sustainability

MDPI

Article

Identifying the Drivers of Circular Food Packaging: A Comprehensive Review for the Current State of the Food Supply Chain to Be Sustainable and Circular

Erhan Ada [1], Yigit Kazancoglu [2,*], Çisem Lafcı [1], Banu Y. Ekren [3,4] and Cansu Çimitay Çelik [5]

[1] Faculty of Business, Business Administration, Yaşar University, Izmir 35100, Turkey; erhan.ada@yasar.edu.tr (E.A.); cisemlafci@gmail.com (Ç.L.)
[2] Faculty of Business, Logistics Management, Yaşar University, Izmir 35100, Turkey
[3] School of Management, Cranfield University, Bedford MK43 0AL, UK; banu.yetkinekren@cranfield.ac.uk
[4] Faculty of Engineering, Industrial Engineering, Yaşar University, Izmir 35100, Turkey; banu.ekren@yasar.edu.tr
[5] Borusan Lojistik Dağıtım Depolama Taşımacılık ve Ticaret A.Ş., Istanbul 34400, Turkey; cansu.cimitay@borusan.com
* Correspondence: yigit.kazancoglu@yasar.edu.tr

Abstract: The resilience of food systems is jeopardized by using food packaging materials that have adverse impacts on the environment, food quality, food safety, shelf-life, food loss, and waste. Therefore, a transition into a more sustainable system can only be possible by adopting circular economy principles and practices that can facilitate the elimination of unsustainable packaging, irresponsible disposal behaviors, and waste management. This paper mainly focuses on circular packaging practices in the existing literature to reveal the drivers of circular food packaging applications. The study also displays the triple combinations of material-sector, material-CE, and sector-CE principles. As a methodology, a systematic literature review (SLR) has been used for this study. Furthermore, this study investigates the literature findings, such as the most frequently mentioned food sector and sub-sector, CE principles, materials adopted for food packaging, and so on. The primary contribution of this study to the body of literature is the synthesis and mapping of the literature as a whole from the perspectives of CE principles, both sector-based and national, and the materials used through circular food packaging, and the attempt to facilitate this transition into a more circular system by outlining the drivers of circular food packaging.

Keywords: food packaging; circular economy; sustainable packaging; drivers; environmental impact; packaging material; food supply chain

check for updates

Citation: Ada, E.; Kazancoglu, Y.; Lafcı, Ç.; Ekren, B.Y.; Çimitay Çelik, C. Identifying the Drivers of Circular Food Packaging: A Comprehensive Review for the Current State of the Food Supply Chain to Be Sustainable and Circular. *Sustainability* **2023**, *15*, 11703. https://doi.org/10.3390/su151511703

Academic Editor: Riccardo Testa

Received: 29 April 2023
Revised: 1 June 2023
Accepted: 24 July 2023
Published: 28 July 2023

Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

The world's rising dynamism and complexity underline the requirement for the upward adaptable innovation of food to become more environmentally friendly and healthy [1]. In particular, the resilience and durability of current food systems are being threatened by the packaging materials of the food products that are being used, which have negative impacts on both the environments and, more specifically, the shelf-life of the products. Therefore, packaging is critical for today's food systems [2], and it is also becoming extremely dominant in the global economy in terms of its market value, which has expanded rapidly in recent years and is expected to surpass USD 1 trillion by 2020, which is up compared to USD 839 billion in 2015 [3,4].

The term "packaging" is more than just a physical aspect, such as a box or a carton. It is also a process that allows for more secure, economical, and efficient storage, management, dealing, distribution, and product promotion across the supply chain (SC) [3,5]. Thus, food packaging has various functions, such as storage, handling, transit, distribution, food safety, and conservation, and serves to convey product information [2,6], to maintain these

processes throughout the supply chain. Setting a suitable equilibrium amidst the product and its packaging is the main difficulty in packaging design [7].

Irresponsible waste habits and improper plastic waste management have become a severe concern for the ecosystem in the linear economic model [8,9]. Unsustainable packaging and consequent consuming patterns have arisen as a danger to sustainable growth and, subsequently, the establishment of a circular economy (CE) [3]. Due to the fact that companies keep relying on ecologically deteriorating packaging for their products, which include single-use disposable plastics and packaging that has multiple layers, unsustainable package usage and disposal by end users endangers the ecosystem and the environment [3,10,11].

Therefore, sustainable food packaging is necessary for a variety of reasons, including food preservation and conservation, convenience, communication [12,13], and environmental concerns. These important features of food packaging are critical for sustainable development and the elimination of food loss and waste (FLW) [14] because the most significant environmental implications of packaged foods may be linked to food losses, which are mostly the result of overproduction and extra-sized portions [7,15]. Furthermore, the food industry is the greatest single-use packaging user compared to other industries, accounting for 35% of total global packaging manufacturing [2,16], in which approximately 95% of these food packages are discarded after a single use [17].

From this perspective, the integration of sustainability and circular food packaging is becoming substantial [18,19]. The transition into the CE considers the possibility for product reversal cycles, which are classified as closed-loops, cascading, defined as open-loops, and waste results; thus, circular flows involving material recovery are becoming a prominent part of supply chains [20,21].

Most of the studies in food value chains have focused on analyzing consumer behavior to reduce food waste, evaluating the fast development of food systems to boost the revenue of the farmers, and reducing food costs dependently. Therefore, it is essential to empower the nationwide food control system for the effective safety of food and incorporating proactive methods to improve its performance of sustainability [22–25]. Concerning the safety of food in multiple ecosystems, there are various possibilities for investigating its position as part of CE, which is fundamentally designed to be restorative and regenerative and strives, in time, to extract maximum value from goods and their parts [3,20]. Even though packaging plays an essential role for the SC and the economy, there is a lack of appropriate execution of Extended Producer Responsibility (EPR) rules in the packaging sector [3,26] in food systems.

This paper mainly focuses on how circular packaging practices are handled in the existing literature to reveal the drivers of circular food packaging applications. For this purpose, related literature from 1996 to 2022 is examined comprehensively from the sustainability and circularity perspectives of plastic food packaging, how CE initiatives meet the issues of sustainability, and what the drivers are regarding this transition. A systematic literature review (SLR) has been conducted in this study as a methodology for examining the existing literature to identify related publications and the mentioned drivers.

RQ1: What is the current state of the food packaging industry in terms of packaging design, materials used, and adopted technologies?
RQ2: Why is the existing system not enough for the sustainability of the food packaging industry and what possible solutions are there in the literature?
RQ3: What are the addressed drivers for applying CE principles in the food packaging industry?

The following sections of this paper are as follows: The Section 2 of this study provides a holistic approach to the current state of the packaging sector and why a transition into circular packaging is becoming needed in the FSC. The methodology of the study is expressed in Section 3. In Section 4, the analysis and drivers of circular food packaging are investigated. Section 5 displays the research findings and reveals the relationships between the CE principles, the materials used during the food packaging operations, and the food

subsectors by displaying them in bilateral relations. Depending on the study's findings, discussion and implications are proposed in Section 6. The study is concluded in Section 7.

2. Comprehensive Review

2.1. Current State of Food Packaging

Food packaging has a noteworthy influence on reducing the environmental implications of waste and carbon dioxide (CO_2) emissions [27,28]. In recent years, the detrimental environmental effects of food packaging have sparked growing concern, both by public media and policymakers [12]. Today, almost 99% of plastic packaging is produced, and these polymers are derived from petroleum [29]; after the use of these polymers, they can last for hundreds of years in the environment [30,31]. Furthermore, approximately 50% of these plastic packages are designed for single-use purposes and are discarded after use [30,32].

The packaging materials are mainly utilized to hamper contaminants, moisture, and oxygen from reaching food products; therefore, it is used for maintaining food quality and safeguarding it from chemical and mechanical stressors [33–35]. Food packaging is necessary for a variety of reasons, including food containment and preservation, accessibility, and communication [12,13]. Therefore, different food packaging functions influence the foodstuff packaging materials; thus, the choice of materials for food packaging is heavily influenced by the nature of the food to be packaged [36–38]. The materials and technologies used for food packaging have a vital role in various areas, such as food quality, the safety of the food, FLW, life span, and preservation of natural resources. To address the concerns of the FLW and food safety, companies and policymakers are attempting to incorporate features of green and/or CE and sustainability into their operations [39–41].

The traditional economic model has become insufficient due to irresponsible discarding activities and improper plastic waste management, which have become a significant concern in terms of the environment [8,9]. As a result, a transition from today's petroleum and fossil-dominated economy to a bio-based CE is required [42,43] in the FSC. Moreover, this transition towards sustainability and circularity is required to achieve the long-term goals of society and cope with rising issues, such as separating economic boosts as an outcome of environmental pressures, sustainable resource management, and increased food security [42]. Therefore, CE's innovative nature has shown progress, in both top-down and bottom-up directions [8,44] within the FSC.

Thus, due to the emergence of new packaging concepts, ideas, e.g., active and intelligent packaging (AIP) concepts, optimization of the food supply chain, enhancing the storage life of food, and increasing customer knowledge of food consumption, are facilitated [27]. In addition, the amount of functionality that can be included in packaging materials is quickly growing due to novel materials and creative technologies for the real-time detection and reporting of food quality [33]. However, this shift entails not only technological changes, but also changes in customer behavior, regulations, meanings in culture, infrastructures, and market mechanisms [42,45–47].

2.2. Packaging Materials and Design

Packaging may be thought of as a collection of structural, visual, and linguistic design elements that can function as customer cues [18,48–50]. A variety of components are used in food packaging, including the food, packaging material selection, labeling, and design, along with storage, transportation, and distribution [37]. The primary function of food packaging is to secure the food, allowing it to arrive at the consumers in an excellent state and preventing FLW during the transportation, retail, and end-user stages [7]. The basic function of packaging is to preserve and convey the correct product to the right end-user in a safe, cost-effective, and user-friendly manner [15]. Therefore, packaging materials are generally considered the primary source of environmental consequences that have a direct impact on sustainability [18,51]. Notwithstanding, food packaging waste has been

reduced in a limited way thanks to improving public knowledge of environmental concerns resulting from food packaging [2].

The properties and type of food being packed are the primary determinants in the choice of the appropriate materials of packaging for current or projected target foods [37,52] and the design of the packaging. Therefore, two major components of packaging are highlighted in terms of circular food packaging, which are the design and the materials used for packaging. Initially, packaging design combines structural elements (e.g., material) with aesthetic and verbal (informational) aspects [18], and the issue in selecting the right package design is achieving the correct balance between the product and the packaging [15]. For this reason, packaging design must meet these verbal, structural, and aesthetic standards with economic, environmental, and social issues. For instance, food packaging needs to be designed depending upon the after-use effectiveness of the materials used (e.g., recycling, reusing, repairing, recovering, etc.), decreasing plastic usage into natural habitats and detaching plastics from fossil feedstocks to aid in decarbonization and resource efficiency [14].

On the other hand, the materials used for food packaging are also significant for the environment. Because food packaging varies, a variety of materials are used, including plastic, metals, paper, (e.g., steel and aluminum), glass, wood, and polymers [2,53]. The bulk of food packaging materials are gradually mitigable petroleum-based plastic polymer materials that cause substantial environmental concerns yet are widely available to consumers [54,55]. In addition, food packaging is likely most important in consumer-packaged-goods sectors, which frequently depend heavily on packaging aspects to preserve the quality of food, avoid FLW, enable distribution and handling, and generate marketplace distinctiveness [18].

3. Methodology

The main methodology, analytic, and statistical strategy, the systematic literature review (SLR) technique, is used in this work [12,56]. SLR is a well-planned review that uses a systematic and clear approach to find, choose, and profoundly examine the results of the research included in the review [57]. SLR can be described as a process of compiling empirical evidence to address a specific study question in a straightforward and reproducible way while seeking to include all accessible data on the subject and evaluate the quality of that evidence [58]. SLR is a significant research endeavor in and of itself, rather than just a review of prior publications [59]. It answers research questions (RQs) and is a method for detecting existing research, choosing and assessing contributions, analyzing and synthesizing data, and summarizing the evidence in a way that forms relatively unambiguous judgments about what is and is not known and may be reached [59,60]. The SLR approach's fundamental goal is to decrease the potential for bias and promote transparency throughout each level of the review process by concentrating on clear, systematic procedures to eliminate bias in study selection and inclusion, assess the quality of the included studies, and objectively report them [58,61,62]. The SLR methodology of the paper is as follows:

As shown in Figure 1, the SLR methodology involves three main steps, which are design, search, and analysis. Firstly, the design step is explained in detail (see Table 1) and is composed of six sub-steps as follows: identification of a problem, identification of a research gap, determination of the RQs, setting inclusion and exclusion criteria, setting search strings, and selection of databases.

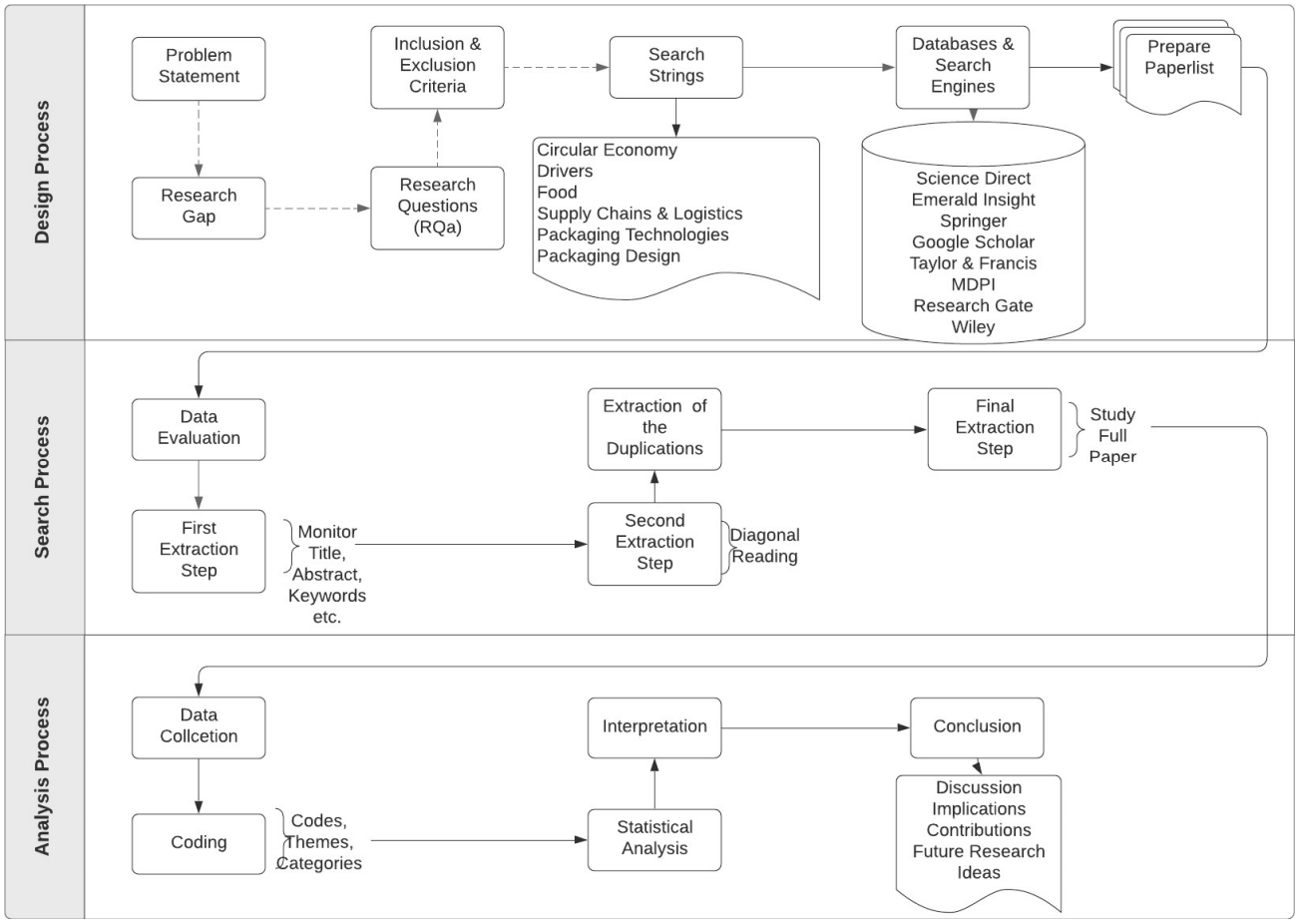

Figure 1. Systematic literature review methodology of the paper.

A statement of the problem that needs immediate attention is the initial step while designing the systematic research design. After the problem statement, the identification of the research gap, which has not been examined and is present in the existing literature, needs to be revealed for emphasizing the study's contribution to the literature. This gap could be a lack of applying a specific methodology to a particular sector or an emerged critical problem that requires immediate attention. Depending on that research gap, research questions need to be formed as a next step. Then, inclusion and exclusion criteria need to be prepared before starting the search step. The search strings (see Figure 2) need to be determined because the publications that will be analyzed during the study will be selected depending on the prepared search strings. Lastly, the databases appropriate for the topics of the study need to be determined.

The search step of the study involves five sub-steps: preparation of a paper list, monitoring the title, abstract, and keywords; inclusion and exclusion criteria; diagonal reading; removal of duplicated publications; and study of full papers. After database selection, the paper extraction and preparing a paper list step can start. In this paper, list preparation, as the first stage, only focusing on the title, main topics, abstract, and keywords would be sufficient. After the preparation of the paper list, further investigations can be started, such as diagonal reading, extracting the duplicate publications, and full reading to eliminate irrelevant publications from the study (see Figure 2 below).

Table 1. Stages of systematic literature review method.

Steps of Systematic Literature Review	Sub-Steps of Systematic Literature Review	Description of the Layers	Adaptation of SLR into This Study
Step 1: Systematic Research Design of the Review (Design Process)	**Sub-step 1:** Problem Statement	1. **Identification of a Problem:** Issues that require explanation, solutions, and attention must be determined.	✓ Current state of packaging sector is becoming insufficient, resulting from negative issues such as food loss and waste, preservation of natural resources, shelf-life of products, and so on. Therefore, adoption of a more circular approach in FSC in terms of packaging has become substantial.
	Sub-step 2: Research Gap	2. **Identification of the Research Gap**: It must be an area or subject that has not been studied before, which needs to be identified as a research gap. It might also be scientific evidence that has not been investigated before, or it may be an application of different methods to a well-known area because a method used in the past studies may have lost its validity.	✓ In the existing literature, there are a large number of studies related to the packaging sector. However, from circularity and technology perspectives, there is limited research that contains circularity and green practices in food packaging. Because of this, the major goal of this article is to integrate circularity with environmentally friendly practices in the food packaging industry and to assess our progress toward circularity.
	Sub-step 3: Research Questions (RQs)	3. **Determination of the Research Questions**: A Research Question (RQ) is a statement of a general or specific inquiry relevant to the problem that can be focused on during the study in a clear, concise, transparent, detailed, and reproducible format.	✓ RQ1: What is the current state of the food packaging sector in terms of packaging design, materials used, and adopted technologies? ✓ RQ2: Why is the existing system not enough for the sustainability of the food packaging sector and what possible solutions are there in the literature? ✓ RQ3: What are the addressed drivers for applying CE in the food packaging sector?

Table 1. *Cont.*

Steps of Systematic Literature Review	Sub-Steps of Systematic Literature Review	Description of the Layers	Adaptation of SLR into This Study
	Sub-step 4: Inclusion and Exclusion Criteria	4. **Setting Inclusion and Exclusion Criteria:** Inclusion and exclusion criteria can be determined as a set of traits that are used to identify subjects that will be included or excluded in a study to address a certain study question.	**Inclusion Criteria:** Language: English; Search Timeline: 2022–1990 **Exclusion Criteria:** Language: Publication not in English; Type: book, white paper, workshop
	Sub-step 5: Search String	5. **Setting Search Strings:** The search strings are created by combining keywords that are relevant to the major themes using the connectors "AND" and "OR".	✓ Search strings are represented in Table 2 below.
	Sub-step 6: Database and Search Engines	6. **Selection of Database:** The use of databases and search engines to find articles with all essential data contained and available is critical for a good review.	✓ Usage of multiple databases and search engines were planned before starting the search process. Accordingly, Science Direct, Springer, Google Scholar, MDPI, Emerald Insight, and Wiley were determined as the main academic databases and search engines to be used throughout this study.
Step 2: Initial Step for Searching Publications (Search Process)	**Sub-step 1:** Data Evaluation	**1. Preparation of a Paper list:** The list of publications to be examined in further steps of the study and resulting from the initial search and collection of publications, as specified in the first step and sub-steps.	✓ A paper list of this study is introduced in Appendix A.

Table 1. *Cont.*

Steps of Systematic Literature Review	Sub-Steps of Systematic Literature Review	Description of the Layers	Adaptation of SLR into This Study
	Sub-step 2: First Extraction Step	**2. Monitoring the Title, Abstract, Keywords, Inclusion and Exclusion Criteria:** This step is for an initial understanding of identifying and eliminating publications unrelated to predetermined RQs and the study.	✓ Related publications' title, abstract, keywords, etc., were monitored depending upon the prepared search strings, and irrelevant publications in terms of the subject, concerns, and papers not dealing with food packaging were extracted from the paper list based on these criteria. ✓ 214 publications were found in the initial stage of the search.
	Sub-step 3: Second Extraction Step	**3. Diagonal Reading:** A rough reading to see if the publication meets the purpose of the study.	✓ After diagonal reading, the paper was scanned in term of usefulness and relevance to the study. ✓ 142 publications remained after diagonal reading.
	Sub-step 4: Duplication Extraction	**4. Removal of Duplicated Publications:** publications need to be removed from the study. Duplicated	✓ Duplications and overlooked irrelevant publications that are not examining food packaging were removed. ✓ 139 publications remained
	Sub-step 5: Final Extraction Step	**5. Study Full Paper:** A detailed and comprehensive reading of the publications in terms of meeting the goals of the study.	✓ 126 publications remained after the final extraction step, which is studying the full paper.

Table 1. *Cont.*

Steps of Systematic Literature Review	Sub-Steps of Systematic Literature Review	Description of the Layers	Adaptation of SLR into This Study
Step 3: Developing an Analysis Framework (Analysis Process)	**Sub-step 1:** Data Collection	**1. Detail Examination of the Publications for Data:** Scrutinizing the publications for obtaining data such as extraction types, methods, academic outlets of publications, etc.	✓ An Excel file was prepared to record the data obtained through examination of the publications.
	Sub-step 2: Coding	**2. Codes, Themes, Categories**: Determining major themes, content, dimension, concepts, and categories based on the predetermined statistical analysis.	✓ Obtained data were categorized into sections depending upon features such as years, publication type, sector, etc., for statistical analysis of the data.
	Sub-step 3: Statistical Analysis	**3. Data analytics:** Statistical analysis of the data is necessary for gathering, analyzing, and presenting massive volumes of data in order to uncover underlying patterns and trends.	✓ Collected data were statistically analyzed under different features to create a meaningful solution of the data.
	Sub-step 4: Interpretation	**4. Interpretation of Findings:** The findings of the statistical analysis need to be interpreted depending on the study and specific research area to provide answers to RQs.	✓ The obtained findings were interpreted for proposing an answer to RQs.
	Sub-step 5: Conclusion	**5. Finalizing the Paper:** Finalizing the paper with required implications based on statistical analyses, discussion, contributions, and future research ideas.	✓ At the end of the paper, the findings were discussed to propose managerial and practical implications, contributions, and further research ideas.

Table 2. Search strings.

Circular Economy	"circular economy" OR "sustainable design" OR "circular design" OR "circular product design" OR "circular product design" OR "close the loop" OR "sustainable packaging strategy" OR "package design for sustainability" OR "redesign" OR "reuse" OR "remanufacture" OR "repurpose" OR "refurbish" OR "recycle" OR "circular design" OR "modular design" OR "cradle to cradle" OR "closed loop" OR "green design" OR "reversible design" OR "transition to circular economy"
	AND
Drivers	"drivers" OR "enablers" OR "facilitators" OR "success factors" OR "promoters"
	AND
Food	"seafood" OR "meat" OR "perishable" OR "food" OR "dairy" OR "food loss" OR "food waste" OR "dried food" OR "durable goods packaging" OR "groceries" OR "groceries packaging" OR "dried food packaging" OR "aquaculture" OR "fishing" OR "aquaculture packaging" OR "fish packaging" OR "cold chain packaging" OR "liquid" OR "cooking oil"
	AND
Supply Chain and Logistics	"supply chain in retail" OR "circular food supply chain" OR "meat supply chain" OR "food supply chain" OR "dairy supply chain" OR "reverse logistics" OR "closed loop supply chain" OR "wholesale supply chain" OR "intermediate supply chain" OR "perishable supply chain" OR "durable goods supply chain" OR "groceries supply chain" OR "dried food supply chain" OR "aquaculture supply chain" OR "fishing supply chain" OR "frozen food supply chain" OR "cold chain supply chain" OR "closed loop food supply chain"
	AND
Packaging Technologies	"bioactive packaging techniques" OR "active packaging" OR "absorbers" OR "ethylene removers" OR "carbon dioxide emitters/absorbers" OR "multi-layer barrier packaging" OR "modified atmosphere packaging (MAP)" OR "edible coatings" OR "ethylene scavengers" OR "oxygen scavengers" OR "moisture absorbers" OR "Aseptic packaging" OR "nanotechnology" OR "bio and smart packaging technologies" OR "vacuum packaging" OR "barcodes" OR "RFID tags" OR "biodegradable packaging" OR "smart packaging"
	AND
Package Design	"life-cycle design" OR "package design" OR "design for life-cycle" OR "sustainable product service system (SPSS)" OR "zero packaging" OR "package free" OR "zero-level packaging" OR "packaging material"

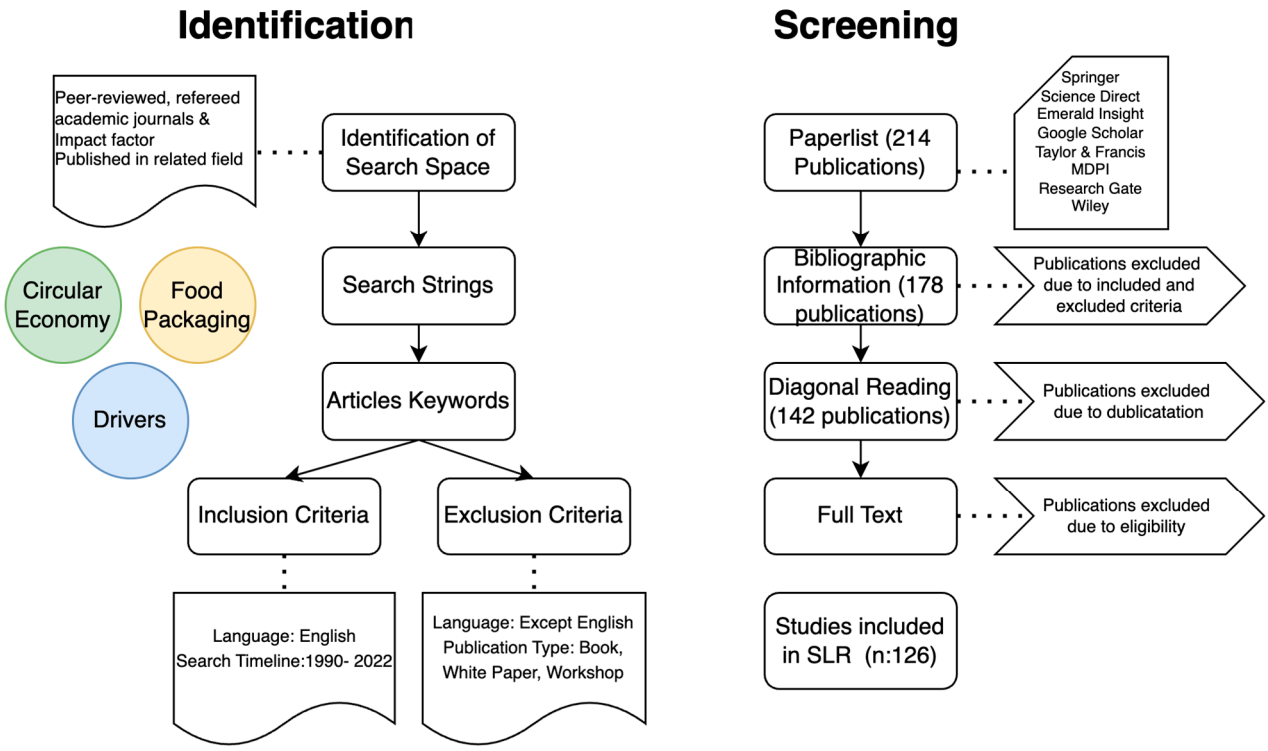

Figure 2. Search strategy flow diagram.

The analysis step is composed of five sub-steps, which are a detailed examination of the publications for data, codes, themes, categories, data analytics, interpretation of findings, and finalizing the paper. The first sub-step in the analysis step is investigating the literature in terms of collecting data. After this step, related data need to be classified or categorized into codes, themes, etc., to create meaningful data. Afterwards, the obtained and categorized data need to be statistically analyzed to uncover unseen patterns and trends. Lastly, the findings of the statistical analysis must be interpreted for providing relational implications.

The main topics used while setting the search strings (see Table 2 below) are "circular wconomy", "drivers", "food", "supply chain and logistics", "packaging technologies" and "packaging design". The connection among these six main topics was determined using a combination of keywords with the aid of the connectors "AND" and "OR". The authors used various combinations of these main topics and keywords for finding more related papers. For example, the keywords from each of the topics "circular economy", "drivers", "seafood" "supply chain in retail", "bioactive packaging techniques", and "life-cycle design" were used for finding papers, and these combinations were changed to find related studies.

4. Analysis

In this stage of the paper, data collected from the predetermined publications were examined under specific codes, themes, and categories to demonstrate a statistical analysis. The charts below were prepared by gathering, analyzing, and presenting a large amount of data to reveal underlying patterns and trends.

In Figure 3, the databases and search engines adopted through the systematic literature review were submitted. Based on this figure, it can be deduced that Science Direct is the most frequently used database/search engine, with 48%, which corresponds to 60 publications. The second-biggest percentage belongs to Google Scholar (17%), which is equal to 21 publications. MDPI ranked as the third-most used database/search engine throughout this study which is equal to 17 publications. These three database/search engines dominate approximately 80% of the database/search engines. The remaining ones

are Wiley (9%), Taylor & Francis (6%), Research Gate (3%), Springer (3%), and Emerald Insight (1%), respectively.

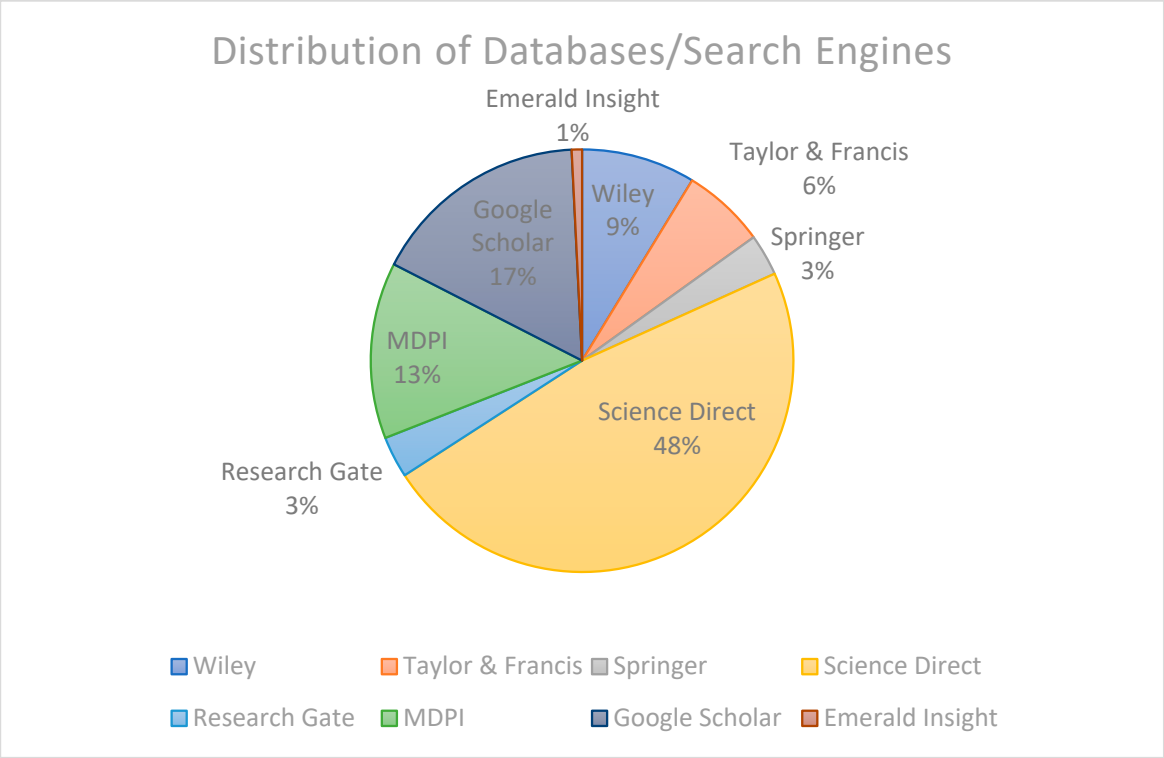

Figure 3. Databases/search engine used throughout the study.

Figure 4 displays the historical series of publication types. The timeline of the research is classified as being between 1996 and 2022. The inclusion criteria of this systematic literature review involve articles, proceedings (conference), reports, and book chapters. Therefore, other publication types such as workshops, white papers, and books were excluded from the study. According to the figure, the least accepted publication types are reports and book chapters, which both have 2 publications. The most common publication type adopted during the systematic literature review belongs to articles, with 116 publications. As seen in the figure, there is an escalating trend in 2019, which is the year that publications related to circular food packaging practices occur the most. Therefore, the emergence and integration of CE practices into food packaging practices were gaining momentum, starting from the year 2016. On the other hand, proceedings (conference) are the second-most frequently published type in this research, with 6 publications.

In Figure 5, the applied methodologies of publications over the years are shown. Depending on this figure, conceptual/theoretical is the most frequently adopted method during the analysis. After this, literature reviews and experiments are the second and third common methodologies, respectively. Empirical studies and modeling were the least common methodologies during the analysis. Additionally, we pointed out that not all of the publications could be evaluated using only one methodology. As a result, we analyzed a few studies using multiple methodologies. The values on the chart appear more because of this fundamental factor.

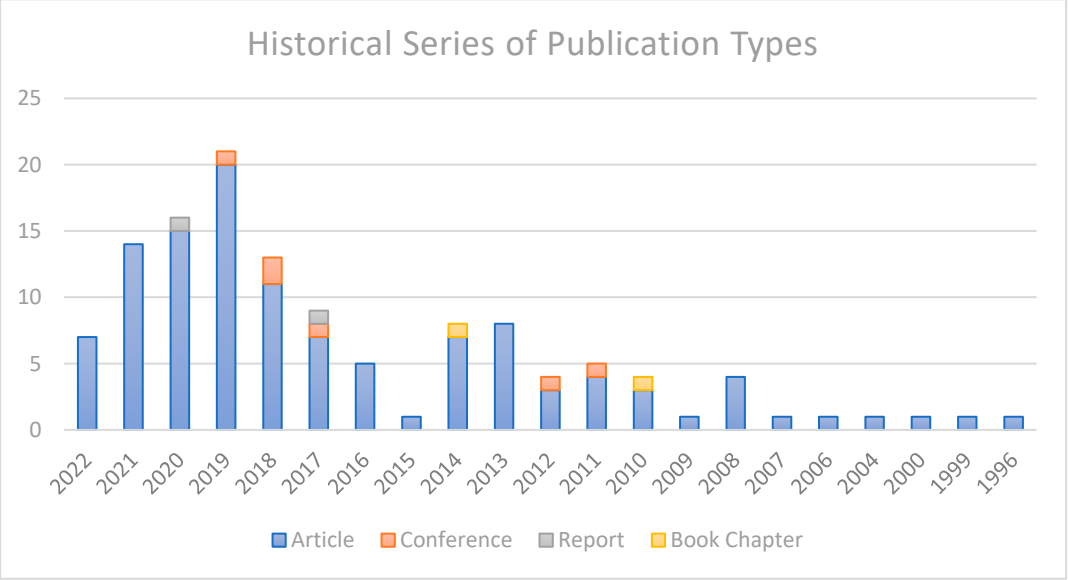

Figure 4. Historical series of publication types.

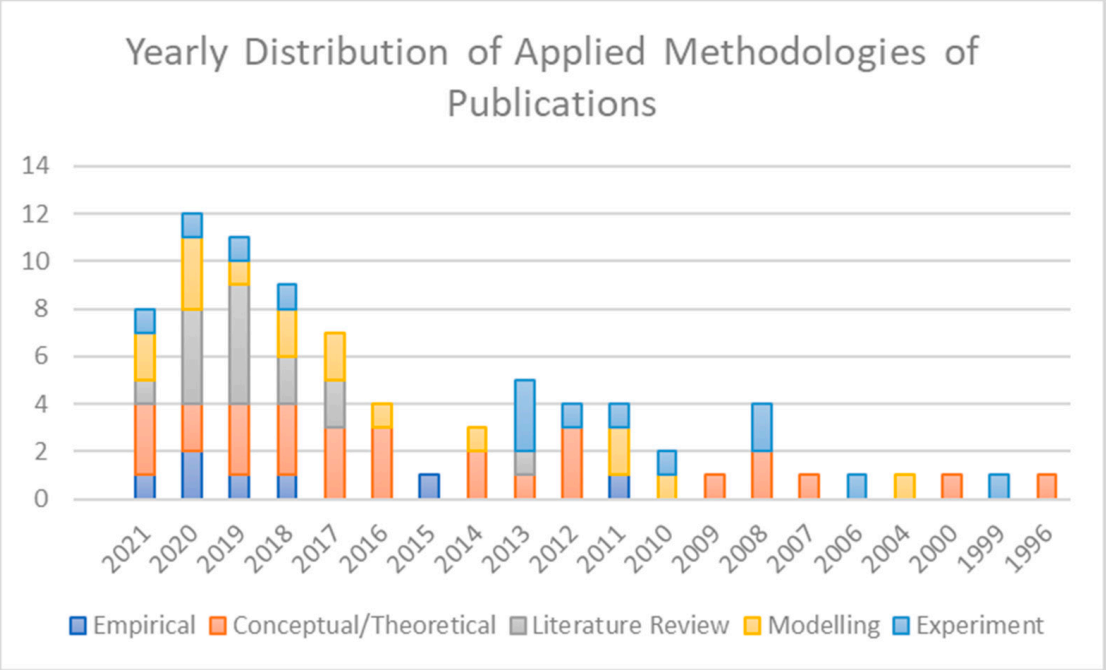

Figure 5. Yearly distribution of applied methodologies of publications.

Figure 6 lays out the distribution of journals. According to this graph, we can deduce that the Journal of Cleaner Production is the most used journal with the highest score of 19 publications. Then, Sustainability (12 publications) comes as the second-most frequently used source. Afterwards, Trends in Food Science and Technology (8 publications), Packaging Technology and Science (7 publications), and Resources, Conservation and Recycling (4 publications) constitutes the five most popular journals in the circular food packaging sector.

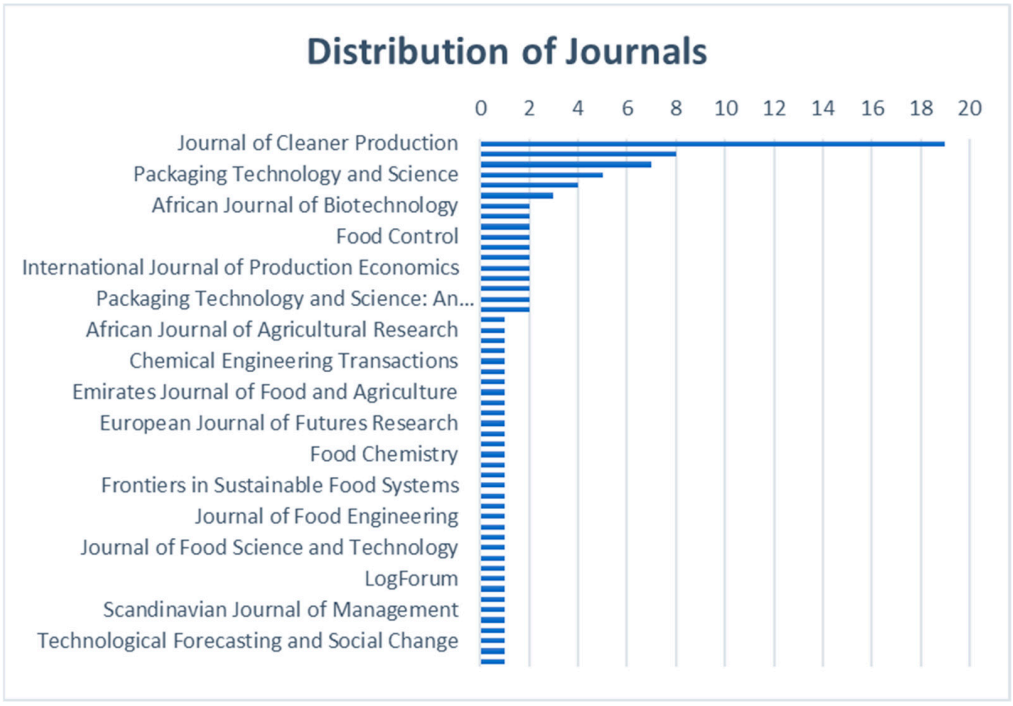

Figure 6. Distribution of Journals.

Figure 7 demonstrates the most frequently mentioned food sub-sector in the circular food packaging sector. Depending upon this figure, the top five sub-sectors that publications focused on throughout their paper are the meat sector (17%), dairy sector (12%), fish (10%), beverage (8%), and bakery (7%).

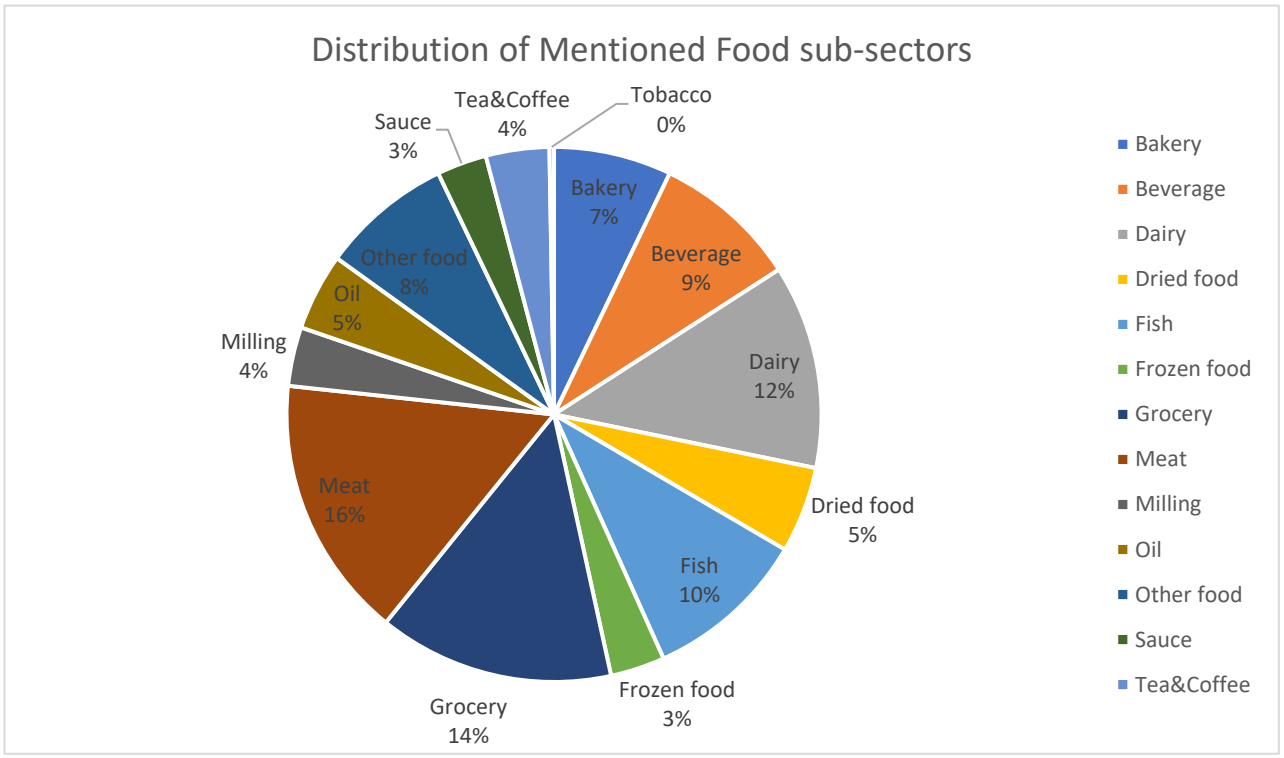

Figure 7. Distribution of mentioned food sub-sectors.

According to Figure 8, plastic, as a material for food packaging, is the most frequently adopted material, with 26%. Metal is the second-most popular material in food packaging, with 17%. Then, paper and board is third, with 16%. Glass has 15%, which puts it in the fourth highest rank in the graph. Furthermore, green material and multi-material have the same percentage, which is 9%, and share the same rank.

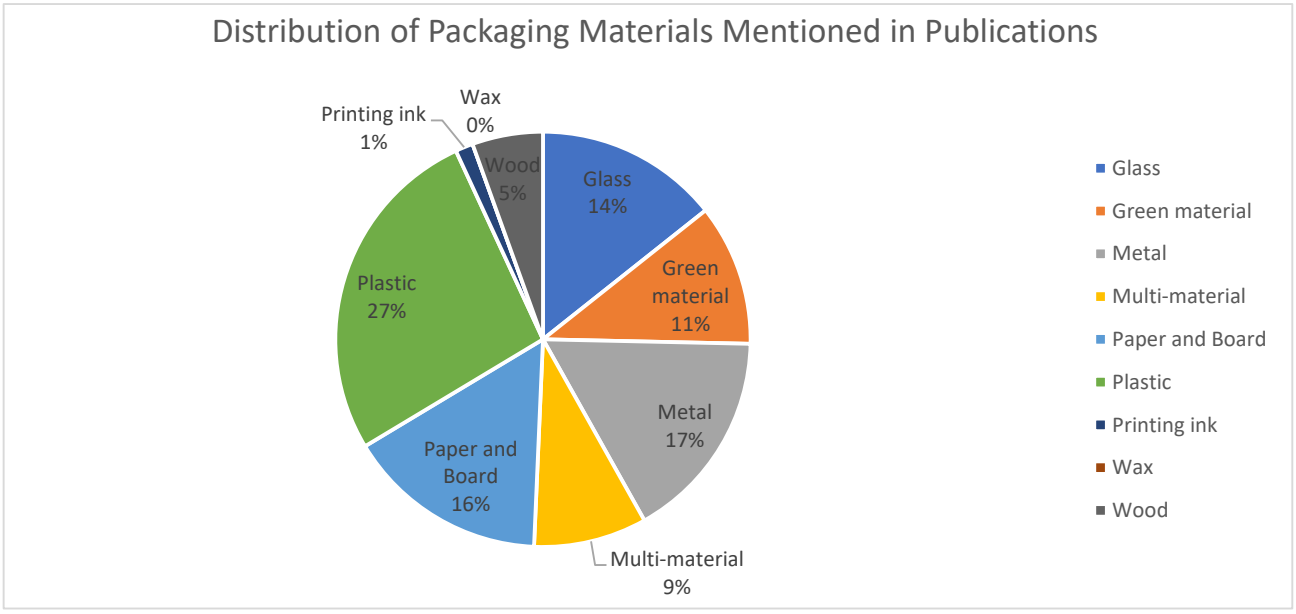

Figure 8. Distribution of packaging materials.

Figure 9 portrays the CE principles mentioned throughout the publications of circular food packaging. The figure shows that recycling is the most frequently adopted CE principle in the food packaging sector. Then come reduce and reuse principles, with 23% and 20%, respectively. Furthermore, Figure 10 shows the distribution of the countries that carried out studies relevant to circular food packaging.

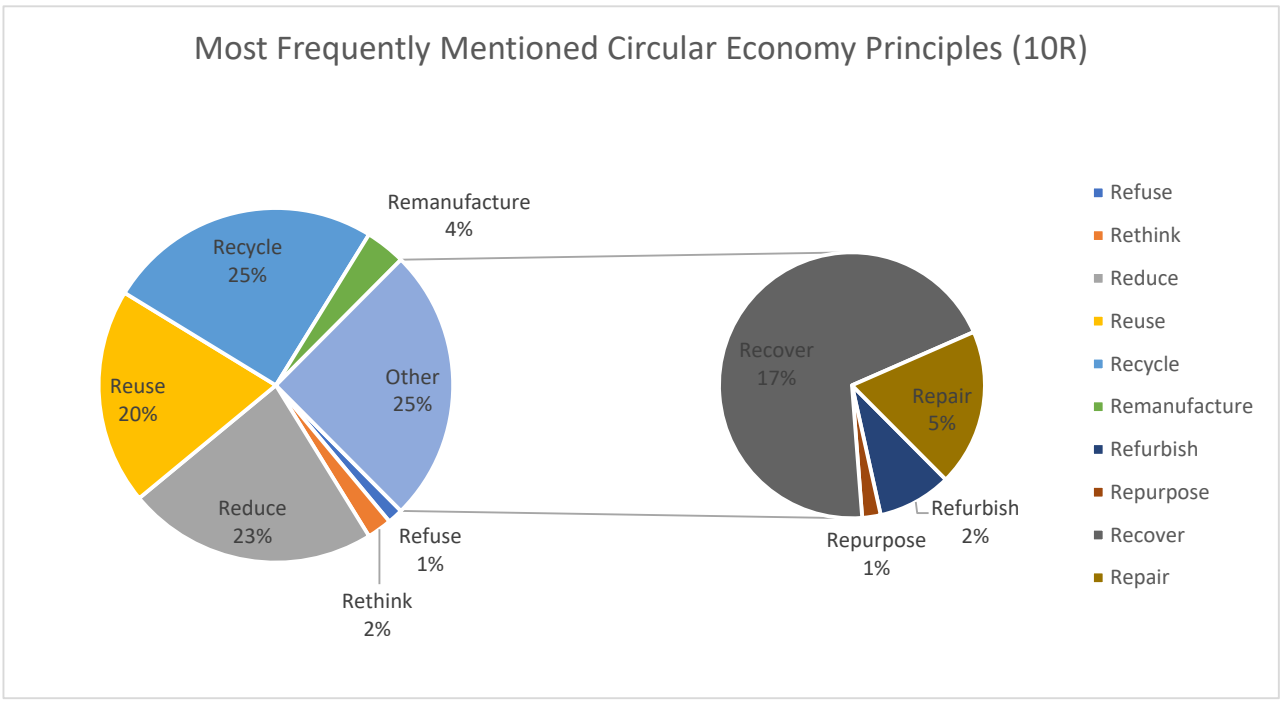

Figure 9. Most frequently mentioned CE principles.

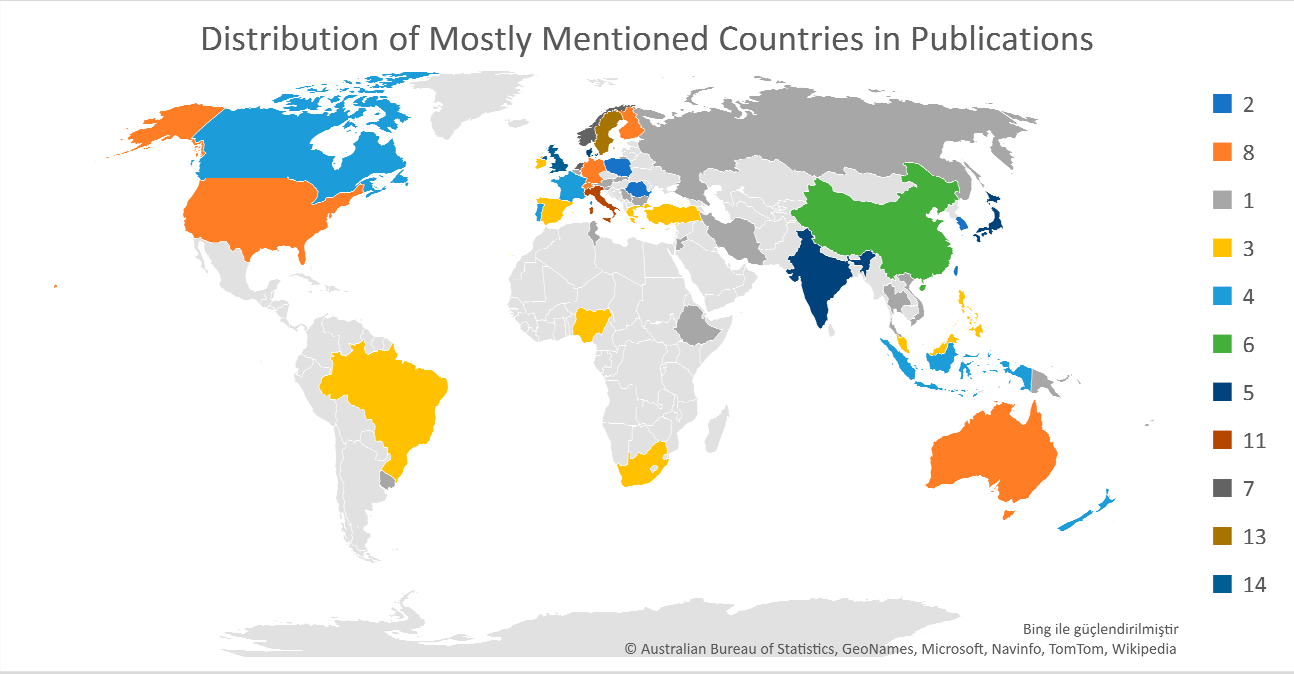

Figure 10. Distribution of mentioned countries in publications.

In Figure 11, the most frequently mentioned keywords in the examined publications are listed and shows as a tree map to visualize their frequency of being used in the current literature. Packaging and Food are the most popular taxonomies related to the circular food packaging concept.

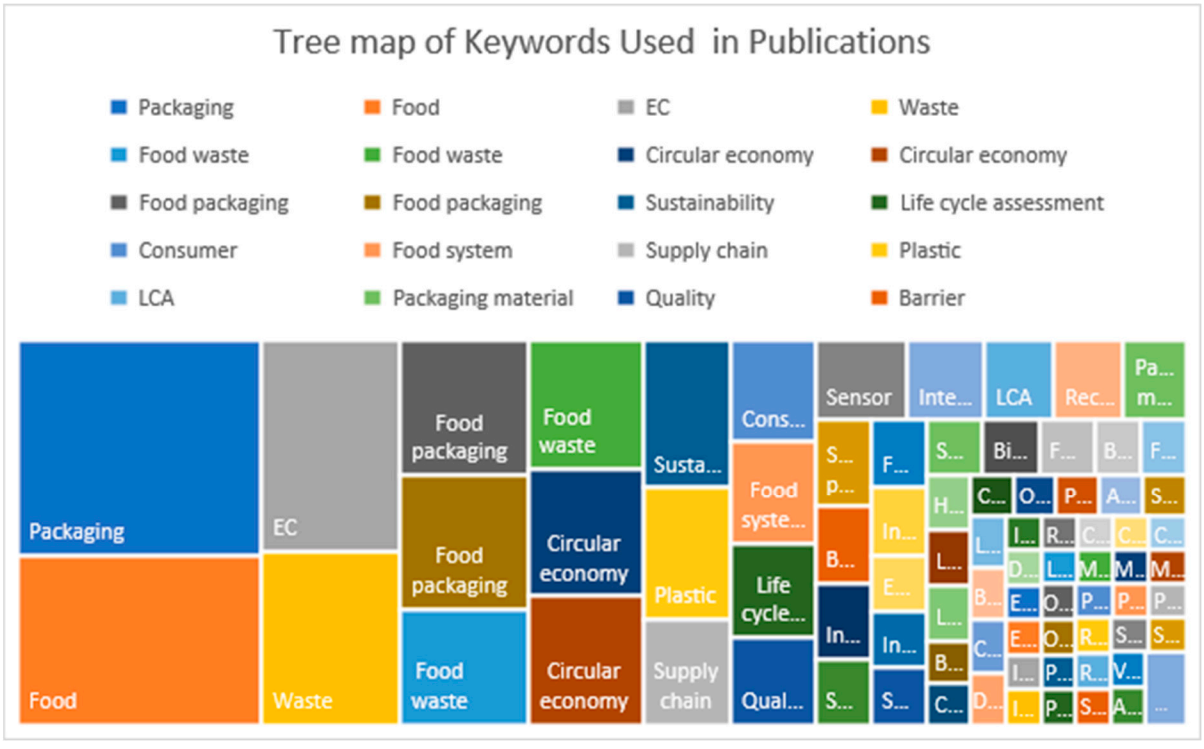

Figure 11. Tree map of keywords most frequently used in publications.

Drivers of Circular Food Packaging

Existing literature on the packaging sector has been scrutinized in terms of CE practices and the mentioned drivers are listed in Table 3. The determined drivers were categorized into seven dimensions, which are legal, financial, environmental, society, product development, technology and innovation, and market organization.

Table 3. Circular food packaging drivers.

Dimensions of Drivers	Number	Drivers	References
Legal Drivers	D1	Strict waste management laws and legislations	[63–73].
	D2	Global and Regional EU and National Policies	[63,64,68].
	D3	Supportive institutional/regulatory environmental policies	[64,65,74,75].
Financial Drivers	D4	Economic and green growth potential	[65,69,76–78].
	D5	Cost efficiency	[74,79–89].
	D6	Supportive funds, incentive, and taxation	[64,69,82,90–95].
Environmental Drivers	D7	Global environmental issues and concerns	[8,14,63,65–67,69,77,96–100].
	D8	Renewable energy demand	[65,96,101,102].
	D9	Pollution concerns	[8,63,99,103,104].
	D10	Increased amount of carbon footprint	[102,105–107].
Social Drivers	D11	Shifting consumer behaviors, prevailing attitudes, and social norms	[28,64,77,99].
	D12	Potential job creation in supply chain	[45,65,69,74,79,101].
	D13	Consumers' environmental awareness, sensitivity, and pressure	[28,64,65,69,102].
	D14	Building a brand image and reputational gains	[64,108–110].
Technical, Technology, and Innovation-Related Drivers	D15	Rise of new technologies and technological innovations	[63,64,69,74,77,82,90–95].
	D16	Technical know-how and capabilities	[64,111].

Strict laws and legislations prevent many key issues related to food packaging, such as creating packaging waste in landfills, prohibiting packaging products containing harmful chemicals, using non-biodegradable materials, and encouraging companies to recycle, etc., and these resulted from the loopholes in existing laws and legislation. In this context, well-conducted and congruous waste laws and legislations can have a steering effect on the entire supply chain to become more circular and sustainable in this regard. Global and regional EU and national policies are substantial for circular food packaging because these packaging guidelines are provided in national legislation [7]. For instance, the "European Strategy for Plastics in a Circular Economy" aims to address the environmental consequences of the production, use, and consumption of plastic [8]. There is the question of what kinds of global or regional policies are effective in the prevention of waste in a broader manner, because this issue is far more difficult than recycling or recovery, as it requires the use of life cycle thinking as well as significant adjustments in our manufacturing, consumption, and distribution patterns [21,112]. Therefore, to reduce incineration while simultaneously increasing biological recovery and recycling rates, a supportive institutional/regulatory environmental policy requiring a separate collection of food waste is required [113].

Economic and green growth are two intertwined concepts that influence each other. Green growth is a theory that claims that ongoing economic growth is or can be made to be consistent with our planet's environment [114]. In addition, ever-changing economic conditions can be a facilitator for the entire supply chain for the transition into more circular packaging materials, designs, and practices. Another difficulty in promoting proper plastic waste management in food packaging is regulating the taxation, incentives, and responsibilities of both producers and consumers. As a result, regulating manufacturers and providing supportive funding, incentives, and taxation might stimulate redesign, as efforts will be made to increase the ease of recycling owing to the duty to recycle or

manage the items at the end of their lifecycle [115]. For instance, the COVID-19 pandemic disrupted the entire SC and changed all the dynamics for good; however, from these changes can also emerge new potentials and opportunities and expedite the transition into more circular food packaging. Hence, supportive funds and taxation are crucial drivers for food packaging resulting from the application of CE principles in real life, but this is not an easy task to perform. In particular, funds and taxes generally do not concern the industrial waste disposed in landfills; thus, most of the economic waste policies avoid tax on landfill [116]. Therefore, by being in collaboration with microfinance institutions and international financing groups, the government should create an environmental funding program and initiatives [117].

Several research papers investigated the impacts on sustainable consumption of environmental concerns [8,48,100]. All environmental drivers (e.g., minerals, temperature, freshwater, biodiversity, dirty energy sources, land, soils, etc.) for building a more circular agricultural system should be considered [1,118]. Awareness of the negative environmental and health influences of the usage of plastics is driving individuals worldwide to adjust their consumption patterns depending upon the planet's requirements [8]. The creation, usage, and disposal of single-use food packaging all pose environmental risks [2] and global environmental concerns. In addition, producers are offering enormous amounts of products to retail supply chains, which frequently necessitates intensive agriculture techniques reliant on chemical fertilizers and fossil fuel energy [119], and these inputs have a substantial worldwide environmental impact [2,120].

Because of the extremely diverse structure of the food industry, numerous food processing, handling, and packing processes generate wastes of varying quality, and if they are not managed appropriately they might cause increased disposal concerns and serious pollution problems [121]. In particular, non-biodegradable materials are now employed in food, beverage, medical, and pharmaceutical packaging, as well as in industrial applications, causing environmental pollution concerns [122]. Another important driver of circular food packaging is renewable energy demand resulting from the increased carbon footprint. As we know, energy needed in circular food packaging must be created from renewable sources and used as effectively as feasible in a CE, for, e.g., co-generation of heat and electricity [123]. As a result, as the level of circularity rises, so does the requirement for renewable energy to improve the recoverability and recyclability of food packaging.

The worldwide problem of plastic waste, pollution, and litter has dramatically influenced consumer pathways [8,103,124]. Shifting consumer behaviors, prevailing attitudes, and social norms are other substantial drivers that affect the transition into circular food packaging. At the consumer level, there is a growing preference for greener options, such as bio-degradable and compostable packaging, as well as a growing need for sustainable packaging for products [3,125]. In particular, consumers' opinions regarding products and buying behaviors are influenced by their concerns about environmental issues, especially for eco-friendly or environmentally friendly things [126,127]. Therefore, changes in customer preferences, as well as the desire for safe and high-quality meals, have resulted in the development of novel and imaginative methods of food packing technologies [34]. Hence, consumers' environmental awareness, sensitivity, and pressure have a substantial effect on consumer behaviors, preferences, and attitudes regarding circular and sustainable food packaging options. Building a brand image depends on being circular and can gain the attention of consumers who are conscious and aware of environmental issues, and that kind of recognizability bring reputational gains to the brand. However, if packaging organizations and companies fail to effectively communicate, consumers may have an imperfect awareness of both the role of packaging and the role of sustainable packaging, resulting in product selections that they assume are sustainable but, in fact, are not [18].

5. Findings

In this section of the study, the relationship between the adopted CE principles, the materials used during the food packaging operations, and related food sub-sectors is

investigated by establishing bilateral relations to create a comprehension of the related field. These interactions might be useful to demonstrate the current state of the food packaging industry in terms of the most frequently used materials and CE principles. Considering this information, existing problems in the food sub-sectors can be assessed and eliminated with the help of integrating the drivers shown in the previous section to overcome packaging-related issues and transition into a more circular food packaging system.

As seen in Figure 12, the relationship between CE principles (10R) and sub-sectors of food packaging has been represented. According to the figure, we can deduce that reduce is the most frequently adopted CE principle among the other Rs. When the reduced principle of CE was analyzed independently in light of these data, it was seen that it was mostly used in the meat and grocery sub-sector. On the other hand, meat, groceries, dairy, and beverages are among the food subsectors where recycling, the second-most used CE principle, is most prevalent. Similarly, the sub-sectors where the reuse principle of CE, which is the third-most frequently used CE principle in the food packaging industry, is seen the most are meat, grocery, dairy, and soft drinks. The principles of repair (milk, sauce, and milling), reuse (grocery and fish), rethink (dairy and bakery), remanufacture (beverage and tobacco), and refurbish (meat) were subsequently widely utilized in the pertinent sub-sectors, which are denoted in parenthesis. Lastly, repurposing is the least adopted CE principle in the food packaging sector. The sub-sector that is mostly seen in the repurpose principle is the tea and coffee sector.

Figure 12. The relationship between CE principles and food packaging sub-sectors.

The mutual relations of CE principles and materials used in the food industry are portrayed in Figure 13. According to the figure, we can see that plastic, metal, paper

and board, glass, and multi-material are the most used materials in recycling. Similarly, plastic, metal, paper and board, and glass are the most frequently adopted materials for applying to the reduce principle of the CE. Furthermore, looking at the figure, it is stated that plastic, metal, paper and cardboard, glass, multi-material, wood, and wax are the most used materials for the reduction principle. On the other hand, reuse and repurpose are the least popular CE principles adopted through food packaging operations. Accordingly, plastic is still the most common material used for food packaging.

Figure 13. The relationship between CE principles and food packaging materials.

The last relationship is between food packaging sectors and used materials in food packaging (see Figure 14). As we observe from the other figures and graphs, plastic is the most used material throughout the entire sub-sectors of food packaging. Examining the current literature and real-life cases related to circularity in food packaging, it can be seen that the meat, dairy, fish, other foods, bakery sub-sectors, etc., are the sectors where plastic material is preferred the most. When the usage of paper and board is evaluated, meat, grocery, and fish are more noticeable among the sub-sectors where this material is utilized the most. Additionally, among the sectors where metal materials are primarily employed are those in meat, dairy, grocery and beverage, seafood, and other food subsectors.

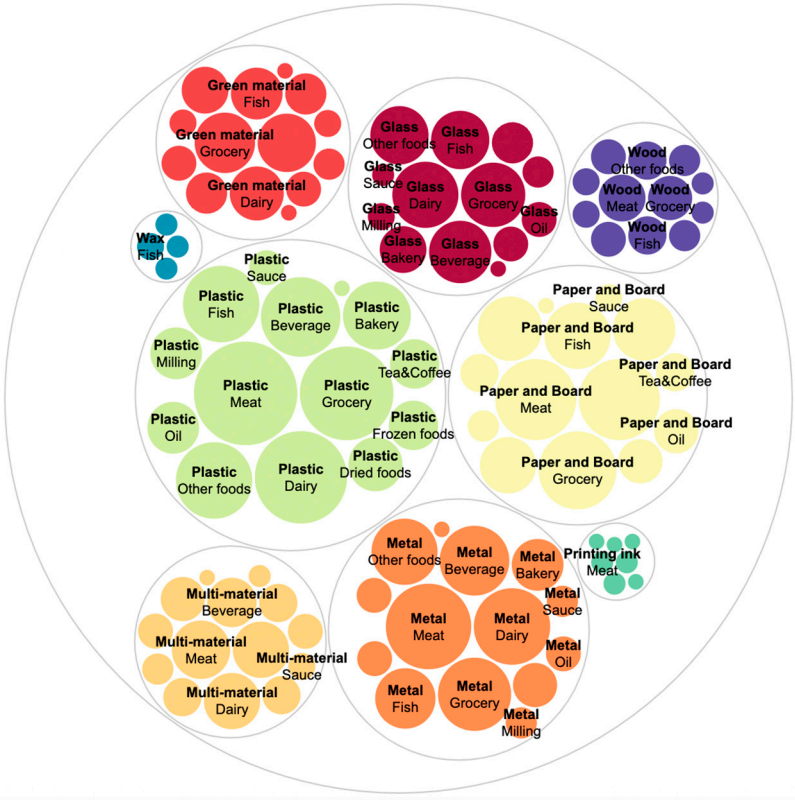

Figure 14. The relationship between food packaging materials and sub-sectors.

6. Discussion and Implications

Despite the fact that there have been many papers written about the food sector and several studies conducted on it in a variety of media, the number of studies in the area of food packaging, which is crucial for ensuring food safety, has remained unaffected. The integrity and safety of food depends greatly on the packaging of the product. By serving as a barrier of defense, it guards against physical harm, microbiological development, and contamination, extending shelf life and minimizing food waste. To guarantee that they do not interact with food or convey dangerous elements, packaging materials are carefully chosen. Additionally, packaging improves convenience for customers, conveys important information to them, and promotes branding and marketing initiatives in the food business. Food packaging has a variety of negative effects on the environment as well as on public health, including microplastics and wildlife harm from excessive packaging, especially single-use plastics. All these issues are made worse by improper food packaging recycling and disposal. To reduce environmental damage and safeguard public health, it is critical to investigate environmentally friendly packaging options and to support ethical waste management methods. For that reason, the CE is required, in which food packaging uses eco-friendly materials that promote public health and are cost-effective. In light of this information, this study, unlike others, investigated papers in the food sector literature to conduct an in-depth review based on sectoral, CE principles and the materials employed. Various combinations, including material-sector, material-CE principles, and sector-CE principles, were evaluated, reported, and submitted to the literature in this triple analysis. In addition, the drivers of food packaging were listed in this paper.

Different viewpoints, options, and requirements for packaging in the environmental, social, and economic domains emerge in the existing literature in this setting. For instance, consumer worries about the environment have pushed the importance of sustainability to the top of the corporate agenda [15]. However, companies continue to rely on ecologically deteriorating packaging solutions, such as disposable plastics and multi-layered packaging, while packaging usage and disposal by end users put environmental demands on the

ecosystem [3,10,11]. Therefore, the concept of a CE arose in reaction to the fact that today's take-make-dispose economy is a major contributor to global changes in the environment and ecosystem damage [4,83,128–131]. There are several studies in the current literature related to how packaging is crucial for food products and how sustainability, CE, and green-oriented food packaging can work. For instance, Ref. [132] demonstrated how packaging may be a crucial component of sustainable food consumption by reducing food waste and losses while also reducing resource usage and waste management. Ref. [133] used a systematic review as a technique to assess the introduced CE literature and identify the most important drivers and hurdles that impact business leaders' decisions to adapt their firms for CE participation. Ref. [14] aimed to create a decision-support framework and key indicators to help with the development and selection of new innovative food packaging in the context of the CE. Ref. [134] highlighted many techniques focusing on different components of the value chain and provides insight into the level of adoption of CE principles in manufacturing enterprises that are members of the Italian national packaging consortium, which includes 900,000 packaging manufacturers and consumers. Furthermore, ref. [3] tried to map and critically examine ongoing SPSCM research activities and analyze the field's potential for development and expansion in CE, using an SLR technique. Depending on these studies, we tried to examine circular food packaging options and opportunities for food sectors by examining and dividing the food sectors into sub-sectors and analyzing them in terms of adopted and used CE principles and materials.

The material-sector, material-CE principles, and sector-CE principles triple combinations, as shown in the study's results section, have been examined and depicted in the food industry to show which materials and CE principles have been adopted in which sector. This analysis was carried out because each food sub-sector has distinct needs and uses various materials, etc. Based on this data, it becomes clear which CE principles and materials the various food subsectors use and do not use, and this data can be used to locate the companies' positions in the food packaging sector. These data, which are essential for identifying the circularity transition, can be utilized to provide guidance on how to become more circular for various food subsectors. According to the study's findings, reduce is the CE concept among the four Rs that is most usually applied. Recycling is the second-most popular CE concept, with a focus on the meat and grocery subsegments. The third-most frequently applied CE principle in the food packaging sector is reuse. In the related subsectors, the words "repair", "refuse", "rethink", "remanufacture", and "refurbish" are also frequently used. The least used CE concept in the food packaging industry is repurposing. Furthermore, when we examine the CE principles and materials, we see that the most frequently utilized materials in recycling and reduce include plastic, metal, paper and board, glass, and multi-material. The majority of food packaging materials are made of plastic, and the meat, dairy, fish, other foods, and bakery sub-sectors are those where plastic is most frequently utilized. The industries that use this material the most are those where paper and board are more obvious. The meat, dairy, grocery and beverage, seafood, and other food subsectors are where metal materials are used most frequently. Lastly, the connections between the CE principles (10R) and the various areas of food packaging are the most crucial information in this article. The CE principle of "reduce" is the one that is most frequently applied, primarily in the meat and grocery industries. The second-most applied CE principle is recycling, while the third-most applied CE principle is reuse. In the related subsectors, the phrases "repair", "refuse", "rethink", "remanufacture", and "refurbish" are also frequently used. The tea and coffee industry is where the repurposed CE concept is most frequently observed.

In addition to that information, literature findings were also submitted throughout the study. According to the literature, plastic is the most frequently utilized packaging material in almost every food sub-sector and CE principles despite it being for single-use purposes and the damage it causes to the environment. In order to overcome this issue, bioplastics can be used as opposed to plastics as a more environmental-friendly option. In addition, plastic is widely adopted in the meat, grocery, and beverage sectors as a food packaging solution.

In particular, for the beverage sector, plastic PET bottles are extensively used, which are generally produced from one material. In this context, there are very sustainable systems implemented throughout the world for reducing plastic pollution and for recycling these plastics to be reused again and again. For instance, the majority of recycled PET bottles are clear, and even when they are colored, only the colors blue, green, and brown are frequently utilized. This enables the efficient separation of colored bottles into different recycling streams [135]. Separation, recycling, and reusing these PET bottles are widely adopted strategies to deal with plastic pollution. Furthermore, for the meat industry, generally, tube and tray packaging alternatives are used. When we examine these two different plastic options, both have different characteristics in terms of environment, food waste and loss, and preservation of the food product, etc. Hence, the usage of bioplastic materials can be a solution for eliminating plastic pollution and environmental hazards. However, bioplastic materials are divided into two categories, which are materials made of bio-based renewable resources and materials that have biodegradable properties [136]. While bio-based renewable resources use raw materials that are replenishable and renewable through natural processes, biodegradable materials can be decomposed by microorganisms in the environment over time [36,137]. The use of tamarind seed powder (TSP) and fenugreek seed powder (FSP) as biodegradable food packaging film materials showed some encouraging results, according to [138], and can be adopted by firms as more circular approaches for food packaging. Similar to this, another study [139] investigates the usage of TSP for coating fruits such as apples and pears under various storage circumstances.

On the other hand, the grocery store is a unique sector from which food can be consumed without the need for any packaging material. In this sense, the number of zero-packaging grocery stores, which are food stores with minimal waste and no packaging, needs to be increased. Moreover, natural materials such as utilizing banana leaves to package fresh fruits and vegetables in order to cut down on single-use plastic waste seem like the best option for the grocery sector. In addition, producers might provide a convenient deposit and delivery system for these grocery products to eliminate non-biodegradable, nonrenewable, and noncompostable materials from usage. Therefore, depending on the major findings of the analysis of the relationship between CE principles, materials used, and food sub-sectors for circular packaging, these implications can be elaborated and integrated with the drivers found throughout the literature to fasten the transition into a more circular food packaging system. Therefore, this study tried to identify the drivers of the food packaging industry and presents how to manage this switch between the traditional and the circular system by examining the existing relations between CE principles, food sub-sectors, and materials used throughout the operations. For further understanding, the drivers studied in this study can be analyzed under specific food packaging sub-sectors for more customized results.

The primary contribution of this study to the body of literature is the synthesis and mapping of the literature as a whole from the perspectives of CE principles, both sector-based and national, and the materials used through circular food packaging, and the attempt to facilitate this transition into a more circular system by outlining the drivers of circular food packaging.

7. Conclusions

The increasing dynamism and complexity of the world highlights the need for a more adaptive, flexible, and resilient food system in order to become more sustainable and healthier and for minimizing the threats and concerns caused by packaging materials. Unsustainable packaging materials have a detrimental effects on both the environment and product shelf life. Despite the environmental and health consequences of packing materials, there is also a supply chain component that entails secure, cheap, and effective storage of goods, management, transportation, and marketing across the SC. As a result, food packaging acts as a way of transmitting product information to sustain these operations across the supply chain, as well as storage, handling, transportation, distribution, food

safety, and conservation. Therefore, more sustainable food packaging systems are required for a variety of reasons, including food preservation and conservation, convenience, and communication, as well as environmental, health, and product shelf-life considerations. The CE evaluates prospects for closed loops, open loops, and waste outcomes, and as a result it is playing an increasingly important role in supply chains for circular flows, including material recovery. In this context, the CE concept has a lot to offer the food packaging industry in terms of achieving all of the above goals.

In order to uncover the drivers of circular food packaging applications, this research focused on how circular packaging techniques are treated in the current literature. To that end, relevant literature from 1996 to 2022 from the viewpoints of sustainability and circularity of plastic food packaging was analyzed exhaustively, along with how efforts address sustainability challenges and what the motivations are for this transformation. This study adopted SLR as an approach for examining the current literature and identified connected articles and identified drivers. For this purpose, 216 publications were examined to reveal the interaction between adopted CE principles and the materials used in various food sub-sectors. Furthermore, drivers for the transition into more circular food packaging have been listed to facilitate the sector's switch into more circular and sustainable food packaging.

Further studies can be performed using a quantitative method or case study to investigate the barriers found throughout the literature in a sector-specific manner. In addition, the driver table we found in this study can be examined using an MCDM method. The driving forces in front of food packaging can also be matched to remove barriers. This kind of SLR study can also be applied to other sectors in terms of packaging, such as the fashion and textile industry, pharmacy, furniture, logistic activities, and so on.

Author Contributions: Conceptualization, E.A., Y.K. and Ç.L.; Methodology, Ç.L.; Validation, B.Y.E. and C.Ç.Ç.; Formal analysis, Ç.L., B.Y.E. and C.Ç.Ç.; Resources, Ç.L.; Writing—original draft, Ç.L.; Writing—review & editing, E.A., Y.K., B.Y.E. and C.Ç.Ç.; Visualization, Ç.L.; Supervision, E.A. and Y.K.; Project administration, E.A. and Y.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data was created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Coverage areas of the food sub-sectors classified throughout the study.

Food Sub-Sectors
Meat: chicken, turkey, pork, beef, sausage, buffalo meat, poultry
Fish: tuna, shrimp, sardine, mussel, salmon
Dairy: butter, margarine, milk, yoghurt, cheese
Bakery: bread, cookie, pasta
Milling: wheat, rice, grain
Beverages: soft drink and breweries, carbonated soft drink, wine, liquor, tea, coffee

Table A1. *Cont.*

Food Sub-Sectors
Grocery: fruit and vegetables
Dried food: seasoning, dressing and spice, fried baked snacks,
Oil: sunflower seed oil, olive oil, sesame oil
Frozen food: ice manufacturing (frozen)
Tea and Coffee: tea, herbal tea, coffee whitener, coffee
Other food: snacks, appetizer, syrup, cereal, noodle, popcorn, food-to-go (packaged and processed food) sweets, pet food
Sauce: puree, chopped tomato, peeled tomato, marmalade

Table A2. Coverage areas of used materials in food packaging sector classified throughout the study.

Materials
Plastic: cellophane plastics, film, bag, bottle, styrofoam box, plastic pouch
Metal: aluminum foil, steel, tin, iron, zinc, copper, gold, nickel, silver, titanium, zirconium, mica tinplate
Paper and board: paper bag, newspaper, magazines, paper foil, recycled paper, disposable paper foil, paperboard, paper box, carton, cardboard, greaseproof paper, kraft paper, sulfite paper, parchment paper
Wood: wooden plate, cellulose, timber pallet, wooden boxes
Glass: glass bow, cup, jar, bottle
Green material: nanomaterial, biodegradable, starch lends, plant-based material, leaves
Multimaterial: polymer, composite, polypropylene, polyolefin, bio-nanocomposites multilayer
Printing ink: printing inks, adhesives, photoinitiators, solvents, plasticizers, surfactants and pigments, processing aids

References

1. Sijtsema, S.J.; Fogliano, V.; Hageman, M. Tool to Support Citizen Participation and Multidisciplinarity in Food Innovation: Circular Food Design. *Front. Sustain. Food Syst.* **2020**, *4*, 58193. [CrossRef]
2. Chakori, S.; Aziz, A.A.; Smith, C.; Dargusch, P. Untangling the Underlying Drivers of the Use of Single-Use Food Packaging. *Ecol. Econ.* **2021**, *185*, 107063. [CrossRef]
3. Meherishi, L.; Narayana, S.A.; Ranjani, K.S. Sustainable Packaging for Supply Chain Management in the Circular Economy: A Review. *J. Clean. Prod.* **2019**, *237*, 117582. [CrossRef]
4. Smirthers Pira Group. *Packaging Material Outlooks—Towards a $1 Trillion Milestone 2020*; Smirthers Pira Group: Akron, OH, USA, 2016.
5. Dixon-Hardy, D.W.; Curran, B.A. Types of Packaging Waste from Secondary Sources (Supermarkets)—The Situation in the UK. *Waste Manag.* **2009**, *29*, 1198–1207. [CrossRef]
6. Gustavo, J.U., Jr.; Pereira, G.M.; Bond, A.J.; Viegas, C.V.; Borchardt, M. Drivers, Opportunities and Barriers for a Retailer in the Pursuit of More Sustainable Packaging Redesign. *J. Clean. Prod.* **2018**, *187*, 18–28. [CrossRef]
7. Grönman, K.; Soukka, R.; Järvi-Kääriäinen, T.; Katajajuuri, J.-M.; Kuisma, M.; Koivupuro, H.-K.; Ollila, M.; Pitkänen, M.; Miettinen, O.; Silvenius, F.; et al. Framework for Sustainable Food Packaging Design. *Packag. Technol. Sci.* **2012**, *26*, 187–200. [CrossRef]
8. Testa, F.; Di Iorio, V.; Cerri, J.; Pretner, G. Five Shades of Plastic in Food: Which Potentially Circular Packaging Solutions Are Italian Consumers More Sensitive To. *Resour. Conserv. Recycl.* **2021**, *173*, 105726. [CrossRef]
9. Hahladakis, J.N. Delineating and Preventing Plastic Waste Leakage in the Marine and Terrestrial Environment. *Environ. Sci. Pollut. Res.* **2020**, *27*, 12830–12837. [CrossRef]
10. Hall, D. Throwaway Culture Has Spread Packaging Waste Worldwide: Here's What to Do about It. *The Guardian*, 13 March 2017.
11. WWF. Solving Plastic Pollution through Accountability 2019. Available online: https://www.worldwildlife.org/publications/solving-plastic-pollution-throughaccountability (accessed on 31 March 2023).
12. Sundqvist-Andberg, H.; Åkerman, M. Sustainability Governance and Contested Plastic Food Packaging—An Integrative Review. *J. Clean. Prod.* **2021**, *306*, 127111. [CrossRef]
13. Marsh, K.; Bugusu, B. Food Packaging—Roles, Materials, and Environmental Issues. *J. Food Sci.* **2007**, *72*, R39–R55. [CrossRef] [PubMed]
14. Schmidt Rivera, X.C.; Leadley, C.; Potter, L.; Azapagic, A. Aiding the Design of Innovative and Sustainable Food Packaging: Integrating Techno-Environmental and Circular Economy Criteria. *Energy Procedia* **2019**, *161*, 190–197. [CrossRef]

15. Rezaei, J.; Papakonstantinou, A.; Tavasszy, L.; Pesch, U.; Kana, A. Sustainable Product-Package Design in a Food Supply Chain: A Multi-Criteria Life Cycle Approach. *Packag. Technol. Sci.* **2018**, *32*, 85–101. [CrossRef]
16. Rundh, B. The Multi-Faceted Dimension of Packaging. *Br. Food J.* **2005**, *107*, 670–684. [CrossRef]
17. MacArthur, D.E.; Waughray, D.; Stuchtey, M.R. *The New Plastics Economy, Rethinking the Future of Plastic*; World Economic Forum: Cologny, Switzerland, 2016.
18. Steenis, N.D.; van Herpen, E.; van der Lans, I.A.; Ligthart, T.N.; van Trijp, H.C.M. Consumer Response to Packaging Design: The Role of Packaging Materials and Graphics in Sustainability Perceptions and Product Evaluations. *J. Clean. Prod.* **2017**, *162*, 286–298. [CrossRef]
19. Glavič, P.; Lukman, R. Review of Sustainability Terms and Their Definitions. *J. Clean. Prod.* **2007**, *15*, 1875–1885. [CrossRef]
20. Batista, L.; Bourlakis, M.; Smart, P.; Maull, R. In search of a circular supply chain archetype—A content-analysis-based literature review. *Prod. Plan. Control* **2018**, *29*, 438–451. [CrossRef]
21. Dervojeda, K.; Verzijl, D.; Rouwmaat, E.; Probst, L.; Frideres, L. *Clean Technologies, Circular Supply Chains, Business Innovation Observatory*; European Commission: Luxembourg, 2014.
22. Zhu, Z.; Chu, F.; Dolgui, A.; Chu, C.; Zhou, W.; Piramuthu, S. Recent Advances and Opportunities in Sustainable Food Supply Chain: A Model-Oriented Review. *Int. J. Prod. Res.* **2018**, *56*, 5700–5722. [CrossRef]
23. Akhtar, P.; Tse, Y.K.; Khan, Z.; Rao-Nicholson, R. Data-Driven and Adaptive Leadership Contributing to Sustainability: Global Agri-Food Supply Chains Connected with Emerging Markets. *Int. J. Prod. Econ.* **2016**, *181*, 392–401. [CrossRef]
24. Glover, J.L.; Champion, D.; Daniels, K.J.; Dainty, A.J.D. An Institutional Theory Perspective on Sustainable Practices across the Dairy Supply Chain. *Int. J. Prod. Econ.* **2014**, *152*, 102–111. [CrossRef]
25. Fearne, A.; María García Álvarez-Coque, J.; López-García Usach Mercedes, T.; García, S. Innovative Firms and the Urban/Rural Divide: The Case of Agro-Food System. *Manag. Decis.* **2013**, *51*, 1293–1310. [CrossRef]
26. Rogoff, M.J. Processing Technologies. In *Solid Waste Recycling and Processing*; William Andrew: Norwich, NY, USA, 2014; pp. 43–111.
27. Tiekstra, S.; Dopico-Parada, A.; Koivula, H.; Lahti, J.; Buntinx, M. Holistic Approach to a Successful Market Implementation of Active and Intelligent Food Packaging. *Foods* **2021**, *10*, 465. [CrossRef] [PubMed]
28. Wikström, F.; Verghese, K.; Auras, R.; Olsson, A.; Williams, H.; Wever, R.; Grönman, K.; Kvalvåg Pettersen, M.; Møller, H.; Soukka, R. Packaging Strategies That Save Food: A Research Agenda for 2030. *J. Ind. Ecol.* **2018**, *23*, 532–540. [CrossRef]
29. Arrieta, M.P.; Peponi, L.; López, D.; López, J.; Kenny, J.M. An Overview of Nanoparticles Role in the Improvement of Barrier Properties of Bioplastics for Food Packaging Applications. In *Food Packaging*; Academic Press: Cambridge, MA, USA, 2017; pp. 391–424.
30. Zhao, X.; Cornish, K.; Vodovotz, Y. Narrowing the Gap for Bioplastic Use in Food Packaging: An Update. *Environ. Sci. Technol.* **2020**, *54*, 4712–4732. [CrossRef] [PubMed]
31. British Plastics Federation. Oil Consumption. Available online: https://www.bpf.co.uk/press/Oil_Consumption.aspx (accessed on 6 March 2023).
32. Hopewell, J.; Dvorak, R.; Kosior, E. Plastics Recycling: Challenges and Opportunities. *Philos. Trans. R. Soc. B Biol. Sci.* **2009**, *364*, 2115–2126. [CrossRef]
33. Yousefi, H.; Su, H.-M.; Imani, S.M.; Alkhaldi, K.; Filipe, C.D.M.; Didar, T.F. Intelligent Food Packaging: A Review of Smart Sensing Technologies for Monitoring Food Quality. *ACS Sens.* **2019**, *4*, 808–821. [CrossRef]
34. Puligundla, P.; Jung, J.; Ko, S. Carbon Dioxide Sensors for Intelligent Food Packaging Applications. *Food Control* **2012**, *25*, 328–333. [CrossRef]
35. Yam, K.L.; Takhistov, P.T.; Miltz, J. Intelligent Packaging: Concepts and Applications. *J. Food Sci.* **2005**, *70*, R1–R10. [CrossRef]
36. Hong, L.G.; Yuhana, N.Y.; Zawawi, E.Z. Review of Bioplastics as Food Packaging Materials. *AIMS Mater. Sci.* **2021**, *8*, 166–184. [CrossRef]
37. Teck Kim, Y.; Min, B.; Won Kim, K. General Characteristics of Packaging Materials for Food System. In *Innovations in Food Packaging*; Academic Press: Cambridge, MA, USA, 2014; pp. 13–35.
38. Beyer, R. *Manual on Food Packaging for Small and Medium-Size Enterprises in Samoa*; Food and Agriculture Organization of the United Nations Sub-Regional Office for the Pacific Islands: Apia, Samoa, 2012.
39. Sharma, Y.K.; Mangla, S.K.; Patil, P.P.; Liu, S. When Challenges Impede the Process. *Manag. Decis.* **2019**, *57*, 995–1017. [CrossRef]
40. Grimm, J.H.; Hofstetter, J.S.; Sarkis, J. Critical Factors for Sub-Supplier Management: A Sustainable Food Supply Chains Perspective. *Int. J. Prod. Econ.* **2014**, *152*, 159–173. [CrossRef]
41. Bhattacharya, A. Achieving Sustainability in Supply Chain Operations in the Interplay between Circular Economy and Industry 4.0. *Prod. Plan. Control* **2021**, *34*, 867–869. [CrossRef]
42. van der A, J.G.; Sijm, D.T. Risk Governance in the Transition towards Sustainability, the Case of Bio-Based Plastic Food Packaging Materials. *J. Risk Res.* **2021**, *24*, 1639–1651. [CrossRef]
43. National Research Council; Policy and Global Affairs; Board on Sustainable Development; Policy Division. Our Common Journey: A Transition Toward Sustainability. Available online: https://nap.nationalacademies.org/catalog/9690/our-common-journey-a-transitiontoward-sustainability (accessed on 31 March 2023).
44. Geng, Y.; Sarkis, J.; Bleischwitz, R. How to Globalize the Circular Economy. *Nature* **2019**, *565*, 153–155. [CrossRef] [PubMed]

45. Marone, P. *Sustainability Transition towards a Bio-Based Economy: New Technologies, New Products, New Policies*; MDPI: Basel, Switzerland, 2018.
46. Johnstone, P.; Newell, P. Sustainability Transitions and the State. *Environ. Innov. Soc. Transit.* **2018**, *27*, 72–82. [CrossRef]
47. Markard, J. Transformation of Infrastructures: Sector Characteristics and Implications for Fundamental Change. *J. Infrastruct. Syst.* **2011**, *17*, 107–117. [CrossRef]
48. Magnier, L.; Crié, D. Communicating Packaging Eco-Friendliness. *Int. J. Retail Distrib. Manag.* **2015**, *43*, 350–366. [CrossRef]
49. Rettie, R.; Brewer, C. The Verbal and Visual Components of Package Design. *J. Prod. Brand Manag.* **2000**, *9*, 56–70. [CrossRef]
50. Underwood, R.L. The Communicative Power of Product Packaging: Creating Brand Identity via Lived and Mediated Experience. *J. Mark. Theory Pract.* **2003**, *11*, 62–76. [CrossRef]
51. Lindh, H.; Williams, H.; Olsson, A.; Wikström, F. Elucidating the Indirect Contributions of Packaging to Sustainable Development: A Terminology of Packaging Functions and Features. *Packag. Technol. Sci.* **2016**, *29*, 225–246. [CrossRef]
52. Siracusa, V.; Rocculi, P.; Romani, S.; Rosa, M.D. Biodegradable Polymers for Food Packaging: A Review. *Trends Food Sci. Technol.* **2008**, *19*, 634–643. [CrossRef]
53. Emblem, A. (Ed.) *Packaging Technology: Fundamentals, Materials and Processes*; Elsevier: Amsterdam, The Netherlands, 2012.
54. Nguyen, A.T.; Parker, L.; Brennan, L.; Lockrey, S. A Consumer Definition of Eco-Friendly Packaging. *J. Clean. Prod.* **2020**, *252*, 119792. [CrossRef]
55. Kirwan, M.J.; Plant, S.; Strawbridge, J.W. Plastics in Food Packaging. In *Food and Beverage Packaging Technology*; Wiley: Hoboken, NJ, USA, 2011; pp. 157–212.
56. Tranfield, D.; Denyer, D.; Smart, P. Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *Br. J. Manag.* **2003**, *14*, 207–222. [CrossRef]
57. Rother, E.T. Systematic literature review X narrative review. *Acta Paul. Enferm.* **2007**, *20*, v–vi. [CrossRef]
58. Lame, G. Systematic Literature Reviews: An Introduction. *Proc. Des. Soc. Int. Conf. Eng. Des.* **2019**, *1*, 1633–1642. [CrossRef]
59. Thomé, A.M.; Scavarda, L.F.; Scavarda, A.J. Conducting Systematic Literature Review in Operations Management. *Prod. Plan. Control* **2016**, *27*, 408–420. [CrossRef]
60. Denyer, D.; Tranfield, D. Producing a systematic review. In *The Sage Handbook of Organizational Research Methods*; Buchanan, D.A., Bryman, A., Eds.; Sage Publications Ltd.: Thousand Oaks, CA, USA, 2009; pp. 671–689.
61. Liberati, A.; Altman, D.G.; Tetzlaff, J.; Mulrow, C.; Gøtzsche, P.C.; Ioannidis, J.P.A.; Clarke, M.; Devereaux, P.J.; Kleijnen, J.; Moher, D. The Prisma Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *J. Clin. Epidemiol.* **2009**, *62*, e1–e34. [CrossRef]
62. Petticrew, M. Systematic Reviews from Astronomy to Zoology: Myths and Misconceptions. *BMJ* **2001**, *322*, 98–101. [CrossRef]
63. Kardung, M.; Cingiz, K.; Costenoble, O.; Delahaye, R.; Heijman, W.; Lovrić, M.; van Leeuwen, M.; M'Barek, R.; van Meijl, H.; Piotrowski, S.; et al. Development of the Circular Bioeconomy: Drivers and Indicators. *Sustainability* **2021**, *13*, 413. [CrossRef]
64. de Jesus, A.; Mendonça, S. Lost in Transition? Drivers and Barriers in the Eco-Innovation Road to the Circular Economy. *Ecol. Econ.* **2018**, *145*, 75–89. [CrossRef]
65. Govindan, K.; Hasanagic, M. A Systematic Review on Drivers, Barriers, and Practices towards Circular Economy: A Supply Chain Perspective. *Int. J. Prod. Res.* **2018**, *56*, 278–311. [CrossRef]
66. Hazen, B.T.; Mollenkopf, D.A.; Wang, Y. Remanufacturing for the Circular Economy: An Examination of Consumer Switching Behavior. *Bus. Strategy Environ.* **2016**, *26*, 451–464. [CrossRef]
67. Quina, M.J.; Soares, M.A.R.; Quinta-Ferreira, R. Applications of Industrial Eggshell as a Valuable Anthropogenic Resource. *Resour. Conserv. Recycl.* **2017**, *123*, 176–186. [CrossRef]
68. Yusuf, Y.Y.; Olaberinjo, A.E.; Papadopoulos, T.; Gunasekaran, A.; Subramanian, N.; Sharifi, H. Returnable Transport Packaging in Developing Countries: Drivers, Barriers and Business Performance. *Prod. Plan. Control* **2017**, *28*, 629–658. [CrossRef]
69. Ilić, M.; Nikolić, M. Drivers for Development of Circular Economy—A Case Study of Serbia. *Habitat Int.* **2016**, *56*, 191–200. [CrossRef]
70. Xinan, L.; Yanfu, L. Driving Forces on China's Circular Economy: From Government's Perspectives. *Energy Procedia* **2011**, *5*, 297–301. [CrossRef]
71. Zhu, Q.; Geng, Y.; Sarkis, J.; Lai, K.-H. Evaluating Green Supply Chain Management among Chinese Manufacturers from the Ecological Modernization Perspective. *Transp. Res. Part E Logist. Transp. Rev.* **2011**, *47*, 808–821. [CrossRef]
72. Park, J.; Sarkis, J.; Wu, Z. Creating Integrated Business and Environmental Value within the Context of China's Circular Economy and Ecological Modernization. *J. Clean. Prod.* **2010**, *18*, 1494–1501. [CrossRef]
73. Sonneveld, K. What Drives (Food) Packaging Innovation? *Packag. Technol. Sci.* **2000**, *13*, 29–35. [CrossRef]
74. Domenech, T.; Bleischwitz, R.; Doranova, A.; Panayotopoulos, D.; Roman, L. Mapping Industrial Symbiosis Development in Europe_ Typologies of Networks, Characteristics, Performance and Contribution to the Circular Economy. *Resour. Conserv. Recycl.* **2019**, *141*, 76–98. [CrossRef]
75. Lazarevic, D.; Valve, H. Narrating Expectations for the Circular Economy: Towards a Common and Contested European Transition. *Energy Res. Soc. Sci.* **2017**, *31*, 60–69. [CrossRef]
76. Franklin-Johnson, E.; Figge, F.; Canning, L. Resource Duration as a Managerial Indicator for Circular Economy Performance. *J. Clean. Prod.* **2016**, *133*, 589–598. [CrossRef]

77. Olsmats, C.; Kaivo-oja, J. European Packaging Industry Foresight Study—Identifying Global Drivers and Driven Packaging Industry Implications of the Global Megatrends. *Eur. J. Futures Res.* **2014**, *2*, 39. [CrossRef]
78. Geng, Y.; Zhu, Q.; Doberstein, B.; Fujita, T. Implementing China's Circular Economy Concept at the Regional Level: A Review of Progress in Dalian, China. *Waste Manag.* **2009**, *29*, 996–1002. [CrossRef] [PubMed]
79. Esposito, M.; Tse, T.; Soufani, K. Is the Circular Economy a New Fast-Expanding Market? *Thunderbird Int. Bus. Rev.* **2015**, *59*, 9–14. [CrossRef]
80. Murray, A.; Skene, K.; Haynes, K. The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *J. Bus. Ethics* **2015**, *140*, 369–380. [CrossRef]
81. Linder, M.; Williander, M. Circular Business Model Innovation: Inherent Uncertainties. *Bus. Strategy Environ.* **2015**, *26*, 182–196. [CrossRef]
82. Dong, L.; Fujita, T.; Dai, M.; Geng, Y.; Ren, J.; Fujii, M.; Wang, Y.; Ohnishi, S. Towards Preventative Eco-Industrial Development: An Industrial and Urban Symbiosis Case in One Typical Industrial City in China. *J. Clean. Prod.* **2016**, *114*, 387–400. [CrossRef]
83. Ghisellini, P.; Cialani, C.; Ulgiati, S. A Review on Circular Economy: The Expected Transition to a Balanced Interplay of Environmental and Economic Systems. *J. Clean. Prod.* **2016**, *114*, 11–32. [CrossRef]
84. Pitt, J.; Heinemeyer, C. Introducing Ideas of a Circular Economy. In *Environment, Ethics and Cultures*; SensePublishers: Rotterdam, The Netherlands, 2015; pp. 245–260.
85. Rizos, V.; Behrens, A.; Kafyeke, T.; Hirschnitz-Garbers, M.; Ioannou, A. The circular economy: Barriers and opportunities for SMEs. In *CEPS Working Documents*; CEPS: Sacramento CA, USA, 2015.
86. Liu, Y.; Bai, Y. An Exploration of Firms' Awareness and Behavior of Developing Circular Economy: An Empirical Research in China. *Resour. Conserv. Recycl.* **2014**, *87*, 145–152. [CrossRef]
87. World Economic Forum. Towards the Circular Economy: Accelerating the Scale-Up across Global Supply Chains. Available online: https://www.weforum.org/reports/towards-circular-economy-accelerating-scale-across-global-supply-chains (accessed on 31 March 2023).
88. Schulte, U.G. New Business Models for a Radical Change in Resource Efficiency. *Environ. Innov. Soc. Transit.* **2013**, *9*, 43–47. [CrossRef]
89. Andersen, M.S. An Introductory Note on the Environmental Economics of the Circular Economy. *Sustain. Sci.* **2006**, *2*, 133–140. [CrossRef]
90. Witjes, S.; Lozano, R. Towards a More Circular Economy: Proposing a Framework Linking Sustainable Public Procurement and Sustainable Business Models. *Resour. Conserv. Recycl.* **2016**, *112*, 37–44. [CrossRef]
91. Bai, C.; Sarkis, J.; Dou, Y. Corporate Sustainability Development in China: Review and Analysis. *Ind. Manag. Data Syst.* **2015**, *115*, 5–40. [CrossRef]
92. Velis, C.A.; Vrancken, K.C. Which material ownership and responsibility in a circular economy? *Waste Manag. Res.* **2015**, *33*, 773–774. [CrossRef]
93. Yu, C.; de Jong, M.; Dijkema, G.P.J. Process Analysis of Eco-Industrial Park Development—The Case of Tianjin, China. *J. Clean. Prod.* **2014**, *64*, 464–477. [CrossRef]
94. Stahel, W.R. Policy for Material Efficiency—Sustainable Taxation as a Departure from the Throwaway Society. *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci.* **2013**, *371*, 20110567. [CrossRef]
95. Desrochers, P. Cities and industrial symbiosis: Some historical perspectives and policy implications. *J. Ind. Ecol.* **2001**, *5*, 29–44. [CrossRef]
96. Clark, J.H.; Farmer, T.J.; Herrero-Davila, L.; Sherwood, J. Circular Economy Design Considerations for Research and Process Development in the Chemical Sciences. *Green Chem.* **2016**, *18*, 3914–3934. [CrossRef]
97. Magnier, L.; Schoormans, J.; Mugge, R. Judging a Product by Its Cover: Packaging Sustainability and Perceptions of Quality in Food Products. *Food Qual. Prefer.* **2016**, *53*, 132–142. [CrossRef]
98. Pringle, T.; Barwood, M.; Rahimifard, S. The Challenges in Achieving a Circular Economy within Leather Recycling. *Procedia CIRP* **2016**, *48*, 544–549. [CrossRef]
99. Thyberg, K.L.; Tonjes, D.J. Drivers of Food Waste and Their Implications for Sustainable Policy Development. *Resour. Conserv. Recycl.* **2016**, *106*, 110–123. [CrossRef]
100. Matthes, J.; Wonneberger, A.; Schmuck, D. Consumers' Green Involvement and the Persuasive Effects of Emotional versus Functional Ads. *J. Bus. Res.* **2014**, *67*, 1885–1893. [CrossRef]
101. Schiller, G.; Müller, F.; Ortlepp, R. Mapping the Anthropogenic Stock in Germany: Metabolic Evidence for a Circular Economy. *Resour. Conserv. Recycl.* **2017**, *123*, 93–107. [CrossRef]
102. van den Oever, M.; Molenveld, K.; van der Zee, M.; Harriëtte, B. *Bio-Based and Biodegradable Plastics: Facts and Figures: Focus on Food Packaging in The Netherlands*; Wageningen Food & Biobased Research: Wageningen, The Netherlands, 2017.
103. Dilkes-Hoffman, L.; Ashworth, P.; Laycock, B.; Pratt, S.; Lant, P. Public Attitudes towards Bioplastics—Knowledge, Perception and End-of-Life Management. *Resour. Conserv. Recycl.* **2019**, *151*, 104479. [CrossRef]
104. Jurgilevich, A.; Birge, T.; Kentala-Lehtonen, J.; Korhonen-Kurki, K.; Pietikäinen, J.; Saikku, L.; Schösler, H. Transition towards Circular Economy in the Food System. *Sustainability* **2016**, *8*, 69. [CrossRef]
105. Korhonen, J.; Honkasalo, A.; Seppälä, J. Circular Economy: The Concept and Its Limitations. *Ecol. Econ.* **2018**, *143*, 37–46. [CrossRef]

106. Korhonen, J.; Nuur, C.; Feldmann, A.; Birkie, S.E. Circular Economy as an Essentially Contested Concept. *J. Clean. Prod.* **2018**, *175*, 544–552. [CrossRef]
107. Merli, R.; Preziosi, M.; Acampora, A. How Do Scholars Approach the Circular Economy? A Systematic Literature Review. *J. Clean. Prod.* **2018**, *178*, 703–722. [CrossRef]
108. Yadav, S.; Mehrotra, G.K.; Bhartiya, P.; Singh, A.; Dutta, P.K. Preparation, Physicochemical and Biological Evaluation of Quercetin Based Chitosan-Gelatin Film for Food Packaging. *Carbohydr. Polym.* **2020**, *227*, 115348. [CrossRef]
109. Genovese, A.; Acquaye, A.A.; Figueroa, A.; Koh, S.C.L. Sustainable Supply Chain Management and the Transition towards a Circular Economy: Evidence and Some Applications. *Omega* **2017**, *66*, 344–357. [CrossRef]
110. Lieder, M.; Rashid, A. Towards Circular Economy Implementation: A Comprehensive Review in Context of Manufacturing Industry. *J. Clean. Prod.* **2016**, *115*, 36–51. [CrossRef]
111. Bramble, T. Book Reviews: The Machine That Changed the World. *J. Ind. Relat.* **1992**, *34*, 182–183. [CrossRef]
112. Tencati, A.; Pogutz, S.; Moda, B.; Brambilla, M.; Cacia, C. Prevention Policies Addressing Packaging and Packaging Waste: Some Emerging Trends. *Waste Manag.* **2016**, *56*, 35–45. [CrossRef]
113. Andersson, C.; Stage, J. Direct and Indirect Effects of Waste Management Policies on Household Waste Behaviour: The Case of Sweden. *Waste Manag.* **2018**, *76*, 19–27. [CrossRef]
114. Hickel, J.; Kallis, G. Is Green Growth Possible? *New Political Econ.* **2019**, *25*, 469–486. [CrossRef]
115. Klemeš, J.J.; Fan, Y.V.; Jiang, P. Plastics: Friends or Foes? the Circularity and Plastic Waste Footprint. *Energy Sources Part A Recovery Util. Environ. Eff.* **2020**, *43*, 1549–1565. [CrossRef]
116. Aarnio, T.; Hämäläinen, A. Challenges in Packaging Waste Management in the Fast Food Industry. *Resour. Conserv. Recycl.* **2008**, *52*, 612–621. [CrossRef]
117. Massoud, M.A.; Fayad, R.; El-Fadel, M.; Kamleh, R. Drivers, Barriers and Incentives to Implementing Environmental Management Systems in the Food Industry: A Case of Lebanon. *J. Clean. Prod.* **2010**, *18*, 200–209. [CrossRef]
118. Van Berkum, S.; Dengerink, J.; Ruben, R. *The Food Systems Approach: Sustainable Solutions for a Sufficient Supply of Healthy Food*; Wageningen Food & Biobased Research: Wageningen, The Netherlands, 2018.
119. Timmer, C.P. Managing structural transformation: A political economy approach. In Proceedings of the WIDER Annual Lecture 18, New York, NY, USA, 18 November 2014.
120. Food and Agriculture Organizatin (FAO) The Future of Food and Agriculture—Trends and and Challenges. 2017. Available online: https://www.fao.org/global-perspectives-studies/resources/detail/en/c/458158/ (accessed on 23 December 2022).
121. Kroyer, G.T. Impact of Food Processing on the Environment—An Overview. *LWT-Food Sci. Technol.* **1995**, *28*, 547–552. [CrossRef]
122. Abdul Khalil, H.P.S.; Davoudpour, Y.; Saurabh, C.K.; Hossain, M.S.; Adnan, A.S.; Dungani, R.; Paridah, M.T.; Islam Sarker, M.Z.; Fazita, M.R.N.; Syakir, M.I.; et al. A Review on Nanocellulosic Fibres as New Material for Sustainable Packaging: Process and Applications. *Renew. Sustain. Energy Rev.* **2016**, *64*, 823–836. [CrossRef]
123. Pauer, E.; Wohner, B.; Heinrich, V.; Tacker, M. Assessing the Environmental Sustainability of Food Packaging: An Extended Life Cycle Assessment Including Packaging-Related Food Losses and Waste and Circularity Assessment. *Sustainability* **2019**, *11*, 925. [CrossRef]
124. European Commission. A European Strategy for Plastics in a Circular Economy. 2018. Available online: https://www.switch-asia.eu/resource/a-european-strategy-for-plastics-in-a-circular-economy/ (accessed on 8 March 2023).
125. Chuck Bennett. SB: Reducing Material Use through Packaging Innovation: Aveda's Journey. 2013. Available online: https://sustainablebrands.com/read/waste-not/reducing-material-use-through-packaging-innovation-aveda-s-journey (accessed on 31 March 2023).
126. Oude Ophuis, P.A.M.; Van Dam, Y.K.; Lamers, A.M.J. Relative importance of health aspects and environmental issues for food consumption: Product attributes of lettuce. In Proceedings of the 21st EMAC Conference Marketing for Europe: Marketing for the Future, Aarhus, Denmark, 26–29 May 1992.
127. Bohlen, G.; Schlegelmilch, B.B.; Diamantopoulos, A. Measuring Ecological Concern: A Multi-Construct Perspective. *J. Mark. Manag.* **1993**, *9*, 415–430. [CrossRef]
128. Geissdoerfer, M.; Savaget, P.; Bocken, N.M.P.; Hultink, E.J. The Circular Economy—A New Sustainability Paradigm? *J. Clean. Prod.* **2017**, *143*, 757–768. [CrossRef]
129. Kirchherr, J.; Reike, D.; Hekkert, M. Conceptualizing the Circular Economy: An Analysis of 114 Definitions. *Resour. Conserv. Recycl.* **2017**, *127*, 221–232. [CrossRef]
130. Winans, K.; Kendall, A.; Deng, H. The History and Current Applications of the Circular Economy Concept. *Renew. Sustain. Energy Rev.* **2017**, *68*, 825–833. [CrossRef]
131. Loiseau, E.; Saikku, L.; Antikainen, R.; Droste, N.; Hansjürgens, B.; Pitkänen, K.; Leskinen, P.; Kuikman, P.; Thomsen, M. Green Economy and Related Concepts: An Overview. *J. Clean. Prod.* **2016**, *139*, 361–371. [CrossRef]
132. Guillard, V.; Gaucel, S.; Fornaciari, C.; Angellier-Coussy, H.; Buche, P.; Gontard, N. The next Generation of Sustainable Food Packaging to Preserve Our Environment in a Circular Economy Context. *Front. Nutr.* **2018**, *5*, 121. [CrossRef]
133. Tan, J.; Tan, F.J.; Ramakrishna, S. Transitioning to a Circular Economy: A Systematic Review of Its Drivers and Barriers. *Sustainability* **2022**, *14*, 1757. [CrossRef]
134. Gusmerotti, N.M.; Testa, F.; Corsini, F.; Pretner, G.; Iraldo, F. Drivers and Approaches to the Circular Economy in Manufacturing Firms. *J. Clean. Prod.* **2019**, *230*, 314–327. [CrossRef]

135. Franz, R.; Welle, F. Recycling of Post-Consumer Packaging Materials into New Food Packaging Applications—Critical Review of the European Approach and Future Perspectives. *Sustainability* **2022**, *14*, 824. [CrossRef]
136. Harnkarnsujarit, N.; Wongphan, P.; Chatkitanan, T.; Laorenza, Y.; Srisa, A. Bioplastic for Sustainable Food Packaging. In *Sustainable Food Processing and Engineering Challenges*; Academic Press: Cambridge, MA, USA, 2021; pp. 203–277.
137. Niaounakis, M. Definitions of Terms and Types of Biopolymers. In *Biopolymers: Applications and Trends*; Academic Press: Cambridge, MA, USA, 2015; pp. 1–90.
138. Mishra, A.; Mohite, A.M.; Sharma, N. Influence of particle size on physical, mechanical, thermal, and morphological properties of tamarind-fenugreek mucilage biodegradable films. *Polym. Bull.* **2023**, *80*, 3119–3133. [CrossRef]
139. Mohite, A.M.; Sharma, N.; Aggarwal, S.; Sharma, S. Effect of Tamarindus Coating on Post-Harvest Quality of Apples and Pears Stored at Different Conditions. *Carpathian J. Food Sci. Technol.* **2018**, *10*, 17–25.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.