Circular Economy in the Portuguese Hotel Industry: An Empirical Overview

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Abstract: The implementation of Circular Economy (CE) in the tourism industry, and more specifically in the hotel industry, is still in its early stages, as the debate on it has focused on the manufacturing sector, undervaluing the service area, namely the travel and tourism one, and their input to the transition to a CE paradigm. Although the hotel industry is one of the essential branches of the travel and tourism sector, there is little relevant scientific and empirical research available on the potential of such an implementation. The Circular Economy construct has recently been gaining prominence as it has the potential to enhance the use of natural resources, in which the tourism and the hotel industry rely, to mitigate the emission of greenhouse gases, and to offer economic, environmental, and social business advantages and opportunities. Making use of the results of a survey applied to the Portuguese hotel industry, this paper offers an analysis of this business's awareness, attitude, enablers, benefits, challenges, and organisational performance with respect to the implementation of a Circular Economy approach. The results indicate that there is awareness regarding CE and its R-Principles and that some measures that may enhance the implementation of this concept are already being put into practice. There is also evidence that this economic approach is beneficial to companies, but support from all the actors (companies, government, stakeholders) is mandatory. The lack of investment in the CE implementation, policies focused in waste treatment, and the lack of promotion of circular design were identified as challenges. Acquiring new competencies as well as the reduction of the hotels' carbon footprint were identified as the major predictive positive impacts of CE in the organisational performance of companies. This research is a contribution to the existing literature on Circular Economy and to the conceptualization of CE within the hotel industry. In addition, to the theoretical contribution, the results of this study may also have empirical inputs for all the actors, and may also lead them to question the goals of their businesses and to examine thoroughly the environmental, social, and economic impact of their activities and operations, and ultimately act as catalysts to circularity.

Keywords: circular economy, Portuguese hotel industry, awareness, benefits, enablers, attitude, organizational performance

1. Introduction

In the last decades the services sector has been expanding at a remarkable pace alongside industry, accounting for a substantial part of the Gross Domestic Product (GDP) in numerous countries and in line with productivity outcomes within the industry sector. Similarly, the participation of the travel and tourism industry, as one of the biggest service industries, and one that contributes to the countries' economic growth and global trade has been growing until 2019 (United Nations World Tourism Organization (UNWTO), 2021), however, this growth pattern was suddenly interrupted, displaying a strong deceleration of economic growth, mainly due to the prevailing health crisis.

Even though this industry has proven to actively impact economies as it is strongly associated with all the other major services, from agriculture to finance, construction, and retail (Sorin and Einarsson, 2020), it is also unmistakably that it negatively impacts the environment, contributing not only to its degradation but also to the increase of Green House Gases (GHG) (Lenzen et al., 2018). Consequently, it is imperative to rethink the values of the travel and tourism sector, its purpose, business models, and value chains so that it can operate within the planetary boundaries, guaranteeing contemporary generations and those to come welfare and proper living

standards. Therefore, the transition to a new travel and tourism paradigm is mandatory and Circular Economy (CE) stands out as an attractive concept, offering a range of instruments that may allow the industry's long-term viability and sustainability.

However, there is a shortage of research on Circular Economy and its adoption by the travel and tourism industry in general and by the hotel industry in particular, although this is an industry dominantly based on a linear economy. This industry has not yet demonstrated a manifest desire to transition to a circular model (Rodriguez et al., 2020), and scientific research on the adoption of CE practices and principles continues to be considerably unexplored.

The purpose of this study is to examine awareness, the attitude, the benefits, the enablers and the challenges and their impact on the organisational performance of the participant companies when transitioning to a CE paradigm. The research questions answered in this study are:

- 1. Is the hotel industry aware of CE?
- 2. Is the hotel industry implementing circular economy?
- 3. What are the challenges that the hotel industry addresses to implement CE?
- 4. What are the benefits of the hotel industry to implement CE?
- 5. Which initiatives (enablers) would encourage CE implementation?
- 6. Is there a relationship between the implementation of CE (attitude) and the organizational performance of this industry (overall performance)?
- 7. Is there a relationship between the hotel industry profile and the organizational performance?

Answering these research questions provides future insights to the development of CE and its implementation by the hotel industry.

2. Circular Economy concept

The report *Our Common Future* (1987) established that one of the world's most important challenge is to sustain generations to come without endangering their future. Nevertheless, the scale of environmental and social emergencies has reached unparallel levels. Global environmental depletion, climate change, biodiversity loss, along with population growth and its demand for resources, and countless other environmental constrains have altered many of the planet's ecosystems (Crutzen and Stoermer, 2000). The prevailing economic model which follows a linear paradigm is exhausting Earth's natural biological capacity with economies 'living on borrowed time for the past 250 years' (Lacy and Rutqvist, 2015:3), and is generating social and environmental constrains. Nonetheless, the Circular Economy concept proposes an alternative, standing out as a holistic approach to the three R-Principle (Reduce, Reuse and Recycle) in the production and consumption processes. It enables the reduction of energy consumption and as a result the decrease of waste generation. It also demands a paradigm redefinition when addressing environmental changes, one that considers sustainability and circular value loops.

According to Hirsch and Levin (1999:199), the concept of Circular Economy stands out as an umbrella construct, with roots that go back relatively further, and is supported by a plurality of approaches displayed by Table 1.

Table 1: Plurality of approaches that are on the basis of the Circular Economy concept

Quesnay, 1758	'circular flow of income'
Simmonds, 1862	'industrial metabolism'
Boulding, 1966	the 'spaceman economy'
Meadows et al., 1972	'limits to growth'
Stahel and Ready-Mulvey, 1981; McDonough and Braungart, 2002	'cradle-to-cradle'
Frosh and Gallopoulos, 1989; Graedel and Allenby, 1995	'industrial ecology'
Lyle, 1996	'regenerative design'
Steinhilper, 1998	'remanufacturing'
Hawken, Lovins and Lovins, 1999	'natural capitalism'
Benyus, 2002	biomimicry
McDonough and Braungart, 2002; Ellen MacArthur Foundation, 2012	'eco-effectiveness' and 'eco-efficiency'
Daly, 2005	'steady state economy'
Stahel, 2010	'performance economy'

This concept was introduced to the academia by Pearce and Turner (1990) to further debate on natural resources strategic use (Su et al., 2013; Ghisellini et al., 2016; Geissdoerfer et al., 2017), and also as a way to boost circularity, reducing energy and natural resources consumption, fundamental principles for sustainable natural resource conservation (Hilsop and Hill, 2011).

It is also presented by Feng et al. (2007), Yang and Feng (2008), Geng and Doberstein (2008), Hu et al., (2011) as an economic paradigm that mirrors natural closed materials systems (Yang and Feng, 2008) and their efficient use to attain management strengthening and economic development. It is also described as 'an industrial system that is restorative or regenerative by intention [that] replaces the end-of-life concept with restoration' (EMF and McKinsey, 2012:7), presupposes the transition to the use of renewable energy, along with 'green technologies, eliminating the utilization of toxic substances, which commonly reduce the potential of the Reuse R-Principle and waste elimination. These together with the improved design of materials systems, as well as products and production processes, could have an impact on product and energy recovery.

So, CE is an economic model that allows value creation processes, based on closed loop patterns, which maintain value retention for the longest time possible, or are ultimately cascaded to a distinct loop in order to retain value. In accordance with Pheifer (2017), EMF (2012), and Braungart et al., (2002), economic systems ought to follow a circular pattern, mimicking natural ecosystems, as circularity is the fundamental principle of nature, i.e. the product of a certain process can be the raw material of another. The concept of 'eco-effectiveness', as a design oriented approach, is also considered as a technique to mitigate and dematerialize products flow systems, facilitating a continuous and reciprocal exchange between environment and economy. Traditionally, business prioritise the efficiency of their production operations, so as to optimise value creation whilst minimizing costs, which, environmentally speaking, may refer to energy or other resources use and even to the constrains inflicted on the environment by the referred production operations. Thus, 'eco-efficiency', the predominant production and consumption paradigm ought to be optimised and addressed in all levels in industrial production, down a greener path employing more resource-efficient materials.

De Angelis (2018) proposes the implementation of three principles that, when associated, can enhance prosperity and at the same time be restorative and regenerative (EMF et al., 2015). The first principle would be to '*preserve and enhance natural capital*' (De Angelis, 2018:20), which considers that in production processes only renewable energy and materials are used as far as possible, and after-life these materials should be restituted to nature so as to enhance natural capital. Principle number two to '*optimise resource yields*' (De Angelis, 2018:21), demands that a maximisation of resources value in the course of time is accomplished in technical and biological cycles. According to EMF and McKinsey (2012) and Lacy and Rutqvist (2015), in a CE model, materials are used in two different patterns, they are biological or are renewable materials lacking toxic components, which can be returned to nature without any risk if reuse is by no means effective. Industrial materials are designed to be reintroduced in manufacturing processes by means of maintenance, repairing, refurbishing, remanufacturing, and also through recycling, as long as quality is preserved. This strategy should be stratified given that recycling is considered the R-Principle that brings lower value-added, whereas the other options retain not only the product integrity but also 'embedded energy and labour' (De Angelis, 2018:21). The third principle to *'foster system effectiveness'* enhances the mitigation of factors that negatively impact the environment (pollution).

Following this same line of thought, Stahel (2019) also considers that to promote the implementation of CE is imperative to foster the efficient utilization of environmental resources, keeping their value and effectiveness for as long as possible. Such a proceeding will enable the deceleration of resource consumption which will ultimately impact production performance and consequently waste emissions, which can be reduced to half if products durability is enlarged.

A CE approach distinguishes itself as an efficient and practical model that can stimulate businesses to pursue corporate policies which enable sustainable economic growth within ecological boundaries. This transition creates new business opportunities, the possibility to access new markets with a range of new goods and services. In addition, it is also the occasion for businesses to reconsider and reassess their use of natural resources throughout their manufacturing processes, as well as supply chains. To conclude, significant challenges ought to be exceeded and implemented in pursuing a circular strategy and the time to transition has come.

2.1 The Portuguese hotel industry

During the past few decades, the travel and tourism sector has played an important role in the Portuguese economy mainly due to its economic and employment possibilities in addition to its social and environmental benefits. With 10.1 million inhabitants, the country captivated around 27.1 million tourists and allowed 70.2 million nights stays in 2019 (Costa, 2021). It stands out as the biggest economic activity in Portugal, accountable for 52.3% of service exports and for 19.7% of the overall exports, with tourism revenues reporting 8.7% of direct contribution to the national GDP (Turismo de Portugal et al., 2020). According to the World Travel and Tourism Council (WTTC), the travel and tourism sector contributed directly and indirectly with 19.8% to the Portuguese GDP. In the last few years Portugal has been considered a leader in the tourism sector worldwide and growth expectations have been encouraging, with Portugal receiving 24 prizes, in 2020, in the tourism area.

Additionally, in January and February 2020, the growth rate was 15% higher than the ones in previous years, which demonstrates that this sector could have grown even more and have attained exceptional success if it wasn't for the Covid-19 pandemic (Costa, 2021). However, the pandemic outset strongly impacted the Portuguese economy, putting tourism arrivals at a standstill and leading the hotel industry to reduce its businesses quite significantly due to the lockdowns imposed by the government. Many companies suspended their operations or reduced them significantly. Although, the travel and tourism sector positively impacts the country's economy, it adversely affects the environment as tourists commonly demand luxurious accommodation and facilities, resource-intensive activities combined with the CO_2 emissions of the transportation sector (Lenzen et al., 2018). However, the major responsible for tourism related CO_2 emissions are the accommodation sector and diverse tourism activities, representing 21% and 4% of the overall figures, respectively (UNTWTO & UNEP, 2008).

The travel and tourism is an economic activity based on the linear model of production and consumption that involves a 'take-make-dispose' pattern, in which energy, assets and labour are applicated in the manufacture of goods and on the production of services obtained from natural resources and with a unique life-cycle, i.e. following a 'cradle-to-grave' principle (McDonough and Braungart, 2010). The travel and tourism industry commonly relies on inexpensive and easily obtained resources, generates solid waste and other environmental challenges (Manniche et al., 2017). The Circular Economy construct is generally employed to business' products and related services, and so this means that it should also be applied to tourism in general and to the hotel industry in particular.

3. Methodology

3.1 Research methodology

The research methodology adopted to perform this study relied on a quantitative approach through the use of an online questionnaire. Its goal was to study the concept of Circular Economy along with awareness regarding its existence, the attitude, the enablers and benefits, the challenges, and the organisational performance of the participant companies. It was implemented by applying the questionnaire to the Portuguese hotel industry, specifically to the target group classified as 'Hotels', among several classifications provided by the *Turismo de Portugal*, on the visitportugal.com site, and made available online between the 16th April 2021 and the 7th July 2021. It was disclosed, by means of an online link disseminated by email, to 1558 hotels located in the different Portuguese regions considered by that entity, displayed by Table 2. However, the hotels successfully contacted ended up being 1407, resulting in 103 questionnaires received, but only 78 were considered valid. As Portugal was in lockdown during this period, and with hotels and borders closed to tourism, the sample collected ended up being a convenience sample.

Table 2: Localisation and number of Portuguese hotels considered in this study.

Region	Number of Hotels
Porto and North region	383
Centre of Portugal	361
Lisbon region	293
Alentejo	114
Algarve	235
Madeira	125
Azores	47

3.2 Instruments and measures

The questionnaire comprises 20 questions, spread across seven sections: i) *Accommodation Profile*; ii) CE *Awareness*; iii) CE *Challenges*; iv) CE *Enablers*; v) CE *Attitude; vi)* CE *Benefits*; vii) CE and the *Organizational Performance*.

The application and relevance of the concept of Circular Economy, within the group of respondents, was measured by a single-item as well as a multiple-item scale, with the negative pole on the left and the positive one on the right (Hartley, 2013), by using a Likert scale in the majority of questions as well as two open-ended questions (questions 14 and 17), which were analysed by means of a content analysis.

4. Main results analysis

This section presents the main results of the quantitative analysis obtained from the 78 valid questionnaires, regarding the methodology formerly delineated.

4.1 Respondents' profile

The questionnaire respondents comprised hotel managers, general managers, hotel CEOs, hotel directors and hotel owners, or a person designated by the hotel supervisor. Table 3 displays the percentage of respondents per region, considering the total number of valid questionnaires.

Table 3: Percentage of questionnaire respondents per Portuguese region.

Region	% of questionnaire respondents per region
Centre of Portugal	30.1%
Lisbon region	25.2%
Porto and North region	16.5%
Alentejo	9.7%
Algarve	8.7%
Madeira	5.8%
Azores	3.9%

Regarding the hotels number of stars, 1.1% referred to one star hotels, 11.5% were two star hotels, 29.9% corresponded to three stars hotel, 51.7% to four stars hotel, and 5.7% were five stars hotel. Considering the hotel scope, 96.7% of the hotels were national companies, and 3.3% correspond to international companies. Concerning the hotels type, 66.3% were independent accommodations, and 33.7% were part of a hotel chain.

4.2 CE awareness

Regarding this dimension, the participants were asked to specify the CE R-Principles (Recycle, Reuse, Reduce, Repair, Re-educate, Repurpose, Recover, Refuse, Rethink, Redesign, Return, Remanufacture, Refurbish) they were aware of, using the Likert scale, from 1- Not at all aware, to 5- Extremely aware. Respondents ranked Recycle (98.72%), Reuse, and Reduce (97.44%), and Repair (96.15%) with the highest means scores.

Participants were also asked to rank their awareness level regarding the measures that would promote the use of environmentally responsible materials, waste and water management, as well as measures that reduce carbon footprint/ CO_2 emissions/ greenhouse gas emissions, and those which assist the implementation of Circular Economy that are not financed by the government, using a Likert scale, from 1- Not at all aware, to 5- Extremely aware. The results demonstrate that they are aware of those measures, namely those that concern the use of environmentally responsible materials (97.44%), and waste and water management (97.44).

4.3 CE attitude

In this section participants had to rank the R-Principles their hotels are implementing, using a Likert scale, from 1- Without implementation, to 5- Fully implemented. Repair (100%), Recycle (98.65%), Reduce (97.30%), and Reuse (90.50%) stand out as the further implemented R-Principles, while Remanufacture (50%), Return (51.35%), and Refuse (52.70%) are detached as the ones with less implementation. However, it is also noticeable that Remanufacture (31.1%), Refuse and Return (29.7%), and Redesign (28.4%) were ranked with the lowest means scores regarding a CE implementation.

By means of an open-ended question, participants were asked to indicate how CE R-Principles are being implemented in their companies. 58.6% of the respondents ranked recycling and water management as the more relevant measures embraced; followed up by energy management (55.1%); cleaning management (37.9%); towel and bed linen programmes (17.2%); staff education and training (17.2%); sustainable environmental practices (13.7%). However, green products usage (6.8%); certifications (6.8%); renewable energies (3.4%); products design (3.4%); products refurbish (3.4%); products reuse (3.4%); greenhouses (3.4%); and water reusing systems (3.4%) were ranked with the lowest mean scores.

Additionally, the respondents rated the CE initiatives their companies are considering, using a Likert scale from 1-Strongly disagree, to 5-Strongly agree. 97.22% of the companies are implementing water management policies; 94.44% energy efficiency improvements; and 72.22% waste management procedures. Nevertheless, 31.94% considered the purchase of products designed according to CE principles as an initiative to consider.

4.4 CE enablers

At this point, respondents were asked to rank the measures that would enable a CE implementation in their companies, using a Likert scale, ranging from 1 – Not at all important, to 5 – Extremely important. 98.68% of the participants ranked stronger support from supply chain agents to implement CE principles; specialized CE consultancy at disposal; national awareness strategy in wide dissemination of the CE concept and its practices; tax reduction to support companies that implement CE principles; governmental training courses support; governmental financial support. However, 96.05% of the participants regarded intense collaboration practices between companies the measure with the lowest mean score.

4.5 CE benefits

In this dimension, the participants were invited to classify the measures/ actions that a CE implementation in their companies would encourage, using a Likert scale, ranging from 1- Never, to 5- Always. The results indicate that a circular economic model would assist companies in establishing their brands and reputation on environmental preservation (100%); it would promote a sustainable environment (98.63%); it would also allow hotels to save costs in the long term (97.26%); it would stimulate innovation (97.26%); and it would encourage the creation of new jobs.

4.6 CE challenges

The CE challenges were ranked using a Likert scale, ranging from 1 – Strongly disagree, to 5 – Strongly agree. 88% point out the lack of investment in CE approaches as the most significative challenge, followed by the lack of governmental support (85.33%); policies focused on waste treatment instead of focusing on CE R-Principles (84%); and the lack of incentive to design circular products (81.33%).

The respondents (25.6%) show a certain low level of awareness regarding the CE constructs, while only 3.8% consider that it is visible a lack of interest to implement CE. The time spent putting into practice a CE model is not ranked as a major challenge, as only 7.7% of participants regarded it as an obstacle.

By means of an open-ended question, the participants specified the challenges that companies may face when implementing CE if the ones considered in the previous question did not stand out as impediments to the CE transition. 35.7% of the participants considered the lack of knowledge on the concept of CE as the major challenge; 21.6% pointed out the mindset of the organisation; 21.4% referred to the lack of knowledge on how to implement it; 21.4% indicated that the investment is costly, and finally, 14.2% identified the lack of governmental support.

4.7 Organisational performance

To determine the predictive positive impact of a CE transition on the companies organisational performance, respondents ranked that impact, using a Likert scale, from 1- Strongly disagree, to 5-Strongly agree. The findings show that acquiring new competencies (96.61%) and the reduction of carbon footprint/ greenhouse gas effects (90.28%) are the most significant positive impacts on the performance of companies, followed up by an improvement on their overall performance (84.72%); growth in customer satisfaction (84.72%); and access to new markets and consumers (84.72%).

5. Discussion and conclusion

Despite of the low level of participation in this exploratory study which does not allow to generalise the findings to the Portuguese hotel industry, it adds additional evidence to the pre-existing literature on CE and the hotel industry, and may be of assistance to stakeholders, researchers and policymakers who operate in the travel and tourism industry and who are focused on sustainability and on implementing a more circular approach regarding companies' economic, social and environmental performance.

This research results indicate the participants are aware of the CE construct and of its R-Principles, with emphasis to Recycle, Reuse, Reduce and Repair. They also demonstrate some degree of awareness regarding Rethink, Redesign, Refurbish, Remanufacture, and Recover, which might be explained by the fact that in recent decades the concept of CE has mainly been examined from a conceptual or theoretical perspective, lacking corroboration on its effectiveness (Linder & Williander, 2017; Ormazabal et al., 2018). This results also show that the 3 R-Principle (Recycle, Reuse, and Reduce) strategy along with Repair stand out as the CE R-Principles that these companies are implementing as an approach to preserve environment and natural resources and promote sustainability. These outcomes indicate that awareness relatively to the CE concept has gradually been flourishing, however, a considerable amount of work still needs to be accomplished.

The findings also indicate that the participants are considering and putting into practice measures that may enhance the transition to a circular model, mainly the promotion of the use of environmentally friendly products, and measures that stimulate waste, water, and energy management policies, recycling, cleaning practices, staff education and training, and bed linen programmes.

Moreover, the participant hoteliers regarded an approach based on circularity as particularly beneficial once it could establish their brand as one in line with environmental sustainability principles, and one that would allow them save costs in the long term and at the same time stimulate innovation, and subsequently enhance job creation.

In order to transition to a CE model, the respondents also considered that a stronger support from the supply chain agents, specialised consultancy at their disposal, and the assembly of a strategy at a national level to enhance awareness regarding CE, along with dissemination of established practices, stand out as the main enablers in this transition. The respondents also pointed out that tax reduction to support companies that are willing to make the transition, training granted by governmental authorities and governmental support would also be an advantage and beneficial.

Regarding the challenges, the respondents identified the lack of investment in the implementation of CE strategies, policies focused on waste treatment in detriment of waste prevention and on strategies centered on the R-Principles, and the lack of incentives to design circular products as the major constrains to a CE implementation.

From the organisational performance point of view, the respondents consider that acquiring new competencies and the reduction of carbon footprint/ greenhouse gas effects stand out as the major positive predictive effects of the implementation of Circular Economy in their companies.

Based on the analysis performed, it is possible to conclude that the participant companies are aware of the concept of Circular Economy and are already putting some of its principles into practice, nevertheless, further research in this area ought to be carried out as there are a number of challenges that need to be overcome to enhance a broader adoption.

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