

22. World Bank; OECD. GDP per Capita (Current US$) | Data. Available online: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2017&locations=ZG&start=1960&view=chart&year_high_desc=false (accessed on 29 July 2020).

23. Ministerio del Medio Ambiente. *Ley 20.920 Gestión de Residuos, la Responsabilidad Extendida del Productor y Fomento al Reciclaje*; Ministerio del Medio Ambiente: Santiago, Chile, 2016.

24. Ministerio del Medio Ambiente. *Ley 21.100 Prohibe la Entrega de Boldas Plásticas de Comercio en todo el Territorio Nacional*; Ministerio del Medio Ambiente: Santiago, Chile, 2018.

25. The World Bank. What a Waste Global Database | Data Catalog. Available online: https://datacatalog.worldbank.org/dataset/what-waste-global-database (accessed on 23 July 2020).

26. Hettiarachchi, H.; Ryu, S.; Caucci, S.; Silva, R. Municipal Solid Waste Management in Latin America and the Caribbean: Issues and Potential Solutions from the Governance Perspective. *Recycling* **2018**, *3*, 19. [CrossRef]

27. UN Envirnoment UN Environment 2018 Annual Report | UNEP—UN Environment Programme. Available online: https://www.unenvironment.org/resources/un-environment-2018-annual-report (accessed on 29 December 2020).

28. Betancourt Morales, C.M.; Zartha Sossa, J.W. Circular economy in Latin America: A systematic literature review. *Bus. Strategy Environ.* **2020**, *29*, 2479–2497. [CrossRef]

29. European Commission Directive 2008/98/EC on waste (Waste Framework Directive)—Environment—European Commission. Available online: http://ec.europa.eu/environment/waste/framework/ (accessed on 2 August 2020).

30. Singh, A. Developing a conceptual framework of waste management in the organizational context. *Manag. Environ. Qual. Int. J.* **2017**, *28*, 786–806. [CrossRef]

31. United Nations Environment Programme. *Waste Management Outlook for Latin America and the Caribbean*; United Nations Latin America and the Caribbean Office: Panama City, Panama, 2018.

32. European Commission. EU Sustainable Development Strategy—Environment—European Commission. Available online: papers3://publication/uuid/BFAA0FF6-7D3E-4425-8E56-6F46D44430D9 (accessed on 15 June 2020).

33. Ministerio de Medio Ambiente y Agua. *Ley N 755 de Gestión Integral de Residuos*; Ministerio de Medio Ambiente y Agua: La Paz, Bolivia, 2015.

34. Ministerio del Ambiente. *Programa Nacional para la Gestión Integral de Desechos Sólidos*; Ministerio del Ambiente: Quito, Ecuador, 2010.

35. Ministerio del Ambiente. Nueva ley y Reglamento de Residuos Sólidos | Dirección General de Gestión de Residuos Sólidos. Available online: https://www.minam.gob.pe/gestion-de-residuos-solidos/nueva-ley-de-residuos-solidos/ (accessed on 21 July 2020).

36. Ministerio del Poder Popular para el Ambiente. *Ley de Gestión Integral de la Basura*; Ministerio del Poder Popular para el Ambiente: Caracas, Venezuela, 2010; Volume CXXXVIII.

37. Ministerio de Ambiente y Desarrollo Sostenible. Ley n 13592 Gestión Integral de los Residuos Sólidos Urbanos. Available online: http://www.opds.gba.gov.ar/sites/default/files/Ley13592.pdf (accessed on 1 August 2020).

38. Ministério do Meio Ambiente. Ley n° 12305 Política Nacional de Residuos Sólidos. Available online: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/Lei/L12305.htm (accessed on 22 July 2020).

39. Ministerio del Medio Ambiente. Ley N 3956/09. Available online: extwprlegs1.fao.org/docs/pdf/par123260.pdf (accessed on 21 July 2020).

40. Ministerio de Medio Ambiente y Desarrollo Sostenible. Ley N 1672 Gestión Integral de Residuos de Aparatos Electrónicos. Available online: https://www.minambiente.gov.co/images/AsuntosambientalesySectorialyUrbana/pdf/e-book_rae_/contenido_2_2_1.html (accessed on 22 July 2020).

41. Ministerio de Ambiente y Desarrollo Sostenible. Resolución n 1407. Available online: http://www.andi.com.co/Uploads/RES1407DE2018.pdf (accessed on 1 August 2020).

42. Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente. Ley N 19829 Gestión Integral de Residuos. Available online: https://www.impo.com.uy/bases/leyes/19829-2019 (accessed on 21 July 2020).

43. Ferronato, N.; Gorritty Portillo, M.A.; Guisbert Lizarazu, E.G.; Torretta, V.; Bezzi, M.; Ragazzi, M. The municipal solid waste management of La Paz (Bolivia): Challenges and opportunities for a sustainable development. *Waste Manag. Res.* **2018**, *36*, 288–299. [CrossRef]

44. Guarnieri, P.; Sobreiro, V.A.; Nagano, M.S.; Marques Serrano, A.L. The challenge of selecting and evaluating third-party reverse logistics providers in a multicriteria perspective: A Brazilian case. *J. Clean. Prod.* **2015**, *96*, 209–219. [CrossRef]

45. Burneo, D.; Cansino, J.M.; Yñiguez, R. Environmental and socioeconomic impacts of urban waste recycling as part of circular economy. The case of cuenca (Ecuador). *Sustainability* **2020**, *12*, 3406. [CrossRef]

46. Ministerio del Medio Ambiente. Sistema Integrador de Información Ambiental. Available online: http://sistemaintegrador.mma. gob.cl/mma-centralizador-publico/indicador/vistaIndicador.jsf?id=58AA51D2-E6A5-2CBC-84F9-7ADF41082274&subtema= 6 (accessed on 9 December 2019).

47. Blazquez, C.; Paredes-Belmar, G. Network design of a household waste collection system: A case study of the commune of Renca in Santiago, Chile. *Waste Manag.* **2020**, *116*, 179–189. [CrossRef]

48. Subsecretaría de Desarrollo Regional y Administrativo. Sistema Nacional de Información Municipal. Available online: http: //datos.sinim.gov.cl/datos_municipales.php (accessed on 11 December 2019).

49. Ministry of Interior. Ley N 3063 Rentas Municipales. Available online: https://eirl.pe/sites/default/files/DecretoLey21621.pdf (accessed on 7 August 2020).

50. OECD. Fostering Greater SME Participation in a Globally Integrated Economy. 2018. Available online: https://www.oecd.org/ cfe/smes/ministerial/documents/2018-SME-Ministerial-Conference-Plenary-Session-3.pdf (accessed on 7 February 2021).

51. Eisenhardt, K.M.; Graebner, M.E. Theory building from cases: Opportunities and challenges. *Acad. Manag. J.* **2007**, *50*, 25–32. [CrossRef]

52. Chen, C.-L.; Lin, Y.-C.; Chen, W.-H.; Chao, C.-F.; Pandia, H. Role of Government to Enhance Digital Transformation in Small Service Business. *Sustainability* **2021**, *13*, 1028. [CrossRef]

53. Ministerio de Economía. *Antecedentes para la Revisión de los Criterios de Clasificación del Estatuto Pyme*; Ministerio de Economía: Santiago, Chile, 2014.

54. Servicio de Impuestos Internos Estadísticas de Empresas. Available online: http://www.sii.cl/sobre_el_sii/estadisticas_de_ empresas.html (accessed on 6 February 2021).

55. Instituto Nacional de Estadísticas de Chile (INE). *Boletín Estadístico de Empleo Trimestral. Periodo Octubre-Diciembre 2020*; INE: Santiago, Chile, 2020.

56. Eisenhardt, K.M. Building Theories from Case Study Research. *Acad. Manag. Rev.* **1989**, *14*, 532–550. [CrossRef]

57. Oelze, N. Sustainable Supply Chain Management Implementation–Enablers and Barriers in the Textile Industry. *Sustainability* **2017**, *9*, 1435. [CrossRef]

58. Caldera, H.T.S.; Desha, C.; Dawes, L. Exploring the characteristics of sustainable business practice in small and medium-sized enterprises: Experiences from the Australian manufacturing industry. *J. Clean. Prod.* **2018**, *177*, 338–349. [CrossRef]

59. Klewitz, J.; Hansen, E.G. Sustainability-oriented innovation of SMEs: A systematic review. *J. Clean. Prod.* **2014**, *65*, 57–75. [CrossRef]

60. Alhojailan, M.I.; Ibrahim, M. Thematic Analysis: A Critical Review of Its Process and Evaluation. Available online: https: //fac.ksu.edu.sa/sites/default/files/ta_thematic_analysis_dr_mohammed_alhojailan.pdf (accessed on 7 February 2021).

61. Castleberry, A.; Nolen, A. Thematic analysis of qualitative research data: Is it as easy as it sounds? *Curr. Pharm. Teach. Learn.* **2018**, *10*, 807–815. [CrossRef]

62. Ryan, G.W.; Bernard, H.R. Techniques to Identify Themes. *Field Methods* **2003**, *15*, 85–109. [CrossRef]

63. Margallo, M.; Ziegler-Rodriguez, K.; Vázquez-Rowe, I.; Aldaco, R.; Irabien, Á.; Kahhat, R. Enhancing waste management strategies in Latin America under a holistic environmental assessment perspective: A review for policy support. *Sci. Total Environ.* **2019**, *689*, 1255–1275. [CrossRef]

64. Rabadán, A.; Sáez-Martínez, F.J. Why European Entrepreneurs in the Water and Waste Management Sector Are Willing to Go beyond Environmental Legislation. *Water* **2017**, *9*, 151. [CrossRef]

65. Karuppiah, K.; Sankaranarayanan, B.; Ali, S.M.; Chowdhury, P.; Paul, S.K. An integrated approach to modeling the barriers in implementing green manufacturing practices in SMEs. *J. Clean. Prod.* **2020**, *265*, 121737. [CrossRef]

66. Roxas, B.; Coetzer, A. Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms. *J. Bus. Ethics* **2012**, *111*, 461–476. [CrossRef]

67. Ministerio de Economia, Fomento y Turismo. Ley n 20416 Fija Normas Especiales para las Empresas de Menor Tamaño. Available online: https://www.leychile.cl/Navegar?idNorma=1010668 (accessed on 13 August 2020).

68. Mura, M.; Longo, M.; Zanni, S. Circular economy in Italian SMEs: A multi-method study. *J. Clean. Prod.* **2020**, *245*, 118821. [CrossRef]

69. Machado, M.C.; Vivaldini, M.; de Oliveira, O.J. Production and supply-chain as the basis for SMEs' environmental management development: A systematic literature review. *J. Clean. Prod.* **2020**, *273*, 123141. [CrossRef]

70. Brenes-Peralta, L.; Jiménez-Morales, M.F.; Campos-Rodríguez, R.; De Menna, F.; Vittuari, M. Decision-making process in the circular economy: A case study on university food waste-to-energy actions in Latin america. *Energies* **2020**, *13*, 2291. [CrossRef]

71. Molina-Moreno, V.; Leyva-Díaz, J.; Sánchez-Molina, J.; Peña-García, A. Proposal to Foster Sustainability through Circular Economy-Based Engineering: A Profitable Chain from Waste Management to Tunnel Lighting. *Sustainability* **2017**, *9*, 2229. [CrossRef]

72. Yıldız-Geyhan, E.; Yılan, G.; Altun-Çiftçioğlu, G.A.; Kadırgan, M.A.N. Environmental and social life cycle sustainability assessment of different packaging waste collection systems. *Resour. Conserv. Recycl.* **2019**, *143*, 119–132. [CrossRef]

73. Milios, L. Towards a Circular Economy Taxation Framework: Expectations and Challenges of Implementation. *Circ. Econ. Sustain.* **2021**, 1–22. [CrossRef]

74. Hernández, R. *Derechos de aseo. Antecedentes de la legislación Chilena y referencias internacionales*; Congreso Nacional: Santiago, Chile, 2019.

75. Guerrero, L.A.; Maas, G.; Hogland, W. Solid waste management challenges for cities in developing countries. *Waste Manag.* **2013**, *33*, 220–232. [CrossRef] [PubMed]

76. Fuss, M.; Vasconcelos Barros, R.T.; Poganietz, W.R. Designing a framework for municipal solid waste management towards sustainability in emerging economy countries—An application to a case study in Belo Horizonte (Brazil). *J. Clean. Prod.* **2018**, *178*, 655–664. [CrossRef]

77. Patricio, J.; Axelsson, L.; Blomé, S.; Rosado, L. Enabling industrial symbiosis collaborations between SMEs from a regional perspective. *J. Clean. Prod.* **2018**, *202*, 1120–1130. [CrossRef]

78. Lamoureux, S.M.; Movassaghi, H.; Kasiri, N. The Role of Government Support in SMEs' Adoption of Sustainability. *IEEE Eng. Manag. Rev.* **2019**, *47*, 110–114. [CrossRef]

79. European Environment Agency. Recycling of Municipal Waste. Available online: https://www.eea.europa.eu/airs/2018/resource-efficiency-and-low-carbon-economy/recycling-of-municipal-waste (accessed on 15 August 2020).

80. Redmond, J.; Walker, E.; Wang, C. Issues for small businesses with waste management. *J. Environ. Manag.* **2008**, *88*, 275–285. [CrossRef] [PubMed]