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# The Portuguese Circular Entrepreneurial Ecosystem: Experts Advice on How to Overcome the Challenges

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**Abstract:** Entrepreneurial ecosystems are unique. Considering the singularities of the Portuguese entrepreneurial ecosystem, this study aims to answer the following question: how can entrepreneurs overcome the challenges of starting their circular businesses in Portugal? To answer it, we carried out a focus group with experts. This study is based on the empirical analysis of data collected in the scope of the RE-START (Reinforcing the Circular Economy Model for START-Ups) Erasmus Plus project, involving organizations from five European countries. The solutions chosen to boost circular businesses predominantly involve education for circular entrepreneurship, cooperation between businesses and universities, and circular entrepreneurs' competencies. Therefore, these research contributions involve an in-depth understanding of the current context of the circular entrepreneurial ecosystem in Portugal, aligned with elucidating what ought to be adopted to overcome the challenges of this context. These draw attention to the crucial issues that policymakers should consider when regulating and promoting the circular economy. Furthermore, we recommend various actions for the stakeholders in order to foster a sound circular economy ecosystem in Portugal while emphasizing collaborative behaviors.

**Keywords:** entrepreneurship; entrepreneurship education; circular economy; start-up; Portugal

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## 1. Introduction

The challenge of transitioning to a circular economy is present in all countries. However, it is impossible to perform this transition while maintaining businesses' processes, structures, and methods. In 2020, the European Commission [1] approved the new Circular Economy Action Plan (CEAP), which pronounces the objectives, actions, and exact timetable of its implementation, and concludes by 2050. The European Union's aims to accomplish this in order to halt biodiversity loss and achieve climate neutrality. In addition, the plan proposes a set of interconnected initiatives to create a strong and coherent product policy framework to make sustainable services, products, and business models [1].

The CEAP should support the European Union's (EU) industrial strategy. Once the capacity of EU start-ups to create innovative and disruptive technologies is realized, based on implementing at least one of the Circular Economy (CE) strategies, they will contribute to the ability of countries to transition into a greener economy [2]. Several EU instruments for deploying green solutions are identified in the Green Deal (an action plan for a sustainable economy aiming to reduce net greenhouse gas emissions) and circular economy plan. In order to achieve the Green Deal goals, Krajnc et al. [3] stressed the relevance of young people's entrepreneurial activities, which together with institutions and governments, would contribute to creating conditions for the transition to a circular economy. All these new plans and regulations from the EU are in line with several Sustainable Development Goals (SDGs), such as the one related to affordable and sustainable energy (SDG 7); the promotion of sustained, inclusive, and sustainable economic growth (SDG 8); and sustainable infrastructure, industrialization and the fostering of innovation (SDG 9).

Moreover, creating circular businesses is growing in demand and attractiveness. Similarly, a circular economy is the main driving force of businesses that address innovation and sustainability [4]. Conversely, even though companies aim to adopt circular business models, this path is not straightforward, being generally arduous and slow.

Concerning the macro level, European countries, China, and the United States implement CE practices differently to other nations [5]. Although there is a unified European action plan for circularity, each country is at a different transition stage. The entrepreneurial ecosystem is a local phenomenon [6]. Therefore, their transition challenges are different and should occasion distinct approaches. Once the research on the CE has been completed, there is a need for in-depth debate [7]. Portugal, for example, has a growing community of innovative foreign companies; it was ranked as the 12th best emerging ecosystem, according to Startup Genome's Global Startup Ecosystem Report 2020.

Appropriately, in this research, we focus on Portugal using a qualitative method, as it is necessary to understand the challenges and their possible solutions thoroughly. Therefore, our study aims to answer the following question: How can entrepreneurs in Portugal overcome the challenges of starting their circular businesses? We utilize a focus group with experts and a content analysis approach. Accordingly, these research contributions involve an in-depth understanding of the current context of the Portuguese circular entrepreneurial ecosystem, aligned with elucidating what ought to be addressed to overcome the challenges of this context. Moreover, we expect to offer suggestions for academics and practitioners in order to foster a healthy Portuguese CE ecosystem.

## 2. Theoretical Background

In this section, we present the constructs that will underpin the analysis of the results and the discussion. We begin by addressing circular entrepreneurship. Following that, we introduce the Portuguese entrepreneurial landscape.

### 2.1. Circular Entrepreneurship

The circular economy can be seen as an "umbrella" construct. It refers to several issues, such as waste and resource management and disposal practices [5,8], always aiming to maximize the value in each phase of the product life cycle [9]. The eco-design, and the design for recyclability and reusability, assume here a crucial role. In this sense, Kirchherr et al. [10] propose that the CE concept is based on the "R" principles. Likewise, Khan et al. [5] suggest that the concept is based on different framework models, which move from the 3R's (Reuse, Reduce, Recycle) to the 6R's (Redesign, Reduce, Reuse, Remanufacture, Recycle, Recover), or even to the 10 R's (Refuse, Redesign, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover). Accordingly, the CE is beginning to enclose the entire product life cycle.

Another target related to the CE is the "loop". This refers to closing, slowing, or narrowing resource loops [11]. The authors explain that loops can be closed by reusing materials that have already been used or recycled; slowing refers to extending the use of the products over time; and narrowing is related to a reduction in the quantity of resources necessary to produce something. Thus, the CE appeared as an alternative model to the conventional linear system, which is based on the idea of take-make-dispose, that instead contributes to sustainable development [12]. However, conciliating the production and productivity levels, while considering the necessity of adapting processes and convincing consumers, is very challenging. Furthermore, the report of the Ellen MacArthur Foundation explains that the transition to a CE implies a general change in the system in order to reduce the impacts of the linear economy and to construct long-term products, considering environmental and social benefits. Since the basic principle is to transform waste into a resource, the way in which to manage the several types of waste emerges as a relevant CE pillar.

The emphasis placed on the CE may create opportunities for new business development, including resource and waste management, product design, and new business

models [9]. According to Foroozanfar et al. [13], these models are developed around five components: (i) closing loops; (ii) value creation; (iii) strategy; (iv) entity matching; and (v) circular revenue systems. Closely related to these, entrepreneurship has become a crucial factor in capturing value from a new circular business. To Suchek et al. [12], even though research is in an early phase of development, it is possible to identify, in the scope of circular entrepreneurship, four main topics: growing circular SMEs (more prominent when compared with the others), new circular firms and start-ups; social entrepreneurship in the CE; and a support ecosystem for circular entrepreneurship.

Therefore, according to Zucchella and Urban [14], circular entrepreneurship can be defined as a process of discovering and exploring business opportunities in the CE and pursuing sustainability. It considers the economic, social, and environmental dimensions. This type of entrepreneurship connects with organic entrepreneurship (health/well-being), green entrepreneurship (climate/ecosystems), and blue entrepreneurship (clean water/marine life). The approach to the CE and entrepreneurship should be multidimensional since it engages with several fields of knowledge. Alonso-Almeida et al. [15] suggest that this approach adds novelty to the existing knowledge about socially and environmentally responsible corporate practices. In sum, circular entrepreneurship involves a set of practices, including “exploring and exploiting entrepreneurial opportunities; incorporating environmental and social benefits into exploring and exploiting entrepreneurial opportunities; innovating business models towards the CE; and sharing resources to improve the overall performance of the communities in the supply chain and continuously innovating to contribute to the wider community towards national and global sustainable development goals” (SDGs) [4]. These SDGs emphasize the need for constructing an economic infrastructure and promoting industrialization based on innovation, sustainable production and consumption models [16]. At this point, SDG 12 assumes special relevance since it seeks to guarantee sustainable patterns of consumption and production, and a way of achieving these could be through circularity.

Manioudis and Meramveliotakis [17] discuss a broad analytical and methodological framework for sustainable development studies, which draws upon the multi-layered legacy of classical political economy. The framework suggests a return to the tradition of classical political economy. This would provide a powerful theoretical foundation for contextualizing, developing, and integrating the multiple and diverse contemporary strands of development studies. The article emphasizes the importance of history and the necessity of an interdisciplinary approach in sustainable development studies. Furthermore, it argues that social classes should be given analytical priority, as this would enrich the understanding of sustainable development. Moreover, an important dimension associated with the circular economy is the role of clustering and networking. Homrich et al. [18] investigate the trends and gaps in the circular economy literature, with a focus on pathway convergence. A combination of research methods is used in a systematic literature review, namely semantic analysis, biblio-metrics, networks, and content analysis. Overall, the study highlights the need for further research and dialogue in order to promote convergence and consensus in the circular economy literature.

Furthermore, some companies are born circular, since they develop circular value propositions from their creation. These start-ups focus on finding solutions to environmental problems by creating a new and environmentally sustainable offer of products and/or services [12]. Conversely, many firms are not born circular but become circular by asking to develop less impactful products and adopting circularity principles [14]. Thus, opportunities can be taken by all companies. However, the more entrepreneurial ones, with innovative business models, will be crucial for the transition to a circular economy, bearing in mind not only the environmental aspects, but also taking into account of the social issues that are related to sustainable development goals.

## 2.2. Portuguese Entrepreneurial Ecosystem

An entrepreneurial ecosystem is composed of a conducive culture, enabling policies and leadership, the availability of appropriate finance, quality human capital, venture-friendly markets for products, and institutional/infrastructural support [19]. Acs et al. [20] consider it a “dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures”. Entrepreneurial ecosystems are based on the relational elements between different institutional stakeholders and innovation, recognizing that enterprises do not function on their own, but are inserted into a broader social, cultural, and institutional environment that influences their growth. This perspective differs from the regional innovation model because the entrepreneur, not the company, is at the center of the equation, emphasizing the role of the implicit social and economic context in the entrepreneurial process [21].

The conjunction between circular economy and innovation must be stressed, as it is a crucial aspect of creating a sustainable future. Circular economy is an economic model that aims to reduce waste and maximize the use of resources by keeping materials and products in use for as long as possible through reuse, repair, and recycling [22]. Innovation, on the other hand, involves developing new ideas, processes, and technologies that can drive progress and change [23]. By combining circular economy and innovation, we can create new solutions that can help address the challenges of resource depletion and waste management. Innovation can help to identify new and better ways to use materials, reduce waste, and develop new sustainable products and services. Circular economy, in turn, can provide a framework that guides the design of products and services that are regenerative and restorative, ensuring that resources are kept in use for as long as possible [10]. Together, circular economy and innovation can help to create a more sustainable and prosperous future by driving economic growth, creating jobs, and reducing environmental impact. By promoting collaboration and partnerships between businesses, governments, and communities, we can accelerate the transition to a circular economy and foster the development of new innovative solutions [24,25].

Regarding the Portuguese case, Startup Portugal highlights the value of the national entrepreneurial ecosystem; besides the unicorns originating in Portugal—Farfetch, OutSystems, Talkdesk, and Feedzai—several other companies are also starting to be valued in the international ecosystem. In addition, they show that, in recent years, the Portuguese entrepreneurial ecosystem has experienced unprecedented dynamism. In 2021, the activity of the Portuguese start-up ecosystem already represented 1.1% of the Gross Domestic Product (GDP), providing 25,000 jobs. According to the European Innovation Scoreboard 2020 [26], Portuguese SMEs are moderate innovators. Innovation in-house and/or product introduction and process innovations have been developed, performing above the EU average. A strong increase since 2015 has been detected in business process innovators, employment in innovative enterprises and public-private co-publications. It is also important to emphasize the country’s capital, Lisbon, as one of the main Portuguese entrepreneurship hubs. The city of Coimbra is another case of success; Santos [21] suggests that the university and its spin-offs, technological park, and incubators, are excellent areas of propulsion for creating and developing entrepreneurial ecosystems. Thus, the author draws upon some implications of his analysis and calls upon policymakers to (re)formulate more accurate strategies to promote territorial innovation and entrepreneurship; this is in order to accomplish a transformation in territorial governance, changing its focus from a managerial one into an entrepreneurial one.

Overall, there has been a very positive evolution of entrepreneurship in Portugal. It is explained by factors that include the following: the economic crisis predisposing more people to taking risks; a significant increase in the quality of human resources, namely in information, communication, and electronic technologies; the existence of an evolved national technological infrastructure; the development and growing maturity of the various agents of the entrepreneurial ecosystem, namely business angels, venture capital, large com-

panies, incubators and accelerators, associations, and universities; and government policies that are favorable to the development of entrepreneurship (Estudo do Ecossistema de Apoio ao Empreendedorismo de Base Tecnológica em Portugal e Silicon Valley. TICE.PT—Pólo das Tecnologias de Informação, Comunicação e Electrónica, [https://www.tice.pt/sites/default/files/projetos-pdf/estudo\\_sobre\\_empreendedorismo\\_sv.pdf](https://www.tice.pt/sites/default/files/projetos-pdf/estudo_sobre_empreendedorismo_sv.pdf) (accessed on 24 February 2023)). This is in line with Spigel's [27] point of view that mentions that some of the advantages of an entrepreneurial ecosystem are related to aspects such as the start-up culture, risk-taking behavior, and innovative financing instruments.

However, there are still factors that hinder the entire operation of this ecosystem: the capacity of the driving agents, such as incubators/accelerators and venture capital; the individualistic and not very result-oriented culture; the lack of synergies and the consequent pulverization of resources; the absence of knowledge management; the general context (bureaucracy, slow justice, complex licensing); inefficient markets; and universities and the scientific and technological system having a limited capacity to transform academic know-how into business value. Additionally, a key challenge for Portuguese firms is finance [28]. Next, some of the conclusions of several studies [6,29–31], related to some aspects of the Portuguese entrepreneurial ecosystem, will be presented.

Venâncio et al. [29] found evidence that reducing taxes can increase firm formation and job creation. Their results suggest that in the municipalities targeted by the tax policy, the number of new firms increased (41%) alongside new firm job creation (24%), indicating that corporate taxation is a significant barrier to entrepreneurship. In turn, Riaz et al. [6], analyzing the effect of institutional transparency on the relationship between the entrepreneurial ecosystem and start-ups, applied to the context of Portuguese municipalities, concluded that, on average, institutional transparency positively moderates the relationship between the entrepreneurial ecosystem and the creation of start-ups, and that the presence of higher education institutions in a municipality helps to attract more start-ups. Likewise, Galvão et al. [30] conducted a study involving three Portuguese universities (UBI, UTAD, and UAlg), located in low-density territories, and compared their role in co-creating knowledge and the transference of it to the community. The authors concluded that all institutions have strong relations with the business community, and in some cases, there are partnerships to apply for funds (national or European). Moreover, the connections between the companies and universities bring economic development and qualified human resources to the region of interest. Nevertheless, both universities and companies are still very dependent on projects funded by public money, and private investment in research and development is reduced.

Dal Bello et al. [31], focusing their analysis on rural ecosystems, concluded that these sites increasingly attract new entrepreneurs due to several factors, such as taking advantage of business opportunities, looking for a better quality of life, and meeting the needs of the family. Indeed, personal motivations can leverage this desire, but usually, these entrepreneurs complain about the lack of infrastructure, human and financial resources, and little knowledge about business.

### 3. Research Design

The literature review revealed scarce empirical knowledge regarding circular entrepreneurship in the Portuguese context and the need to create an enlightening overview. Hence, we decided that qualitative data is suitable [32]. Thus, in order to answer the research question, 'How can entrepreneurs in Portugal overcome the challenges of starting their circular business?', we selected using a focus group as the method for exploratory qualitative data collection. In this research technique, participants interact in a moderator-led discussion [33]. It is the most appropriate method because it makes it possible to understand the issues related to diversity and consensus among the participants [34].

### 3.1. The RE-START Project

This study is based on the empirical analysis of some of the data collected in the scope of the RE-START (REinforcing the circular economy model for START-ups) project. It is an Erasmus Plus project that involves six organizations from five European countries. The partners involved present different competencies according to their typology: a foundation from Spain (Fundación Empresa Universidad de Alicante de la Comunidad Valenciana); a Non-Governmental Organization from Greece (Innovation Hive); two universities from Greece and Portugal (Hellenic Open University and the University of Beira Interior), and two companies from Cyprus and Poland (GrantXpert Consulting and Danmar Computers).

The project's primary goals are as follows: (i) to reduce the skills mismatch between Higher Education and the demands of today's labor market; (ii) foster HEI students' sustainability mentality and eco-responsible citizenship; (iii) equip HEI students with adequate circular economy strategies (5R-strategies; Reduce, Reuse, Recycle, Recover, Regenerate) and competences that reinforce Circular Entrepreneurship; (iv) encourage HEI students to collaborate with established circular start-ups and commercialize their business idea through the RE-START competition; (v) stimulate HEI students to think creatively, take initiatives and develop transversal skills; and (vi) increase economic growth and competitiveness in Europe.

Furthermore, the project aims to develop some deliverables, such as the development of Circular Business Models by the participants enrolled in courses specifically designed to this end, using the tool developed and having guidance from mentors involved in the Online Community Platform of RE-START. Thus, the project will provide seven short courses on entrepreneurial competencies that reinforce the Circular Economy approach available, as OERs and a Guidebook for trainers and academics, which will guide how to plan, prepare for, and deliver training using the RE-START MOOC. Accordingly, for the purpose of the project's intellectual outputs, all the supporting materials will be developed based on primary and secondary research conducted in every participating country.

### 3.2. The Focus Group Approach

A focus group is a tool for creating knowledge that results from prior beliefs, experiences, and group interaction [34]. Thus, the partners collaboratively developed a semi-structured script, supported by the issues presented in the literature, to guide the interaction. Following this, insights emerge about the discussion's similarities and differences, which is possible due to the participants' diverse backgrounds. Accordingly, the focus group offers a variety of perspectives and experiences to support answering the research question [34].

Different interpretations are suitable to provide a comprehensive debate on overcoming the challenges of starting circular businesses in Portugal. To ensure meaningful interaction during the discussion, we carefully selected a heterogeneous group of experts with a common ground [34,35] in the circular economy. The experts have social relevance due to "their ability to affect people's practices to a significant degree" [35]. In addition, they possess specific knowledge (i.e., technical, process, and interpretative knowledge) related to the issue and have a role in different decision-making processes. Therefore, their perceptions offer guidelines for social action meaningfully [35].

The number of participants in a focus group typically ranges from five to ten people [34]. Accordingly, we selected eight participants based on their expertise in circular business in Portugal (see Appendix A). The group of experts comprised (#P1) a circular textile entrepreneur; (#P2) a policymaker; (#P3) a consultant; (#P4) an incubator manager; (#P5) a project office staff member; (#P6) an engineering academic; (#P7) a trainer; and (#P8) a Ph.D. student in management. Before the discussion, all participants received information about the purpose of the research. Moreover, the moderator has experience in qualitative data collection, a PhD in management, and is involved in project management in Erasmus Plus projects, focused on entrepreneurship education and circular economy.

The focus group was conducted online and synchronously using the Zoom application on 13 September 2022, lasting two and a half hours. The Portuguese project coordinator led, and the project manager moderated the focus group. At the beginning of the meeting, the moderator explained the procedures, and the participants had the opportunity to speak to create a rapport. The topics discussed included the challenges present in creating a circular business in Portugal, overcoming the challenges, integrating industry/university, the competencies a start-up needs to create a circular business, and education in terms of a circular economy. Toward the end, the participants were invited to advise the entrepreneurs-to-be. Following the recording of the meeting, it was transcribed.

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

#### 4. Analysis of the Results

Content analysis was used to analyze the data [36]. Additionally, we codified (Table 1), combining induction and deduction [34,36]. The first code concerns the (C1) challenges in the Portuguese circular entrepreneurial ecosystem. The second code addresses the (C2) solutions, and it is sub-coded in (C2.1) circular entrepreneurship education, (C2.2) cooperation between businesses and universities, and (C2.3) circular entrepreneurs' competencies. Subsequently, the following subtopics present the analysis of each code and subcode.

**Table 1.** Coding agenda (adapted from Mayring [36]).

Category	Definition	Examples	Coding Rules
<b>C1. Challenges in the Portuguese circular entrepreneurial ecosystem</b>	Mention of challenges present in creating a circular business in Portugal.	"No doubt that the lack of funding for the circular industry in the textile area is severe and problematic" (#P1)	If the challenge quote is detailed and related to education/training, the code is under C2.1.
<b>C2. Solutions for circular entrepreneurs in Portugal</b>	Mention of the solutions to overcome the challenges present in creating a circular business in Portugal.	"There are technological solutions for multiple sectors of the economy [...] transforming waste into raw materials for other sectors. These scientific and technological challenges need more investment [...] for companies, but also more investment is needed in these areas [...]'" (#P6)	If the solution quote is detailed and related to education/training, the code is under C2.1.
<i>C2.1. Circular Entrepreneurial Education</i>	Mention of training, education, and learning for circular entrepreneurship.	"Sometimes the model we have, with many hours, is very cumbersome. If there are actions of shorter duration, perhaps these could be more accepted and lead people to participate" (#P3)	If the training/education quote is detailed and related to collaboration, the code is under C2.2.
<i>C2.2. Industry/University Collaboration</i>	Mentions the collaboration between businesses and higher education institutes.	"I would like to add that it is imperative to involve companies/universities, local authorities, and municipalities in this partnership because this business is beginning to gain sustainability within the logic of the local economy" (#P7)	If the collaboration quote is detailed and related to training/education, the code is under C2.1.
<i>C2.3. Circular Start-up Competencies</i>	Mention the personal competencies and characteristics the circular entrepreneur is expected to have/acquire.	"We are all entrepreneurs and what makes us more entrepreneurial or more resilient is precisely the ability to change, and the people who will survive the least are the ones who have less capacity to change, to adapt [...] Entrepreneurs will only be entrepreneurs if they have this ability from the start" (#P6)	If the competencies quote is detailed and related to education/training, the code is under C2.1.

##### 4.1. Challenges in the Portuguese Circular Entrepreneurial Ecosystem

The initial question was related to the challenges that circular entrepreneurs face in Portugal. First, the circular entrepreneur (#P1) mentioned funding, the absence of machinery, communication, legislation, and taxes. Following, the consultant (#P3) added licensing (costs and slowness) for using the "waste", and stressed that the scarcity of access to capital is a serious problem. Next, the policymaker (#P2) engaged in the previous comment, highlighting levels of awareness in terms of using waste, by-products, and raw

materials. Furthermore, the academic (#P6) agreed with the challenges mentioned formerly. Finally, the incubator manager (#P4) pointed out the lack of tangible incentives. In sum, while some challenges are like those faced by all entrepreneurs, others are intrinsically linked to circular entrepreneurship.

#### 4.2. Solutions for Circular Entrepreneurship in Portugal

Following the challenges, the group presented their vision of how to solve these problems in the Portuguese entrepreneurial ecosystem. The academic (#P6) started by listing the following solutions: (i) scientific and technological issues; (ii) the integration of sectors with industrial co-utilization (passing waste from one sector to another; an integrated combination of waste management); (iii) investment in education and training of people; (iv) greater concentration of efforts at a regional level for circular economy and entrepreneurship, and combining waste in a regional center for circular economy; (v) patents, and the creation of a productive and circular system of knowledge sharing; (vi) a greater cooperation between entities/sectors in order to foster the development of the circular economy; and (vii) ensuring that the circular economy is beneficial to people so that they can live better and protect the environment and its ecosystems by increasing resilience at an affordable price. Moreover, #P6 addressed investment funds and how they should be used to finance the transition to a circular economy, with companies receiving tax breaks; #P6 also inferred how these funds would be spent in the circular economy.

Furthermore, the trainer (#P7) stressed the need for the development of circular citizenship, platforms with information for consumers about household waste, a more aggressive tax regime for companies that do not adopt the circular economy logic, and incentives for the circular supply chain. In addition, the Ph.D. student (#P8) stated the relevance of “talking with consumers, talking with suppliers, peers, and other institutions because co-creation underlies business models”. In addition, it is crucial to be in contact with consumers, whether to engage them, involve them or encourage them to use and consume more sustainably, or to ask them for feedback in order to improve and achieve a more sustainable business model successfully.

##### 4.2.1. Circular Entrepreneurial Education

Entrepreneurial education was the solution that was most addressed by the experts. The Ph.D. student (#P8) highlighted the need to train/educate people concerning the difference between finding a business opportunity and turning it into a circular business, and finding a circular idea and turning it into a business. Likewise, #P8 argued that some components of the circular economy should be added to the curriculum: “so, starting from environmental management systems, begin to include these components not only in engineering but also in a transversal way, in fashion, management courses, etc. I think that, in general, it is better to have interdisciplinary teams that will be able to find good solutions because it is an engineer or a designer who will be able to find a more circular product. Still, students from other areas will have better conditions to promote and put the product on the market”.

Moreover, the consultant (#P3) stated, “it would be opportune to promote and develop some courses or short-term actions with the industry. Sometimes the model we have, with many hours, is very cumbersome. If there are actions of shorter duration, perhaps these could be more accepted and lead people to participate. The responsibility is on both sides, but maybe it is easier for the university to invite the industry than for the industry to take the initiative to go to the university”.

Additionally, the trainer (#P7) stated that “adhering to these circular economy things has not been easy. Usually, these programs do not start because there has been little adherence to generic training in a circular economy”. Moreover, “in the case of training for companies, work must be done for the leaders. [ . . . ] Once the leadership is sensitized, it is easy to implement these training programs in companies [ . . . ] In the case of companies, to recover their business model, new practices encourage workers to have the daring and

creativity to do things differently to bring the company closer to the logic of a circular economy". #P7 also mentioned the importance of training students and future entrepreneurs in circular citizenship.

The circular entrepreneur (#P1) commented on educating people about the social impact of business in terms of communication and hiring employees. Likewise, #P1 raised the issue of female entrepreneurship being relevant in circular entrepreneurship. Furthermore, the incubator manager (#P4) added green finance and the need to address existing regulations in circular business.

#### 4.2.2. Industry/University Collaboration

The experts highlighted the collaboration between businesses and universities. Initially, e.g., addressing the issues to be solved, the incubator manager (#P4) mentioned that "the languages are quite different. The people and the staff that are at the university have very complicated schedules, and it is necessary that the companies also understand this. So, people from companies often come here and say that the university is disconnected from the industry".

Regarding the solutions raised by the industry/university collaboration, the trainer (#P7) stated, "it is imperative to involve companies/universities, local authorities, and municipalities in this partnership because this business is beginning to gain sustainability within the logic of the local economy. The greater involvement there is on the part of municipalities or even smaller structures, such as parishes, also stimulates the issue of citizenship and conscious consumption. In some way, they will also support companies to gain on a particular scale and jump from the comfort zone of the neighborhood or the city to a slightly larger scale. Therefore, the involvement of municipalities is significant in this partnership between companies and universities".

Furthermore, the circular entrepreneur (#P1) included that "some resources within the academy could be made available to companies at the level of collaboration. I am speaking about life cycle assessments that are so important and costly, and impact reports and things like that. The collaboration strategy would be critical to bringing academia to the business world".

#### 4.2.3. Circular Start-Up Competencies

On the competencies that circular entrepreneurs should have, the circular entrepreneur (#P1) pointed out that resilience is an indispensable competence, that an entrepreneur from this field should have some background in academic research, and that they should be concerned with understanding the current research on circular economy. The project office staff (#P5) and the academic (#P6) agreed. The last affirmed that "we are all entrepreneurs and what makes us more entrepreneurial or more resilient is precisely the ability to change, and the people who will survive the least are the ones who have less capacity to change, to adapt [ . . . ] Entrepreneurs will only be entrepreneurs if they have this ability from the start". Following, the Ph.D. student (#P8) highlighted the necessity of possessing rhetorical competencies in order to convince consumers about the added value for society and for sustainable development in purchasing products from circulars.

### 5. Discussion

While more than half of the research on the CE is conceptual [5], we conducted empirical qualitative research. Moreover, in previous research, the CE is analyzed at the micro-level [5]. Conversely, we analyzed the macro level. In addition, the analysis of the results has revealed that the challenges and solutions related to the CE in Portugal are closely associated with the average entrepreneurial issues that exist in this entrepreneurial ecosystem [21]. Furthermore, SDG 12 assumed an emphasized position in the results, along with finance, innovation, and collaboration in the CE.

Our outcomes show that CE entrepreneurship in Portugal is still very feeble. Although a culture of entrepreneurship might exist, there is not a culture of circular economy; this is

essential as a conductive culture is one of the cornerstones of an entrepreneurial ecosystem [19]. To improve CE entrepreneurship culture, educational programs on what the CE is and the opportunities connected to it should be set. As mentioned by participants, educational units on the circular economy could be introduced into the curricula. Moreover, higher education students ought to be aware of this economy and its opportunities to explore it, as mentioned by Stewart and Niero [9]. Furthermore, the circular solutions comprise socioculturally shaped institutional complexities and the potential for socio-technical transition [37]. Thus, is crucial creating markets along with policies supporting citizen recycling behaviors (and not only).

Considering innovation for the CE, aligned with the European Innovation Scoreboard 2020 [27], there has been an increase in the quantity of innovation that can be associated with the CE, and it should capitalize on emerging digital technologies [38]. Nonetheless, participants reported the inexistence of technologies that could operate in the circular economy. Artificial intelligence, big data, the Internet of Things, and blockchain, combined with the purposes of the CE, ought to provide solutions to various issues [38]. Thus, it is of paramount importance that the government, at all levels, develops policies that connect universities, research and development centers, and businesses in developing technological solutions that are dedicated to the transition and creation of circular business. Additionally, the importation of international solutions, the development of international alliances for technological development, and investments for supporting patent and intellectual property development should be fostered at the legislation and educational levels.

Taxation is a relevant issue since it is an imperative drawback for entrepreneurship [29]. Moreover, while the Portuguese XXII Constitutional Government Program states that it aims to promote policies in order to achieve green practices, the participants reported several barriers associated with the use of waste, including legislation, taxes, and licensing. In this sense, the government should improve direct legislation by removing the existing barriers and adding supportive legislative mechanisms, e.g., tax reform, creating unique benefits in terms of taxation for circular businesses. Similarly, funding issues were also repeatedly mentioned by the participants. The existence of micro-loans, venture capital funds, business angel investors, and other funding opportunities could be used to support CE initiatives. Nevertheless, the government should foster profound changes in the national financial system, e.g., offering direct benefits for banks, funds, and investors who allocate their funding to circular start-ups and businesses.

Enlarging stakeholders' collaborations is an additional requirement for the transition to circularity [39,40]. Likewise, the role of collaboration in the development of the CE was widely discussed, given its power to accelerate the circular transition. Moreover, ways in which to develop and maintain ties were addressed with emphasis. The importance of developing a collaborative network that feeds back into each participant is essential for the creation of circular businesses and the transformation to circularity. This relationship expands from knowledge and technology sharing towards the production chain level.

Start-up competencies are widely addressed in entrepreneurship, especially in building the 'right' competencies [41]. In terms of the CE, the respondents emphasized rhetorical and resiliency competencies. Sumter et al. [42] indicate that CE storytelling competencies are important, pointing out how they influence the growth of collaborations. Conversely, Janssens et al. [43] connect the CE competencies and higher education institutions. Resilience, as a CE entrepreneurial competence, is approached in research. However, it is not comprehensively understood yet and needs further research [44]. Thus, the reflections of the focus group are current and relevant.

To summarize, these results show that the participants mentioned all the aspects of the entrepreneurial ecosystem that were identified by Isenberg [19]: culture, finance, support, human capital, markets, and policy. Nonetheless, in all of them, they feel that the context is incomplete in order to support CE entrepreneurship. Legal support is scarce, and the markets are not fully aware of this "novel" economy and what behaviors they should have.

In terms of human capital, they are not yet prepared for this economy, and its culture is also fragile.

## 6. Conclusions

Through an expert focus group approach and content analysis, this research scrutinized how entrepreneurs in Portugal overcome the challenges of starting their circular businesses. Accordingly, this study contributed to enhancing the understanding of the current situation of the Portuguese CE ecosystem, and clarified what ought to be handled to overcome its challenges. On the one hand, these results seem disappointing. However, on the other hand, they draw attention to the crucial issues that Portuguese (national and regional) governments should consider when contributing to the CE, while achieving the standards set by the CEAP.

Another point is the entrepreneurial capacity to continuously innovate and create new businesses in the scope of the CE. However, targeting young entrepreneurs seems to be challenging. According to Krajnc et al. [3], most of the time they do not see themselves as “creators of change towards the CE”. Thus, ‘education for circularity’ could be a theme to consider in the university curriculum.

Consequently, this research offers theoretical and practical implications. We added valuable knowledge concerning the Portuguese CE ecosystem literature. Similarly, we identified and categorized the challenges that exist for circular start-ups and businesses in the Portuguese CE ecosystem. Moreover, we recommend various actions for governments, high education institutes, and investors in order to foster a sound Portuguese CE ecosystem. Furthermore, we emphasize how collaborative behaviors are key to solving the challenges listed by the experts.

This research has shortcomings, for example, the accessibility sample and the realization of a unique focus group. Thus, other focus groups using homogenous participants could be used to compare the interactions. Likewise, we suggest further qualitative research, with interviews and a phenomenological approach in order to better understand the Portuguese Entrepreneurial Circular Ecosystem. In addition, future research, for example, employing action research, should address the issues raised by the experts, especially concerning the cooperation with universities and policymakers. Similarly, other CE ecosystems should be analyzed and even compared. In addition, the challenges and possible solutions should be addressed by using experiential methods. Finally, we also suggest future research to address circular citizenship education.

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## Appendix A

**Table A1.** Experts' characteristics.

Experts	Gender	Age Range	Mini Bio
(#P1) circular textile entrepreneur	Female	30–40	She is a graduate in fashion design, and since 2016, she has strived to create better fashion for a mindful tomorrow with a certified B Corp. She is the founder and designer of this company and is a brand consultant.
(#P2) policymaker	Male	40–50	He began his professional career in an Association of Municipalities as Financial Director, where he was part of the team that led the construction of the Multi-municipal Solid Urban Waste Treatment System and the creation of the Selective Collection System, and over the past few years, has coordinated several investment projects in various areas, from Planning, Energy Efficiency, Environmental Sustainability, Training, and Cross-Border Cooperation entity, where he currently has the position of coordinator. In parallel, he was involved in the Working Group that created several energy agencies, including the Regional Agency for Energy and Environment, which currently represents 16 municipalities, where he currently holds the position of Director General. He is currently its coordinator on behalf of Portuguese municipalities under the Cross-Border Cooperation projects. In addition, he is President of the Board of an Association of Energy and Environment Agencies National Network.
(#P3) consultant	Male	30–40	He holds a degree in management and is a manager of a consultancy firm that specializes in consultancy and training services. He is also linked to several calls and projects related to entrepreneurship and environmental issues.
(#P4) incubator manager	Female	40–50	She is a manager of an incubator for the health and life sectors. Among other duties, she is responsible for the creation and scale-up of new start-ups coming from the university, as well as the organization and management of international projects with other stakeholders from incubators, universities, and companies, and for attracting and managing the clinical studies at the incubator. Her primary interests are in the fields of entrepreneurship and innovation. She is a member of the EIT Food RIS Council, a Mentor in the EIT Health Mentoring and Coaching Network (MCN), and BGI—Building Global Innovators. In addition, she is a co-founder of a start-up in neuroscience.
(#P5) project office staff	Female	30–40	She holds a PhD in Management. She is a Science and Technology Manager at a Portuguese university's Innovation and Development Office. She supports the administrative and financial management of R&D projects (national and international). She is also responsible for the processes of intellectual property and market potential analysis. In addition, she supports the processes that foster technology transfer to the market/industry, licensing, and commercialization rights.
(#P6) engineering academic	Male	50–60	He is a full professor at the Faculty of Engineering in a Portuguese university. He has been the professor and leader of the Centre of Materials and Building Technologies Research Unit since January 2007. He develops research and innovation in sustainable materials and construction for a competitive and climate-neutral circular economy, namely in developing eco-materials obtained by co-utilizing waste and carbon dioxide. He was awarded several prizes for waste co-utilization and carbon utilization in the construction industry.
(#P7) trainer	Male	30–40	He is a specialist in quality management and holds a master's degree in the same area. In addition, he is a trainer in quality, innovation, and the circular economy for public and business organizations. He is also a researcher at the Centre for Studies and Opinion Polls, working on Municipal Sustainability Indices and Municipal Performance.
(#P8) Ph.D. student in management	Female	20–30	She is a Ph.D. student in management. Her areas of interest include entrepreneurship, sustainability, the circular economy, and circular business models. She is developing her Ph.D. thesis on circular entrepreneurship.

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