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Levers and Barriers to the Transition to a Circular Economy: A Systematic Literature Review

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Abstract. The requirement for the CE in the current global scenario of climate change, biodiversity, and natural resource depletion because of unsustainable production and consumption patterns is an imperative requirement. It is identified as a sustainable development strategy in the local setting of countries to deal with the problems of ecology, ensuring economic, social, and environmental sustainability. This systematic review seeks to thoroughly explore the barriers and drivers of CE by strictly following the PRISMA protocol. The search engine utilized was Scopus. A total of 93 articles were retrieved from the search engine within the set time period, that is, 2019-2025. After the search process, the articles were filtered based on the categories of business, management, and accounting, social sciences, economics, econometrics, and finance. A total of 21 articles were selected after the reading process. This assisted in identifying the barriers and drivers of CE, which are categorized into 7 groups of supply chain, regulatory, technological, organizational, economic, socio-cultural, and environmental dimensions. The results of this systematic review may be useful for the decision-making processes of governments and corporate leaders in adopting the CE strategy by leveraging the available drivers and overcoming the barriers.

Introduction

At the core of the environmental problems is the circular economy (CE) because of its innovation and participative approach in the achievement of sustainability [1], the world economy that is unable to achieve 10% of its circularity [2], and the positive effects that lead to a 70% reduction in greenhouse gas emissions and a 4% increase in employment [3]. The CE is able to mitigate climate change, biodiversity loss, waste, and pollution and decouple the economy from resource use [4]. The CE is implemented at the micro (product, firm, consumer), meso (eco-industrial parks), and macro (city, region, nation, and beyond) levels to accomplish the three pillars of sustainable development: environmental quality, economic prosperity, and social equity [5]. The application of EC improves the sustainability of the business [6], reduces the cost of natural resources, maximizes resource use, and improves the image of the business [7]. However, EC somewhat ignores social and environmental factors [5,8]. Apart from this, in order to implement EC principles such as "reduce, repair, reuse, recycle," in line with existing business models, it is necessary to redefine existing value propositions as well as change different factors [9]. Although it is slightly costly to implement EC [10], it is a win win strategy [5], which means it is accepted with all its limitations as well as with the aspiration to be more "green" and generate additional value [11].

To implement CE, it is important to identify the barriers and drivers of CE [12, 13], as this will help policymakers to promote the circular economy and benefit from the available drivers of change [2]. There is more literature available on barriers than drivers [13]. As barriers are time-dependent and dynamic, some barriers are changing rapidly. The study carried out between 2019 and 2020 [14] revealed that the barriers in 2019 are not the same as those in 2020, which shows that the process of finding barriers is continuous, as new barriers arise after the elimination of

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previous ones. This study will try to cover this gap by explaining the drivers and barriers in more detail, considering the points mentioned by different approaches, such as the institutional theory [15,16,17], the stakeholder theory [18], and the Natural Resource Based View (NRBV) approach [15,16,19]. In this context, the literature review carried out was intended to support the study and answer our main question: what are the drivers and barriers of the effective transition to CE?

The structure of the paper is as follows: The second section will discuss the methodology that was adopted, and the PRISMA protocol. The third section will discuss the results regarding the drivers and barriers of CE. The fourth section will be the discussion of the results, and the fifth section will be the conclusion. The sixth section will discuss the limitations and suggestions.

Methodology

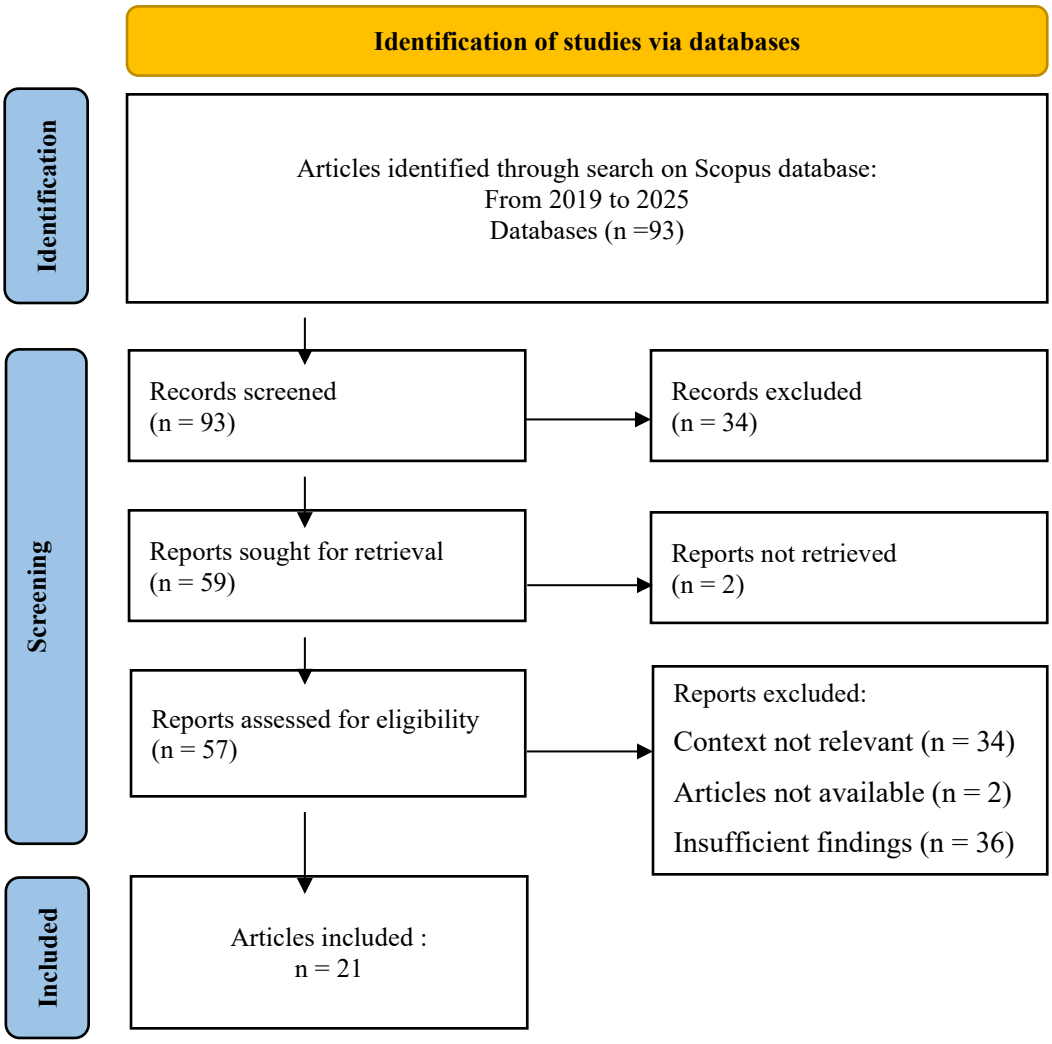


Fig. 1, Flowchart of literature selection for the review.

Research strategy. The main goal of this systematic review of literature (SRL) is to search, evaluate, interpret, and synthesize the literature on the subject matter by academics, researchers, and practitioners [20]. This SRL was conducted in accordance with the guidelines suggested in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [21] initiative, as presented in Figure 1 below.

Data collection. The search engine used is the main search engine. The main search engine used is Scopus. The search was carried out under the following subjects: "business, management and accounting," "social sciences," and "economics, econometrics and finance." Journal articles and conference proceedings were targeted for the year 2019. The following words were used: "transition to a circular economy" and "obstacles" or "barriers" or "catalysts" or "drivers" or "levers." They were also disseminated in the English scientific journals.

Data analysis. The initial search yielded a total of 93 articles. After filtering the search to the respective fields, a total of 34 articles were excluded. After reviewing the abstracts of the remaining articles, a total of 59 articles were left, as they tackled the research question. Finally, 21 articles were selected and are shown in Table 1 below. The review of the articles helped in the identification of the enablers and barriers of CE. Table 1 below shows the articles used in the study, the authors, and the year of publication.

Table 1, List of eligible studies.

No	Reference	Year	No	Reference	Year
1	Kerdlap et al., [31]	2019	12	Blackburn et al.,[32]	2023
2	Gue et al., [35]	2020	13	Wandl et al.,[48]	2023
3	Heurkens et al., [8]	2020	14	Li, [30]	2023
4	Ang et al.,[37]	2021	15	Farrukh et al., [16]	2024
5	Almulhim et al., [49]	2021	16	Brändström et al.,[42]	2024
6	Ciliberto et al.,[23]	2021	17	Salman et al., [43]	2025
7	Nazlı Köseoğlu,[11]	2022	18	Congiu et al.,[46]	2025
8	Barford & Ahmad,[2]	2022	19	Bislimi et al.,[25]	2025
9	Ho et al.,[22]	2023	20	Gajanayake et al.,[33]	2025
10	Souza Piao et al.,[14]	2023	21	Sehgal et al.,[36]	2025
11	Rodrigues&Zancul[27]	2023			

Result

The section will include a summary of data collected in the systematic review of the 21 articles. The results will reveal driving and impeding forces of CE in seven aspects, as shown in Figures 2 and 3: supply chain, regulation, technology, organization, economics, socio-cultural, and environment.

Levers of the circular economy. Supply Chain: Through collaboration, the various components of the supply chain can get connected and find ways to increase the product life cycle [22]. For example, the India-based Doodlage collaborated in order to help the India-based Fabindia brand create their "ReFab" product line from their own textile waste [9]. It must be noted that the stakeholders must be involved in the supply chain in the reuse and recycling of materials in accordance with the zero waste principle [19]. This can be seen as a good attribute in the case of reverse logistics as a strategic move to include the EC principles in the supply chain [23], as well as in the viable take-backs [24].

Regulatory: This element may also contribute to the configuration of the involvement of businesses and the community in the circular economy system [22]. On the other hand, this element may also create value-innovating innovation through the disposal of waste, as this forces companies to look for alternatives in order to reduce the cost of waste disposal [17]. Several countries have tried to do this. For example, the State of Victoria has identified its strategy, "Recycling Victoria: A New Economy," followed by the CE Act 2021 and the establishment of a product stewardship program [22]. The Government of Pakistan has also implemented the Net Zero initiative, where companies in the textile sector are asked to join this initiative in an open manner [16]. China has also implemented the EC Promotion Law since 2009 [17]. It is also very important that the government gets involved and is committed to the implementation of the EC in

the economy as a whole [19], and this can be achieved through subsidies, but also through campaigns for the development of infrastructure and awareness [25], but also through the development of a tax system that will encourage consumers, especially those with higher income, to purchase products that have a circular economy nature, and will also encourage companies to use materials by developing new methods of production [26]. Other international factors also make governments seek sustainable solutions [22], and meet the international demands [16], such as the State of Victoria, which sought circular economy solutions due to the waste crisis that was created by the "National Sword" policy of China, which banned the import of foreign waste [22], or Pakistan, where the local suppliers, together with international companies, were forced to follow the guidelines of the "Green Deal" [16].

Technological: The use of I4.0 technologies allows for the adoption of EC such as IoT, blockchain technology, artificial intelligence, and additive manufacturing [27]. In fact, technologies such as the Internet of Things (IoT), big data, and analytics will allow the company to monitor user behavior, prevent risky behavior, and provide high-value services such as preventive/predictive maintenance, usage optimization, digital retrofitting, and residual life assessment [28]. Moreover, blockchain technology will allow for the optimization of data use value, supply chain management efficiency, eco-efficiency, as well as superior traceability in order to promote EC [29]. Contrariwise, artificial intelligence will allow for the design of products, optimize production processes, develop circular consumption patterns, as well as smart options for reusing, repairing, and recycling products [30]. In a similar fashion, zero waste design, through design for disassembly and additive manufacturing, will enable us to design products with certain shapes from start to finish, as well as assemble materials layer by layer [31]. Lastly, there are digital platforms for sharing information and resources among organizations in a coordinated and secure fashion [32]. In conclusion, it can thus be said that Singapore is one of the countries that have adopted the collaborative industrial ecology platform for the support of their zero waste management strategy [31].

Organizational: The importance of employee engagement and leadership in developing an innovation culture and managing risks, like in the case of Dow, a chemical multinational corporation, where a community was built on life cycle analysis and valorization of EC-based solutions [2]. Moreover, building a positive organizational structure with EC indicators, which are accepted by all, may also favor EC practices and business circularity [33]. In addition to all these practices, building an eco-design of the activities of a company may also be a manifestation of its social responsibility, which may also contribute to the retention and prestige of its human capital [34]. The second approach is linked to ISO 14001 and 9001 certifications, which may reinforce the effectiveness of CE on sustainable business practices of companies [7]. Internal support from internal stakeholders, especially in vulnerable contexts, and cases of circumvention or ineffective laws and regulations, like in Brazil, are pressing issues facing CE [7].

Economic: One of the major reasons for EC is the economic case, which is developed with measures, tools, and guidance [24]. This is then followed by the demand for circular products, which influences business behavior regarding EC [33, 35]. Along with cost reduction [7] and the need to achieve competitive advantage [16].

Socio-cultural: First, the awareness of the consumers about sustainability and climate change is compelling organizations to adopt CE approaches [36]. But awareness alone is not enough to bring behavioral changes; it requires the help of incentives, infrastructure, and reaching the critical mass [25]. Likewise, a great deal of education raises the chances of buying recycled goods and segregating waste [26]. Besides the above two aspects, the contribution of non-governmental organizations in bringing about the transition to CE has been recognized by the study [16] in the Pakistani textile sector, where the Ellen MacArthur Foundation sets out guidelines in the form of

"The Jeans Redesign." Moreover, CE provides an opportunity to generate employment [1,37], decrease income inequality, and enhance the middle class sector in society.

Environmental: On one side, environmental issues such as global warming may lead to the emergence of a responsible production chain [38]. On the other side, the emergence of resource efficiency [7]. Finally, ecological awareness, defined as the level of carbon dioxide emissions per capita, is one of the main factors for CE [26].

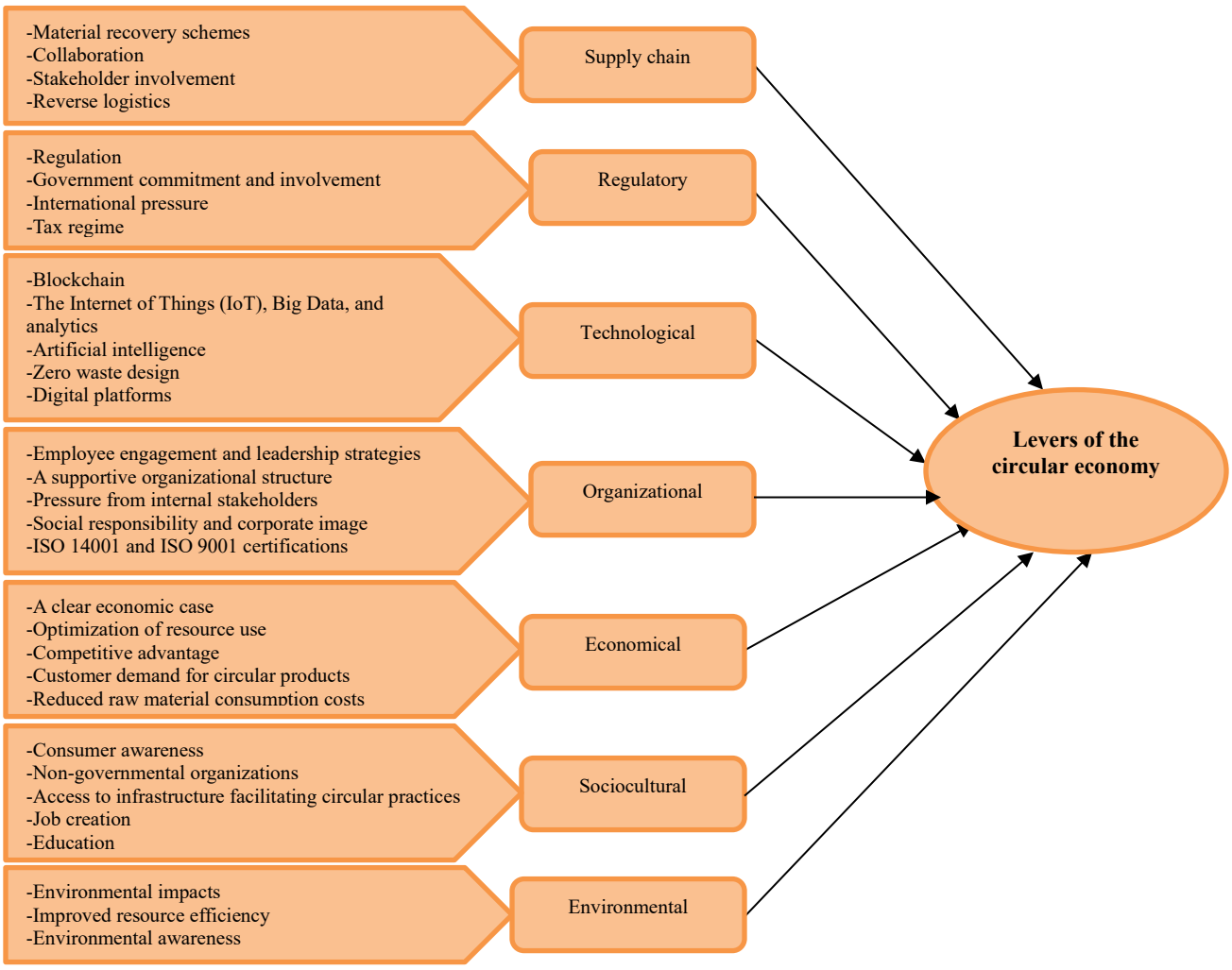


Fig. 2, The levers of the circular economy

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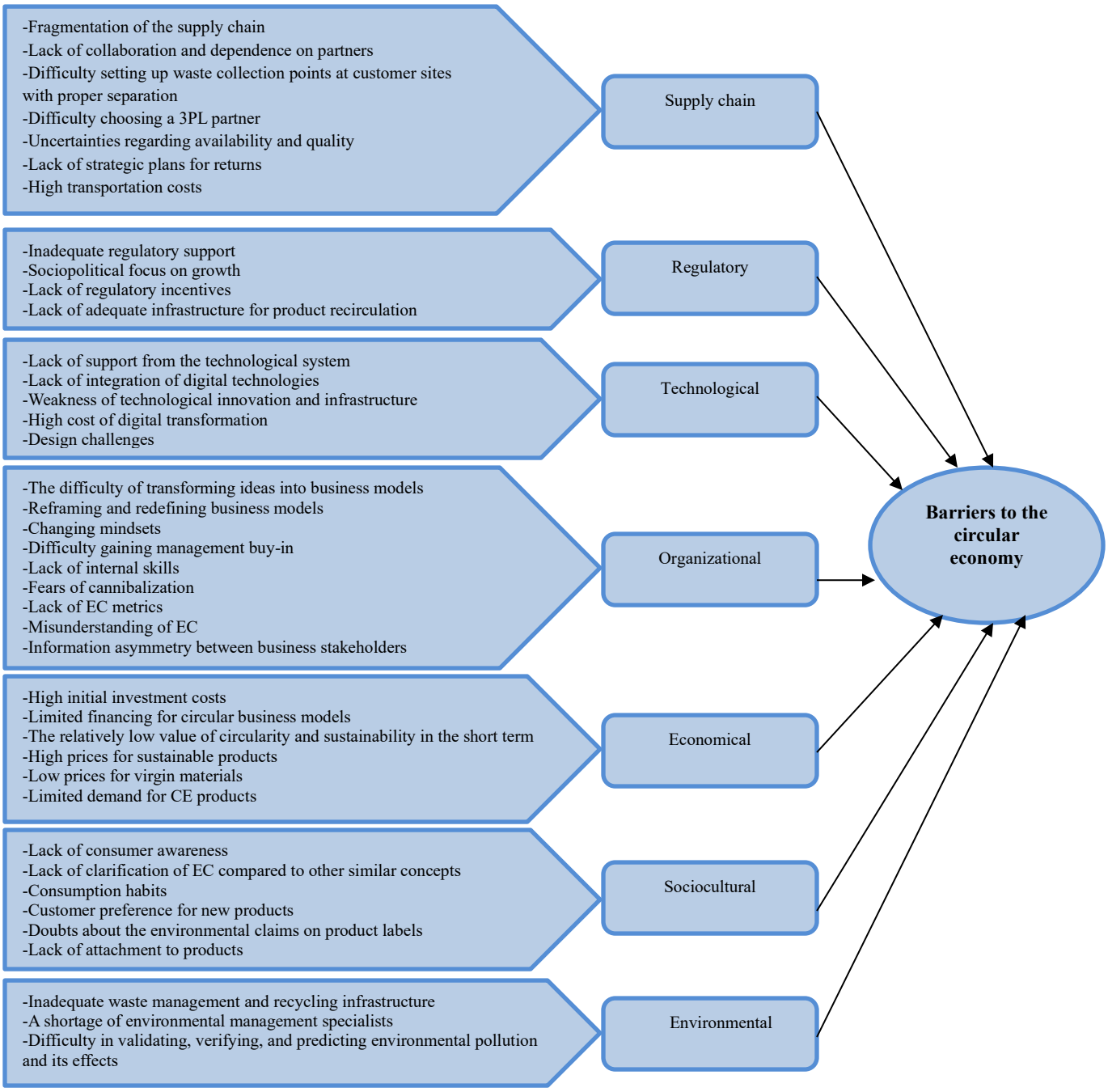


Fig. 3, Barriers to the circular economy

Barriers to circular transition. Supply Chain: The fragmented supply chain [24], as well as the lack of collaboration and coordination between the different actors of the supply chain, and the dependency on them, which creates difficulties in building new partnerships with them [39]. In addition, building common processes, identifying potential partners, as well as integrating different areas of expertise, as well as conveying different company points of view to consumers [40]. There are other difficulties associated with building an inverse logistics network. These are high transportation costs, which is a barrier to collecting products [38], building points of collection of products from the customer's premises with proper waste separation, as well as choosing a 3PL partner, as well as the lack of strategic plans for returns, which creates difficulties in selling returned products [15], as well as the availability of wastes as well as their quality [41].

Regulatory: Lack of support from the regulatory framework, as in China, where there is no enforcement of the high-level law on EC due to the normative legitimacy of the informal sector [17]. This is also the case in the Netherlands, where the Omgevingswet (Environmental Law) has failed to provide sufficient guidance on the implementation of EC [8]. To fill this gap, it has been suggested that there should be sufficient regulatory guidance with strong social and economic incentives that benefit the elderly, the less educated, and the less affluent [26]. Sociopolitical factors have also been identified to negatively influence the use of strategies that promote refusal and reduction [33]. Lack of regulatory incentives is also a challenge, as evidenced from the study [42] that shows the Swedish government has introduced a tax on computer and phone repair services. The lack of sufficient infrastructural support for the re-circulation of products, particularly with regard to the availability of product recycling and re-use facilities, is also a significant challenge in Kosovo, which discourages consumer behavior [25]; in Pakistan, there are only two textile factories that sort clothes [16].

Technological: This type of barriers might make it difficult to find a sustainable solution due to the lack of support for the technological system, the lack of integration of digital technology, and the level of technological innovation achieved [43]. To this, the following might be added: the high cost of investing in the digital transformation process, especially in the acquisition of the software, as well as the changes required in the production chain [38]. There are also some indications that the design stage is experiencing some difficulties, such as the lack of consideration of the end-of-life issues and the uncertainty of the needs of the users in the long term [24]. Also, the difficulty of keeping up with the evolution of trends and fashions [44]. In addition to the quality of the recycled materials used as input, which makes it difficult to identify the parameters of the new system design [11]. Also, the use of which results in the loss of performance and quality, especially with regard to aesthetics [16].

Organizational: There may also be some organizational challenges associated with the adoption of CE, which include the challenge of turning ideas into successful business models, changing and re-interpreting business models, as well as changing the mindset from a product company to a service company [40]. There is also another challenge associated with gaining support from management [45,14], which can be as a result of risk aversion in general [46], lack of internal capabilities which make it impossible to use externally created knowledge [47], as well as cannibalization due to new circular business models which will extend the life of the product and thus reduce sales [45]. There are also other challenges that include the integration of sustainability into all the functions of the organization, where all the functions are independent without collaboration and alignment to the sustainability strategy [8, 39]. Moreover, the absence of EC metrics implies that there are no industry standards and reputation and leadership for the companies [33]. Also, the misconception that EC is a recycling strategy implies that EC cannot easily move to other higher-level strategies such as reduction and reuse [33, 22]. Furthermore, the reluctant culture of the organization, due to the lack of trust, implies that the stakeholders cannot share resources and information [32, 48].

Economic: There are various economic factors that may hinder the adoption and implementation of the circular economy, and some of these factors include high investment costs, as well as limited funding opportunities for circular economy business models [43], and also low circularity and sustainability value in the short term [47], which may pose a challenge in convincing the owners/investors, as they seek a quick return on investment [39]. Additionally, high prices of sustainable products [44] may also imply that there is no interest in green products, not even from consumers who are aware of the benefits [25]. Moreover, low prices of virgin materials may pose a challenge in recycling economically unviable materials [11,14]. Additionally, low demand for circular products may not offer pressure that can encourage companies to shift from linear business models [11].

Socio-cultural: These barriers can be divided into two categories: first, it is linked to society, which happens because of the lack of consumer awareness, because of the lack of knowledge about CE, as stated in the study [25] in Kosovo, besides the lack of explanation of CE in relation to other similar concepts [24], which is also applicable in Saudi Arabia, as consumers link CE to sorting waste or recycling. The second category is linked to the cultural aspect, which comprises the existing consumption patterns that influence consumer behavior in favor of ownership rather than renting or sharing products [49], besides the preference of customers for new products [17], which can be attributed to health issues, as stated in the study [49], according to which a significant number of consumers felt that sharing common products gave them a sense of risk to their health, especially because of the COVID-19 pandemic. Besides this, there is a lack of affinity with products [44], besides the ambiguity in relation to ecological statements on product packaging, as some people thought it to be a false ecological alternative, while others thought it to be a marketing strategy [49].

Environmental: This may include challenges to the implementation of CE, which may result from poor management of wastes and infrastructure, as well as the non-availability of experts in environmental management, and the non-availability of environmental-friendly technology [43]. There may also be challenges to the validation, verification, and prediction of pollution in the environment and all its effects and impacts [50].

Discussion of results

The paper also highlights seven drivers that can help in the transition to CE. The first driver is associated with the diffusion and adoption of cutting-edge technology, which can help in better decision-making, innovation, sustainability, and business model development [6]. The second driver is associated with environmental factors, which include the reduction of environmental pollution, energy consumption, and greenhouse gases, which can directly impact overall well-being [51] and, hence, environmental protection with greater efficiency for a longer period of time [52]. The third driver is associated with the supply chain, which includes various factors of the supply chain, such as supply chain, distribution channels, reverse logistics [13], and stakeholder engagement [52]. The fourth driver is related to the economic and market dimension of CE, which involves aspects such as business growth, cost reduction, and changes in customer needs [53]; achieving a competitive advantage [6]. The fifth driver is related to the social and cultural dimension of CE, which enables the creation of good jobs, a good work environment and culture, and a good quality of life through environmental improvements [52]. The sixth driver is related to the Regulations that enable the creation of an EC [53]. The last driver is related to the organizational dimension, which emphasizes the role of leadership in the improvement of sustainable innovation in a company through a clear vision and commitment to it [52]; the image of the company [16]; social responsibility [1].

However, most literature has focused on the barriers to the implementation of CE, not the facilitators [13]. First, the barriers to the implementation of CE can be categorized into seven types. The barriers include economic and market-related barriers, which encompass barriers to the implementation of CE despite the availability of technical knowledge [14, 54]. For example, investment costs, investment risk, and the absence of financing opportunities [55] can be barriers to the implementation of CE. Secondly, socio-cultural barriers include challenges in consumer behavior/consciousness and culture in adopting the circular economy concept [56]. Additionally, technological barriers include challenges in the complexity of circular design, technical knowledge, and the cost of technology [13]. Moreover, the regulation has the following barriers: legal and regulatory, as well as the lack of global cooperation for CE projects [55]. Organizational barriers, which are brought about by the silo mentality within an organization [8], include the lack of know-how, resistance from employees, organization complexities, lack of support from top management [42], as well as the lack of performance measurements; and limited understanding

and application of EC, which is applied in recycling [48]. Additionally, supply chain barriers have the following: organization of logistics for collection of waste, which is scattered in the territory; establishment of contracts with different suppliers of resources; quality and quantity of waste; as well as strategic dependency on suppliers [57]. On the other hand, environmental barriers have the following: sustainability, environment, waste management, recycling, as well as resource scarcity [13].

Conclusion

The shift to a sustainable production and consumption system requires the use and scaling up of sustainable market-based management measures [53], and strategic planning that begins with the identification of factors for change [35] and challenges that different stakeholders may encounter in their shift to CE.

The objective of this systematic review is to extensively classify the drivers and challenges of CE. In order to carry out the systematic review, data collection was done by studying 21 different studies. In the course of this study, the drivers and challenges were classified into seven different categories.

We share the opinion of the study [13], which states that "more than the levers, the barriers of CE adoption are found in the scientific literature." This means that there is more interest in studying the barriers, and there is some lack of interest in studying the levers of CE.

The results of this work emphasize the challenges and key enablers that will enable stakeholders to develop more effective strategies for successful implementation of the EC. By identifying real pathways to a circular built environment, the results provide insights to accelerate this transition, which is at the core of today's concerns.

Limitations and Future Research

The paper also shows that there are some limitations, especially concerning the use of one search engine, Scopus. This shows that there is no inclusion of articles from other sources. Thus, it is possible that the limitation of the search to articles from 2019-2025 and the three areas that have been determined may exclude some interesting scientific articles.

Future studies should use other sources than Scopus and other criteria for the search. They should also focus more on the research regarding the sources that drive CE

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