

CIRCULAR ECONOMY IN THE BRAZILIAN LEGAL SYSTEM: CHALLENGES FOR ITS INSTITUTIONALIZATION

Júlia Scholz Karl

juliascholzkarl@gmail.com
Santa Catarina Federal University -
UFSC, Florianópolis, SC, Brazil.

Alexandre Augusto Karl

alexandreaugustokarl@gmail.com
Santa Catarina Federal University -
UFSC, Florianópolis, SC, Brazil.

ABSTRACT

The goals for sustainable development and the new business models under the green label propose significant changes in the modus operandi of consumption and production. Since environmental protection is the main guiding target, they require greater responsibility regarding the social and environmental impacts of the production chains. It is possible to notice the importance of policymakers and legal provisions for the transition to green economies based on a Circular Economy. Despite the economic, social, and environmental advantages, there is deficient legal regulation in Brazil. This study presents the legal approach of the Circular Economy in Brazil, analyzing the challenges of its institutionalization and application. A literature review was conducted to identify studies related to the topic. Throughout the research, we identified the great potential for Brazil regarding the adoption of circular practices, which, however, fails in its normative regulation. As a result, despite the praise given to the National Policy for Solid Waste, there is no enforceable legal norm for the transition from a linear model to a circular production model. However, certifications, control bodies, trade barriers, and the demands of the foreign market itself have been means of encouraging the institutionalization of the Circular Economy in Brazil.

Keywords: Circular Economy; Legislation. Brazilian National Policy on Solid Waste.

INTRODUCTION

The circular economy (CE), unlike the linear trend prevalent since the industrial revolution, enables the generation of multiple cycles in the use of products to reduce resource use and consequently minimize waste (Ellen MacArthur Foundation, 2013). However, according to some authors (Ellen MacArthur Foundation, 2015; Azevedo, 2015; Kuzma *et al.*, 2020), research on the circular economy is still relatively new, with significant growth beginning in 2015, the year that the foundation published a series of important reports titled “Towards a circular economy.”

According to Lawandowski (2016), in the circular economy, the paradigm must be broken from the “end-of-life” to the “cradle to cradle” concept by analyzing opportunities and creating circular business models. In this context, advanced manufacturing techniques and technology should be included, reducing toxic chemicals, using renewable energy sources, and eliminating waste from superior design models across products, production lines, and systems. In this way, job opportunities can be created, the profitability of organizations can be increased, and environmental degradation can be mitigated (Linder; Sarasini; Loon, 2017).

Considering the global scenario and according to the Ellen McArthur Foundation (2020), the institutionalization of circular economy principles is still a challenge; however, when it comes to the European Union, a comprehensive circular economy policy package was adopted in December 2015. This package of initiatives includes legislative measures known as the European Circular Economy Action Plan, which, if implemented, could foster and drive a transition to a circular economy. The European project stands as one of the first plans to implement circular economy policies across Europe and beyond (Ellen MacArthur Foundation, 2020).

It is worth noting that, in general, only the large industries of a few countries are aware of the circular economy, which is still scattered among small and medium-sized companies. For now, it is observed that governments should foster the academic and industrial fields of study of CE through specific tax and fiscal legislation (Stahel, 2016) since the middle class will reach three billion people around 2030, putting pressure on our system for natural resources and increasing public pressure for companies to present processes with significant sustainable performance (Kharas, 2017).

Concerning the trade sanctions imposed by the international market, if the circular economy is neglected, it

may follow the same path as the compliance or hazardous waste rules, as can be observed in Directive 2002/96/EC on Waste Electrical and Electronic Equipment, which imposes restrictions on the use of hazardous substances (RoHS). Upon analyzing the impacts of these substances, the European Union (EU) countries undertook initiatives that reached the international market, pressuring all countries interested in continuing to export products to the EU to adapt to this new legislation (Silva; Pimenta; Campos, 2013).

In this vein, it is analyzed that, according to the Ellen McArthur Foundation (2020), the European Union has mapped out 54 actions and four legislative proposals on waste to be met by 2030 and 2035 to mitigate waste generated in its action plan. This was done by including new obligations such as separating the collection of municipal textiles and biowaste and containing targets for landfill, reuse, and recycling. On the one hand, China and the European Union have applied the circular economy’s legislative and/or normative principles in their public policies, allowing for different approaches due to their different organizational contexts. Thus, it is noteworthy that the European Union’s efforts are focused on legislative measures to foster ecodesign, while China’s focus is on cleaner production (Nery, 2017).

Therefore, academic studies have focused on identifying the circular economy principles in public policies to avoid possible negative trade sanctions (Mendes, Ferrarez, Pinto, 2020). According to the sample of articles identified, these sanctions were limited to the National Solid Waste Policy and did not address the CE legislative practices, analyzing the challenges of institutionalizing the circular economy in Brazil. For these reasons, this research aims to analyze the Brazilian legislation to identify legal instruments that allow the institutionalization of circular economy principles in the supply chain.

A literature review was conducted to gather known data to explore this relationship and generate new knowledge to initiate this understanding. The article is divided into four parts, besides this introduction. The first part presents the process used to develop the research. Next, the conceptual results discuss circular economy legislation in Brazil, its practices, and the regulatory landscape. The third part is dedicated to analyzing the Brazilian legislation related to the circular economy principles, especially the National Solid Waste Policy, the National Environmental Policy, and other related normative devices. The final section presents the article’s concluding remarks.

METHOD

General considerations

This descriptive exploratory study is intended to explore the Brazilian legislation to identify circular practices. To this end, search parameters were created with Tranfield *et al.* (2004) guidelines to order the study steps. Next, review questions and search parameters were prepared and used in the Web of Science and Scopus databases without a pre-defined timeframe to obtain articles due to the need to analyze possible environmental laws and legal ordinances that contribute to reverse logistics and circular economy.

The methodology adopted herein, considering the interdisciplinary nature of this research, was related to the legal sciences for the legislative part and analysis of legal norms, as well as to engineering, which is a determining factor in the understanding of circular supply chains and their concepts and practices, to make the study replicable and connected to the Brazilian reality. Thus, in addition to the articles collected in the Scopus and Web of Science databases, a search was conducted in the state legislative assemblies and the National Congress searching for legislation related to the circular economy.

By considering the basic purpose of this study to present the legislative practices of the Circular Economy in Brazil, searching and exploring the literature data, reports, and information that support and back up the research, two review questions were elaborated:

QR1) What is the current legislation related to the circular economy principles in Brazil?

QR2) What are the barriers to institutionalizing and implementing the circular economy in Brazil?

The purpose of QR1 is to identify current Brazilian legislation related to circular economy principles, based especially on the National Solid Waste Policy. Finally, QR2 seeks to present the challenges of institutionalizing the Circular Economy in Brazil.

Study location

Constructs, keywords, and search strings were created in the Scopus and Web of Science databases to research to obtain answers to the proposed review questions, as shown in Chart 1.

Constructs	keywords	Strings
Legislation in Circular Economy	Legislation in Circular Economy	(("Circular Economy") OR "circularity") AND (Law* OR Regulation* OR Legislation*)
	Circular Economy Law	
	Circular Economy Regulations	
	Taxation in Circular Economy	
	Circular Legislation	
	Circular Regulations	

Chart 1. Research Parameters

Study selection and evaluation

The study selection and evaluation started with the first selection, reading the title, abstract, and keywords. In the second, we read the introduction and conclusion and searched for the content of the articles. In the third selection, the full reading of the articles was conducted to evaluate the journal's quality, accessibility, theoretical-empirical content, and unit of analysis. Thus, the analysis and synthesis were conducted with a thorough reading of the articles, observing the legislation applied to the circular economy.

Articles were searched in the proposed databases for selecting and evaluating the study. The search in Scopus was limited by the final publication stage, type of source article, and language of the articles in English, Spanish, and Portuguese helping to answer the proposed QRs. In the initial search, 1,256 documents were found, and after the first selection, 96 articles were selected. Then, seven articles were chosen in the second selection and four articles in the third selection. In this step, the filter article document type in English, Spanish, and Portuguese was applied to the Web of Science. Thus, 947 articles were identified, with 63 applying to the first selection, nine to the second selection, and five to the third. In short, ten articles resulted from the analyses in the two databases, which, in turn, were entered into the Mendeley software and the duplicates were eliminated, totaling ten articles

from the databases to substantiate the proposed QRs. Furthermore, documents from reports, norms, laws, proposals for amendments to the constitution, and relevant articles from congresses were thoroughly read, totaling 19 documents and thus forming the bibliographic portfolio of the current research.

RESULTS AND DISCUSSION

The normative reception of circular economy in Brazil: perspectives of the current legislative scenario

For Karl and Scholz-Karl (2022), circular operations derive from the circular economic model, where only closed cycles exist, i.e., zero waste; thus, the circular economy concept has received increasing attention from countries around the world as an alternative to the current extract-produce-dispose linear model.

The Brazilian normative instrument at the federal level that currently comes closest to the circular economy principles is Law No. 12,305 of August 2, 2010, which established the National Solid Waste Policy (PNRS), and Decree No. 7,404 of December 23, 2010, that regulates it. Item XII of Article 3 of the PNRS defines “reverse logistics” as “an economic and social development instrument characterized by a set of actions, procedures, and means to enable the collection and return of solid waste to the business sector, for reuse in its cycle or other production cycles, or other environmentally appropriate final destination.”

The definition of reverse logistics brought by the PNRS is very similar to the Ellen MacArthur Foundation’s concept of the circular economy, which seeks to eliminate waste and pollution, keep products and materials in use, and regenerate natural systems. However, the terms circular economy and reverse logistics are not interchangeable. According to Dantas (2020), reverse logistics is one of the circular economy practices.

In this context, although the development of reverse logistics is an important aspect of the circular economy that has been normatively institutionalized in Brazil, discussions are needed on the effectiveness of the legal instruments currently provided for its application and how much they impact the implementation of the circular economy in Brazil. In this aspect, Azevedo (2015, p. 13) criticizes the effectiveness of the PNRS in the adoption of circular practices. For the author, private and public sector responsibilities should be better defined to establish preemptory deadlines to implement the circular economy

model and its production mode and provide penalties for non-compliance with said deadlines.

In the research conducted by Paes *et al.* (2020), the authors discussed how the National Policy for Solid Waste - Law no. 12,305/2010 would be aligned with the principles of the circular economy, considering its potential to close the cycle in solid waste production. By supporting environmental policies in Brazil, such as reverse logistics and shared responsibility institutes, we contribute to more efficient waste management and the implementation of the circular economy. However, one must consider the potential barriers to adopting solid waste management from a circular economy perspective, as there are regulatory barriers to the transition to a circular economy in waste management legislation.

For the National Confederation of Industries (CNI, 2019), the transition to a circular economy demands improvements in national infrastructure and public policies, and it is necessary to adapt the Brazilian tax system to stimulate the best use of natural resources. In this vein, the research developed by CNI (2019) shows that the improved use of natural resources and the use of waste as inputs by the productive sector have the potential to generate new businesses and more jobs. For this reason, to strengthen the transition to a circular model, CNI proposes, in its agenda for 2021, the development of guidelines for a National Policy on Circular Economy and the coordination of studies, aiming to define an ISO standard on circular economy.

Recently, the state of Paraná established through Law No. 20,607, dated June 10, 2021, its State Plan for Solid Waste (PERS/PR). This plan follows the guidelines of the National Solid Waste Policy - PNRS (Law No. 12,305/2010). In addition to waste management, the PERS/PR disciplines reverse logistics within the state, imposing the reverse logistics plan for post-consumption products in the environmental licensing procedures for obtaining the operating license and its renewal.

The state legislation innovated by expressly encouraging the adoption of the circular economy as one of its pillars for the first time in state legislation:

“Article 7th - The strategies of the PERS/PR are:

IV – the promotion:

b) of the adequate segregation, maximum utilization, and reduction of solid residues destined for sanitary landfills;

c) environmental education emphasizing the principles of non-generation, reduction, reuse, recycling, solid waste treatment, and environmentally sound waste disposal of waste;

V – The adoption, strengthening, and expansion of reverse logistics for post-consumer waste and the circular economy (...).”

By inserting the premises of non-generation, prevention, and minimization of solid waste generation, PERS/PR opens normative space for circular economy practices, especially innovation and product design aimed at circularity.

The PERS/PR (art. 5) also brings the full responsibility of solid waste generators in Paraná concerning the polluter-pays principle. Moreover, the PERS/PR (Art. 7) also calls the attention of solid waste generators to the shared responsibility for the life cycle of products, which demonstrates an initial step towards the transition to change in production processes, especially the idea of a closed cycle.

In general, the sustainable premises of the State Plan for Solid Waste of Paraná and the principles oriented to environmental education, considering the idea of non-generation of solid waste in line with the international perspective of the transition to a circular economy, are to be praised.

However, despite the Paraná state legislation being a step forward in the search for normative reception of the circular economy, Brazil still has no binding legislation at the federal level to impose or grant benefits to those who incorporate circular principles into their production processes.

The barriers of institutionalizing and implementing the circular economy in Brazil: an analysis based on the Brazilian legislation

The discussion about the possible institutionalization of the circular economy in Brazil is recent and faces challenges, especially regarding the lack of legislation. There is no federal legislation in the Brazilian normative scope that disciplines or regulates the circular economy model in industries.

Despite being praised internationally, the National Policy on Solid Waste (PNRS) currently fails to provide for the mandatory implementation of reverse logistics for all types of waste, according to Azevedo (2015). This is because it is restricted to the products listed in article

33: pesticides and their waste and packaging; batteries; tires; lubricating oils and their waste and packaging; fluorescent, sodium vapor, mercury, and mixed light bulbs; and electrical and electronic products and their components. The other products that do not make up this list are subject to terms of commitment and agreements that remove the legal responsibility for the product's life cycle (Azevedo, 2015).

For Foster, Roberto, and Igari (2016), the possibility of sectoral agreements in the PNRS established between the public authorities and manufacturers, importers, distributors, or traders represents the equating of responsibilities for solid waste management along the production chains, that is, the shared responsibility for the life cycle of products.

Nevertheless, it is observed that the responsibilities for the product's life cycle using reverse logistics should be defined by the PNRS to establish deadlines and sanctions so that companies are obliged to create projects for inserting the circular economy model into their production mode, considering that the scarcity of natural resources is imminent.

Another legal argument reinforcing the need to create legal instruments to institutionalize the circular economy is the constitutional and collective duty to defend and preserve the environment provided in article 225 of the 1988 Constitution of the Federative Republic of Brazil (CRFB).

In addition to the aforementioned regulatory instruments, Stival, Barros, and Veiga (2020) mention that the National Environmental Policy, established by Law No. 6,938 of August 31st, 1981, also contains objectives similar to the circular economy principles. Article 2, in its item II, by providing for the “rationalization of the use of soil, subsoil, water, and air,” correlates with the circular economy's systemic thinking. In this sense, item IV, which deals with “incentives for the study and research of technologies aimed at the rational use and protection of environmental resources,” is in line with both systemic thinking and the idea of renewable energy, whose ideas are related to the principles of the circular economy (Stival, Barros, Veiga, 2020).

Although the aforementioned legal instruments allow the implementation of measures that correlate with the principles of circular economy, so far, there is no legislation directly related to this production model. In the Brazilian scenario, an effective public policy to implement the circular economy has not yet been adopted, so Brazil still focuses on the premises of the three “R's,” which are to reduce, reuse, and recycle. In contrast, the circular

economy goes much further, working on the product design itself from the standpoint of non-generation of waste (Cosenza *et al.*, 2020). In this context, Foster, Roberto, and Igari (2016) point out that China was the first country to establish the circular economy as a national economic and social development strategy through a federal regulatory instrument, the Circular Economic Promotion Law of 2008.

In 2015, due to the European Union's Circular Economy Action Plan, there was a worldwide stimulus for Europe's transition to a circular economy to promote sustainable economic growth. The proposal contains 54 measures aimed at closing the life cycle of products. In 2020, with the launch of the New Action Plan for the Circular Economy, Europe started to take initiatives to abandon the linear model since the conception of products (Serenio *et al.*, 2020).

Given this international landscape, sustainable practices have received increasing attention from academics, businesses, and policymakers in recent decades (Sadhukhan *et al.*, 2020; Stahel, 2017). This movement has been intensified due to global commitments focused on reducing greenhouse gas emissions to address resource scarcity and rethink waste management (EMF, 2015; Zhang *et al.*, 2019).

Furthermore, international agreements and policies require sustainability-related initiatives as a prerequisite for contracts, turning adherence to sustainable initiatives into a market advantage (Filippini *et al.*, 2019; Juste-Ruiz, 2020). According to Rashed and Shah (2020), businesses are critical stakeholders capable of accelerating the implementation of sustainable practices outlined in the United Nations Agenda 2030 (UN, 2015). Research shows that private engagement provides win-win situations for their own business, society, and the environment (Dantas *et al.*, 2020; Scheyvens *et al.*, 2016).

Assunção (2019) analyzed in his recent research the evolutionary process of the circular economy in Brazil from the perspective of environmental management and the actions proposed with this bias. Most of the actions taken in the Brazilian scenario are based on the National Solid Waste Policy. However, non-enforcement standards can also drive the transition to a circular economy, such as ISO 14006 of 2011, which defines the production criteria for raw materials and product production that generate less impact on the environment under the ecodesign principle.

In Brazil, one of the paths to its institutionalization may be the creation of a National Policy for Circular Economy through the elaboration of an ISO standard on circular

economy. This is also an alternative supported by the National Confederation of Industries (CNI). According to the survey conducted by that confederation in 2019, the main reasons for adopting circular practices in industries are the search for operational efficiency (69.2%) and new business opportunities (41.5%). Other reasons include (i) customer requests (20.8%), (ii) meeting legal compliance (18.5%), and (iii) shareholder requests (7.7%).

The Circular Economy 100 (CE100) program was created to offer collaboration and innovation, bringing together stakeholders related to business, government, academia, and organizations to work on the transition from the linear economy to the circular economy in Brazil. With the support of CE100 Global and the Ellen MacArthur Foundation, the program sought to develop creative solutions aimed at sustainable development in Brazil by sharing knowledge and solutions to change the Brazilian productive paradigm.

In Brazil, the Ellen MacArthur Foundation studies carried out in 2017 focused on the following sectors: agriculture and biodiversity assets, buildings and construction, and electrical and electronic equipment. According to the report (Ellen MacArthur Foundation, 2017), environmental certifications are being adopted as a first step in the circular economy transition and development of circular projects in the building and construction sector in the Brazilian scenario. The use of circular principles in new developments to avoid linear constraints has proven to be an important starting point.

CONCLUSION

Several practices are needed to foster the circular economy, such as improving waste reuse and recycling, which are only transitional activities of the business models. All stages of the product life cycle must also be analyzed and improved, including design, production, use, and reuse, reducing primary materials and influencing overall consumption by making a product or service an ecologically superior practice to obtaining and maintaining it.

Because of Brazil's unique market and social characteristics and its vast natural capital, the Ellen MacArthur Foundation sees the country as an attractive scenario for the transition to a circular economy, as this production model can contribute to building economic, social, and natural capital, despite economic turbulence and budgetary constraints.

The promotion of circular practices must be encouraged in the federal sphere and each state, given the peculiarities related to the Brazilian natural resources and bi-

ome and the tax and fiscal burdens. As seen, the state of Paraná stands out among the rest of the Brazilian federation for being the first to incorporate the term “circular economy” into the legislative scope, including disciplining the principle of non-generation of waste and environmental education from the premises of the circular economy.

In this context, the article has fulfilled its objective of understanding the legislative practices of the Brazilian Circular Economy by exploring in a general way the legal foundations of the CE in the world, contributing to obtaining a grounded legal system focused on the citizen, on the environment, and economic development. However, even though the National Solid Waste Policy is praised, there are omissions as to the circular economy since it only addressed a part of it, i.e., it has disciplined reverse logistics but omitted to address the responsibility for waste generation. In this sense, it is still necessary to reform the legal regulations in Brazil to contemplate the non-generation principle, addressing the responsibility for consumption and production since the product’s design.

However, future research will broaden this search into other legal systems to conduct a comparative analysis to pave the way for the institutionalization of the circular economy in Brazilian legislation.

REFERENCES

Assunção, GM 2019, ‘A gestão ambiental rumo à economia circular: como o Brasil se apresenta nessa discussão’, *Sistemas & Gestão*, vol. 14, no. 2, pp. 223-231.

Azevedo, JL 2015 ‘A Economia Circular Aplicada no Brasil: uma análise a partir dos instrumentos legais existentes para a logística reversa’, artigo apresentado no *XI Congresso Nacional de Excelência em Gestão*, 2015.

Brasil, Lei n. 12.305, de 2 de agosto de 2010, Política Nacional de Resíduos Sólidos (PNRS).

CNI – Confederação Nacional da Indústria. Economia Circular 2019, disponível em: <http://www.portaldaindustria.com.br/cni/canais/industria-sustentavel/temas-de-atuacao/economia-circular> (acesso em 28 out. 2021).

Cosenza, JP, De Andrade, EM, De Assunção, GM 2020, ‘Economia circular como alternativa para o crescimento sustentável brasileiro: análise da Política Nacional de Resíduos Sólidos’, *Revista de Gestão Ambiental e Sustentabilidade*, vol. 9, no. 1, pp. 16147.

Dantas, TET, Souza, ED & Destro, IR 2020, ‘How the combination of Circular Economy and Industry 4.0 can contribute towards achieving the Sustainable Development Goals’. *Sustainable Production and Consumption*.

Ellen Macarthur Foundation 2013, ‘Towards the circular economy: economic and business rationale for an accelerated transition’, disponível em: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur_Foundation-Towards-the-Circular-Economy-vol.1.pdf (acesso em: 20 nov. 2021).

Ellen Macarthur Foundation, Mckinsey Center For Business And Environment 2015, ‘Growth within: a circular economy vision for a competitive Europe’, Ellen MacArthur Foundation.

Ellen Macarthur Foundation 2017, ‘Uma Economia Circular no Brasil: uma abordagem exploratória inicial’, EMF - Ellen Macarthur Foundation.

Foster, A, Roberto, SS & Igari, AT 2016, ‘Economia circular e resíduos sólidos: uma revisão sistemática sobre a eficiência ambiental e econômica’, *Anais do Encontro Internacional Sobre Gestão Empresarial e Meio Ambiente*, São Paulo.

Iwasaka, FY 2018, ‘Políticas públicas e economia circular: levantamento internacional e avaliação da Política Nacional de Resíduos Sólidos’, Tese de Doutorado, Universidade de São Paulo.

Karl, AA & Scholz-Karl, JS 2022, ‘Human rights for refugees: enhancing sustainable humanitarian supply chain to guarantee a health environment in refugee settlements’, *Journal of Humanitarian Logistics and Supply Chain Management*, DOI: <https://doi.org/10.1108/JHLSCM-11-2020-0104>

Kharas, H 2017, ‘The unprecedented expansion of the global middle class: An update’, disponível em: <https://thinkasia.org/bitstream/handle/11540/7251/global-20170228global-middle-class.pdf?sequence=1> (acesso em 21 nov. 2021).

Kuzma, EL, Sehnem, S & Bencke, FF 2020, ‘Design do Método de Pesquisa em Economia Circular: Uma Revisão Sistemática de Literatura’, *Revista Gestão Organizacional*, 13.3, pp. 93-118.

Lewandowski, M 2016 ‘Designing the Business Models for Circular Economy—Towards the Conceptual Framework’, *Sustainability, Basel*, vol. 8, no. 1, pp. 43.

Linder, M, Sarasini, S & Loon, P 2017, ‘A Metric for Quantifying Product-Level Circularity’, *Journal of Industrial Ecology*, Hoboken, vol. 21, no. 3, pp. 545-558.

Mendes, IVSA, Ferrarez, AH & Pinto, A 2020, ‘Legislação sobre Economia Circular no Brasil e no Mundo’, *XII CON-FICT - V CONPG 2020*.

Nery, SM 2017, ‘A Economia Circular e o Cenário no Brasil e na Europa’, pp. 1-388-416,

Paes, L. *et al.* 2020, 'A Transition Toward a Circular Economy: Insights from Brazilian National Policy on Solid Waste', *Handbook of Solid Waste Management: Sustainability through Circular Economy*, pp. 1-31.

Paraná, Lei n. 20.607, de 10 de junho de 2021, *Plano Estadual de Resíduos Sólidos (PERS/PR)*.

Sereno, A, Magrinho, A, Filipe, C, Seabra, FM & Negas, M 2020, 'A Economia Circular', *Grupo de Trabalho Economia Circular e Ambiente*, REDE RSO PT.

Stival, LT, Barros, RG, Veiga, RM 2020, 'Os instrumentos legais de gestão ambiental e sua relação com os princípios da economia circular', *Caminhos de Geografia*, vol. 21, no. 73, pp. 70–85-70–85.

Tranfield, D, Denyer, D, Marcos, J & Burr, M 2004, 'Co-producing management knowledge', *Management Decision*.

Received: January 24, 2022

Approved: April 5, 2022

DOI: 10.20985/1980-5160.2022.v17n1.1774

How to cite: Karl, J.S., Karl, A.A. (2022). Circular economy in the brazilian legal system: challenges for its institutionalization. *Revista S&G* 17, 1. <https://revistasg.emnuvens.com.br/sg/article/view/1774>